Comprehensive Transportation Review

Takoma Metro Multifamily Development

Washington, DC

April 26, 2023

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Executive Summary

This report presents a Comprehensive Transportation Review (CTR) in support of the Takoma Metro Multifamily PUD (the “Project”).

The purpose of this CTR is to evaluate whether the Project will result in a detrimental impact to the transportation network surrounding the site. This evaluation is based on a technical comparison of Existing Conditions, Background Conditions, and Total Future Conditions.

This report concludes that the Project will not have a detrimental impact to the surrounding transportation network assuming the proposed site design elements are implemented.

Proposed Project

The Project site is bounded by Eastern Avenue NW to the northeast, Cedar Street NW to the east, Carroll Street NW to the south, and the Takoma Metro station to the west.

The existing site is currently improved with a WMATA Metro parking/kiss-and-ride lot, bus loop, and green space. The Project proposes to redevelop the existing site into a mixed-use development with approximately 440 multifamily residential units, 17,650 square feet of ground-floor retail space, and 230 garage parking spaces. As part of the Project, the WMATA facilities will be reconfigured within the remaining WMATA area adjacent to the Metro station.

Site Layout

The Project will occupy the northern portion of the site, with primary vehicular and loading access provided from a new curb cut on Cedar Street connecting a curbless driveway into the site. An additional garage access point will be provided from the WMATA bus-loop entrance from Eastern Avenue.

The WMATA Metro station vehicular circulation will be reconfigured to allow for inbound and outbound bus access from Eastern Avenue and Carroll Street via a new internal roadway separating the Project from the Metro station. Kiss-and-ride service will be accommodated via inbound movements from Carroll Street that will become median divided from the bus-loop once internal to the site. Kiss-and-ride vehicles will exit the site via Eastern Avenue. No WMATA or Metro station parking will be provided with the reconfigured layout.

A new traffic signal is proposed at the Carroll Street intersection with the WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

The Project also includes a proposal to provide kiss-and-ride spaces along Carroll Street beneath the bridge.

Multimodal Overview

Trip Generation

The Project is expected to generate new trips within the surrounding transportation network across all transportation modes during the morning and afternoon peak hours. However, with the Project’s proposed Transportation Demand Management (TDM) plan, the resulting new trips generated by the Project will not have a detrimental impact on the area transportation network. The multimodal trip generation for the Project, without reductions taken for existing uses to be removed, is as follows:

	AM Peak Hour	**PM Peak Hour**
Vehicle Trips	115	136
Transit Trips	102	146
Bicycle Trips	15	21
Pedestrian Trips	30	63

Transit

The Project is located at the Takoma Metro station on the Red Line and is served by several local bus routes.

The Project is expected to generate a manageable amount of transit trips, and the existing service can accommodate these new trips.

Pedestrian

The site is surrounded by a generally adequate pedestrian network. Despite some incidences of missing sidewalks, curb ramps, and crosswalks on minor streets near the project site, there are generally adequate pedestrian facilities along primary walking routes between the site and major local destinations.

The Project is expected to generate a manageable amount of pedestrian trips, and the existing and proposed pedestrian facilities can accommodate these new trips.

Further, the Project will include upgrading pedestrian infrastructure along portions of the site perimeter on Eastern Avenue, Cedar Street and Carroll Street, as well as internal pedestrian facilities. A bike and pedestrian pathway will also be provided through the site connecting Eastern Avenue with Cedar Street and Carroll Street.

Bicycle

The site is located 0.1 miles from the protected bike lanes on Piney Branch Road NW and the bike trail along Takoma Avenue and Fenton Street in Takoma Park. The site is also adjacent to the future extension of the Metropolitan Branch Trail which is expected to open in 2024. Using these facilities, bicyclists have access to several other regional bicycle facilities.

The Project will include long-term bicycle parking inside the building and short-term bicycle parking along the building perimeter and in a publicly accessible area within the garage that meets or exceeds zoning requirements. The Project will also provide a shared use path along its southern and eastern sides which will connect with the Metropolitan Branch Trail extension.

The Project is expected to generate a manageable amount of bicycle trips, which can be accommodated both by existing nearby bicycle facilities and the shared use path proposed within the Project which will connect with the existing bike network.

Vehicular

The project is accessible via Carroll Street NW, a minor arterial, and Eastern Avenue NW and Cedar Street NW, collectors, which connect the site to principal arterials such as Georgia Avenue NW, Missouri Avenue NW, and New Hampshire Avenue NW which becomes a designated major highway in Montgomery County, Maryland. These principal arterials and highways connect with expressways within the District and Maryland such as the Capital Beltway (I-495), the Anacostia Freeway (DC-295), the Southeast Freeway (I-695), and the Southwest Freeway (I-395). These expressways connect with other regional Interstates.

To determine the Project's impact on the transportation network, future conditions were analyzed with and without the Project based on the number of trips the Project is expected to generate. Intersection analyses were performed to obtain the average delay and queue a vehicle will experience. These average delays and queues were compared to the acceptable levels of delay set by DDOT standards as well as existing and background queues to determine if the Project will negatively impact the study area.

The analysis concluded that two (2) of the 11 intersections studied (Blair Road & Cedar Street NW, and Cedar Street & Carroll Street NW) meet DDOT's delay- or queuing-related thresholds for potential mitigation.

Potential improvements were identified that would reduce delays below background conditions, including signal timing adjustments at the intersections; however, the Project's impacts at these locations are proposed to be mitigated via the Project's robust TDM plan that will encourage non-auto modes of travel for site users.

Further, it should be noted that a primary driver of the Cedar Street and Carroll Street NW intersection's increased delay under background future conditions with the Metro reconfiguration is that we have added additional bus and kiss-and-ride traffic to the road network to represent full potential kiss-and-ride use based on historical WMATA Metro usage data for pre-covid conditions.

Safety Recommendations

A qualitative review of the crash data available through the DDOT-maintained and publicly-available "Crashes in DC" database was performed to identify study intersections in which conditions for vehicles, pedestrians, and bicyclists can be improved.

Based on a review of facilities in the area and crash data, one (1) intersection was identified for DDOT to evaluate further. Recommendations for these intersections, **presented for DDOT's consideration and not for the Applicant to complete as part of the Project, are summarized below:**

Blair Road and Cedar Street NW

DDOT should consider performing a safety audit at this intersection as part of DDOT's Traffic Safety Assessment program to further evaluate the extent of safety issues and determine if any action is needed.

Transportation Demand Management (TDM) Plan

Per the DDOT CTR guidelines, the goal of implementing TDM measures is to reduce the number of single occupancy vehicles and vehicle ownership within the District. The promotion of various programs and existing infrastructure includes maximizing the use of transit, bicycle, and pedestrian facilities. DDOT has outlined expectations for TDM measures in the CTR guidelines, and this Project is proposing to implement a TDM plan consistent with these guidelines, as discussed in the Project Design section of this report.

Loading Management Plan (LMP)

Per DDOT scoping comments, this report includes a Loading Management Plan (LMP), whose goals are to maintain a safe environment for all users of the site, loading area, streets, and nearby intersections, minimize undesirable impacts to pedestrians and to employees, reduce conflicts between truck traffic using the loading facilities and other street users, and ensure smooth operation of the loading facilities through appropriate levels of management and schedule operations.

Summary

This report concludes that the Project will not have a detrimental impact on the surrounding transportation network assuming the proposed site design elements are implemented.

The Project has several positive design elements that minimize potential transportation impacts, including:

- The Project's proximity to transit service and bicycle infrastructure, located at the Takoma Metro Station;
- The Project's location within in a generally adequate pedestrian network along major walking routes;
- The Project's loading facilities, which maintain loading activity within private property and provide loading circulation that ensures head-in/head-out truck movements are performed from the public roadway network;
- The inclusion of secure long-term bicycle parking spaces that meet zoning requirements;
- The inclusion of short-term bicycle parking spaces along the frontage of the site that meet zoning requirements;
- The inclusion of a shared use path connecting to nearby bicycle facilities;
- The inclusion of extensive pedestrian improvements around the property and at the Carroll Street intersection with the WMATA bus-loop, including signalization, curb extensions and installation of the missing crosswalk on the east leg of Carroll Street;
- A Loading Management Plan (LMP) that facilities safe and orderly loading operations; and
- A TDM plan that reduces the demand of single-occupancy, private vehicles during peak period travel times and shifts single-occupancy vehicular demand to off-peak periods.

Introduction

This report is a Comprehensive Transportation Review (CTR) for the Project, prepared in accordance with DDOT guidelines. The site, shown in Figure 1 and Figure 2, includes Square 3352 and Lots 806, 811, 812, 813, 820, 822, 823, 829, 831, 839, 840, 841, 846, 847, 848, 849, 850, 851 in the Takoma neighborhood of Washington, DC. The site is currently zoned a mixture of MU-4, NC-2, RA-1, with MU-5A zoning proposed.

The Project site is currently improved with a Metro parking/kiss-and-ride lot, bus loop, and green space. The proposed Project will reconfigure the existing WMATA facilities and develop the northern portion of the site into a mixed-use development with approximately 440 multifamily residential units, 17,650 square feet of ground-floor retail space, and 230 below-grade parking spaces.

Purpose of Study

The purpose of this report is to:

- Review the transportation elements of the Project and demonstrate that it conforms to DDOT's general policies of promoting non-automobile modes of travel;
- Provide information to DDOT and other agencies on how the Project will impact the local transportation network, accomplishing this by identifying the potential trips generated by the Project on all major modes of travel and where these trips will be distributed on the network;
- Determine whether the Project will lead to adverse impacts on the local transportation network; and
- Propose design elements and Transportation Demand Management (TDM) measures as necessary to mitigate any potential adverse impacts to the transportation network.

Project Summary

The Project site is bounded by Eastern Avenue NW to the northeast, Cedar Street NW to the east, Carroll Street NW to the south, and the Takoma Metro station to the west.

The existing site is currently improved with a Metro parking/kiss-and-ride lot, bus loop, and green space. The Project proposes to develop the northern portion of the site into a mixed-use development with approximately 440 multifamily residential units and 17,650 square feet of ground-floor retail space.

Additionally, the proposed Project includes the removal of one driveway (the current bus access driveway at Eastern Avenue) and the addition of one driveway (from Cedar Street between Carroll Street and Eastern Avenue). The proposed project also includes relocating the existing bus loop and consolidating it with the kiss-and-ride function and providing additional kiss-and-ride capacity beneath the bridge on Carroll Street. The Project includes approximately 230 parking spaces in a garage to serve retail and residential uses. No WMATA parking would be provided with the site reconfiguration.

Pedestrian access to the Project's residential component is to be located via the lobby on the Cedar Street side of the Project. Pedestrian access to the Project's retail component is to be located via several retail entrances on the Carroll Street side of the Project.

Bicycle access to the Project will be provided at the short-term bicycle racks around the perimeter of the site and within a publicly accessible area within the garage, as well as the long-term bicycle parking spaces in the garage accessed from the new internal curbless driveway with internal turnaround off Cedar Street. As requested by DDOT, all long-term residential bike parking will be provided in Level 1.

The Project is located 0.1 miles from the protected bike lanes on Piney Branch Road NW and the bike trail along Takoma Avenue and Fenton Street in Takoma Park. The site is also adjacent to the future extension of the Metropolitan Branch Trail which is expected to open in 2024.

The Project will meet zoning requirements by providing at least 149 long-term bicycle parking spaces inside the building and at least 27 short-term bicycle parking spaces on exterior racks along the site's frontage and in a publicly accessible area within the garage.

Primary vehicular access to the parking garage will occur from a new internal driveway/turnaround accessed from Cedar Street NW and an additional garage access will be provided from the relocated bus loop on the Eastern Avenue side of the site. Additionally, the Project will include a curbside lay-by area on its Carroll Street frontage which will accommodate either curbside parking or pick-up/drop-off activity, or a combination of both, with the ultimate curbside use to be determined during the Public Space process.

Loading and deliveries will occur from the new internal driveway/turnaround accessed from Cedar Street. The proposed loading facilities will accommodate the Project's loading needs, maintain loading activity within private property, and provide loading circulation that ensures head-in/head-out truck movements are performed from the public roadway network.

The following curb cut modifications will occur with the Project:

- One (1) existing curb cut removed on Eastern Avenue (serving the former bus loop);
- One (1) new curb cut on Cedar Street (serving the new internal driveway/turnaround). This curb cut will include an apron ramping up to a curbless driveway; and
- Reconstruction and relocation of the two (2) existing curb cuts to remain on Eastern Avenue and Carroll Street.

A new traffic signal is proposed at the Carroll Street intersection with the relocated bus-loop/WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

Contents of Study

This report contains nine (9) chapters as follows:

- Study Area Overview
  This chapter reviews the transportation characteristics of the area surrounding the Project.
- Project Design
  This chapter reviews the transportation components of the Project, including site access and circulation, loading and trash operations, parking, and bicycle and pedestrian facilities.
- Travel Demand Assumptions
  This chapter outlines the travel demand and projected trip generation of the Project.
- Traffic Operations
  This chapter 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 and presents mitigation measures for minimizing impacts, as needed.
- Transit Facilities
  This chapter summarizes the existing and future transit service adjacent to the site and reviews how the Project's transit demand will be accommodated.
- Pedestrian Facilities
  This chapter summarizes existing pedestrian access to the site, reviews walking routes to and from the Project, and reviews how the Project's pedestrian demand will be accommodated.
- Bicycle Facilities
  This chapter summarizes existing and future bicycle access to the site and reviews how the Project's bicycle demand will be accommodated.
- Safety Analysis
  This chapter summarizes the potential safety impacts of the Project. This includes a qualitative review of existing and proposed safety features surrounding the site.
- Summary and Conclusions
  This chapter presents overall findings and conclusions.

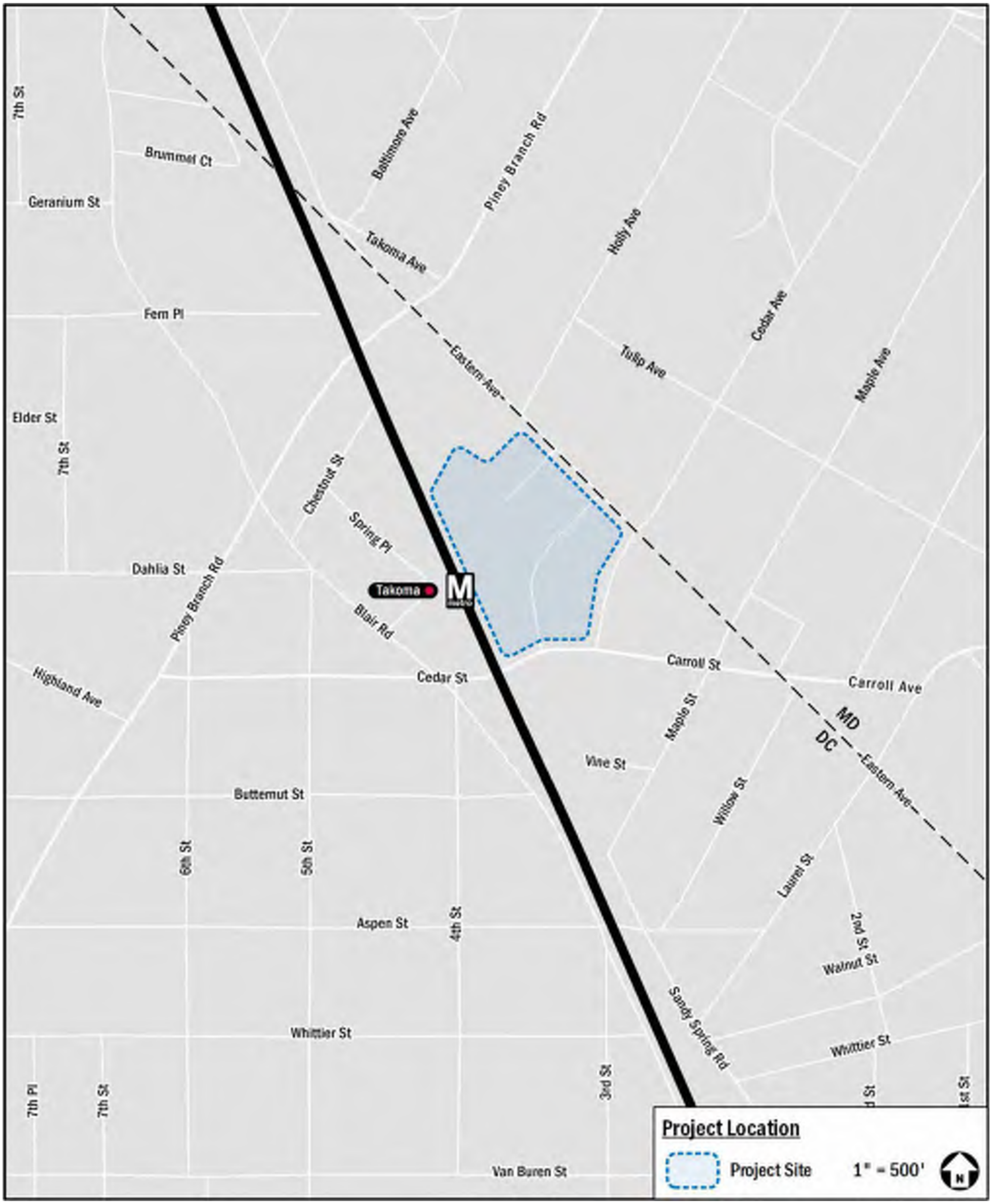
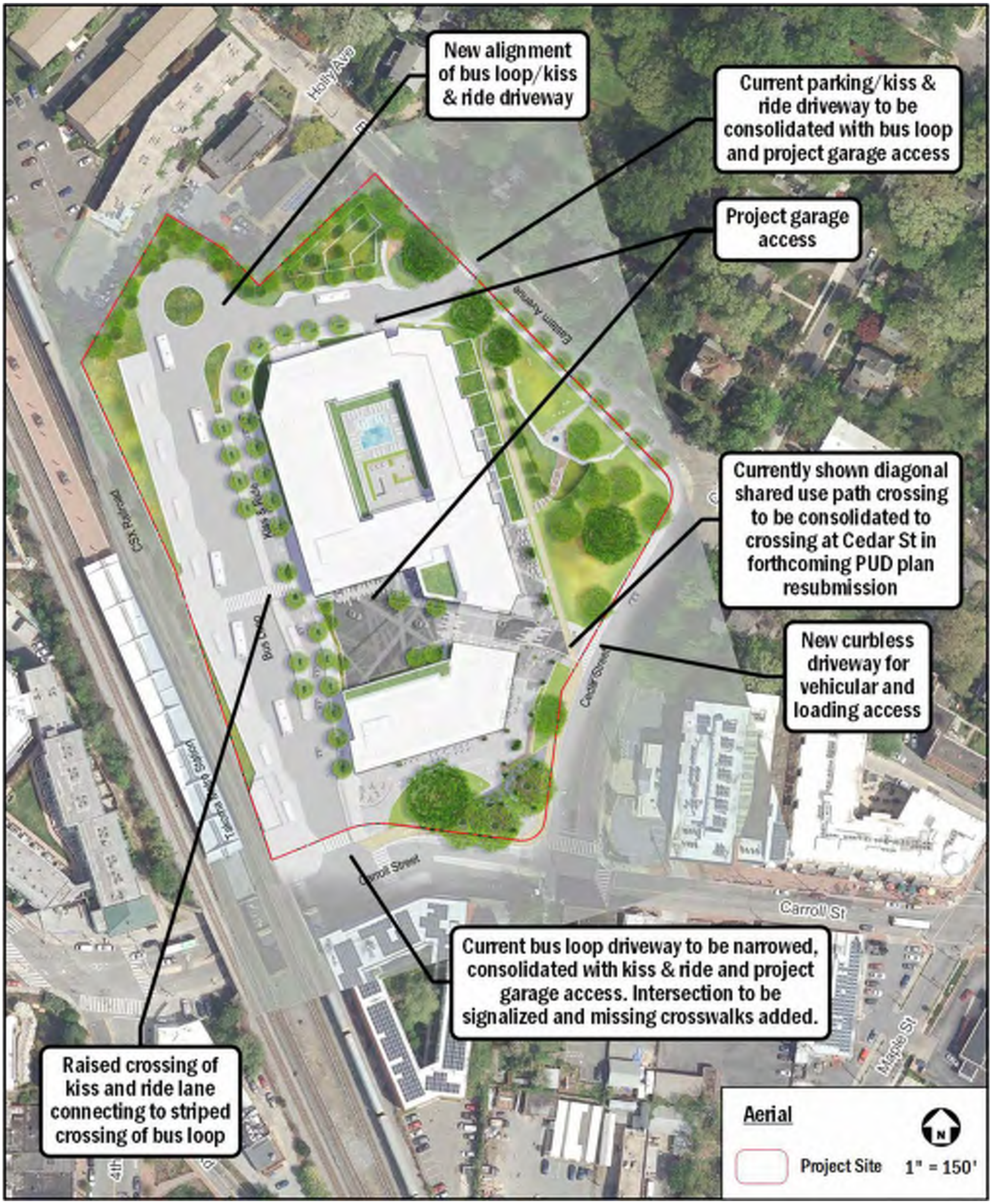


Figure 1: Project Location



New alignment of bus loop/kiss & ride driveway

Current parking/kiss & ride driveway to be consolidated with bus loop and project garage access

Project garage access

Currently shown diagonal shared use path crossing to be consolidated to crossing at Cedar St in forthcoming PUD plan resubmission

New curbless driveway for vehicular and loading access

Current bus loop driveway to be narrowed, consolidated with kiss & ride and project garage access. Intersection to be signalized and missing crosswalks added.

Raised crossing of kiss and ride lane connecting to striped crossing of bus loop

Figure 2: Site Aerial

Study Area Overview

This chapter reviews the major transportation characteristics of the study area and of future local and regional projects.

This chapter concludes:

- The site is surrounded by an extensive regional and local transportation system connecting it to the rest of the District and surrounding areas;
- The site is served by bus and rail transit providing service to local and regional destinations;
- The site is accessible to several shared mobility options, including car-sharing, Capital Bikeshare, and personal mobility devices;
- There are several on- and off-street bicycle facilities near the site, with several nearby bicycle improvements planned or proposed;
- The existing pedestrian infrastructure surrounding the site provides a mostly adequate walking environment; and
- There are several nearby District-wide and local planning initiatives whose goals are supported by the Project.

Major Transportation Features

Overview of Regional Access

As shown in Figure 3, the site has ample access to regional vehicular and transit options that connect the site to destinations within the District, Maryland, and Virginia.

The site is accessible via Carroll Street NW, a minor arterial, and Eastern Avenue NW and Cedar Street NW, collectors, which connect the site to principal arterials such as Georgia Avenue NW, Missouri Avenue NW, and New Hampshire Avenue NW which becomes a designated major highway in Montgomery County, Maryland. These principal arterials and highways connect with expressways within the District and Maryland such as the Capital Beltway (I-495), the Anacostia Freeway (DC-295), the Southeast Freeway (I-695), and the Southwest Freeway (I-395). These expressways connect with other regional Interstates.

The site is located adjacent to the Takoma station on the Red Line, which travels between the Glenmont and Shady Grove stations by way of downtown Washington, DC.

Overall, the site has ample access to regional roadways and transit options, allowing convenient travel between the site and regional destinations.

Overview of Local Access

There are a variety of major local transportation facilities near the site that serve vehicular, transit, walking, and cycling trips, as shown on Figure 4.

Primary vehicular access to the parking garage will occur from a new internal curbless driveway with internal turnaround accessed from Cedar Street. Additional access to the lower parking level will be provided via an access to the relocated WMATA bus loop on the Eastern Avenue side of the site. Additionally, the Project will include a curbside lay-by area on its Carroll Street frontage which will accommodate either curbside parking or pick-up/drop-off activity, or a combination of both, with the ultimate curbside use to be determined during the Public Space process.

Loading access will be provided from the new internal curbless driveway with turnaround accessed from Cedar Street that will allow for head-in and head-out maneuvers to and from the public street network.

For local transit trips, Metrorail, Metrobus and Montgomery County Ride-On provide transit service immediately adjacent to the Project at the Takoma Metro Station. As shown in Figure 4, there are several bus routes stopping within a half-mile of the site. These bus routes connect the site to areas throughout Washington, DC and Maryland, including several Metro stations where transfers can be made to reach further areas in the District, Maryland, and Virginia. A detailed review of all bus routes and transit stops within a half-mile walk of the site is provided in the Transit Facilities chapter of this report.

For bicycle trips, the site is located 0.1 miles from the protected bike lanes on Piney Branch Road NW and the bike trail along Takoma Avenue and Fenton Street in Takoma Park. The site is also adjacent to the future extension of the Metropolitan Branch Trail which is expected to open in 2024. Using these facilities, bicyclists have access to several other regional bicycle facilities. To accommodate bicyclists, the Project will provide on-site bicycle facilities as discussed in detail in the Project Design chapter. A detailed review of existing and proposed bicycle facilities and connectivity is provided in the Bicycle Facilities chapter of this report.

Anticipated pedestrian routes such as those to transit stops, schools, and community amenities, provide adequate pedestrian facilities; however, there are some sidewalks nearby that do not meet DDOT width standards some street segments missing sidewalks altogether, and several missing curb ramps and crosswalks at minor intersections. The nearby CSX and Metrorail tracks also form a pedestrian connectivity barrier in the area where one must travel south to Carroll Street or north to Piney Branch Road to cross to/from the west. A detailed review of existing and future pedestrian access and infrastructure is provided in the Pedestrian Facilities chapter of this report.

The Project includes improving the pedestrian network around and within the site with improved sidewalks around portions of the site perimeter and signalization, addition of curb extensions and completion of the missing crosswalk at the Carroll Street intersection with the relocated bus loop.

Carsharing

Two (2) carsharing companies provide service in the District: Zipcar and Free2Move. Both services are private companies that provide registered users access to a variety of automobiles. Of these, Zipcar has designated spaces for their vehicles. The nearest Zipcar location to the site is located near the intersection of Maple Street and Vine Street NW, approximately 0.1 miles southeast of the site.

Carsharing is also provided by Free2Move, which provides point-to-point carsharing. Free2Move currently has a fleet located within areas of the District and Arlington County. Free2Move 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. Free2Move does not have permanent designated spaces for their vehicles; however, availability is tracked through their website and mobile phone application, which provides an additional option for car-sharing patrons.

Bikeshare and Shared Mobility

The Capital Bikeshare program provides an additional bicycle option for residents, staff, and visitors of the Project. The program has placed over 600 bikeshare stations across the Washington, DC metropolitan area with over 5,000 bicycles in the fleet.

In addition to Capital Bikeshare, eight (8) electric-assist scooter (e-scooter) and electric-assist bicycle (e-bike) companies provide Personal Mobility Device (PMD) service in the District: Bird, Lime, Lyft, Razor, Skip, Spin, Helbiz, and JUMP. These PMDs are provided by private companies that give registered users access to a variety of e-scooter and e-bike options. These devices are used through each company-specific mobile phone application. Many PMDs do not have designated stations where pick-up/drop-off activities occur like with Capital Bikeshare; instead, many PMDs are parked in public space, most commonly in the “furniture zone” (the portion of sidewalk between where people walk and the curb, often where other street signs, street furniture, trees, parking meters, etc. are found). Currently, PMD pilot/demonstration programs are underway in Arlington County, the District, Fairfax County, the City of Alexandria, and Montgomery County.

Walk Score and Bike Score

Walkscore.com is a website that provides scores and rankings for walking, biking, and transit conditions within neighborhoods of the District. Based on this website, the site has a walk score of 79 (or “Very Walkable”), a transit score of 73 (or “Excellent Transit”), and a bike score of 79 (or “Very Bikeable”). The following conclusions can be made based on the data obtained from Walkscore.com:

- The site is located in a very walkable location where most errands can be accomplished on foot;
- The site is located in an area where transit is convenient for most trips; and
- The site is located in a very bikeable area where biking is convenient for most trips.

The Project will directly improve the neighborhood’s pedestrian and bike accessibility by ensuring sidewalks on the Project site meet DDOT standards, improving the Carroll Street intersection with the bus loop, by providing a new shared use path along the Project’s southern and eastern sides, and by providing new short- and long-term bicycle parking facilities.

Future Projects

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

Planning Documents

The following is a review of District-wide or neighborhood-level planning documents which relate to the Project.

MoveDC

MoveDC is the District's long-range transportation plan which provides a framework of goals and policies that will guide transportation decisions in the District over a 25-year period. The *MoveDC* plan is oriented around the goals of safety, mobility, management and operations, enjoyable spaces, equity, project delivery, and sustainability.

Included in *MoveDC* are Mobility Priority Network maps for bicycles, surface transit, and freight. These maps do not identify specific projects or improvements, but are intended to guide future decisions about which projects will be selected and developed. The Mobility Priority Network maps identify the following improvement areas near the Project:

- Bicycle improvements on Eastern Avenue NW, Alaska Avenue NW, Kalmia Road NW; Dahlia Street NW, Aspen Street NW, 3rd Street NW, and Kansas Avenue NW; and
- Transit priority treatments on Georgia Avenue NW.

Vision Zero Action Plan

DDOT's *Vision Zero Action Plan* is the implementation strategy of DC's Vision Zero Initiative, which commits to reaching zero fatalities and serious injuries to travelers of DC's transportation system by the year 2024. The *Action Plan* is based on DC interagency workgroups, public input, local transportation data and crash statistics, and national and international best practices. Workgroups identified the guiding themes for the *Vision Zero Action Plan* and the goals of the DC government. The *Action Plan* focuses on the following themes:

- Create Safe Streets
- Protect Vulnerable Users
- Prevent Dangerous Driving
- Be Transparent and Responsive

Strategies within each theme assign lead and supporting agencies responsible for the planning and implementation of each program. The plan also calls for partners external to District government to ensure accountability and aid in implementation.

While the *Vision Zero Action Plan* does not propose any location-specific actions that relate to the Project, the Project supports DC's overall Vision Zero goals by providing new short- and long-term bicycle parking facilities and by ensuring sidewalks along the Project's perimeter meet DDOT standards and provide a safe, attractive pedestrian experience.

Capital Bikeshare Development Plan

DDOT's *Capital Bikeshare Development Plan* was originally released in 2016 to guide the continued growth of Capital Bikeshare in the District of Columbia. The most recent update of the *Development Plan* was released in 2020 and includes the following:

- A proposed station at Blair Street and Geranium Street, 0.5 miles from the Project; and
- A proposed station at 9th Street and Butternut Street NW, 0.5 miles from the site Project.

Rock Creek East I Livability Study

The study was undertaken by DDOT to investigate opportunities to improve the daily quality of life of residents, patrons, and employees that commute to, from, or through the study area. To meet this goal, DDOT analyzed the local street network and identified actions which could be taken to increase safety and improve connectivity and accessibility. The study was finalized in December 2020. The study goals included:

- Development of a comprehensive approach to traffic calming and operational improvements for all users living in and visiting the area;
- Identifying specific issues that impact safety and comfort of multimodal users while also accommodating freight and delivery needs;
- Designing cost-effective and measurable improvements that benefit all users;
- Reducing vehicle speeds where problems have been measured or observed;
- Emphasizing safety and access improvements around neighborhood facilities including, but not limited to schools, churches, parks recreation centers, and other key community facilities; and
- Enhancing comfort and livability for residents and visitors to the project areas.

The study recommends improvements for pedestrians (visibility, sidewalks), bicyclists (additional facilities and bikeshare locations), transit users (making bus stops more accessible), and overall safety (signal optimization reviews).

In direct relation to the Project study area, the Rock Creek East I Livability Study recommends roadway safety improvements at the intersection of Piney Branch Road and Eastern Avenue NW, some of which have already been implemented. These improvements include bike lanes on Piney Branch Road NW, high-visibility crosswalks with a pedestrian refuge median, and curb bulb-outs with planting areas.

Metropolitan Branch Trail extension

When completed, the Metropolitan Branch Trail (MBT), will be an eight-mile trail that runs from Union Station in the District of Columbia to Silver Spring in Maryland. Following the Metropolitan Branch Line of the Baltimore and Ohio (B&O) Railroad, the trail passes through numerous vibrant and historic neighborhoods as well as connecting to the National Mall. The latest section being designed connects the Fort Totten Metro Station to the Takoma neighborhood. This section of the MBT will provide pedestrians and bicyclists with a convenient and safe on- and off-street route while traveling between Fort Totten and Takoma area. The section is anticipated to be constructed by summer 2024.

Planned Developments

There are eight (8) planned development projects identified in the vicinity of the Project. For the purpose of this analysis and consistent with DDOT and industry standards, only approved or planned developments expected to be completed prior to the Project with an origin/destination within the study are included. Developments were included based on their proximity to the Project and whether their site-generated volumes would impact the study area intersections. It is noted that additional sites are located in the area that could be redeveloped; however, only sites with current development approvals/plans were considered.

Figure 5 shows the location of the background development projects considered in relation to the Project. The projects are described below.

Fern Street Townhomes

This development will include 140 townhomes and condominiums along Fern Street NW. This development was analyzed using ITE *Trip Generation*, 11th Edition and is expected to generate 30 peak hour trips in the morning and 36 peak hour trips in the afternoon. This development is expected open in 2023.

The Hartley

This development includes 323 residential units, a 42,000 square foot grocer, and 18,000 square feet of additional retail. The development also includes 300 underground parking spaces. This development was analyzed using ITE *Trip Generation*, 11th Edition and is expected to generate 148 peak hour trips in the morning and 329 peak hour trips in the afternoon. This development is now open but was still under construction when traffic count data was collected.

Kite House

This development is located at 1000 Butternut Street NW and includes 109 residential units. This development was analyzed using the ITE *Trip Generation*, 11th Edition and is expected to generate 16 peak hour trips in the morning and 19 peak hour trips in the afternoon. This development is now open but was still under construction when traffic count data was collected.

Reynard

This development will include 345 residential units between The Parks Marketplace and Great Lawn. This development was analyzed using ITE *Trip Generation*, 11th Edition and is expected to generate 63 peak hour trips in the morning and 61 peak hour trips in the afternoon. This development is currently under construction and is expected to open before the Takoma Metro Multifamily Project.

Aspen Square at The Parks

The development will include approximately 50 townhouses along Aspen Street between 14th Place and Luzon Avenue NW. This development was analyzed using ITE *Trip Generation*, 11th Edition and is expected to generate 17 peak hour trips in the morning and 19 peak hour trips in the afternoon. This development is expected open in 2023.

The Arbor at Takoma

This development located at 218 Cedar Street NW includes 36 residential units, and 9,182 square feet of commercial space. This development was analyzed using ITE *Trip Generation*, 11th Edition and is expected to generate 10 peak hour trips in the morning and 29 peak hour trips in the afternoon. This development is now open but was still under construction when traffic count data was collected.

Gilbert & Wood

This development will include 19,605 square feet of retail and 10,000 square feet of office space. This development was analyzed using ITE *Trip Generation*, 11th Edition and is expected to generate 20 peak hour trips in the morning and 57 peak hour trips in the afternoon. An opening year for this development is not known; it was included in this analysis to provide a conservatively high estimate of background development traffic.

225 Vine Street

This planned matter-of-right development is expected to include 28 residential units. This development was analyzed using ITE *Trip Generation*, 11th Edition and is expected to generate no peak hour trips in the morning and three (3) peak hour trips in the afternoon. An opening year for this development is not known; it was included in this analysis to provide a conservatively high estimate of background development traffic.

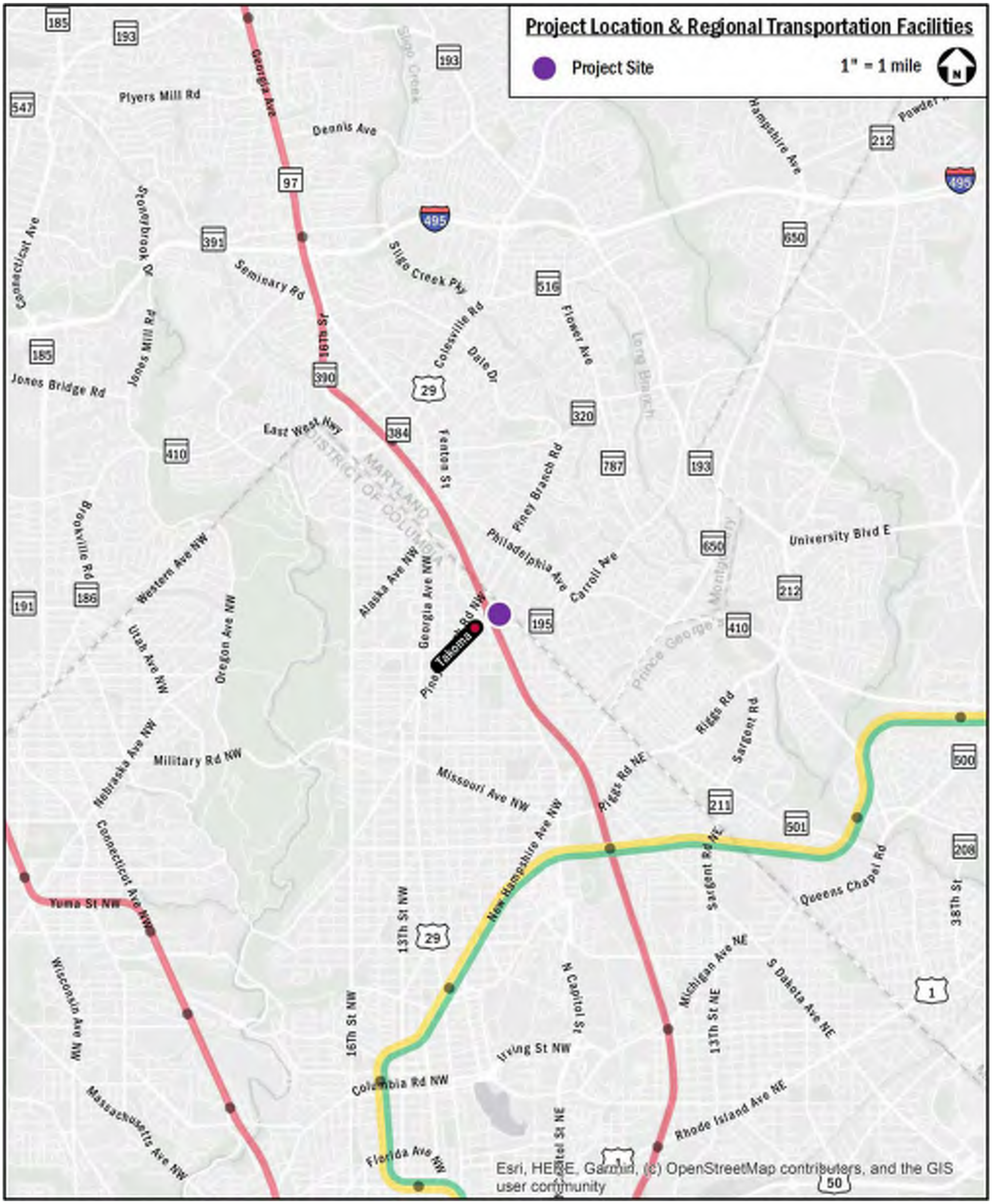


Figure 3: Major Regional Transportation Facilities

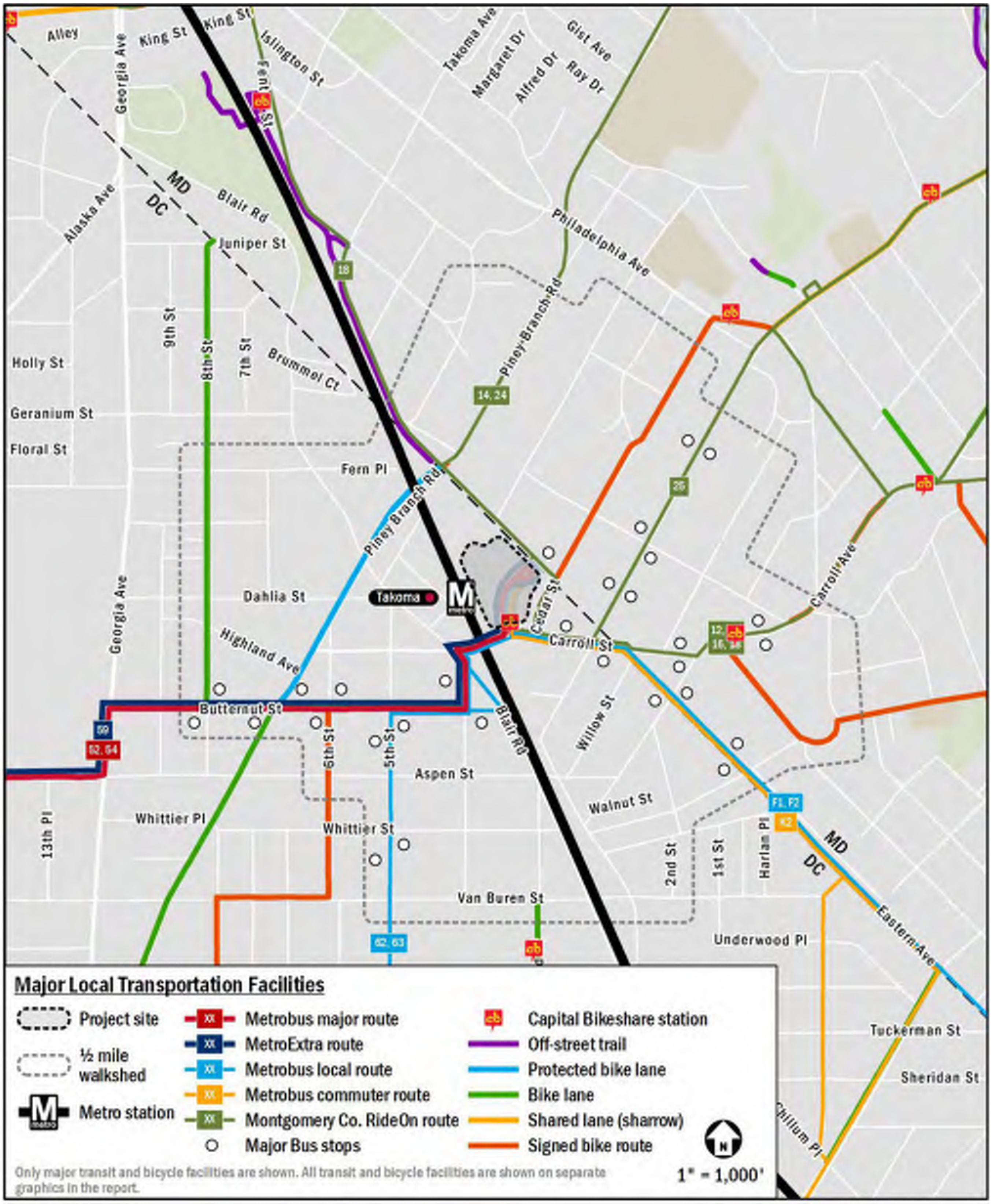


Figure 4: Existing Major Local Transportation Facilities

Figure 5: Background Developments

Project Design

This section reviews the transportation components of the Project, including the proposed site plan and access points. It includes descriptions of the Project's vehicular access, pick-up/drop-off operations, parking, and pedestrian and bicycle accommodations.

The Project is generally bounded by bounded by Eastern Avenue NW to the northeast, Cedar Street NW to the east, Carroll Street NW to the south, and the Takoma Metro station to the west.

The existing site is currently improved with a Metro parking/kiss-and-ride lot, bus loop, and green space. The Project proposes to reconfigure the WMATA metro station and bus facilities and develop the northern portion of the site with a mixed-use development with approximately 440 multifamily residential units and 17,650 square feet of ground-floor retail space.

Additionally, the proposed Project includes the removal of one driveway (the current bus access driveway at Eastern Avenue NW) and the addition of one driveway (from Cedar Street NW between Carroll Street and Eastern Avenue). The proposed project also includes relocating the existing bus loop and consolidating it with the kiss-and-ride function.

The residential building and retail uses will be served by approximately 230 parking spaces in a garage.

The Project also includes a new traffic signal at the Carroll Street intersection with the reconfigured bus-loop/WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

Detailed site plans are shown on Figure 6 and Figure 7, and Figure 8.

Site Access and Circulation

Pedestrian Access

Pedestrian access to the Project's residential component is to be located via the lobby on the Cedar Street side of the Project. Pedestrian access to the Project's retail component is to be located via several retail entrances on the Carroll Street side of the Project.

Pedestrian access to the Project is shown on Figure 6 and Figure 7.

Bicycle Access

Bicycle access to the Project will be provided at the short-term bicycle racks around the perimeter of the site and in a publicly accessible area within the garage, and the long-term bicycle parking spaces in the garage accessed from the new internal driveway/turnaround off Cedar Street. As requested by DDOT, all residential long term bike parking will be provided on Level 1.

The Project is located 0.1 miles from the protected bike lanes on Piney Branch Road NW and the bike trail along Takoma Avenue and Fenton Street in Takoma Park. The site is also adjacent to the future extension of the Metropolitan Branch Trail which is expected to open in 2024.

The Project will meet zoning requirements by providing at least 149 long-term bicycle parking spaces inside the building and at least 27 short-term bicycle parking spaces on exterior racks along the site's frontage and in a publicly accessible area within the garage.[1]

The long-term bicycle spaces will adhere to Subtitle C § 805.9 of DC's zoning requirements, as well as DDOT's *Bike Parking Guide*, which stipulate that long-term spaces be located indoors in a parking garage or bike storage room, and that at least 75 long-term spaces (50% of the total) be placed horizontally on the floor or ground, without bicycles being suspended. Additionally, at least eight (8) of the long-term spaces (5% of the total) will be 10' x 3' spaces to accommodate cargo/tandem bikes, and at least 15 of the long-term spaces (10% of the total) will include electrical outlets for e-bikes and scooters. The exact location of the short-term bicycle parking spaces around the site perimeter is still to be determined.

The locations of these facilities are shown on Figure 7 and Figure 8.

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[1] Bike parking totals assume a development program of 440 dwelling units and 17,650 SF of retail. Final bike parking totals may be adjusted based on the ZR16 requirements for the final development program.

Vehicular Access

Vehicular access to the parking garage will occur from a new internal curbless driveway with turnaround accessed from Cedar Street NW. Additional access to the lower parking level will be provided from the relocated bus-loop on the Eastern Avenue side of the site.

The following curb cut modifications will occur with the Project:

- One (1) existing curb cut removed on Eastern Avenue (serving the former bus loop);
- One (1) new curb cut on Cedar Street (serving the new internal driveway/turnaround). This curb cut will include an apron ramping up to a curbless driveway; and
- Reconstruction and relocation of the two (2) existing curb cuts to remain on Eastern Avenue and Carroll Street.

Figure 6 and Figure 7, and Figure 8 show the locations of the vehicular access points for the parking garage.

Proposed Traffic Signal

A new traffic signal is proposed at the Carroll Street intersection with the relocated bus-loop/WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

Signal warrants were performed at this intersection using methodologies prescribed in the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD). Of the eight (8) warrants outlined in the MUTCD, Warrant 3 (Peak Hour) and Warrant 4 (Pedestrian Peak Hour Volume) were performed for this analysis. These warrants are included in the Technical Attachments.

The Peak Hour warrant was not met based on Total Future traffic volumes.

The Pedestrian Peak Hour Warrant was not met based on Total Future traffic volumes and existing pedestrian volumes collected in May 2022. However, it is noted that adjusting the May 2022 pedestrian volumes based on growth to pre-pandemic levels and the addition of site-generated pedestrian volumes would trigger this warrant. As shown in Table 1, system-wide WMATA rail ridership was at 36% of pre-pandemic levels in May 2022 when traffic and pedestrian counts were collected. Growing the May 2022 volumes accordingly, as well as adding in estimated site-generated pedestrian trips would result in 239 and 213 pedestrian trips at the west leg of the intersection in the AM and PM peak hours, respectively. Using these volumes would place pedestrian volumes substantially closer to the Pedestrian Peak Hour Warrant threshold.

In addition to better accommodating pedestrian volumes, a traffic signal would allow for more efficient bus operations, particularly for left turns into and out of the bus loop.

Given the high volume of pedestrians, entering Kiss-and-Ride traffic and two-way bus traffic, a traffic signal is needed to facilitate Metro station traffic at this location.

Table 1: Estimated Pedestrian Trips at West Leg of Carroll Street and Bus Loop Intersection

	AM Peak Hour	PM Peak Hour
Existing pedestrians using west leg of intersection	84	73
Growth to pre-pandemic levels [1]	149	130
Site-generated pedestrians [2]	6	10
Total Estimated Pedestrians	**239**	**213**

[1] Based on WMATA Metro Ridership Snapshot from May, which says rail ridership was at 36% of pre-pandemic levels on weekdays.
[2] Based on pedestrian trip generation outlined in Table 4, routed based on the site trip distributions shown in Figures 20 and 21, and assuming 50% of pedestrians traveling through this intersection used the crosswalk on the west leg.

Pick-up/Drop-off Access

Pick-up/drop-off access will occur from the new internal curbless driveway with turnaround accessed from Cedar Street NW. A new layby PUDO zone is being added along the driveway adjacent to the residential lobby. This update will be reflected in a forthcoming PUD plan resubmission. Additionally, the Project will include a curbside lay-by area on its Carroll Street frontage which will accommodate either curbside parking or pick-up/drop-off activity, or a combination of both, with the ultimate curbside use to be determined during the Public Space process. Pick-up/drop-off access is shown on Figure 6 and Figure 7.

Loading and Trash

Loading

The proposed loading facilities will accommodate all loading activity and delivery demand for the Project without any detrimental impact to the surrounding transportation network. DDOT standards stipulate that truck movements be accommodated without back-in movements through public space. The Project has been designed to accommodate all loading activity and associated backing maneuvers within the site. Truck turning diagrams using AutoTURN are provided in the Technical Attachments.

Loading and deliveries will occur in two (2) internal loading areas. The residential loading area will contain one (1) 12' x 30' loading berth and one (1) 10' x 20' service/delivery space. The retail loading area will contain one (1) 12' x 30' loading berth. Therefore, the Project will be serviced by a total of two (2) 12' x 30' loading berths and one (1) 10' x 20' service/delivery space, exceeding zoning requirements for the Project. Access to both loading areas will be provided from the new internal curbless driveway with turnaround accessed from Cedar Street NW.

Near the site, Eastern Avenue, Georgia Avenue, and Blair Road are designated as truck and bus through routes, and truck restrictions are in place along Aspen Street, Dahlia Street, and Blair Road north of Piney Branch Road.

A Loading Management Plan (LMP) is included in a later section of this report.

Loading access and circulation is shown on Figure 6 and Figure 7.

Trash

Trash for the Project will be accommodated using trash receptacles within the loading areas. No trash will be stored in public space or within the alleys or private driveways.

Parking

The Project proposes 230 parking spaces within a garage.

The Project's baseline ZR16 requirement is 164 parking spaces. Accounting for the Project's proximity to Metrorail, ZR16 11C702 allows for a reduction of 50%, reducing the ZR16 required parking for the site to approximately 82 spaces.

The Project's proposed parking supply of 230 spaces is 66 spaces greater than the baseline ZR16 requirement (before reductions) of 164 spaces. Since the Project does not exceed the baseline ZR16 requirement (before reductions) by greater than double or by greater than 100 spaces, no mitigation is required to comply with ZR16 regulations for parking.

Based on the Project's location less than ¼ mile from Metrorail the Project's DDOT-preferred parking maximum is 128 spaces. The Project's proposed parking supply of 230 spaces is 80% higher than the DDOT-preferred maximum. Therefore, enhanced/additional TDM commitments are included as part of the Project's proposed TDM plan.

The Project proposes to provide a minimum of five (5) of the 230 provided parking spaces with electric vehicle (EV) stations.

The parking garage's location and access points within the Project are shown on Figure 6, Figure 7, and Figure 8.

Curbside Management

Existing curbside designations within two (2) blocks of the Project are shown on Figure 9.

The Project is proposing curbside changes along portions of Carroll Street at the site frontage and below the bridge. These changes include either parking or a pick-up/drop-off zone along the site frontage along the westbound side of Carroll Street and kiss-and-ride spaces along the westbound side beneath the bridge.

All proposed changes are subject to Public Space Committee approval.

Bicycle Facilities

The Project will meet or exceed 2016 Zoning Regulations requirements for long-term and short-term bicycle parking. Per the Zoning Regulations, the Project is required to provide bicycle facilities using the rates listed in Table 2.

Further, per Subtitle C § 802.2, "after the first fifty (50) bicycle parking spaces are provided for a use, additional spaces are required at one-half (0.5) the ratio specified in Subtitle C § 802.1."

The Project will meet or exceed zoning requirements by providing at least 149 long-term bicycle parking spaces. All residential long term bike parking will be located inside a bike room on Level 1, and at least 27 short-term bicycle parking spaces on exterior racks along the Project's frontage and in a publicly accessible area within the garage. The exact location of the short-term bicycle parking spaces is still to be determined. The long-term bicycle spaces will adhere to Subtitle C § 805.9 of DC's zoning requirements, as well as DDOT's Bike Parking Guide, which stipulate that long-term spaces be located indoors in a parking garage or bike storage room, and that at least 50% of required long-term spaces be placed horizontally on the floor or ground, without bicycles being suspended.

In addition to long- and short-term bike parking, the Project will provide a shared use path along the Project's southern and eastern sides, which will connect with the Metropolitan Branch Trail extension.

Table 2: Bike Parking Requirements

Land Use	Size	ZR16 Bicycle Parking Rate		ZR16-required Bicycle Parking Spaces [1]		DCMR 18-1214 Calculation [2]	DCMR 18-1214 Requirement	Proposed Bicycle Parking Spaces	
		Long Term	Short Term	Long Term	Short Term	Long Term	Long Term	Long Term	Short Term
Residential	440 DU	1 per 3 du's	1 per 20 du's	98	22	1 per 3 du's	146.67	147	22
Retail	17,650 SF	1 per 10,000 sf	1 per 3,500 sf	2	5	N/A	N/A	2	5
Total				**100**	**27**		**146.67 (147)**	**149**	**27**

[1] Rate applied at 50% after first 50 spaces per ZR16 11C802.2
[2] No 50% reduction after first 50 spaces

Pedestrian Facilities

The Project will include a reconfiguration of the bus loop/driveway serving the Takoma Metro station, as well as reconfigure the open space on the Project site. These reconfigurations will include sidewalks along the perimeter of the site, as well as internal walkways and a shared use path through the site which will improve the porosity of the overall pedestrian network in the Project area.

A new traffic signal is proposed at the Carroll Street intersection with the relocated bus-loop/WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

Transportation Demand Management

Transportation Demand Management (TDM) is the application of policies and strategies used to reduce travel demand or to redistribute demand to other times or spaces. TDM elements typically focus 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 development does trigger intersection mitigation at one location, and the proposed parking supply exceeds DDOT's preferred parking maximums. Per the DDOT CTR guidelines, where a development's proposed parking supply is greater than 25% higher than DDOT's preferred maximum parking and intersection mitigation is triggered, strategies and methodologies of the Enhanced Plus Plan highlighted in DDOT's CTR guidance can be adopted to mitigate project impacts. The following is a list of TDM strategies the Applicant proposes for the Project, including Enhanced and Enhanced Plus components.

Overall Project

- Unbundle the cost of vehicle parking from the lease or purchase agreement for each residential unit or commercial lease and charge a minimum rate based on the average market rate within a quarter mile. Only hourly, daily, weekly or monthly rates will be charged. Free parking, validation, or discounted rates will not be offered.
- Identify Transportation Coordinators for the planning, construction, and operations phases of development. The Transportation Coordinators will act as points of contact with DDOT, goDCgo, and Zoning Enforcement and will provide their contact information to goDCgo.
- Transportation Coordinator will conduct an annual commuter survey of building employees and residents on-site, and report TDM activities and data collection efforts to goDCgo once per year for three years.
- Transportation Coordinator will develop, distribute, and market various transportation alternatives and options to residents, employees and [customers, patrons, attendees], including promoting transportation events (i.e., Bike to Work Day, National Walking Day, Car Free Day) on property website and in any internal building newsletters or communications for three years.
- Transportation Coordinator will subscribe to goDCgo's residential newsletter and receive TDM training from goDCgo to learn about the transportation conditions for this project and available options for implementing the TDM Plan

- Provide residents and employees who wish to carpool with detailed carpooling information and will be referred to other carpool matching services sponsored by the Metropolitan Washington Council of Governments (MWCOG) or other comparable service if MWCOG does not offer this in the future.
- Offer a SmarTrip card and one (1) complimentary Capital Bikeshare coupon good for a free ride to every new resident or employee for the initial lease up period of the building operations.
- Provide at least 27 short- and 149 long-term bicycle parking spaces.
- Long-term bicycle storage rooms will accommodate non-traditional sized bikes including cargo, tandem, and kids bikes, with a minimum 5% of spaces (8 for this project) being designed for longer cargo/tandem bikes (10' by 3'), a minimum of 10% of spaces (15 for this project) will be designed with electrical outlets for the charging of electric bikes and scooters, and a minimum of 50% of spaces (75 for this project) will be placed horizontally on the floor. There will be no fee to the residents or employees for usage of the bicycle storage room and strollers will be permitted to be stored in the bicycle storage room.
- Install a minimum of five (5) electric vehicle (EV) charging stations.
- Following the issuance of a Certificate of Occupancy for the Project, the Transportation Coordinator will submit documentation summarizing compliance with the transportation and TDM conditions of the Order (including, if made available, any written confirmation from the Office of the Zoning Administrator) to the Office of Zoning for inclusion in the IZIS case record of the case.
- Following the issuance of a Certificate of Occupancy for the Project, the Transportation Coordinator will submit a letter to the Zoning Administrator, DDOT, and goDCgo every five (5) years (as measured from the final Certificate of Occupancy for the Project) summarizing continued substantial compliance with the transportation and TDM conditions in the Order, unless no longer applicable as confirmed by DDOT. If such letter is not submitted on a timely basis, the building shall have sixty (60) days from date of notice from the Zoning Administrator, DDOT, or goDCgo to prepare and submit such letter.
- Install a Transportation Information Center Display (electronic screen) within the building amenities containing information related to local transportation alternatives. At a minimum the display should include information about nearby Metrorail stations and schedules, Metrobus stops and schedules, car-sharing locations, and nearby Capital Bikeshare locations indicating the availability of bicycles.
- Additional short- and long-term bicycle parking spaces above ZR16 requirements. (Will provide 27 short-term and 149 long-term spaces, exceeding ZR16 requirements of 27 short-term and 100 long-term spaces.)
- Provide a bicycle repair station in the long-term bicycle parking storage room.
- Hold a transportation event for residents, customers, employees, and members of the community once per year for a total of three (3) years. Examples include resident social, walking tour of local transportation options, goDCgo lobby event, transportation fair, WABA Everyday Bicycling seminar, bicycle safety/information class, bicycle repair event, etc.).
- Collect parking demand and trip generation data, annually, for three (3) years after building opening and report this information to DDOT's Planning and Sustainability Division (PSD).

Residential

- Provide welcome packets to all new residents that should, at a minimum, include the Metrorail pocket guide, brochures of local bus lines (Circulator and Metrobus), carpool and vanpool information, CaBi coupon or rack card, Guaranteed Ride Home (GRH) brochure, and the most recent DC Bike Map. Brochures can be ordered from DDOT's goDCgo program by emailing info@godcgo.com.
- Post all transportation and TDM commitments on building website, publicize availability, and allow the public to see what has been promised.

- Provide one (1) collapsible shopping cart (utility cart) for every 50 residential units, for a total of nine (9), to encourage residents to walk to the grocery store and run errands.

Retail

- Post “getting here” information in a visible and prominent location on the website with a focus on non-automotive travel modes. Also, links will be provided to goDCgo.com, CommuterConnections.com, transit agencies around the metropolitan area, and instructions for [customers, attendees, patrons] discouraging parking on-street in Residential Permit Parking (RPP) zones.
- Transportation Coordinator will demonstrate to goDCgo that tenants with 20 or more employees are in compliance with the DC Commuter Benefits Law to participate in one of the three transportation benefits outlined in the law (employee-paid pre-tax benefit, employer-paid direct benefit, or shuttle service), as well as any other commuter benefits related laws that may be implemented in the future such as the Parking Cash-Out Law.
- Provide at least one (1) locker for use by employees.
- Coordinate with [BID, WMATA, ANC] on a way finding plan along walking routes to the property from the Takoma Metro station.

The following additional pedestrian and safety improvements are proposed by the Applicant, subject to DDOT approval.

- Realign and reconfigure the Carroll Street and WMATA bus loop intersection to include the following pedestrian safety improvements:
    - Concrete curb extensions on the northwest corner to replace the existing striping and flex-posts;
    - Expanded concrete median divider on Carroll Street to replace the existing striping and flex-posts;
    - Concrete curb extensions on the south curb of the intersection to replace the existing striping and flex-posts; and
    - New crosswalk on the eastern leg of the intersection, which currently lacks a crosswalk.
- Provide a new mid-block raised pedestrian crossing across the realigned kiss-and-ride lane connecting to a striped crossing of the new bus loop, connecting the Project with the Takoma Metro station entrance.
- Install a traffic signal at the Carroll Street intersection with the realigned bus loop, including pedestrian phasing/signals.

Loading Management Plan

As requested by DDOT during the scoping process, the following Loading Management Plan (LMP) is proposed to be implemented with the Project. The goals of this plan are to maintain a safe environment for all users of the site, loading area, streets, and nearby intersections, minimize undesirable impacts to pedestrians and to employees, reduce conflicts between truck traffic using the loading facilities and other street users, and ensure smooth operation of the loading facilities through appropriate levels of management and schedule operations. The components of the LMP that will be implemented for the life of the Project are as follows:

- A loading dock manager will be designated by the building management who will be on duty during delivery hours. The dock manager will be responsible for coordinating with vendors and tenants to schedule deliveries and will work with the community and neighbors to resolve any conflicts should they arise.
- A lease provision will require all tenants to use only the loading area for all deliveries and move-in and move-out activities.
- All tenants will be required to schedule deliveries that utilize the loading area (any loading operation conducted using a truck 20-feet in length or larger).
- The dock manager will schedule deliveries using the berths such that the dock’s capacity is not exceeded. In the event that an unscheduled delivery vehicle arrives while the dock is full, that driver will be directed to return at a later time when a berth will be available so as to not compromise safety or impede the functionality of the internal site driveway or of Cedar Street NW.
- The dock manager will schedule residential loading activities so as not to conflict with retail deliveries.

- The dock manager will monitor inbound and outbound truck maneuvers and will ensure that trucks accessing the loading dock do not block vehicular, bike, or pedestrian traffic within the site driveway except during those times when a truck is actively entering or exiting a loading berth.

- Service vehicle/truck traffic interfacing with traffic on Cedar Street NW and the internal site driveway will be monitored during peak periods and management measures will be taken if necessary to reduce conflicts between truck and vehicular movements.

- The dock manager will monitor the timing of the retail and residential deliveries to see if any adjustments need to be made to ensure any conflicts with the retail loading and residential loading activities are minimized.

- Trucks using the loading dock will not be allowed to idle and must follow all District guidelines for heavy vehicle operation including but not limited to DCMR 20 – Chapter 9, Section 900 (Engine Idling), the goDCgo Motorcoach Operators Guide, and the primary access routes shown on the DDOT Truck and Bus Route Map (godcgo.com/freight). The dock manager will also distribute flyer materials, such as the MWCOG Turn Your Engine Off brochure and others from DDOT and goDCgo, to drivers as needed to encourage compliance with idling laws. The dock manager will also post these materials and other relevant notices in a prominent location within the loading area.

- The dock manager will be responsible for disseminating suggested truck routing maps to the building’s tenants and to drivers from delivery services that frequently utilize the development’s loading dock as well as notifying all drivers of any access or egress restrictions.

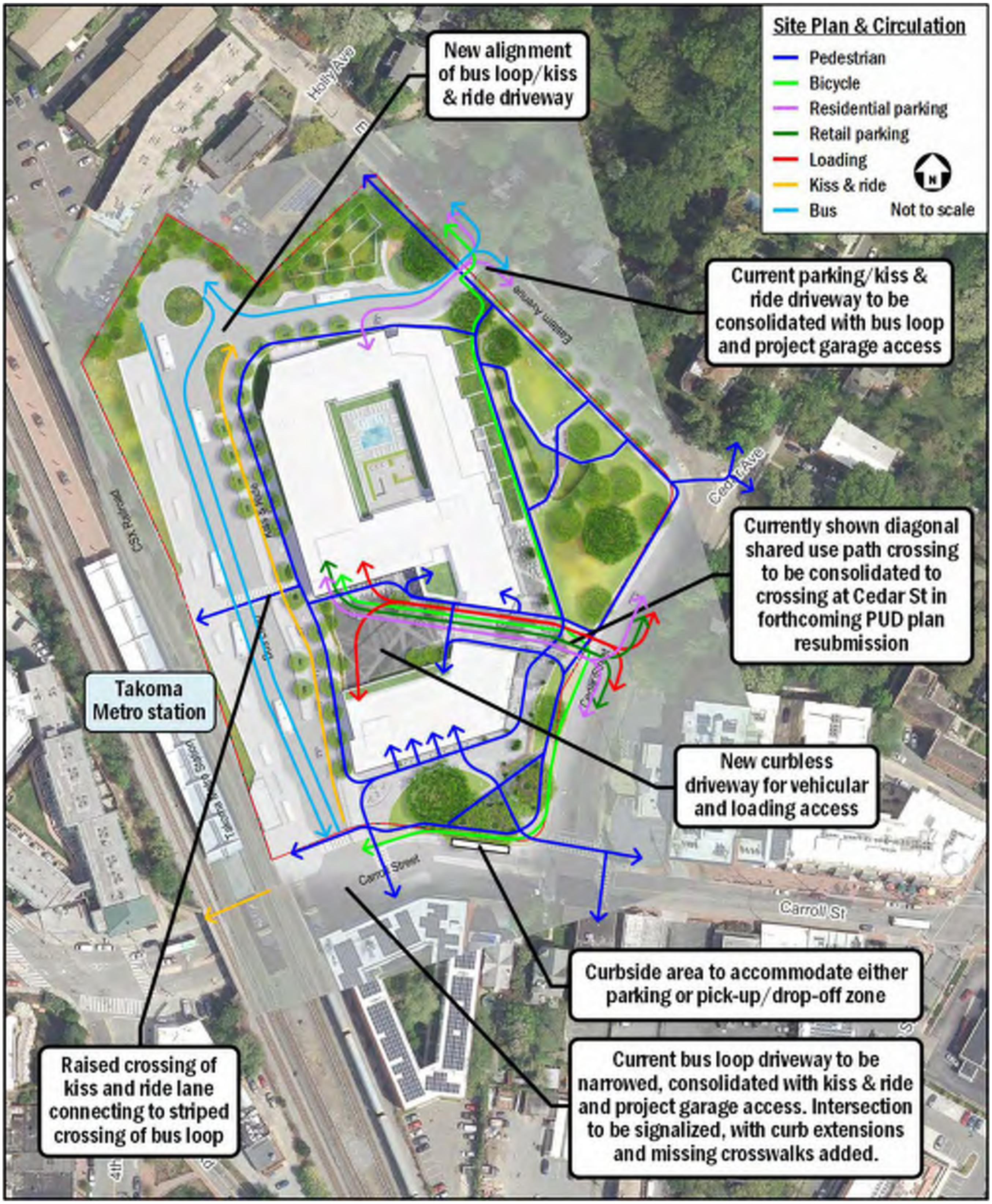


Figure 6: Proposed Site Access and Circulation Plan (Overall)

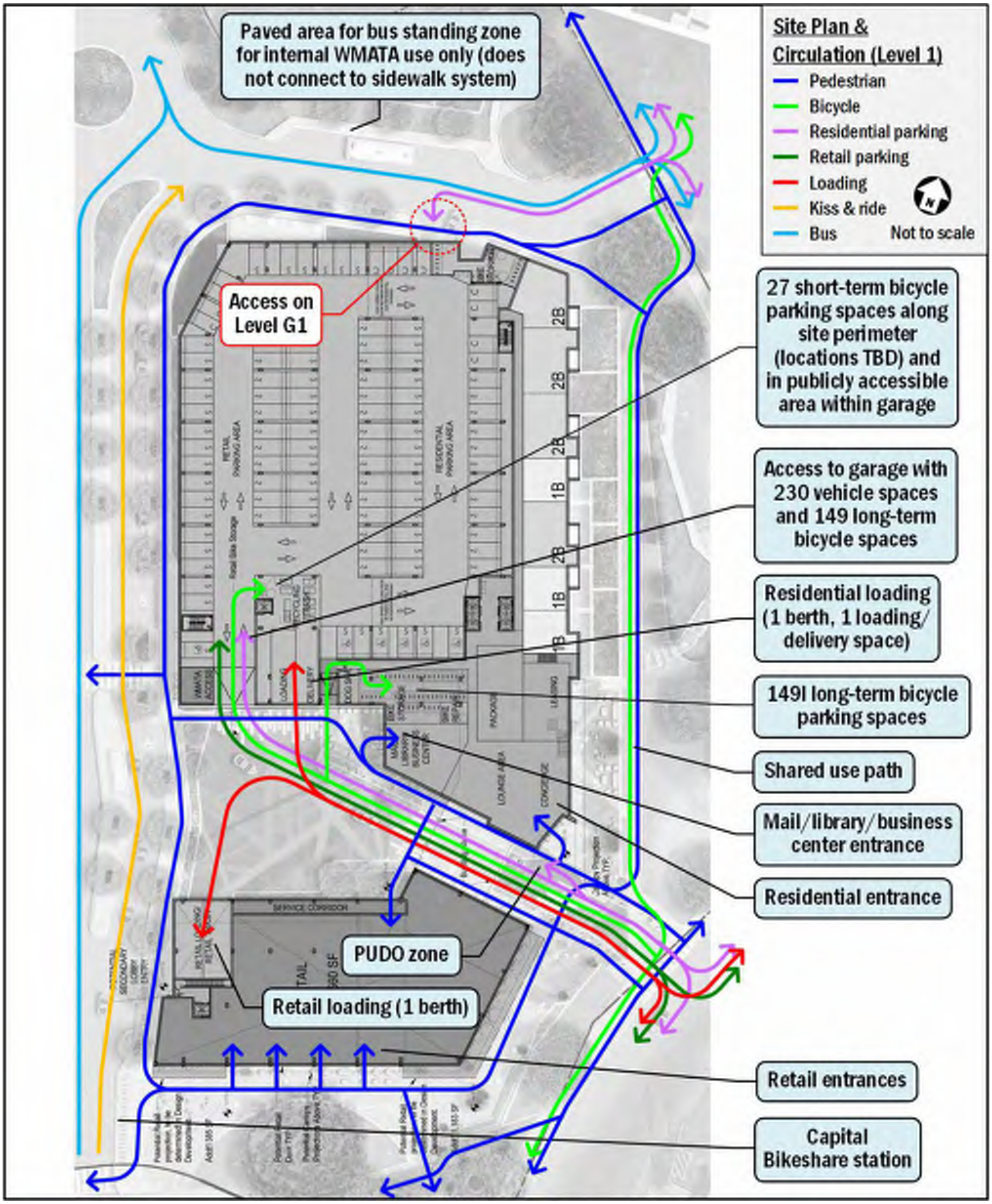


Figure 7: Proposed Site Access and Circulation Plan (Level 1)

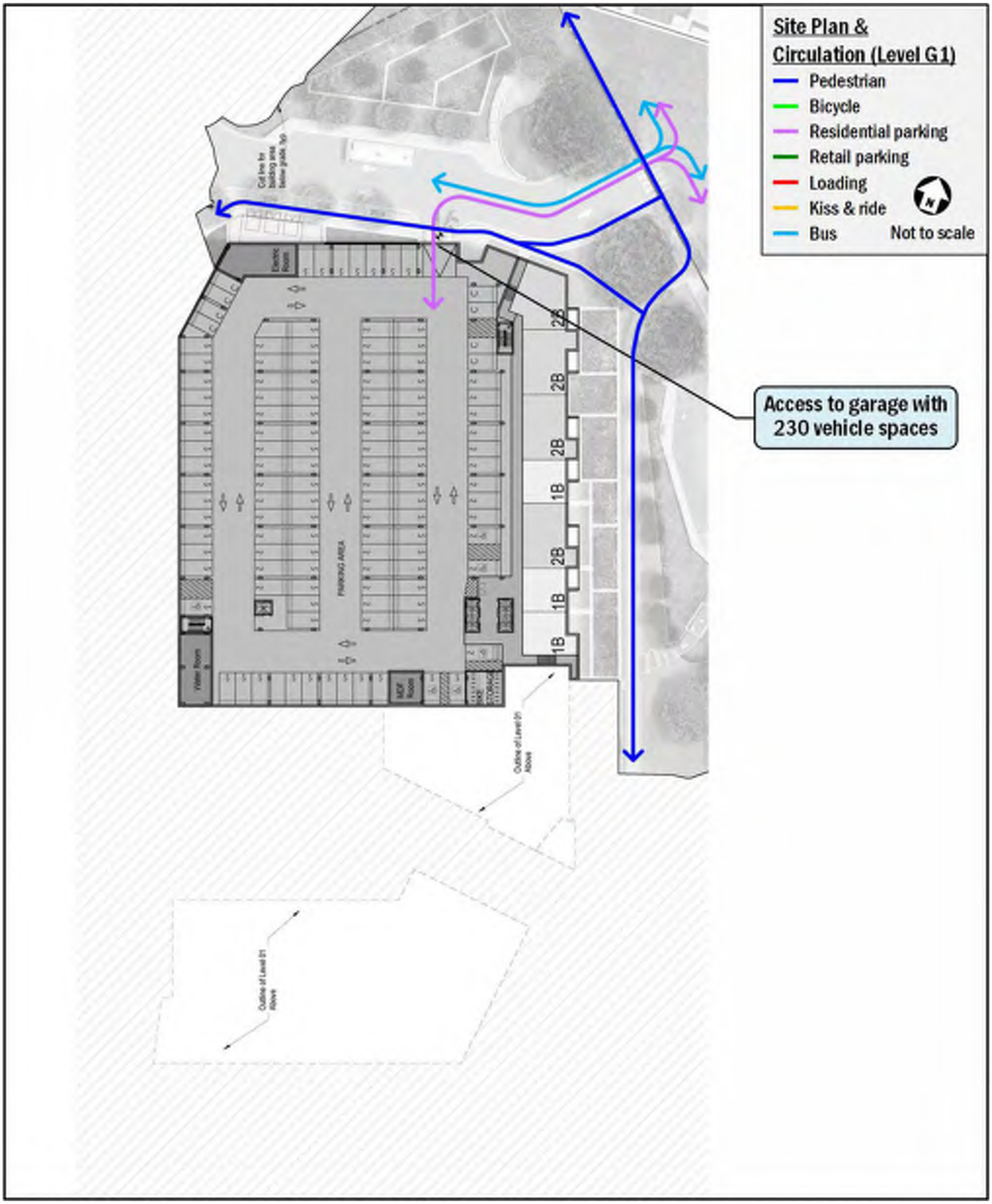


Figure 8: Proposed Site Access and Circulation Plan (Level G1)

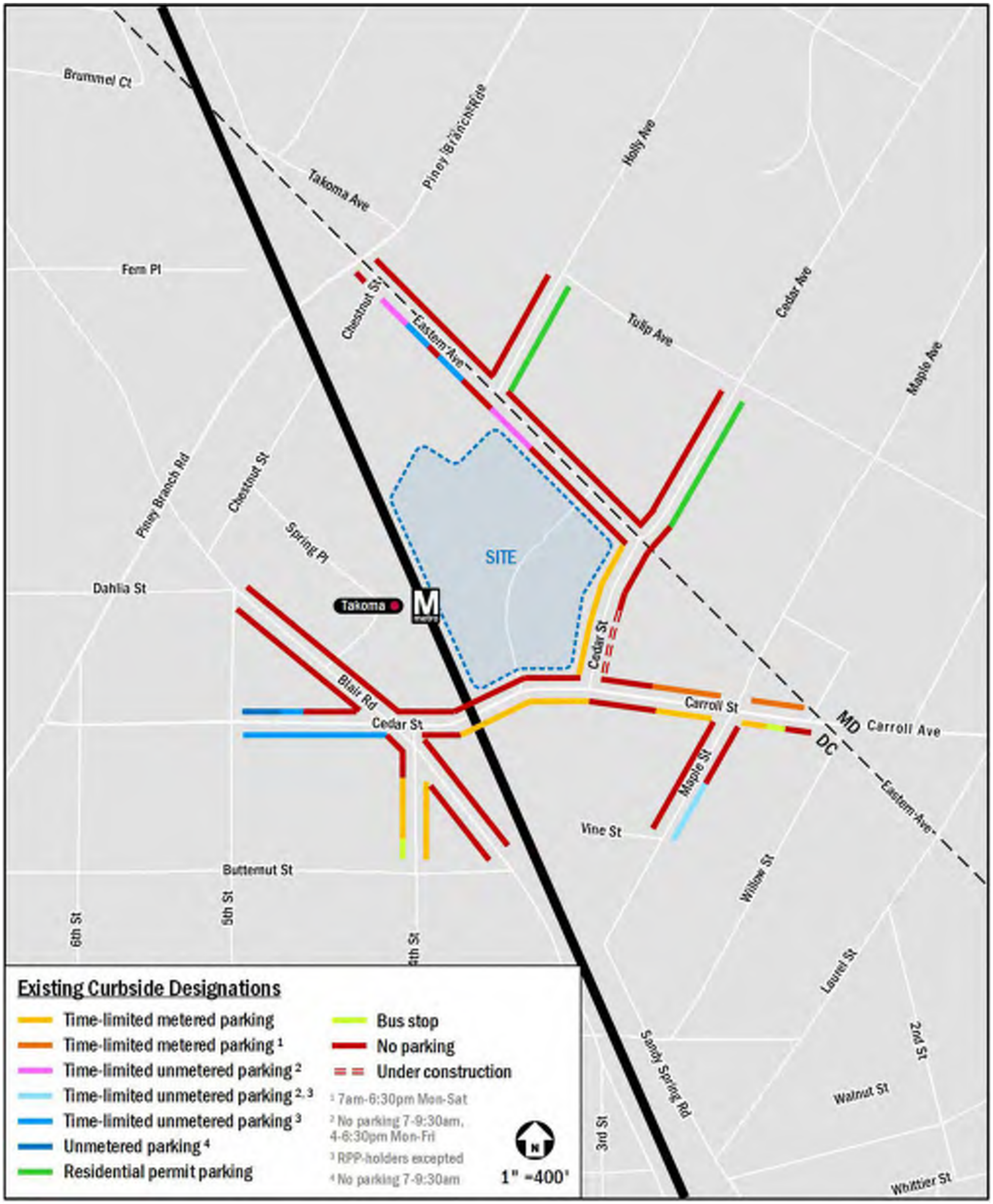


Figure 9: Existing Curbside Designations

Travel Demand Assumptions

This section outlines the transportation demand for the Project. It summarizes the projected trip generation of the Project by mode, which forms the basis for the sections that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 11th Edition. This methodology was supplemented to account for the urban nature of the Project (ITE *Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

Proposed Site Trip Generation

Multi-modal trip generation was calculated using ITE Trip Generation 10th Edition rates for Land Use 221, *Multifamily Housing (Mid-Rise) (3-10 floors)* and Land Use 822, *Strip Retail Plaza (<40k)*.

Trips were split into different modes using assumptions derived from census data for people that currently live or work near the Project, WMATA ridership survey data, and the proposed parking supply. A summary of the mode split assumptions is provided in Table 3.

Table 3: Mode Split Assumptions

Land Use	Mode			
	Drive	Transit	Bike	Walk
Residential	55%	35%	5%	5%
Retail	35%	35%	5%	25%

A summary of the multimodal trip generation for the Project is provided in Table 4 for the AM and PM peak hours. The Project is expected to generate 115 vehicular trips (33 in, 82 out) during the AM peak hour, and 136 vehicular trips (78 in, 58 out) during the PM peak hour. Detailed calculations are included in the Technical Attachments.

Table 4: Multimodal Trip Generation

Mode	Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Auto (veh/hr)	Residential	440 du	55%	24	76	100	58	37	95
	Retail	17,650 sf	35%	9	6	15	20	21	41
	Total			**33**	**82**	**115**	**78**	**58**	**136**
Transit (ppl/hr)	Residential	440 du	35%	18	57	75	43	28	71
	Retail	17,650 sf	35%	16	11	27	37	38	75
	Total			**34**	**68**	**102**	**80**	**66**	**146**
Bike (ppl/hr)	Residential	440 du	5%	3	8	11	6	4	10
	Retail	17,650 sf	5%	2	2	4	5	6	11
	Total			**5**	**10**	**15**	**11**	**10**	**21**
Walk (ppl/hr)	Residential	440 du	5%	3	8	11	6	4	10
	Retail	17,650 sf	25%	12	7	19	27	26	53
	Total			**15**	**15**	**30**	**33**	**30**	**63**

Traffic Operations

This chapter provides a summary of an analysis of the existing and future roadway capacity surrounding the Project. Included is an analysis of potential vehicular impacts of the Project.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the Project on the study area roadways; and
- Discuss any potential improvements to accommodate the additional vehicular trips.

This analysis was performed by determining the traffic volumes and roadway capacity for Existing Conditions, Background (no-build) Conditions, and Total Future (build) Conditions. (An additional Background Interim Conditions scenario was included in the analysis for reference only. The Background Conditions which are the basis for the comparison with Total Future Conditions are noted as such in the Traffic Volume Assumptions section of this chapter.) The capacity analysis focuses on the weekday AM and PM commuter peak hours.

This chapter concludes:

- Under Existing Conditions, two (2) study intersections have one or more approaches operating with unacceptable delay, and five (5) study intersections have one or more lane group that exceeds the given storage length.
- Under Background Conditions, three (3) study intersections have one or more approaches operating with unacceptable delay, and five (5) study intersections have one or more lane group that exceeds the given storage length.
- Under Total Future Conditions, three (3) study intersections have one or more approaches operating with unacceptable delay, and five (5) study intersections have one or more lane group that exceeds the given storage length.
- Two (2) study intersections meet DDOT thresholds for mitigation as a result of the proposed development.
- **Overall, this report concludes that the Project will not have a detrimental impact to the surrounding vehicular network with the implementation of all recommended site design elements and Transportation Demand Management (TDM) measures.**

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 upon by DDOT. The general methodology of the analysis follows national and DDOT guidelines on the preparation of transportation impact evaluations of site development. The approved scope is included in the Technical Attachments.

Capacity Analysis Scenarios

The vehicular capacity analyses were performed to determine whether the Project will lead to adverse impacts on traffic operations. A review of potential impacts to other modes is outlined later in this report. This is accomplished by comparing two (2) future scenarios:

- Without the Project (referred to as the Background Conditions); and
- With the Project approved and constructed (referred to as the Total Future conditions).

Specifically, the roadway capacity analysis examines the following scenarios:

- Existing Conditions (2022 Existing Conditions);
- Future Conditions without Metro Station Volume Adjustments or the Project (2027 Background Interim Conditions);
- Future Conditions with Metro Station Volume Adjustments and without the Project (2027 Background Conditions); and
- Future Conditions with Metro Station Volume Adjustments and the Project (2027 Total Future Conditions).

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses were 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 Project. Although it is possible that impacts will occur outside of the study area, those impacts are neither significant enough to be considered a material adverse impact nor worthy of mitigation measures.

Based on the projected future trip generation and the location of the Project access points, the following intersections were selected:

1. Piney Branch Road & Eastern Avenue NW
2. Eastern Avenue NW & Holly Avenue
3. Eastern Avenue NW & Kiss-and-Ride/Relocated Metro Station Driveway
4. Eastern Avenue NW & Removed Metro Station Driveway
5. Eastern Avenue & Cedar Street NW/Cedar Avenue
6. Cedar Street NW & Site Driveway
7. Blair Road & Cedar Street NW
8. Blair Road & 4th Street NW
9. Cedar Street NW & Metro Station Driveway
10. Cedar Street & Carroll Street NW
11. Maple Street & Carroll Street NW

Figure 10 shows a map of the study area intersections.

Geometry and Operations Assumptions

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

2022 Existing Geometry and Operations Assumptions

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.

The lane configurations and traffic controls for the Existing Conditions are shown on Figure 11.

2027 Background Interim Geometry and Operations Assumptions

The configurations and traffic controls for the 2027 Background Interim Conditions were based on those for the 2022 Existing Conditions with the addition of background improvements.

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 Project.

Based on these criteria, the following improvement was identified for this analysis:

- Metropolitan Branch Trail Extension

The lane configurations and traffic controls for the Background Interim Conditions, which are the same as those of the Existing Conditions, are shown on Figure 11.

2027 Background and 2027 Total Future Geometry and Operations Assumptions

The configurations and traffic controls for the 2027 Background and 2027 Total Future Conditions were based on those for the 2027 Background Interim Conditions with the inclusion of Project-related driveway reconfigurations and alterations at the Carroll Street intersection with the relocated bus-loop.

The Project includes the removal of the current bus access driveway at Eastern Avenue NW and the addition of a new site driveway along Cedar Street NW between Carroll Street and Eastern Avenue. The two other existing site driveways (one connecting to Eastern Avenue NW and one connecting to Carroll Street NW) will be retained but reconstructed with the Project. The Project also includes relocating the right-of-way of the existing bus loop and consolidating it with the Metro station’s kiss-and-ride function.

The Carroll Street intersection with the relocated bus-loop was assumed to be signalized with the Project.

The lane configurations and traffic controls for the Background and Total Future Conditions are shown on Figure 12.

Traffic Volume Assumptions

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

2022 Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data collected on Thursday, May 19, 2022. The results of these traffic counts are included in the Technical Attachments. For all intersections, the individual morning and afternoon peak hours were used.

The 2022 Existing peak hour traffic volumes are shown in Figure 13.

2027 Background Interim Traffic Volumes (without Metro Station Volume Adjustments or the Project)

Traffic projections for the 2027 Background Interim Conditions consist of the 2022 Existing volumes with the following additions:

- The addition of traffic generated by developments expected to be completed prior to the Project (known as background developments); and
- The addition of inherent growth on the roadway (representing regional traffic growth).

Volumes Generated by Background Developments

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 future analysis year of 2027.

Based on these criteria, and as discussed with and agreed upon by DDOT, eight (8) developments were considered and determined to meet the above criteria. These developments include the following:

1. Fern Street Townhomes
2. The Hartley
3. Kite House
4. Reynard
5. Aspen Square at The Parks
6. The Arbor at Takoma
7. Gilbert & Wood
8. 225 Vine Street

The locations of these developments are shown in Figure 5.

Trip generation for the background developments is based on ITE *Trip Generation,* 11th Edition. The mode splits and trip distribution assumptions for these developments were based on their respective transportation studies where available, or on the same assumptions as the Takoma Metro Multifamily Project. In the case of the Gilbert & Wood and 225 Vine Street developments, auto mode splits were increased 10% from those of the Takoma Metro Multifamily Project due to their increased distance from Metrorail. The available transportation studies are included in the Technical Attachments.

A summary of the trip generation for the background developments is shown in Table 5 and the combined background projects peak hour volumes are shown in Figure 14.

Volumes Generated by Regional Traffic Growth

While background developments represent local traffic changes, regional traffic growth is typically accounted for using growth rates. The growth rates used in this analysis are based on MWCOG's currently adopted regional transportation model, comparing the difference between the year 2022 and 2027 model scenarios. The growth rates observed in this model served as a basis for analysis assumptions, and a conservative 0.10 percent annual growth rate was applied to roadways where a decline in volumes were observed. The applied growth rates are shown in Table 6. The traffic volumes generated by the inherent growth along the network between 2022 and 2027 are shown on Figure 15.

The existing peak hour volumes presented in Figure 13 were combined with the background projects' peak hour volumes shown in Figure 14 and the background growth peak hour volumes shown in Figure 15 to establish the 2027 Background Interim traffic volumes. The traffic volumes for the 2027 Background Interim Conditions are shown in Figure 16.

The Background Interim Conditions are included in this analysis for reference only, and are not the basis for comparison with Total Future Conditions.

2027 Background Traffic Volumes (with Metro Station Volume Adjustments and without the Project)

The 2027 Total Future traffic volumes consist of the following:

- Existing volumes, shown on Figure 13;

- Traffic generated by background developments, shown on Figure 14;
- Inherent growth on study area roadways, shown on Figure 15;
- Existing kiss & ride traffic removed and rerouted per the new Metro station driveway configuration, shown on Figure 17; and
- Existing bus traffic removed and rerouted per the new Metro station driveway configuration, shown on Figure 18.
- **To provide a conservatively high traffic estimate, we have added additional bus and kiss-and-ride traffic to the road network to represent full potential kiss-and-ride use based on historical WMATA metro usage data for pre-covid conditions.**

The existing peak hour volumes presented in Figure 13 were combined with the background projects' peak hour volumes shown in Figure 14, the background growth peak hour volumes shown in Figure 15, the removed/rerouted kiss & ride volumes shown on Figure 17, and the removed/rerouted bus volumes shown on Figure 18 to establish the 2027 Background traffic volumes. The traffic volumes for the 2027 Background Conditions are shown in Figure 19.

The Background Conditions are the basis for comparison with Total Future Conditions.

2027 Total Future Traffic Volumes (with Metro Station Volume Adjustments and the Project)

The 2027 Total Future traffic volumes consist of the following:

- Existing volumes, shown on Figure 13;
- Traffic generated by background developments, shown on Figure 14;
- Inherent growth on study area roadways, shown on Figure 15;
- Existing kiss & ride traffic removed and rerouted per the new Metro station driveway configuration, shown on Figure 17; and
- Existing bus traffic removed and rerouted per the new Metro station driveway configuration, shown on Figure 18; and
- Site-generated volumes, shown on Figure 22.

Site-Generated Volumes

Trip distribution for the site-generated trips was determined based on: (1) Census Transportation Planning Products (CTPP) Traffic Analysis Zone (TAZ) data, (2) existing and future travel patterns in the study area, and (3) previously approved methodologies employed in approved studies in the vicinity of the Project.

Based on this review and the site access locations, the site-generated trips were distributed through the study area intersections. Trip distribution assumptions and specific routings were analyzed for inbound and outbound trips, and for the residential and retail portions of the Project. Inbound and outbound distribution assumptions for the Project are provided in Figure 20 and Figure 21, respectively.

Site-generated peak hour volumes are shown in Figure 22.

The traffic volumes for the 2027 Total Future Conditions are shown on Figure 23.

Table 5: Summary of Background Developments Trip Generation

Development	Trip Generation Source	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Fern Street Townhomes	ITE *Trip Gen.*, 11th Ed.	8	22	30	23	13	36
The Hartley	ITE *Trip Gen.*, 11th Ed.	67	81	148	170	159	329
Kite House	ITE *Trip Gen.*, 11th Ed.	3	13	16	12	7	19
Reynard	ITE *Trip Gen.*, 11th Ed.	14	49	63	37	24	61
Aspen Square at The Parks	ITE *Trip Gen.*, 11th Ed.	4	13	17	12	7	19
The Arbor at Takoma	ITE *Trip Gen.*, 11th Ed.	5	5	10	15	14	29
Gilbert & Wood	ITE *Trip Gen.*, 11th Ed.	12	8	20	29	28	57
225 Vine Street	ITE *Trip Gen.*, 11th Ed.	0	0	0	2	1	3
Total		**113**	**191**	**304**	**298**	**252**	**550**

Table 6: Applied Annual and Total Growth Rates

Roadway	Dir.	Proposed Annual Growth Rate Between 2022 and 2027		Proposed Total Growth Between 2022 and 2027	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Carroll St/Cedar St NW	EB	0.10%	0.10%	0.50%	0.50%
	WB	0.10%	0.10%	0.50%	0.50%
Piney Branch Rd NW	NB	0.40%	0.50%	2.02%	2.53%
	SB	0.50%	0.20%	2.53%	1.00%
Eastern Ave/Cedar St NW	NB	0.10%	2.00%	0.50%	10.41%
	SB	2.00%	0.10%	10.41%	0.50%
Blair Rd NW	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.50%	0.10%	2.53%	0.50%
5th St NW	NB	1.30%	0.50%	6.67%	2.53%
	SB	0.50%	0.10%	2.53%	0.50%
4th St NW [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Butternut St NW [1]	EB	0.10%	0.10%	0.50%	0.50%
	WB	0.10%	0.10%	0.50%	0.50%
Maple St NW [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Holly Ave [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Cedar Ave [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%

[1] AADT and/or MWCOG data is not available for this street; therefore a conservative 0.1% growth rate per year was used.

Vehicular Analysis Results

Intersection Capacity Analysis

Intersection capacity analyses were performed for existing, background and total future scenarios outlined previously at the intersections contained within the study area during the AM and PM peak hours. *Synchro* version 11 was used to analyze the study intersections based on the Highway Capacity Manual (HCM) 2000 methodology.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from "A" being the best to "F" being the worst. LOS D is typically used as the acceptable LOS threshold in the District; although LOS E or F is sometimes accepted in urbanized areas if vehicular improvements would be a detriment to safety or non-auto modes of transportation.

The LOS capacity analyses were based on: (1) the intersection peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the HCM methodologies (using *Synchro* software). The average delay of each approach and LOS is shown for all intersections in addition to the overall average delay and intersection LOS grade. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Attachments.

Table 7 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the 2022 Existing, 2027 Background Interim, 2027 Background, and 2027 Total Future scenarios. Table 8 shows a comparison of the volume to capacity (v/c) ratios, while Table 9 shows a comparison of queuing results.

Intersection Capacity Under Existing Conditions

As shown in Table 7, two (2) of the study intersections operate at unacceptable conditions or have one or more approaches operating at unacceptable levels during Existing Conditions:

- Blair Road & Cedar Street NW
  - Eastbound (PM)
- Cedar Street & Carroll Street NW
  - Southbound (AM)

Intersection Capacity Under Background Interim Conditions

As shown in Table 7, two (2) of the study intersections operate at unacceptable conditions or have one or more approaches operating at unacceptable levels during Background Conditions:

- Blair Road & Cedar Street NW
  - Eastbound (PM)
- Cedar Street & Carroll Street NW
  - Southbound (AM)

Intersection Capacity Under Background Conditions

As shown in Table 7, three (3) of the study intersections operate at unacceptable conditions or have one or more approaches operating at unacceptable levels during Background Conditions:

- Blair Road & Cedar Street NW
  - Eastbound (PM)
- Blair Road & 4th Street NW
  - Northwestbound (AM)
- Cedar Street & Carroll Street NW
  - Overall (AM)
  - Southbound (AM)

Intersection Capacity Under Future Conditions

As shown in Table 7, three (3) of the study intersections operate at unacceptable conditions or have one or more approaches operating at unacceptable levels during Future Conditions:

- Blair Road & Cedar Street NW
  - Eastbound (PM)
- Blair Road & 4th Street NW
  - Northwestbound (AM)
- Cedar Street & Carroll Street NW
  - Overall (AM)
  - Southbound (AM)
  - It should be noted that a primary driver of this intersection's increased delay under background future conditions with the Metro reconfiguration is that we have added additional bus and kiss-and-ride traffic to the road network to represent full potential kiss-and-ride use based on historical WMATA metro usage data for pre-covid conditions.

Queuing Analysis

In addition to the capacity analyses presented above, a queuing analysis was performed at each of the study intersections. The queuing analysis was performed using *Synchro* software. The 50th percentile and 95th percentile maximum queue lengths are shown for each lane group at the study area's signalized intersections. The 50th percentile maximum queue is the maximum back of queue on a typical cycle. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. For unsignalized intersections, the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM calculations.

Table 9 shows the queuing results for the study intersections, including 50th and 95th percentile queues for the 2022 Existing, 2027 Background Interim, 2027 Background, and 2027 Total Future scenarios.

<u>Queuing Under Existing Conditions</u>

As shown in Table 9, five (5) of the study intersections have one or more lane group that exceeds the given storage length during Existing Conditions:

- Piney Branch Road & Eastern Avenue NW
  - Eastbound right (AM, PM)
  - Westbound right (AM, PM)
  - Southbound thru (AM, PM)
- Blair Road & Cedar Street NW
  - Westbound thru (AM)
- Blair Road & 4th Street NW
  - Northwestbound thru (AM, PM)
- Cedar Street & Carroll Street NW
  - Eastbound left/thru (PM)
- Carroll Street & Maple Street NW
  - Westbound left/thru/right (AM, PM)

<u>Queuing Under Background Interim Conditions</u>

As shown in Table 9, five (5) of the study intersections have one or more lane group that exceeds the given storage length during Background Interim Conditions:

- Piney Branch Road & Eastern Avenue NW
  - Eastbound right (AM, PM)
  - Westbound right (AM, PM)
  - Southbound thru (AM, PM)
- Blair Road & Cedar Street NW
  - Westbound thru (AM)
- Blair Road & 4th Street NW
  - Northwestbound thru (AM, PM)
- Cedar Street & Carroll Street NW
  - Eastbound left/thru (PM)
- Carroll Street & Maple Street NW
  - Westbound left/thru/right (AM, PM)

<u>Queuing Under Background Conditions</u>

As shown in Table 9, five (5) of the study intersections have one or more lane group that exceeds the given storage length during Background Interim Conditions:

- Piney Branch Road & Eastern Avenue NW
  - Eastbound right (AM, PM)
  - Westbound right (AM, PM)
  - Southbound left (AM)
  - Southbound thru (AM, PM)
- Blair Road & 4th Street NW
  - Northwestbound thru (AM, PM)
- Cedar Street NW & Metro Station Driveway
  - Westbound thru/right (AM, PM)
- Cedar Street & Carroll Street NW
  - Eastbound left/thru (PM)
- Carroll Street & Maple Street NW
  - Westbound left/thru/right (AM, PM)

<u>Queuing Under Future Conditions</u>

As shown in Table 9, five (5) of the study intersections have one or more lane group that exceeds the given storage length during Future Conditions:

- Piney Branch Road & Eastern Avenue NW
  - Eastbound right (AM, PM)
  - Westbound right (AM, PM)
  - Southbound left (AM)
  - Southbound thru (AM, PM)
- Blair Road & 4th Street NW
  - Northwestbound thru (AM, PM)
- Cedar Street NW & Metro Station Driveway
  - Westbound thru/right (AM, PM)
- Cedar Street & Carroll Street NW
  - Eastbound left/thru (PM)
- Carroll Street & Maple Street NW
  - Westbound left/thru/right (AM, PM)

Mitigation Measures

Based on DDOT standards, the Project is considered to have an impact at an intersection within the study area if any of the following conditions are met:

- The capacity analyses show a LOS E or F at an intersection or along an approach in Future conditions with the Project where one does not exist in Background Conditions;
- There is an increase in delay at any approach or overall intersection operating under LOS E or F of greater than five (5) percent when compared to Background Conditions;
- A 95th percentile queue exceeds storage along an approach in Future Conditions with the Project where it does not in Background Conditions; or
- There is an increase in the 95th percentile queue by more than 150 feet along an approach in that exceeds storage in Background Conditions.

Based on these criteria, there are impacts to two (2) intersections as a result of the Project. These intersections are:

- Blair Road and Cedar Street NW (PM)
- Cedar Street and Carroll Street NW (AM)

Potential mitigation measures were tested at these intersections, including signal timing adjustments.

Further, it should be noted that a primary driver of the Cedar Street and Carroll Street NW intersection's increased delay under background future conditions with the site reconfiguration is that we have added additional bus and kiss-and-ride traffic to the road network to represent full potential kiss-and-ride use based on historical WMATA metro usage data for pre-covid conditions.

Blair Road and Cedar Street NW

The eastbound approach of Cedar Street NW, which operates at LOS E in Background Conditions, is projected to experience an increase in delay of more than five (5) percent in Total Future Conditions during the PM peak hour, bringing its delay to LOS F in Total Future Conditions.

Signal timing adjustments were tested at this intersection. The results of this analysis indicate that it would reduce delays to levels below those observed in Background Conditions.

Mitigation at this intersection is proposed via the Project's robust TDM Plan, which includes the Base Plan as well as components from the "Enhanced" and "Enhanced Plus" categories.

The potential signal timing adjustments for this intersection can be found in the Technical Attachments.

Cedar Street and Carroll Street NW

The southbound approach of Cedar Street NW, which operates at LOS F in Background Conditions, is projected to experience an increase in delay of more than five (5) percent in Total Future Conditions during the AM peak hour. Similarly, overall delay at the intersection is projected to experience an increase in delay of more than five (5) percent in Total Future Conditions during the AM peak hour.

Signal timing adjustments were tested at this intersection. The results of this analysis indicate that it would reduce delays to levels below those observed in Background Conditions.

Mitigation at this intersection is proposed via the Project's robust TDM Plan, which includes the Base Plan as well as components from the "Enhanced" and "Enhanced Plus" categories.

The potential signal timing adjustments for this intersection can be found in the Technical Attachments.

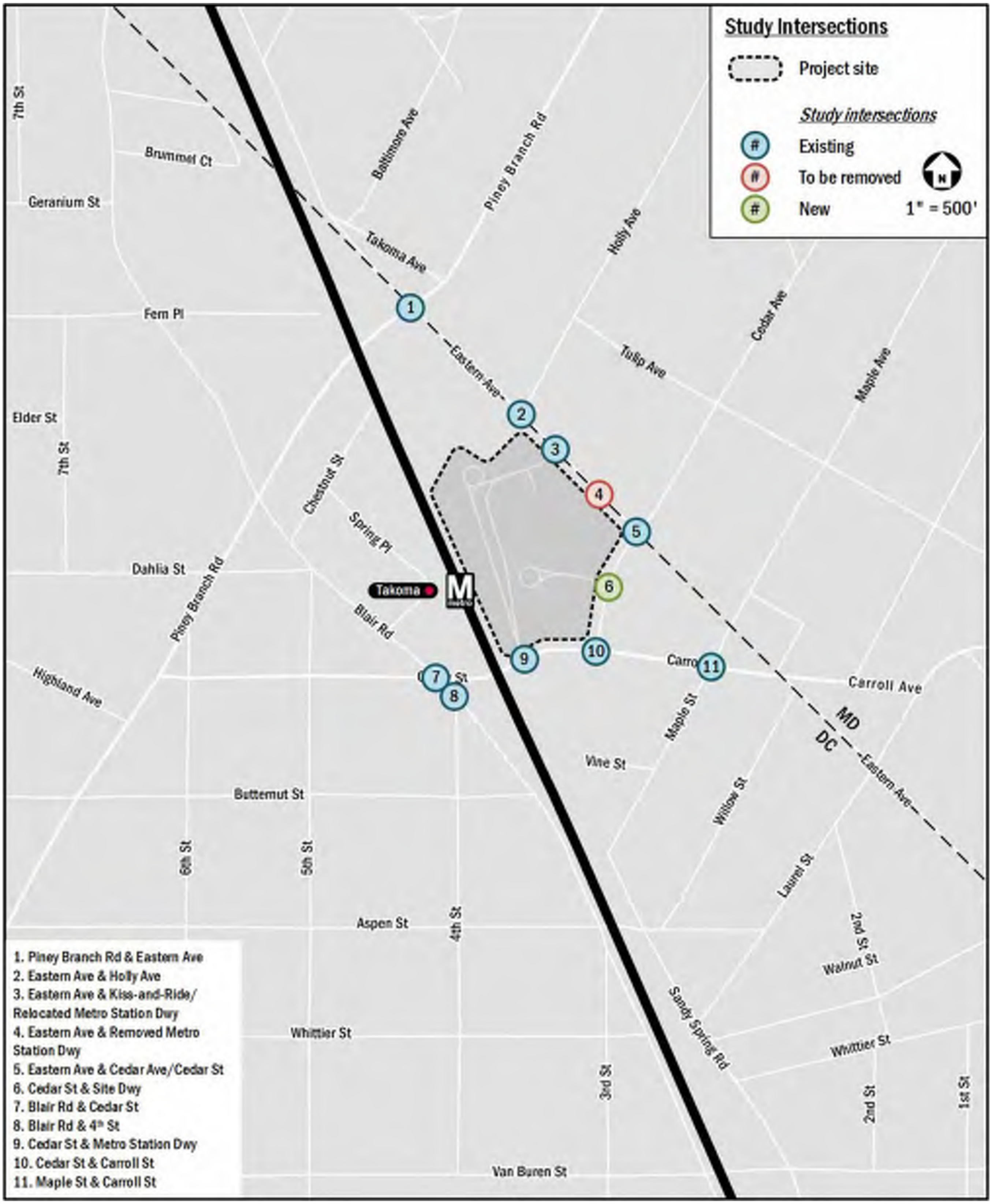


Figure 10: Study Area Intersections

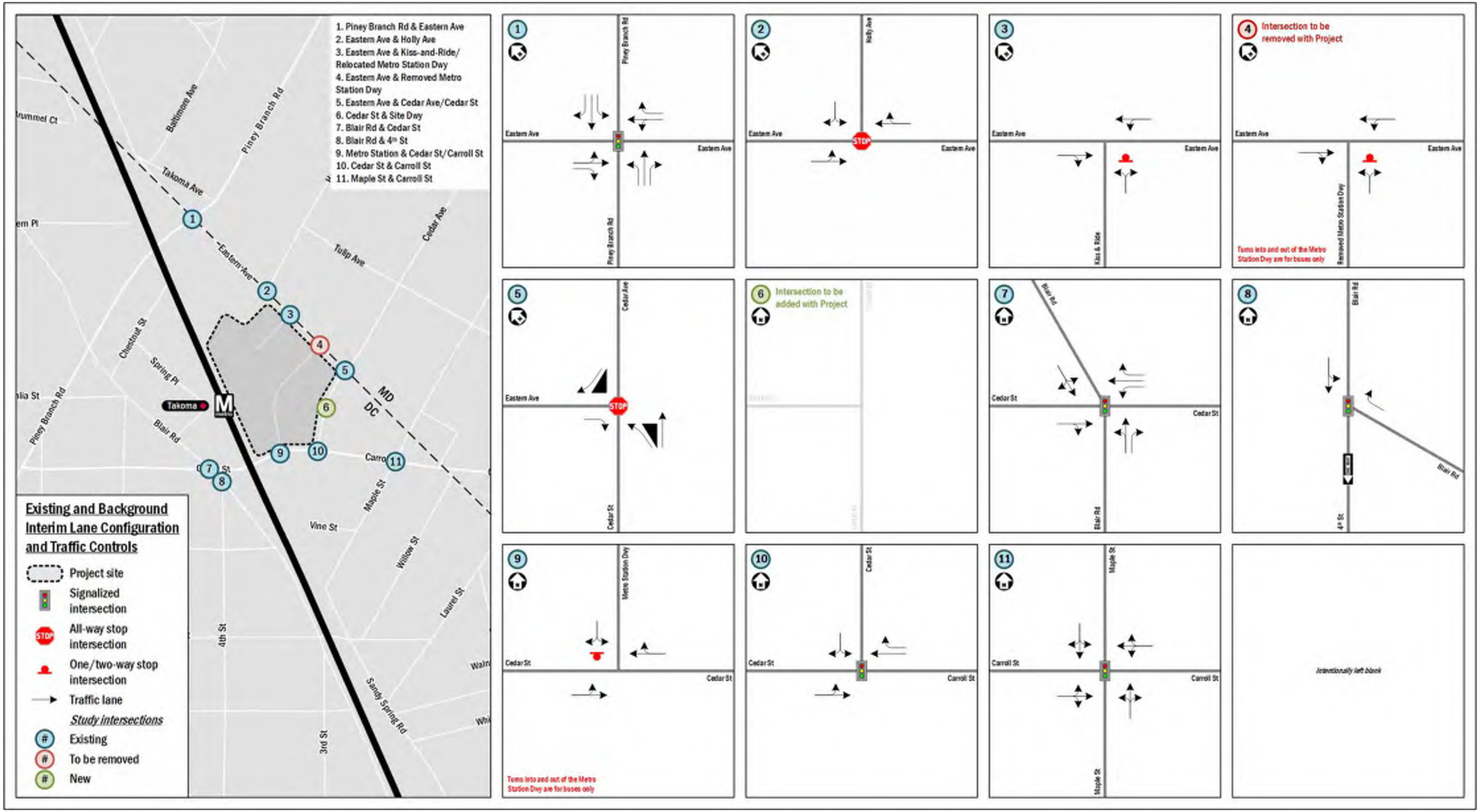


Figure 11: Existing and Background Interim Lane Configurations and Traffic Controls

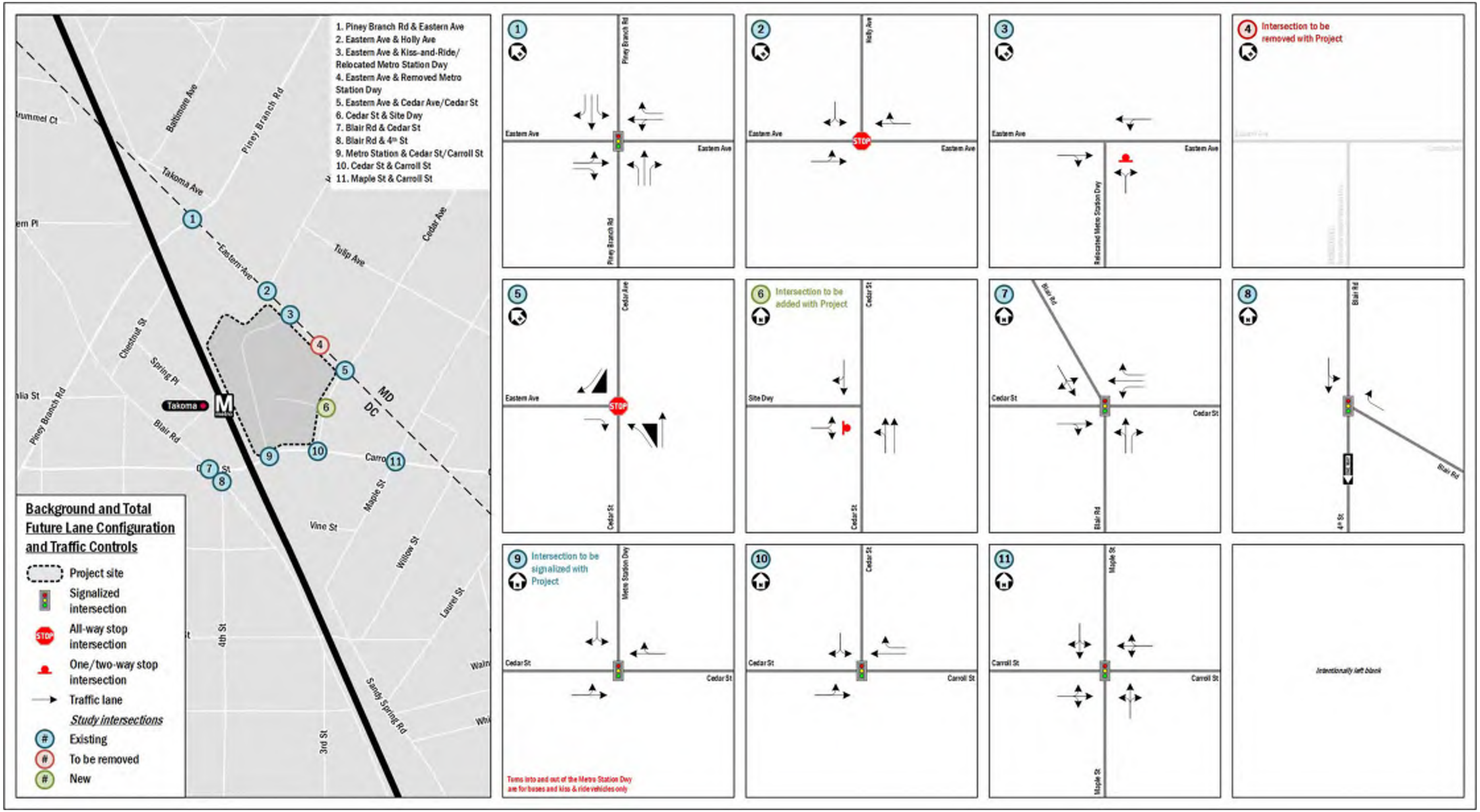


Figure 12: Background and Total Future Lane Configurations and Traffic Controls

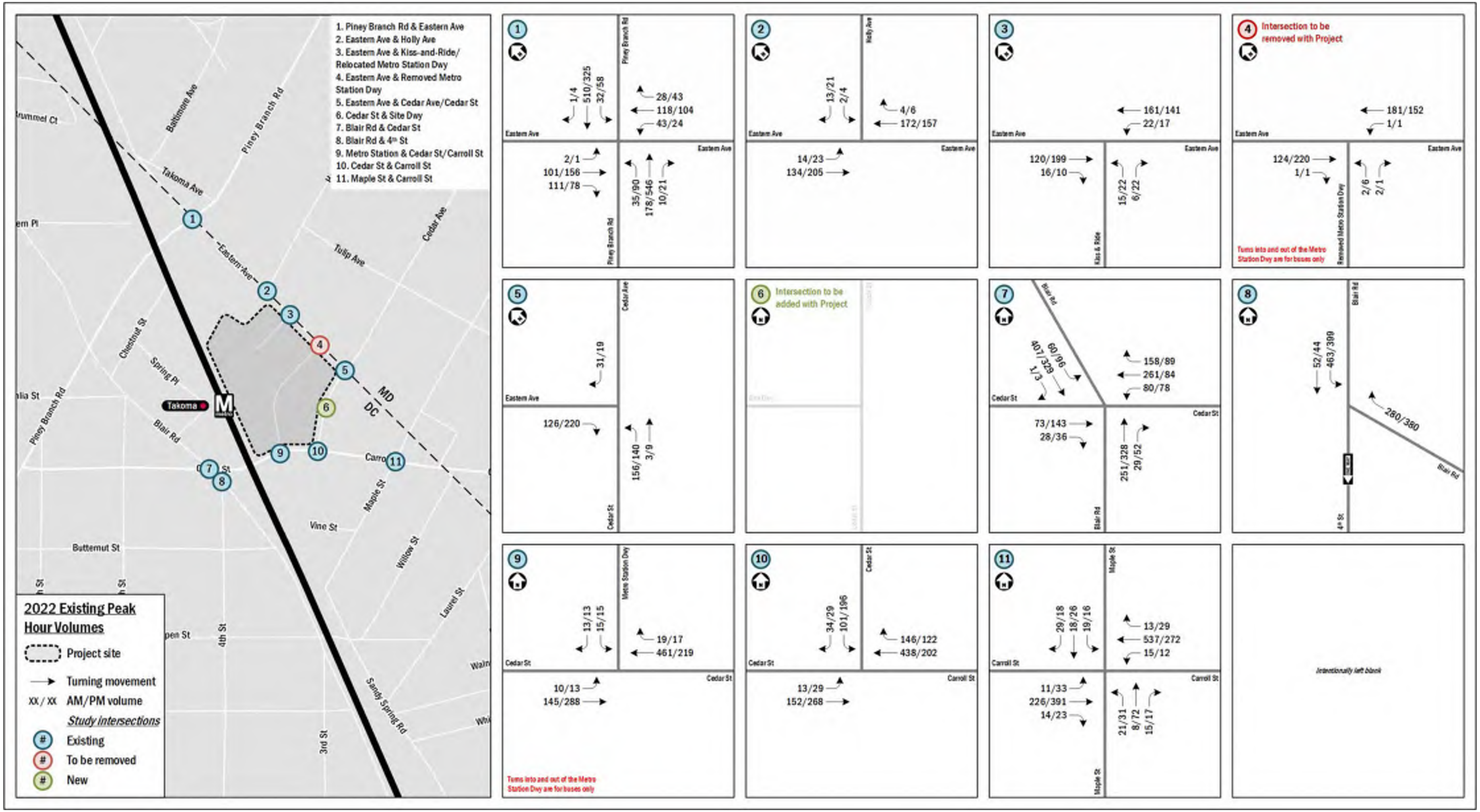


Figure 13: 2022 Existing Peak Hour Volumes

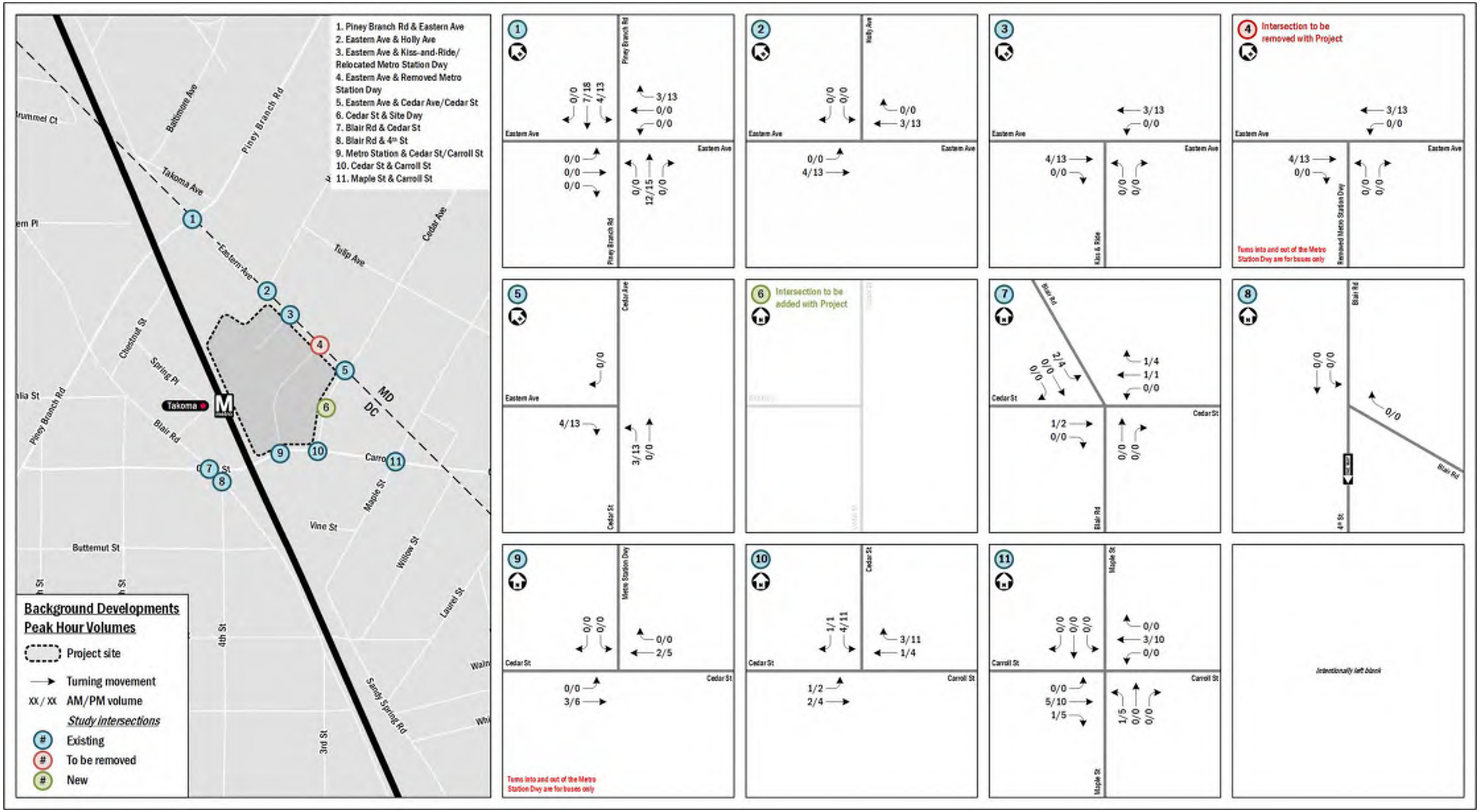


Figure 14: Background Developments Peak Hour Volumes

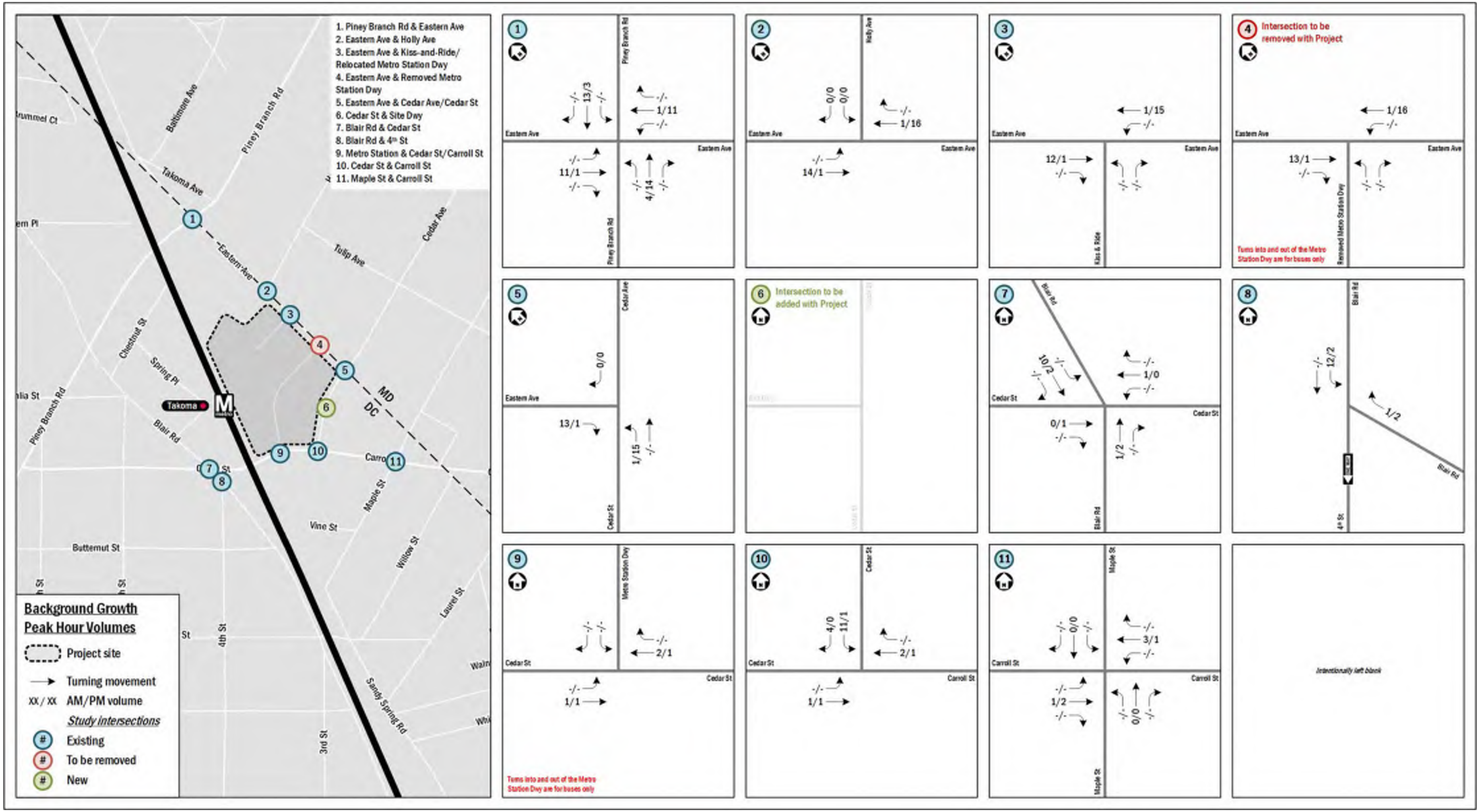


Figure 15: Background Growth Peak Hour Volumes

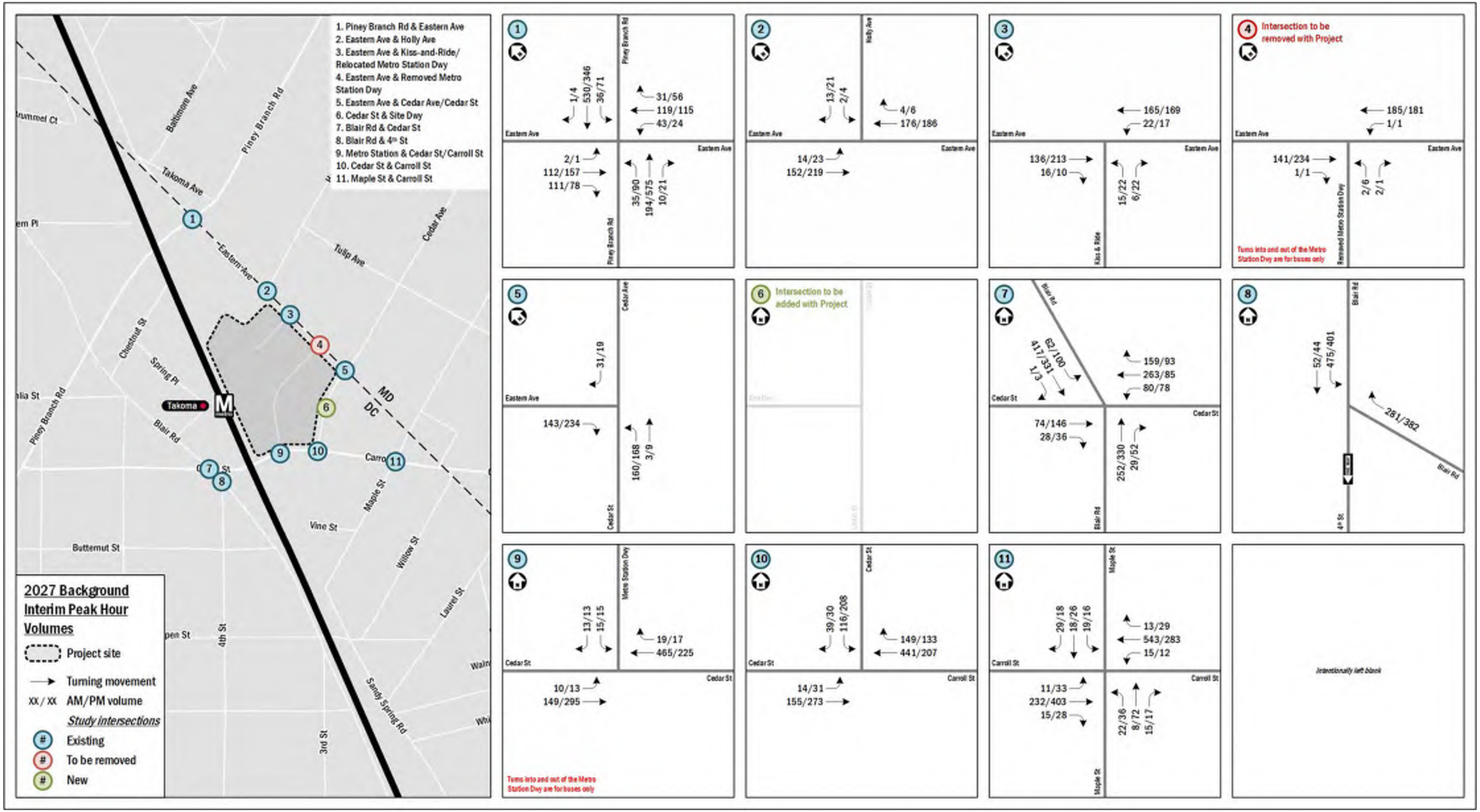


Figure 16: 2027 Background Interim Peak Hour Volumes

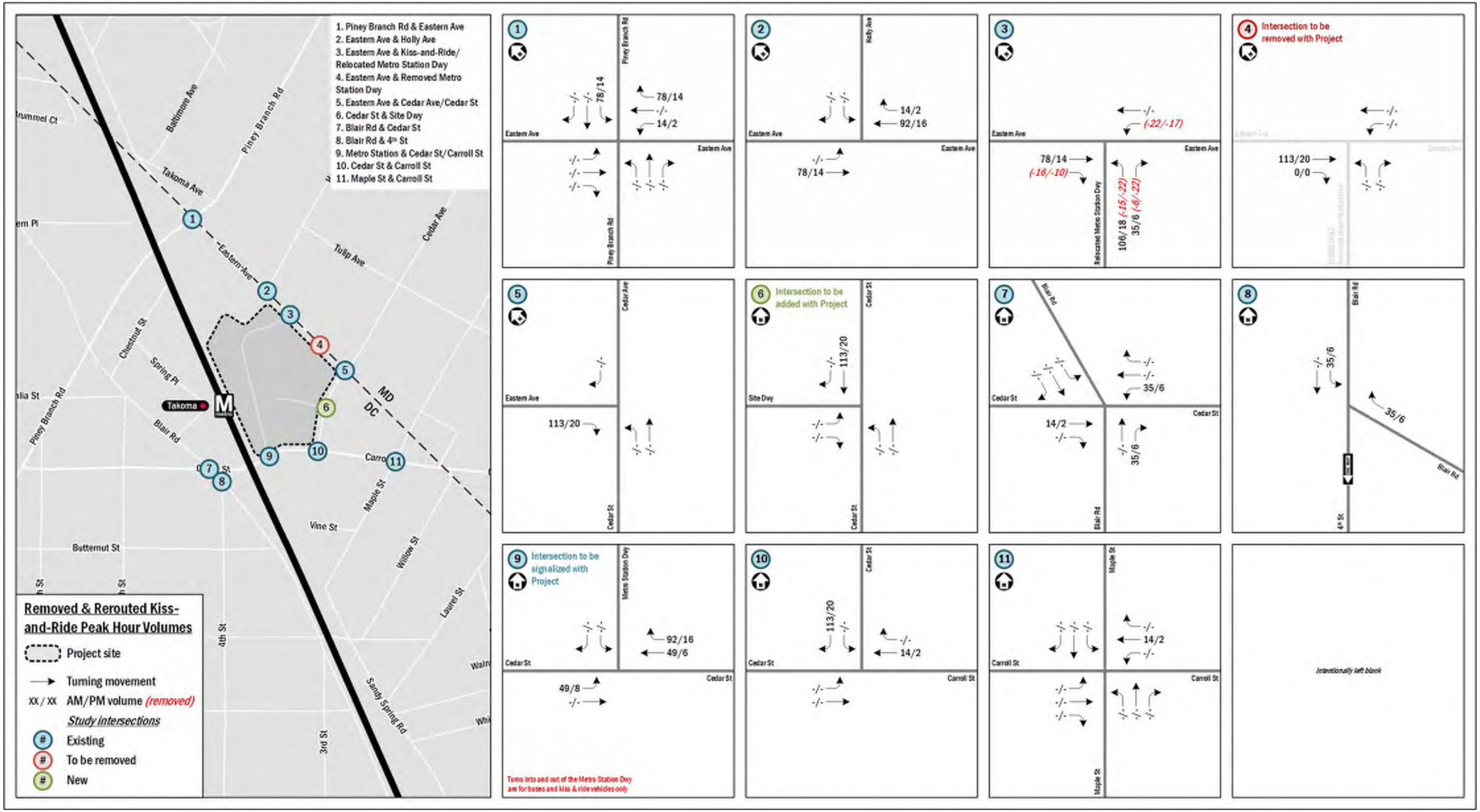


Figure 17: Removed/Rerouted Kiss-and-Ride Peak Hour Volumes

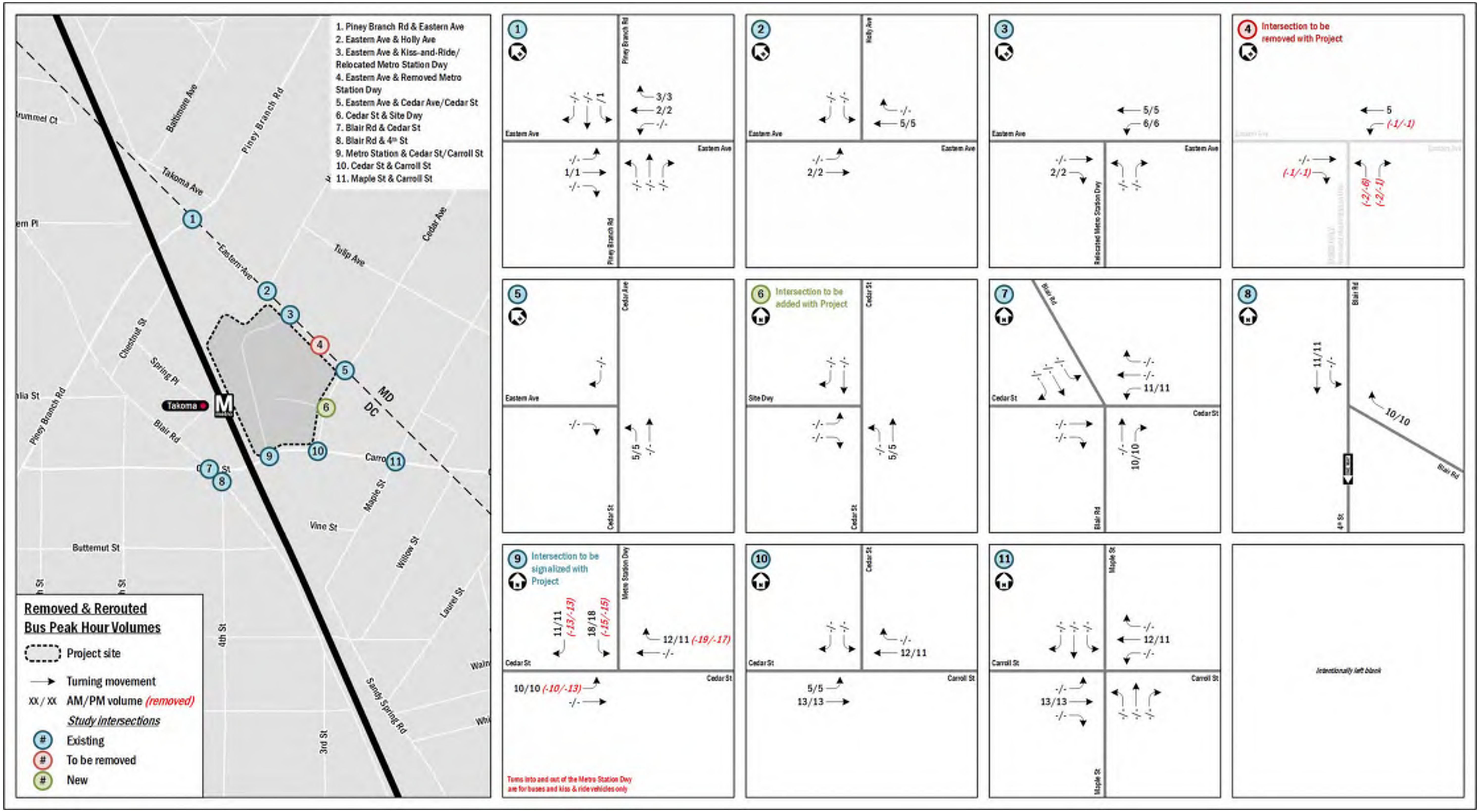


Figure 18: Removed/Rerouted Bus Peak Hour Volumes

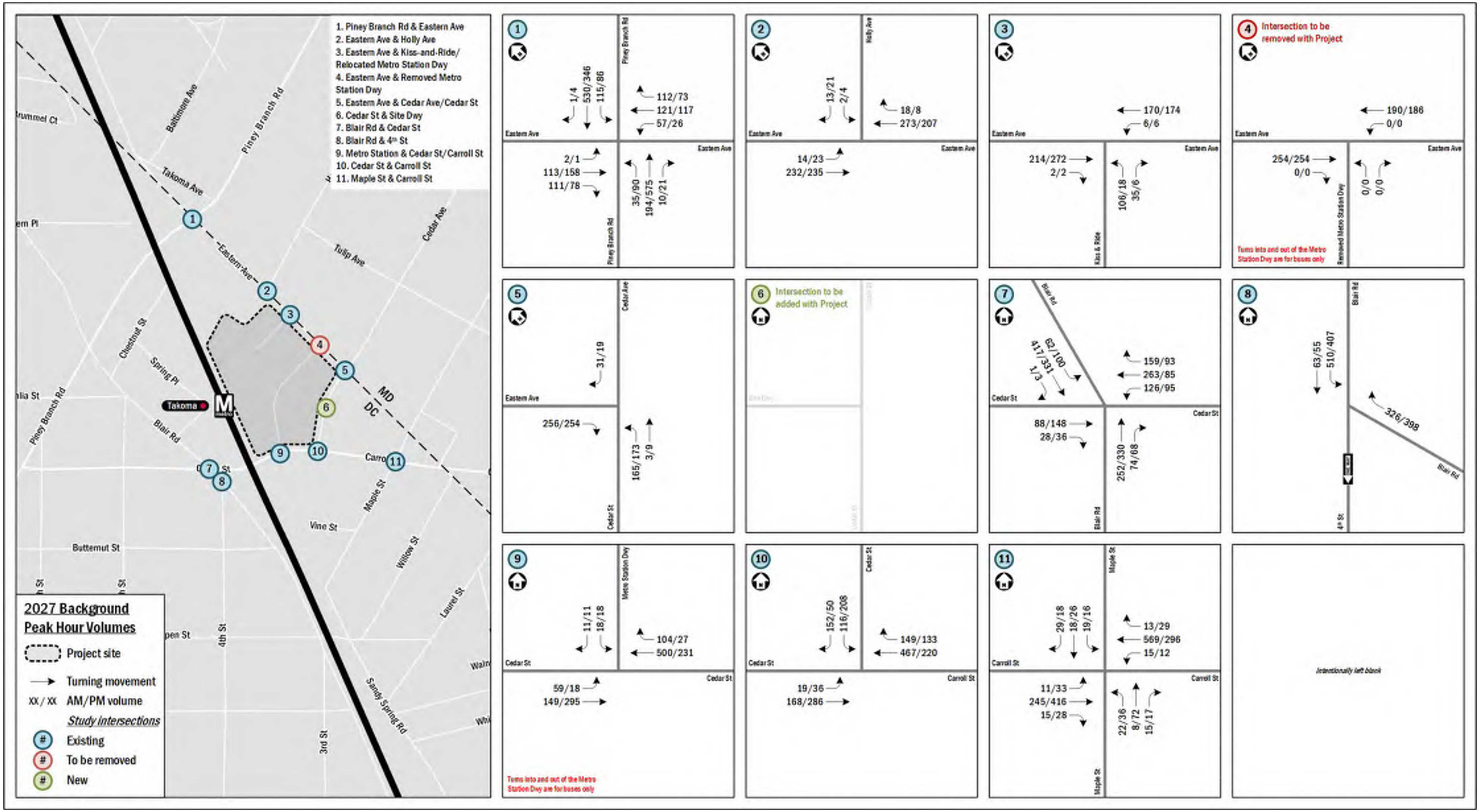


Figure 19: 2027 Background Peak Hour Volumes

Figure 20: Inbound Trip Distribution

Figure 21: Outbound Trip Distribution

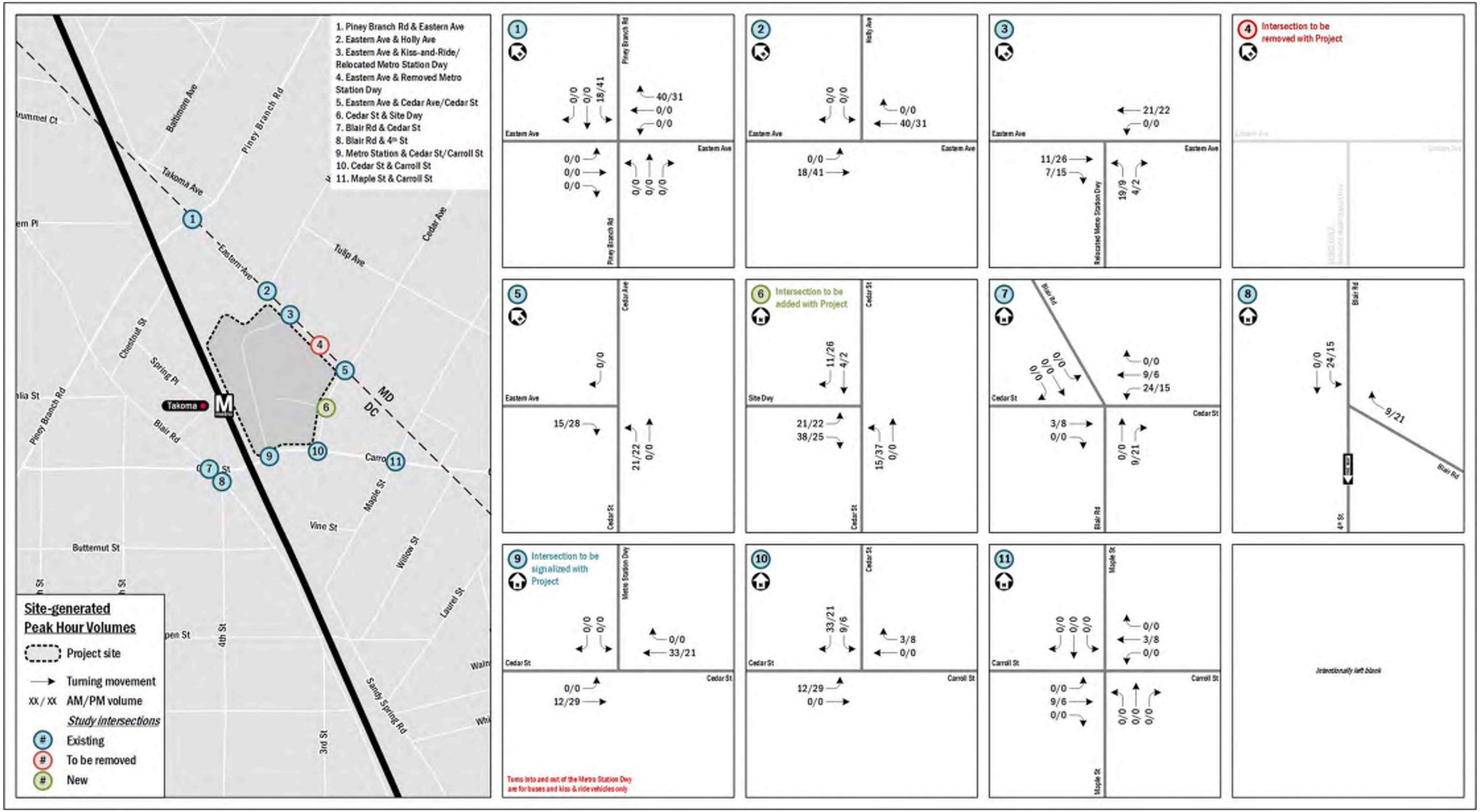


Figure 22: Site-Generated Peak Hour Volumes

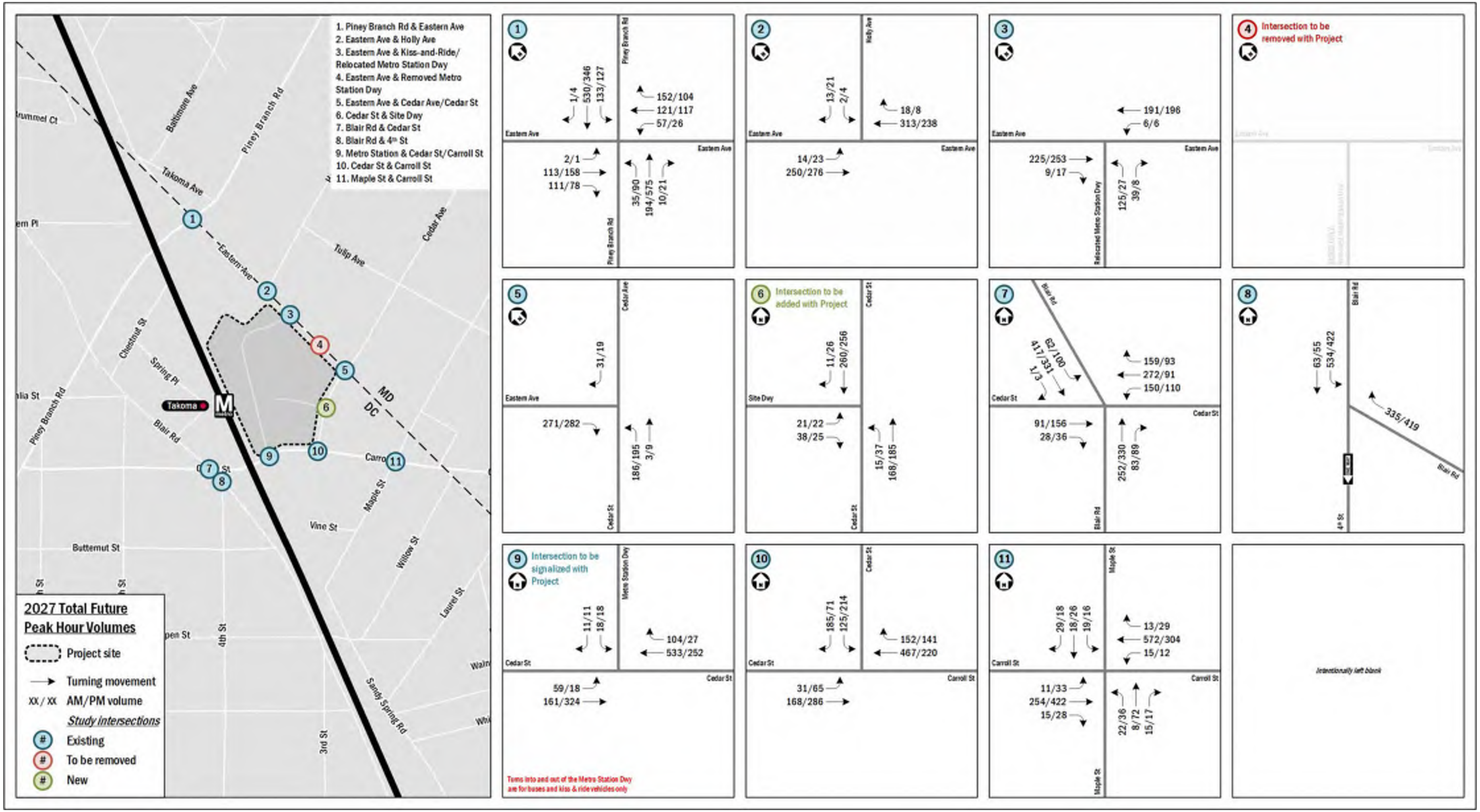


Figure 23: 2027 Total Future Peak Hour Volumes

Table 7: LOS Comparison

	Intersection and Approach	Existing (2022)				Background Interim (2027)				Background (2027)				Future (2027)				Future (2027) with Mitigations			
		AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
		Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS
1.	**Piney Branch Rd & Eastern Ave**																				
	Overall	**23.0**	**C**	**18.7**	**B**	**23.2**	**C**	**19.3**	**B**	**23.7**	**C**	**19.6**	**B**	**24.1**	**C**	**20.1**	**C**	**-**	**-**	**-**	**-**
	Eastbound	33.1	C	44.0	D	33.3	C	44.1	D	33.3	C	44.2	D	33.3	C	44.2	D	-	-	-	-
	Westbound	34.5	C	42.3	D	34.5	C	42.9	D	35.6	D	43.4	D	36.5	D	44.2	D	-	-	-	-
	Northbound	16.7	B	9.1	A	16.9	B	9.8	A	16.9	B	9.8	A	16.9	B	9.9	A	-	-	-	-
	Southbound	17.5	B	9.3	A	18.0	B	9.7	A	17.4	B	9.9	A	17.3	B	10.5	B	-	-	-	-
2.	**Eastern Ave & Holly Ave**																				
	Eastbound	8.2	A	8.9	A	8.4	A	9.1	A	9.5	A	9.3	A	9.8	A	9.9	A	-	-	-	-
	Westbound	8.4	A	8.4	A	8.5	A	8.7	A	9.9	A	9.0	A	10.6	B	9.4	A	-	-	-	-
	Southbound	7.3	A	7.6	A	7.3	A	7.7	A	7.8	A	7.8	A	7.9	A	7.9	A	-	-	-	-
3.	**Eastern Ave & Kiss-and-Ride/Relocated Metro Station Dwy**																				
	Eastbound	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		-	-	-	-
	Westbound	1.0		1.0		1.0		0.8		0.3		0.3		0.3		0.3		-	-	-	-
	Northbound	10.5	B	10.9	B	10.6	B	11.2	B	12.9	B	11.5	B	13.9	B	12.3	B	-	-	-	-
4.	**Eastern Ave & Metro Station Dwy**																				
	Eastbound	0.0		0.0		0.0		0.0		-	-	-	-	-	-	-	-	-	-	-	-
	Westbound	0.0		0.1		0.0		0.0		-	-	-	-	-	-	-	-	-	-	-	-
	Northbound	11.3	B	13.0	B	11.6	B	13.5	B	-	-	-	-	-	-	-	-	-	-	-	-
5.	**Eastern Ave & Cedar St/Cedar Ave**																				
	Eastbound	7.6	A	8.0	A	7.7	A	8.3	A	8.7	A	8.5	A	9.0	A	9.0	A	-	-	-	-
	Northbound	8.9	A	8.9	A	9.1	A	9.4	A	9.7	A	9.6	A	10.2	B	10.2	B	-	-	-	-
	Southbound	6.3	A	6.3	A	6.3	A	6.3	A	6.3	A	6.3	A	6.3	A	6.3	A	-	-	-	-
6.	**Cedar St & Site Dwy**																				
	Eastbound	-	-	-	-	-	-	-	-	0.0	A	0.0	A	11.3	B	11.7	B	-	-	-	-
	Northbound	-	-	-	-	-	-	-	-	0.0		0.0		0.7		1.4		-	-	-	-
	Southbound	-	-	-	-	-	-	-	-	0.0		0.0		0.0		0.0		-	-	-	-
7.	**Blair Rd & Cedar St**																			***Signal timing adjustments tested***	
	Overall	**35.1**	**D**	**31.4**	**C**	**35.8**	**D**	**32.8**	**C**	**30.1**	**C**	**38.3**	**D**	**31.2**	**C**	**39.7**	**D**	**-**	**-**	***41.2***	***D***
	Eastbound	46.8	D	75.7	E	47.0	D	77.6	E	48.6	D	78.9	E	48.9	D	83.9	F	-	-	*69.3*	*E*
	Westbound	45.0	D	24.3	C	44.5	D	24.3	C	28.6	C	50.7	D	31.5	C	53.2	D	-	-	*51.2*	*D*
	Northbound	7.3	A	6.6	A	7.3	A	6.6	A	9.8	A	7.1	A	10.2	B	7.7	A	-	-	*7.7*	*A*

Intersection and Approach	Existing (2022)				Background Interim (2027)				Background (2027)				Future (2027)				Future (2027) with Mitigations			
	AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS	Del.	LOS
Southbound	38.8	D	39.0	D	41.0	D	42.0	D	41.2	D	42.0	D	41.2	D	42.0	D	-	-	*54.2*	*D*
8. Blair Rd & 4th St																				
Overall	**18.2**	**B**	**22.7**	**C**	**18.1**	**B**	**22.9**	**C**	**21.7**	**C**	**24.1**	**C**	**22.3**	**C**	**26.5**	**C**	**-**	**-**	**-**	**-**
Southeastbound	2.1	A	2.3	A	2.2	A	2.3	A	2.2	A	2.3	A	2.3	A	2.2	A	-	-	-	-
Northwestbound	47.2	D	46.6	D	47.4	D	46.9	D	55.0	E	49.5	D	57.2	E	54.1	D	-	-	-	-
9. Cedar St & Metro Station Dwy																				
Overall	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**26.3**	**C**	**24.8**	**C**	**27.0**	**C**	**26.0**	**C**	**-**	**-**	**-**	**-**
Eastbound	0.7		0.6		0.7		0.5		8.8	A	10.1	B	9.3	A	10.6	B	-	-	-	-
Westbound	0.0		0.0		0.0		0.0		31.2	C	41.6	D	32.2	C	44.0	D	-	-	-	-
Southbound	23.3	C	17.4	C	23.5	C	17.5	C	48.3	D	34.0	C	48.3	D	34.0	C	-	-	-	-
10. Cedar St & Carroll St																	***Signal timing adjustments tested***			
Overall	**13.5**	**B**	**21.3**	**C**	**15.9**	**B**	**22.0**	**C**	**63.9**	**E**	**23.0**	**C**	**95.6**	**F**	**25.3**	**C**	***36.7***	***D***	**-**	**-**
Eastbound	2.0	A	12.3	B	2.0	A	12.3	B	1.9	A	12.6	B	1.9	A	13.9	B	*8.8*	*A*	-	-
Westbound	5.7	A	13.8	B	5.7	A	14.2	B	5.7	A	14.1	B	5.6	A	14.3	B	*19.3*	*B*	-	-
Southbound	61.7	E	44.1	D	69.7	E	45.4	D	241.1	F	48.2	D	335.1	F	53.3	D	*89.5*	*F*	-	-
11. Carroll St & Maple St																				
Overall	**13.2**	**B**	**18.3**	**B**	**13.2**	**B**	**18.5**	**B**	**13.7**	**B**	**21.8**	**C**	**13.7**	**B**	**21.9**	**C**	**-**	**-**	**-**	**-**
Eastbound	6.7	A	7.9	A	6.3	A	8.1	A	6.3	A	15.1	B	6.4	A	15.4	B	-	-	-	-
Westbound	10.5	B	17.5	B	10.7	B	17.8	B	11.8	B	18.1	B	12.0	B	18.3	B	-	-	-	-
Northbound	40.8	D	47.1	D	40.9	D	47.9	D	40.9	D	47.9	D	40.9	D	47.9	D	-	-	-	-
Southbound	42.0	D	41.9	D	42.0	D	41.9	D	42.0	D	41.9	D	42.0	D	41.9	D	-	-	-	-

Table 8: Volume to Capacity (v/c) Ratio Comparison

Intersection and Movement	Existing (2022)		Background Interim (2027)		Background (2027)		Future (2027)		Future (2027) with Mitigations	
	AM Peak	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*
	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c
1. Piney Branch Rd & Eastern Ave										
Eastbound Left Thru	0.24	0.49	0.26	0.49	0.26	0.49	0.26	0.49	-	-
Eastbound Right	0.32	0.30	0.32	0.30	0.32	0.30	0.32	0.30	-	-
Westbound Left Thru	0.40	0.42	0.40	0.45	0.46	0.46	0.46	0.46	-	-
Westbound Right	0.08	0.16	0.09	0.21	0.31	0.27	0.41	0.39	-	-
Northbound Left	0.13	0.20	0.13	0.20	0.13	0.20	0.13	0.20	-	-

Intersection and Movement		**Existing (2022)**		**Background Interim (2027)**		**Background (2027)**		**Future (2027)**		**Future (2027) with Mitigations**	
		AM Peak	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*
		v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c
	Northbound Thru	0.29	0.66	0.32	0.69	0.32	0.69	0.32	0.69	-	-
	Northbound Right	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.03	-	-
	Southbound Left	0.06	0.15	0.06	0.19	0.20	0.23	0.24	0.35	-	-
	Southbound Thru	0.57	0.31	0.59	0.33	0.59	0.33	0.59	0.33	-	-
	Southbound Right	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-
2.	**Eastern Ave & Holly Ave**										
	Eastbound Left Thru	-	-	-	-	-	-	-	-	-	-
	Westbound Thru Right	-	-	-	-	-	-	-	-	-	-
	Southbound Left Right	-	-	-	-	-	-	-	-	-	-
3.	**Eastern Ave & Kiss-and-Ride/Relocated Metro Station Dwy**										
	Eastbound Thru Right	0.09	0.14	0.10	0.15	0.14	0.15	0.15	0.18	-	-
	Westbound Left Thru	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	-	-
	Northbound Left Right	0.03	0.08	0.03	0.08	0.25	0.05	0.31	0.07	-	-
4.	**Eastern Ave & Metro Station Dwy**										
	Eastbound Thru Right	0.08	0.14	0.09	0.15	-	-	-	-	-	-
	Westbound Left Thru	0.00	0.00	0.00	0.00	-	-	-	-	-	-
	Northbound Left Right	0.01	0.02	0.01	0.02	-	-	-	-	-	-
5.	**Eastern Ave & Cedar St/Cedar Ave**										
	Eastbound Right	-	-	-	-	-	-	-	-	-	-
	Northbound Left	-	-	-	-	-	-	-	-	-	-
	Northbound Thru	-	-	-	-	-	-	-	-	-	-
	Southbound Right	-	-	-	-	-	-	-	-	-	-
6.	**Cedar St & Site Dwy**										
	Eastbound Left Right	-	-	-	-	0.00	0.00	0.10	0.09	-	-
	Northbound Left Thru	-	-	-	-	0.00	0.00	0.01	0.03	-	-
	Northbound Thru	-	-	-	-	0.07	0.08	0.07	0.08	-	-
	Southbound Thru Right	-	-	-	-	0.17	0.17	0.18	0.18	-	-
7.	**Blair Rd & Cedar St**										***Signal timing adjustments tested***
	Eastbound Thru Right	0.41	0.84	0.41	0.86	0.47	0.87	0.48	0.90	-	0.82
	Westbound Left	0.27	0.35	0.27	0.35	0.43	0.43	0.52	0.51	-	0.48
	Westbound Thru	0.61	0.21	0.62	0.21	0.62	0.21	0.64	0.23	-	0.21
	Westbound Right	0.55	0.31	0.56	0.32	0.56	0.32	0.56	0.32	-	0.31

Intersection and Movement	Existing (2022)		Background Interim (2027)		Background (2027)		Future (2027)		Future (2027) with Mitigations	
	AM Peak	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*	*AM Peak*	*PM Peak*
	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c	v/c
Northbound Thru	0.62	0.64	0.62	0.65	0.62	0.65	0.62	0.65	-	0.65
Northbound Right	0.07	0.10	0.07	0.10	0.17	0.14	0.19	0.18	-	0.18
Southbound Left Thru Right	0.76	0.81	0.78	0.84	0.78	0.84	0.78	0.84	-	0.89
8. Blair Rd & 4th St										
Southeastbound Left Thru	0.46	0.41	0.47	0.41	0.52	0.43	0.54	0.44	-	-
Northwestbound Thru	0.70	0.79	0.70	0.79	0.81	0.82	0.84	0.87	-	-
9. Cedar St & Metro Station Dwy									***Signal timing adjust-ments tested***	
Eastbound Left Thru	0.01	0.02	0.01	0.02	0.24	0.37	0.26	0.40	0.26	-
Westbound Thru Right	0.29	0.16	0.30	0.16	0.74	0.48	0.77	0.52	0.77	-
Southbound Left Right	0.13	0.10	0.13	0.10	0.27	0.16	0.27	0.16	0.27	-
10. Cedar St & Carroll St										
Eastbound Left Thru	0.19	0.41	0.19	0.42	0.22	0.45	0.24	0.51	-	-
Westbound Thru	0.49	0.35	0.50	0.35	0.53	0.38	0.53	0.38	-	-
Westbound Right	0.27	0.38	0.27	0.41	0.27	0.41	0.28	0.43	-	-
Southbound Left Right	0.65	0.60	0.75	0.63	1.36	0.69	1.58	0.77	-	-
11. Carroll St & Maple St										
Eastbound Left Thru Right	0.28	0.48	0.29	0.50	0.30	0.51	0.31	0.52	-	-
Westbound Left Thru Right	0.68	0.38	0.69	0.39	0.72	0.40	0.73	0.41	-	-
Northbound Left Thru Right	0.19	0.44	0.19	0.47	0.15	0.46	0.15	0.46	-	-
Southbound Left Thru Right	0.27	0.24	0.27	0.24	0.21	0.20	0.21	0.20	-	-

Table 9: 50th & 95th Percentile Queuing Comparison (in feet)

Intersection and Lane Group	Stor. Lgth. (ft)	Existing (2022)				Background Interim (2027)				Background (2027)				Future (2027)				Future (2027) with Mitigations			
		AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
1. Piney Branch Rd & Eastern Ave																					
Eastbound Left Thru	300	65	113	115	186	72	124	115	187	73	125	116	189	73	125	116	189	-	-	-	-
Eastbound Right	25	72	126	54	103	72	126	54	103	72	126	54	103	72	126	54	103	-	-	-	-
Westbound Left Thru	410	107	174	92	156	107	175	101	168	121	194	104	172	121	194	104	172	-	-	-	-
Westbound Right	25	16	40	29	63	19	44	38	78	72	126	50	97	101	168	74	131	-	-	-	-
Northbound Left	100	12	m24	12	m21	12	m24	13	m22	12	m24	13	m22	12	m24	13	m22	-	-	-	-

Intersection and Lane Group	Stor. Lgth. (ft)	Existing (2022)				Background Interim (2027)				Background (2027)				Future (2027)				Future (2027) with Mitigations			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Northbound Thru	800	59	m85	77	m128	65	m93	87	m141	65	m92	87	m141	65	m92	87	m141	-	-	-	-
Northbound Right	800	3	m9	3	m5	3	m9	3	m5	3	m9	3	m5	3	m9	3	m5	-	-	-	-
Southbound Left	60	11	25	15	31	12	28	19	36	41	71	23	42	49	81	35	60	-	-	-	-
Southbound Thru	80	253	358	104	151	268	379	113	163	268	379	113	163	268	379	113	163	-	-	-	-
Southbound Right	80	0	3	1	5	0	3	1	5	0	3	1	5	0	3	1	5	-	-	-	-
2. Eastern Ave & Holly Ave																					
Eastbound Left Thru	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Westbound Thru Right	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southbound Left Right	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Eastern Ave & Kiss-and-Ride/Relocated Metro Station Dwy																					
Eastbound Thru Right	180	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	-	-	-
Westbound Left Thru	100	-	1	-	1	-	1	-	1	-	0	-	0	-	0	-	0	-	-	-	-
Northbound Left Right	100	-	3	-	6	-	3	-	6	-	25	-	4	-	32	-	6	-	-	-	-
4. Eastern Ave & Metro Station Dwy																					
Eastbound Thru Right	130	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-
Westbound Left Thru	180	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-
Northbound Left Right	550	-	1	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
5. Eastern Ave & Cedar St/Cedar Ave																					
Eastbound Right	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northbound Left	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northbound Thru	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southbound Right	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Cedar St & Site Dwy																					
Eastbound Left Right	100	-	-	-	-	-	-	-	-	-	0	-	0	-	8	-	7	-	-	-	-
Northbound Left Thru	180	-	-	-	-	-	-	-	-	-	0	-	0	-	1	-	3	-	-	-	-
Northbound Thru	180	-	-	-	-	-	-	-	-	-	0	-	0	-	0	-	0	-	-	-	-
Southbound Thru Right	190	-	-	-	-	-	-	-	-	-	0	-	0	-	0	-	0	-	-	-	-
7. Blair Rd & Cedar St																				***Signal timing adjustments tested***	
Eastbound Thru Right	390	74	131	120	#260	75	132	122	#264	86	146	124	#267	89	150	129	#282	-	-	128	#263
Westbound Left	250	46	m87	42	m71	46	m87	42	m69	40	m86	58	111	55	m105	69	126	-	-	69	126
Westbound Thru	250	176	279	46	m75	178	m279	46	m73	110	m237	51	101	125	m238	57	110	-	-	57	109
Westbound Right	250	40	112	23	m54	40	m112	24	m39	2	m35	28	64	3	m25	27	63	-	-	27	63

Intersection and Lane Group	Stor. Lgth. (ft)	Existing (2022)				Background Interim (2027)				Background (2027)				Future (2027)				Future (2027) with Mitigations			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Northbound Thru	50	0	0	0	m2	0	0	0	m2	0	m2	0	m2	0	m2	0	m2	-	-	0	m2
Northbound Right	50	0	m0	0	m0	0	m0	0	m0	0	m0	0	m0	0	m0	0	m0	-	-	0	m0
Southbound Left Thru Right	450	212	370	200	m264	257	402	208	m268	257	401	208	m268	257	401	208	m268	-	-	228	m283
8. Blair Rd & 4th St																					
Southeastbound Left Thru	50	0	0	27	m28	0	0	27	m28	0	0	26	m27	0	0	26	m27	-	-	-	-
Northwestbound Thru	290	215	322	292	#434	216	323	294	#452	261	#414	312	#482	271	#432	336	#524	-	-	-	-
9 Cedar St & Metro Station Dwy																		***Signal timing adjustments tested***			
Eastbound Left Thru	250	-	1	-	1	-	1	-	1	63	m102	137	m208	69	m110	165	m220	69	m110	-	-
Westbound Thru Right	130	-	0	-	0	-	0	-	0	455	m504	230	317	471	m494	247	m333	350	531	-	-
Southbound Left Right	550	-	11	-	8	-	11	-	8	13	44	12	39	13	44	12	39	13	44	-	-
10. Cedar St & Carroll St																					
Eastbound Left Thru	130	18	m21	115	m157	18	m21	119	m159	18	19	117	152	15	19	133	173	-	-	-	-
Westbound Thru	320	94	130	55	95	93	132	58	101	98	135	63	106	97	135	62	105	-	-	-	-
Westbound Right	100	19	m32	36	79	19	m33	43	93	18	m29	41	87	19	m29	45	97	-	-	-	-
Southbound Left Right	180	103	#185	161	251	121	#228	172	265	~284	#456	190	291	~356	#540	217	#350	-	-	-	-
11. Carroll St & Maple St																					
Eastbound Left Thru Right	320	58	83	164	221	56	m78	173	235	51	m72	232	108	51	m73	245	112	-	-	-	-
Westbound Left Thru Right	150	233	349	190	m175	236	355	197	m182	253	377	206	m189	255	379	211	m194	-	-	-	-
Northbound Left Thru Right	380	21	56	79	142	21	57	83	148	21	57	83	148	21	57	83	148	-	-	-	-
Southbound Left Thru Right	760	29	73	29	70	29	73	29	70	29	73	29	70	29	73	29	70	-	-	-	-

Transit Facilities

This chapter discusses the existing and proposed transit facilities near the Project and evaluates the overall transit impacts of the Project.

This chapter concludes that:

- The Project is well-served by existing transit;
- The Project is located at the Takoma Metro station;
- The Project is served by seven (7) Metrobus and seven (7) Montgomery Country Ride-On routes; and
- The Project is expected to generate a manageable amount of transit trips that existing transit service is capable of handling.

Existing Transit Service

The study area is served by Metrorail, Metrobus and Montgomery County Ride-On. Combined, these transit services provide local and regional transit connections and link the Project with residential, employment, commercial, and cultural destinations throughout the region. Figure 24 identifies the transit routes, stations, and stops in the study area.

The 10-, 20-, and 30-minute distances accessible by transit (or "transitsheds") for the site are shown in Figure 25.

The Project is located adjacent to the Takoma Metro station served by the Red Line. The Red Line travels between the Glenmont and Shady Grove stations, both in Montgomery County, Maryland, by way of downtown Washington, DC.

As of November 2022, Red Line trains run every 10 minutes on weekdays and weekends.

The Project is also served by seven (7) Metrobus and seven (7) Montgomery County Ride-On routes. These bus routes connect the Project to many areas of the region, as well as several Metro stations. Table 10 shows a summary of the bus route information for the routes that serve the Project, including service hours, headway, and distance to the nearest bus stop.

Table 11 shows WMATA's recommended amenities for each type of bus stop. Table 12 shows a detailed inventory of the amenities appearing at each bus stop within the transit study area.

Planned Transit Service

MoveDC Transit Priority Network

The Transit Priority Network in the approved *MoveDC* 2021 update, the District's multimodal long-range transportation plan, proposes transit priority infrastructure such as dedicated transit lanes, better transit stops, and/or special treatments for buses at intersections along designated corridors. Specific treatments along given streets or route paths are not proposed but rather prioritized as part of the long-range plan. Transit priority corridors proposed near the proposed project include:

- Georgia Avenue NW for its entire length within the District of Columbia.

Site-Generated Transit Impacts

The proposed development is projected to generate 102 transit trips (34 inbound, 68 outbound) during the AM peak hour and 146 transit trips (80 inbound, 66 outbound) during the PM peak hour.

It is expected that existing transit service can accommodate these new site-generated trips.

Table 10: Local Bus Route Information

Route Number	Route Name	Service Hours at Stop Closest to Site			Headway (minutes)	Walking Distance to Nearest Stop
		Weekdays	Saturdays	Sundays		
WMATA Routes						
52, 54	14th Street Line	5:19am-1:51am	5:44am-1:50am	6:34am-1:50am	12-30	<0.1 mi (2 min)
62, 63	Takoma-Petworth Line	5:09am-12:00am	5:30am-11:57pm	5:30am-11:57pm	15-25	<0.1 mi (2 min)
F1, F2	Chillum Road Line	5:40am-9:45pm	6:30am-7:36pm	7:30am-7:30pm	55-65	<0.1 mi (2 min)
K2	Takoma-Fort Totten Line	5:58am-9:08am, 3:19pm-7:00pm	--	--	22	0.3 mi (6 min)
Montgomery County Ride-On Routes						
12	Silver Spring-Takoma	5:21am-12:58am	6:05am-12:57am	6:04am-12:57am	15-40	<0.1 mi (2 min)
13	Silver Spring-Takoma	7:04am-8:57am, 4:33pm-7:26pm	--	--	30-35	<0.1 mi (2 min)
14	Silver Spring-Takoma	5:57am-9:29pm	7:25am-7:29pm	--	45	<0.1 mi (2 min)
16	Silver Spring-Takoma	5:41am-1:43am	6:13am-1:42am	6:13am-1:42am	15-40	<0.1 mi (2 min)
18	Silver Spring-Langley Park	6:35am-11:55pm	6:30am-10:15pm	7:15am-8:00pm	45-55	<0.1 mi (2 min)
24	Hillandale-Takoma	5:45am-8:57am, 3:50pm-8:10pm	--	--	35	<0.1 mi (2 min)
25	Takoma-Langley Park	5:17am-8:42pm	--	--	35-45	<0.1 mi (2 min)

Table 11: WMATA Recommended Bus Stop Amenities

Amenity	Basic Stop		Enhanced Stop	Transit Center Stop
	< 50 daily boardings	≥ 50 daily boardings		
Bus stop flag	●	●	●	●
Route map and schedule	●	●	●	●
5’ x 8’ landing pad	●	●	●	●
40’/60’ x 8’ landing pad			●	●
4’ sidewalk	●	●	●	●
Bench		●	●	●
Shelter		●	●	●
Lighting (on shelter or within 30’ if overhead)	Recommended for stops with early morning and evening service		●	●
Dynamic information signage	Contingent on presence of shelter			
Trash and recycling receptacles	Recommended where surrounding uses may generate trash			

Source: 2019 WMATA *Bus Stop Amenity Reference Guide*

Table 12: Bus Stop Inventory

Location	Stop ID	Routes Served	Amenities								
			Bus stop flag	Route map & schedule	Landing pad	Sidewalk	Bench	Shelter	Dynamic info sign	Lighting	Trash Recp.
WMATA Stops											
4th St & Butternut St NW (SB)	1002825	52, 54, 62, 63	●	●	●	●				●	●
5th St & Butternut St NW (NB)	1002819	62, 63	●		●	●				●	●
5th St & Butternut St NW (SB)	1002818	62, 63	●		●	●				●	●
5th St & Whittier St NW (NB)	1002795	62, 63	●		●	●				●	●
5th St & Whittier St NW (SB)	1002794	62, 63	●		●	●				●	●
Butternut St & 4th St NW (EB)	1003932	52, 54, 62, 63	●	●	●	●				●	
Butternut St & 6th St NW (EB)	1003254	52, 54	●	●	●	●				●	●
Butternut St & 6th St NW (WB)	1003255	52, 54	●	●	●	●				●	●
Butternut St & 8th St NW (EB)	1003252	52,54	●	●	●	●					●
Butternut St & 8th St NW (WB)	1002822	52, 54	●	●	●	●					●
Butternut St & Piney Branch Rd NW (EB)	1002821	52,54	●	●	●	●				●	●
Butternut St & Piney Branch Rd NW (WB)	1003256	52, 54	●	●	●	●					●
Eastern Ave & Laurel St NW (NB)	2001138	F1, F2, K2	●	●	●	●				●	●
Eastern Ave & Laurel St NW (SB)	1002827	F1, F2, K2	●	●	●	●					●
Eastern Ave & Walnut St NW (NB)	2001137	F1, F2, K2	●	●	●	●				●	
Eastern Ave & Walnut St NW (SB)	1002812	F1, F2, K2	●	●	●	●					●
Montgomery County Ride-On Stops											
Carroll Ave & Laurel Ave (EB)	20744	12, 13, 16, 18	●	●	●	●	●			●	●
Carroll Ave & Maple Ave (EB)	20742	12, 13, 16, 18	●		●	●					
Carroll Ave & Maple Ave (WB)	20806	12, 13, 16, 18, 25	●		●	●				●	●
Carroll Ave & Tulip Ave (EB)	20746	12, 13, 16, 18	●	●	●	●	●	●			●
Carroll Ave & Tulip Ave (WB)	20802	12, 13, 16, 18	●		●	●	●			●	●
Carroll Ave & Willow Ave (WB)	20804	12, 13, 16, 18	●		●	●	●			●	●
Eastern Ave & Holly Ave (NB)	21858	14, 18, 24	●		●	●					
Maple Ave & Austin Pl (NB)	23844	25	●		●	●					
Maple Ave & Austin Pl (SB)	23866	25	●		●	●					

Location	Stop ID	Routes Served	Amenities								
			Bus stop flag	Route map & schedule	Landing pad	Sidewalk	Bench	Shelter	Dynamic info sign	Lighting	Trash Recp.
Maple Ave & Carroll Ave (NB)	23840	25	●		●	●				●	
Maple Ave & Carroll Ave (SB)	23870	25	●		●	●					
Maple Ave & Tulip Ave (NB)	23842	25	●			●					
Maple Ave & Tulip Ave (SB)	23868	25	●		●	●					

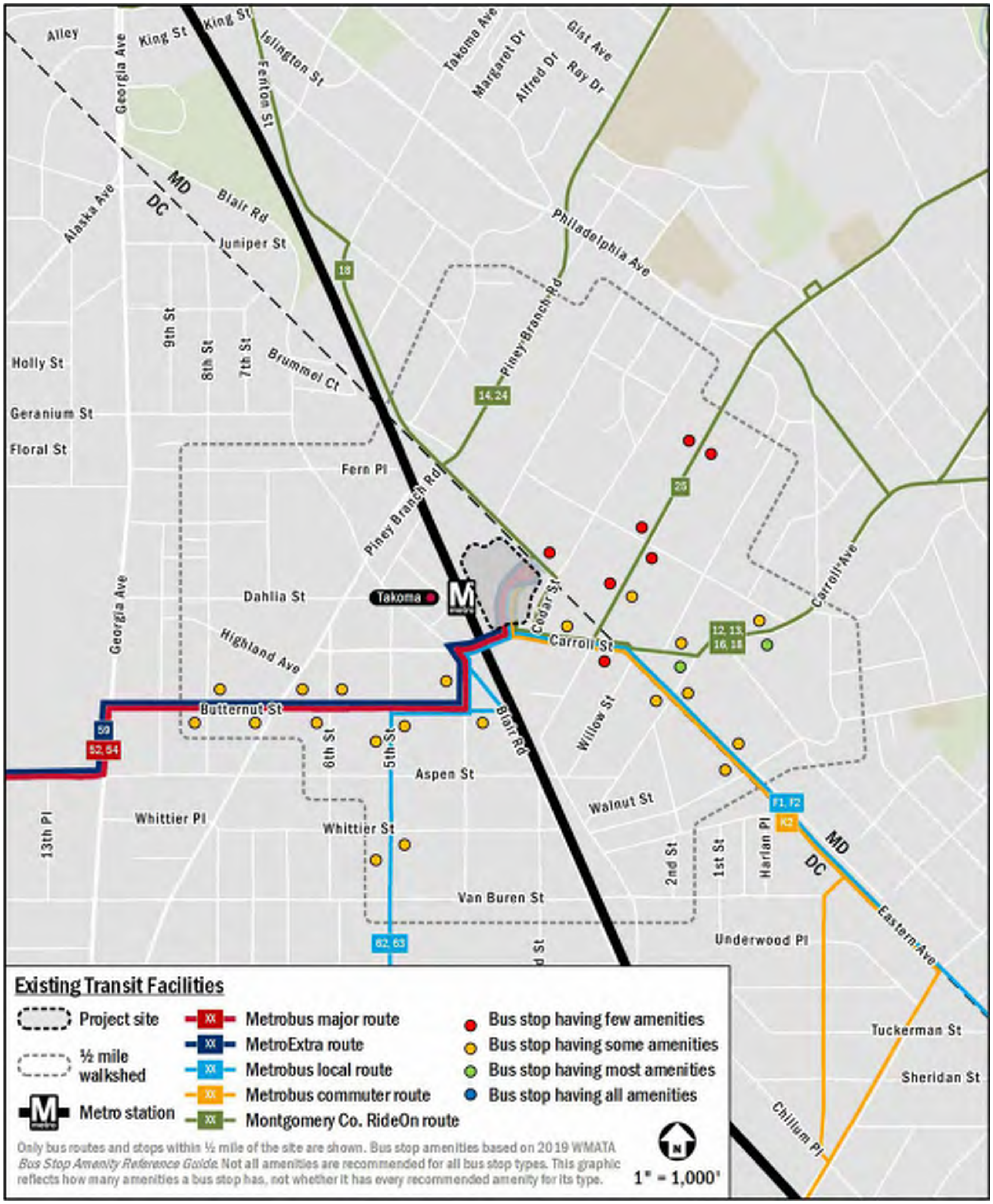


Figure 24: Existing Transit Facilities

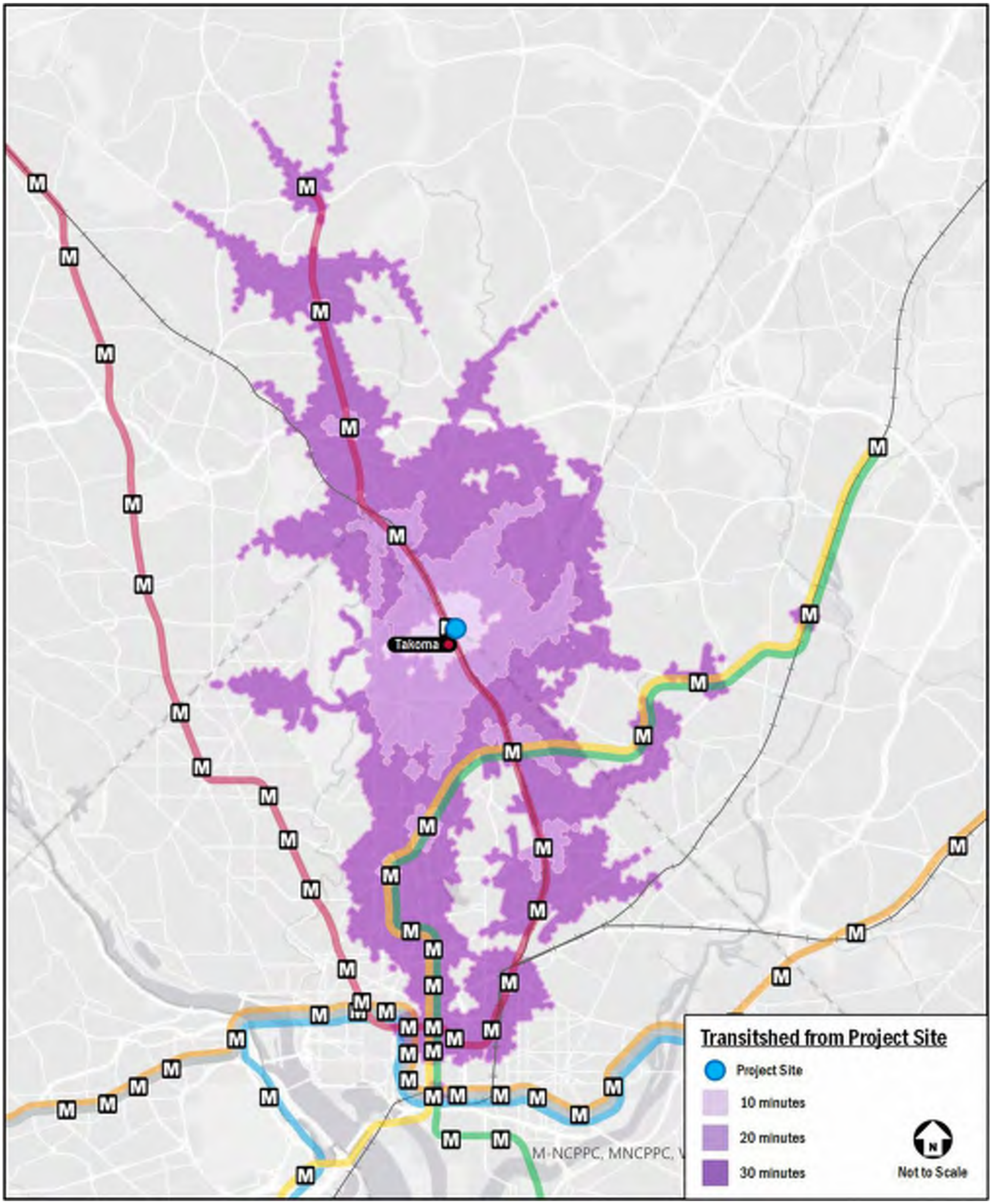


Figure 25: Transitshed from project site

Pedestrian Facilities

This chapter summarizes existing pedestrian access to the Project and reviews the impacts of the Project on the pedestrian network.

The following conclusions are reached within this chapter:

- There is generally a quality, connective pedestrian network surrounding the site, despite some instances of sidewalks not meeting width requirements, as well as non-compliant curb ramps and crosswalks; and
- The Project is expected to generate pedestrian trips to and from nearby destinations, and the pedestrian facilities surrounding the Project can accommodate these new trips.
- A new traffic signal is proposed at the Carroll Street intersection with the relocated bus-loop/WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

Pedestrian Study Area

Pedestrian facilities within a quarter-mile of the Project were evaluated. There are several sidewalks within the study area that do not meet minimum width requirements, as well as missing or non-compliant crosswalks and curb ramps at minor intersections. Despite these shortcomings, there is generally an adequate, well-connected pedestrian network surrounding the Project.

The 10-, 20-, and 30-minute walksheds for the project site are shown in Figure 26.

Existing Pedestrian Infrastructure

A detailed inventory of the existing pedestrian facilities within the study area is shown on Figure 27. Sidewalks, crosswalks, and curb ramps were evaluated based on the guidelines set forth by DDOT's *Design and Engineering Manual* (2019) in addition to Americans with Disabilities Act (ADA) standards. These facilities are shown within their respective land use types based on DC's Zoning Regulations of 2016, which determines which of DDOT's sidewalk width requirements apply. The sidewalk width requirements are determined using the DC's Zoning Regulations of 2016. These sidewalk width requirements are shown in Table 13.

Table 13: DDOT Sidewalk Width Requirements

Street Type	Curb Walk	Tree/Fur-nishing Zone	Sidewalk Unobstructed Clear Width	Total Minimum Sidewalk Width
Low to Moderate Density Residential	None	4 - 6 feet	6 feet	10 feet
High Density Residential or Light Commercial	1 foot	4 - 8 feet	8 feet	13 feet
Central DC and Commercial Areas	1 - 2 feet	4 - 10 feet	10 feet	16 feet

Source: DDOT *Design and Engineering Manual*

Sidewalks

As shown on Figure 27, the pedestrian study area includes streets within the "Low to Moderate Density Residential" and "High Density Residential or Light Commercial" categories of sidewalk width requirements. There are some sidewalks that do not meet DDOT's minimum width requirements. In some of these cases, the sidewalk meets the width requirement of a lower intensity land use, but not its applicable land use. There are missing sidewalks near residential neighborhoods near the project.

Curb ramps

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 are not desired but where they are present, a 48" clear space is required outside active vehicle traffic lanes and within marked crossings. As shown on Figure 27, there are some intersections near the Project that are missing a curb ramp and/or crosswalk on one or more leg.

Crosswalks

DDOT's *Design and Engineering Manual* (2019) requires crosswalks at all intersections or mid-block locations controlled by vehicular and/or pedestrian traffic signals or all-way stop signs. Additionally, high-visibility crosswalks are required at all uncontrolled crosswalks and all crosswalks (including signalized or stop-controlled crosswalks) leading to a block with a school, within a designated school zone area, along a designated school walking route, on blocks adjacent to a Metro station, in areas with moderate to high pedestrian volumes, and in locations with high frequencies of conflicts with pedestrians and turning vehicles.

As shown on Figure 27, there are several instances near the Project where crosswalks are non-compliant or not present.

Connectivity Barriers

As shown in Figure 27, the Metrorail tracks immediately west of the Project form a barrier to pedestrian connectivity in the area. There is a pedestrian crossing of the tracks on Cedar Street NW immediately south of the Project, but crossings throughout the neighborhood are otherwise limited.

Proposed Pedestrian Infrastructure

The Project will include a reconfiguration of the bus loop/driveway serving the Takoma Metro station, as well as reconfigure the open space on the Project site. These reconfigurations will include upgraded sidewalks along the most of the perimeter of the site, internal walkways traversing the open space, and a shared use path through the site which will improve the porosity of the overall pedestrian network in the Project area. In addition to providing function and connectivity, the Project’s pedestrian infrastructure will include attractive landscaping and paving materials which will improve the overall pedestrian experience both for site users and for people walking through the site to the Metro station.

A new traffic signal is proposed at the Carroll Street intersection with the relocated bus-loop/WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

Site-Generated Pedestrian Impacts

The proposed development is projected to generate 30 pedestrian trips (15 inbound, 15 outbound) during the AM peak hour and 63 pedestrian trips (33 inbound, 30 outbound) during the PM peak hour.

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

- Commuting to/from work
- Retail and restaurant locations; and
- Neighborhood destinations such as libraries and parks.

In addition to these trips, the transit trips generated by the Project will also generate pedestrian demand between the Project and nearby bus stops. It is expected that existing pedestrian facilities can accommodate these new site-generated trips.

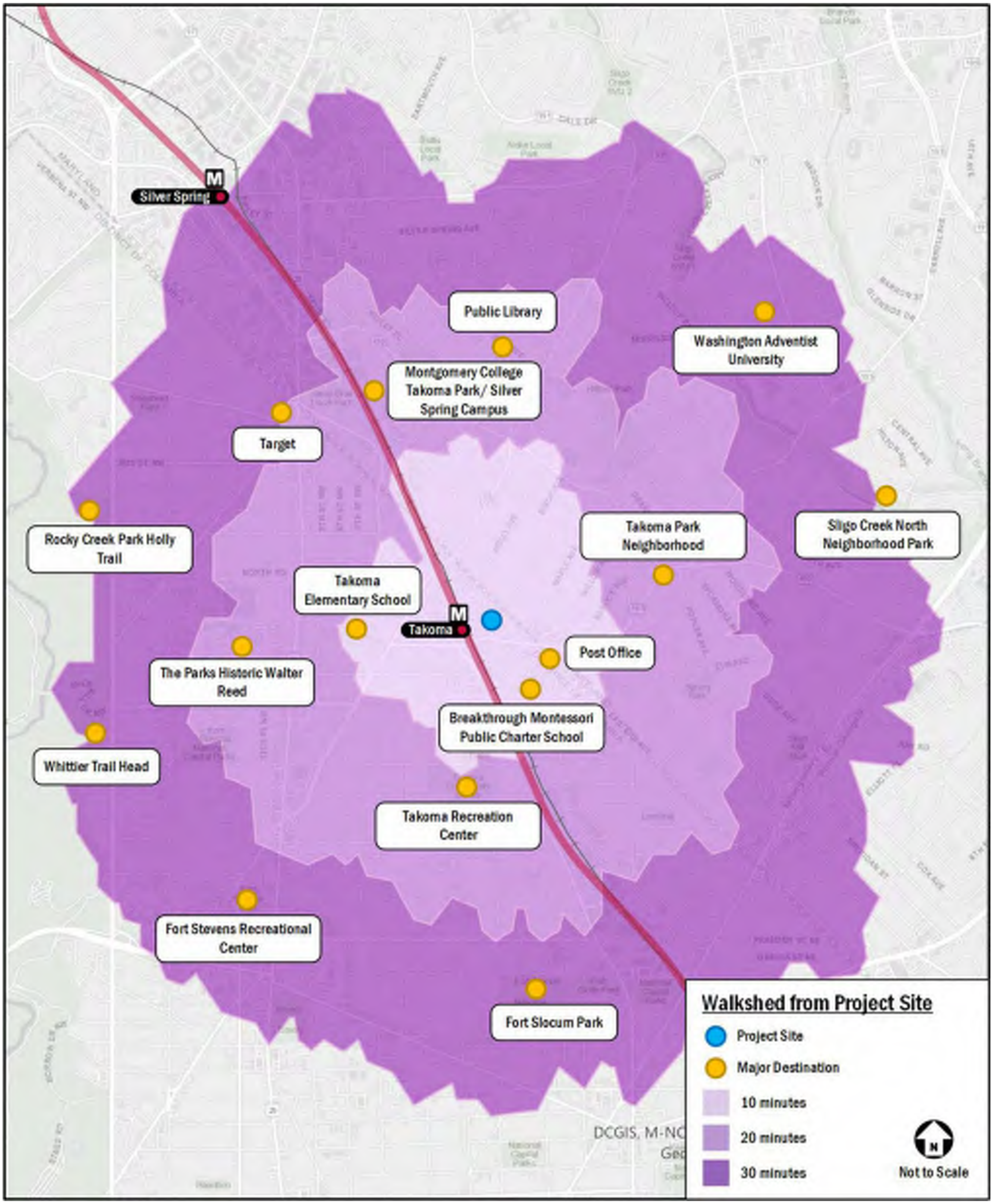


Figure 26: Walkshed from Project Site

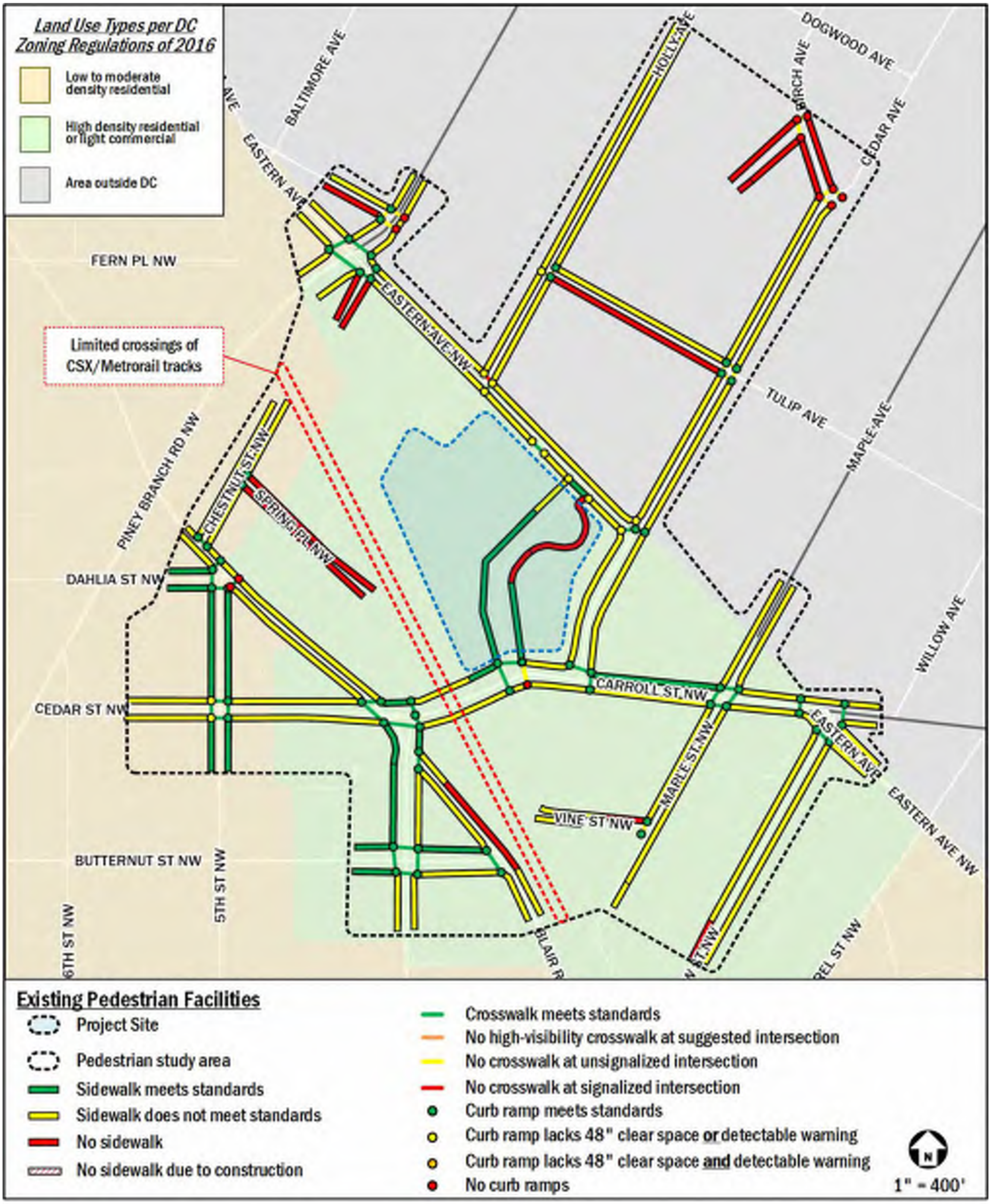


Figure 27: Existing Pedestrian Facilities

Bicycle Facilities

This chapter summarizes existing bicycle access to the Project and reviews the impacts of the Project on the bicycle network.

The following conclusions are reached within this chapter:

- The Project has access to several on- and off-street bicycle facilities within the study area;
- Several planned and proposed bicycle projects will improve bicycle access to the Project;
- The Project will include short- and long-term bicycle parking that meets zoning requirements; and
- The Project is expected to generate a manageable number of bicycle trips; therefore, site-generated bicycle trips can be accommodated on existing infrastructure.

Existing Bicycle Facilities

The Project is located adjacent to the protected bike lanes on Piney Branch Road NW, signed bike routes on Cedar Street NW, and 0.3 miles from bike lanes on Butternut Street NW, and 0.5 miles from bike lanes on 8th Street NW. Using these facilities, bicyclists have access to several other regional bicycle facilities, such as the Rock Creek Trail. The site is also adjacent to the future extension of the Metropolitan Branch Trail which is expected to open in 2024 Figure 28 illustrates existing bicycle facilities in the area.

The 10-, 20-, and 30-minute bikeable distances (or “bikesheds”) from the site are shown in Figure 30.

Capital Bikeshare

In addition to personal bicycles, the Capital Bikeshare program provides an additional cycling options for residents, employees, and visitors of the Project. The program has placed over 600 bikeshare stations across the Washington, DC metropolitan area with over 5,000 bicycles in the fleet. The following Capital Bikeshare stations are within a half-mile of the Project:

- A 19-dock station at Takoma Metro Station, less than 0.1 miles south of the Project; and
- A 15-dock station at Carroll and Westmoreland Avenue NW, 0.4 miles east of the Project.

Figure 28 shows existing Capital Bikeshare locations in the area.

Shared Mobility

As of November 2022, micromobility service in the District is provided by eight (8) private dockless companies operating e-bikes and electric scooters (e-scooters). These include two (2) companies operating e-bikes (HelBiz and Jump) and six (6) companies operating e-scooters (Bird, Lime, Lyft, Razor, Skip, and Spin). These dockless vehicles are provided by private companies that give registered users access to a variety of e-bike and e-scooter options. These devices are used through each company-specific mobile phone application. Many dockless vehicles do not have designated stations where pick-up/drop-off activities occur like with Capital Bikeshare. They are typically parked in public space, most commonly in the “furniture zone” or the portion of the sidewalk between where people walk and the curb, often where other street signs, street furniture, trees, and parking meters are found. In addition to DDOT’s program, dockless programs exist in Arlington County, Fairfax County, the City of Fairfax, the City of Alexandria, and Montgomery County.

Planned and Proposed Bicycle Facilities

There are several bicycle improvements near the Project that are planned and scheduled to open in the near future. These are shown on Figure 29.

MoveDC Bicycle Priority Network

As part of its ongoing update to the District’s multimodal long-term transportation plan, *MoveDC*, DDOT has designated both funded and future planned improvements to the District’s Bicycle Priority Network. Funded improvements are locations that currently have funding identified for construction within six (6) years. Metropolitan Branch Trail, an off-street trail is a funded improvement along Blair Road NW near the project site.

Additionally, DDOT has designated future planned improvements to the network that may be added in the future but currently do not have committed funding. These planned improvements are shown on Figure 29.

Montgomery County Bicycle Master Plan

Montgomery County’s Bicycle Master Plan has identified several planned bicycle facilities immediately northeast of the Project in Takoma Park, Maryland. These planned improvements are shown on Figure 29.

Capital Bikeshare Development Plan

DDOT's Capital Bikeshare Development Plan was originally released in 2016 to guide the continued growth of Capital Bikeshare in the District of Columbia. The most recent update of the Development Plan was released in 2020 and proposed new Capital Bikeshare stations near the site, including at the following intersection(s):

- Germanium Street and Blair Road NW;
- Butternut Street and 9th Street NW;
- 7th Street and Van Buren Street NW; and
- Roxboro Place and 7th Street NW.

Site-Generated Bicycle Impacts

This section summarizes the impacts of the Project on bicycling conditions surrounding the Project.

On-site Bicycle Infrastructure

The Project will meet zoning requirements by providing at least 149 long-term bicycle parking spaces inside the building and at least 27 short-term bicycle parking spaces on exterior racks along the site's frontage and in a publicly accessible area within the garage. All residential long-term bike parking will be located in Level 1, as requested by DDOT.

The long-term bicycle spaces will adhere to Subtitle C § 805.9 of DC's zoning requirements, as well as DDOT's *Bike Parking Guide*, which stipulate that long-term spaces be located indoors in a parking garage or bike storage room, and that at least 50% of required long-term spaces (120 spaces) be placed horizontally on the floor or ground, without bicycles being suspended. Additionally, at least 12 of the long-term spaces (5% of the total) will be 10' x 3' spaces to accommodate cargo/tandem bikes, and at least 24 of the long-term spaces (10% of the total) will include electrical outlets for e-bikes and scooters.

In addition to long- and short-term bike parking, the Project will provide a shared use path along the Project's southern and eastern sides, which will connect with the Metropolitan Branch Trail extension.

Bicycle Trip Generation

The Project is projected to generate 15 bicycle trips (5 inbound, 10 outbound) during the AM peak hour and 21 bicycle trip (11 inbound, 10 outbound) during the PM peak hour.

It is expected that existing bicycle facilities can accommodate these new site-generated trips.

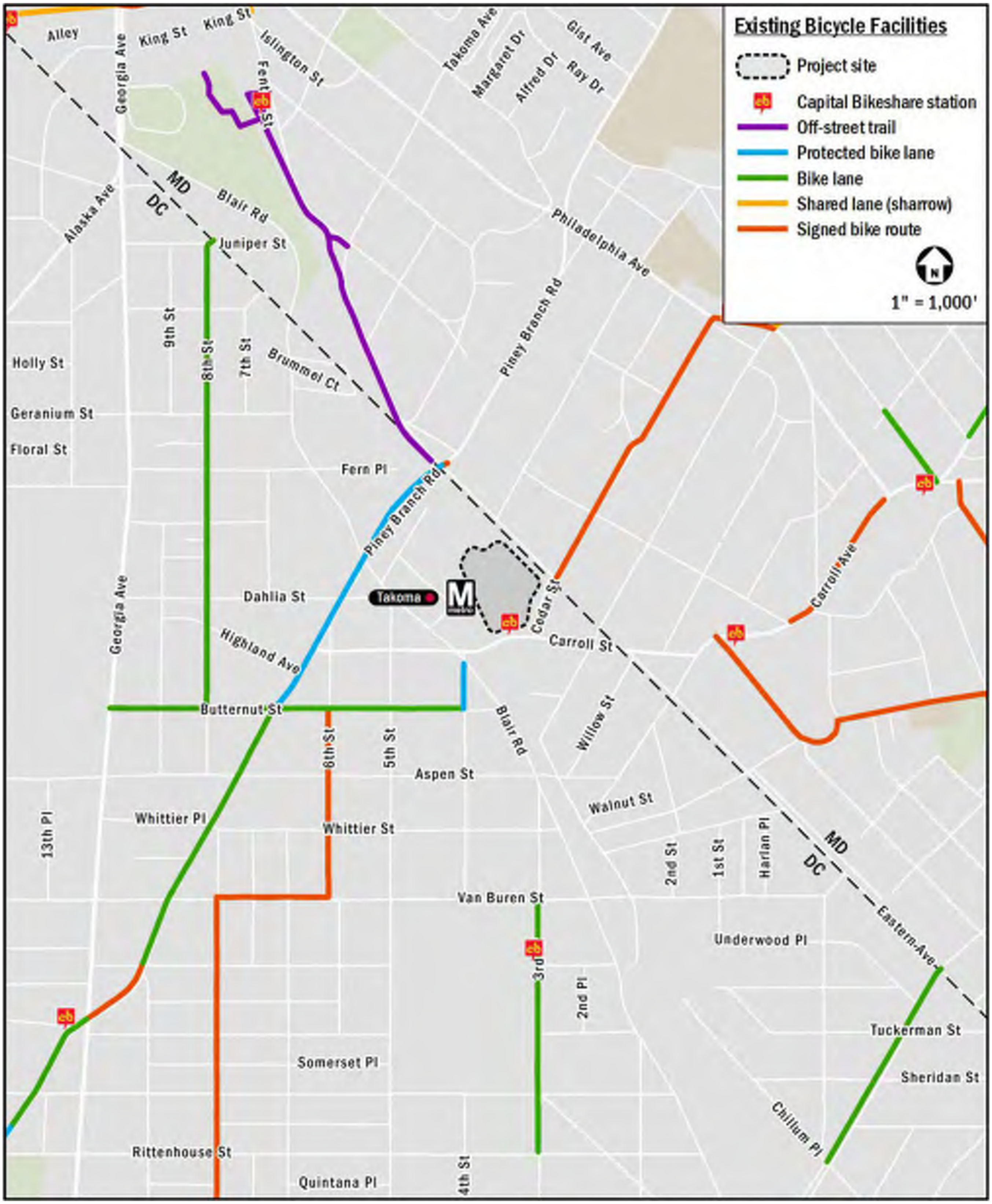


Figure 28: Existing Bicycle Facilities

Figure 29: Existing and Planned Bicycle Facilities

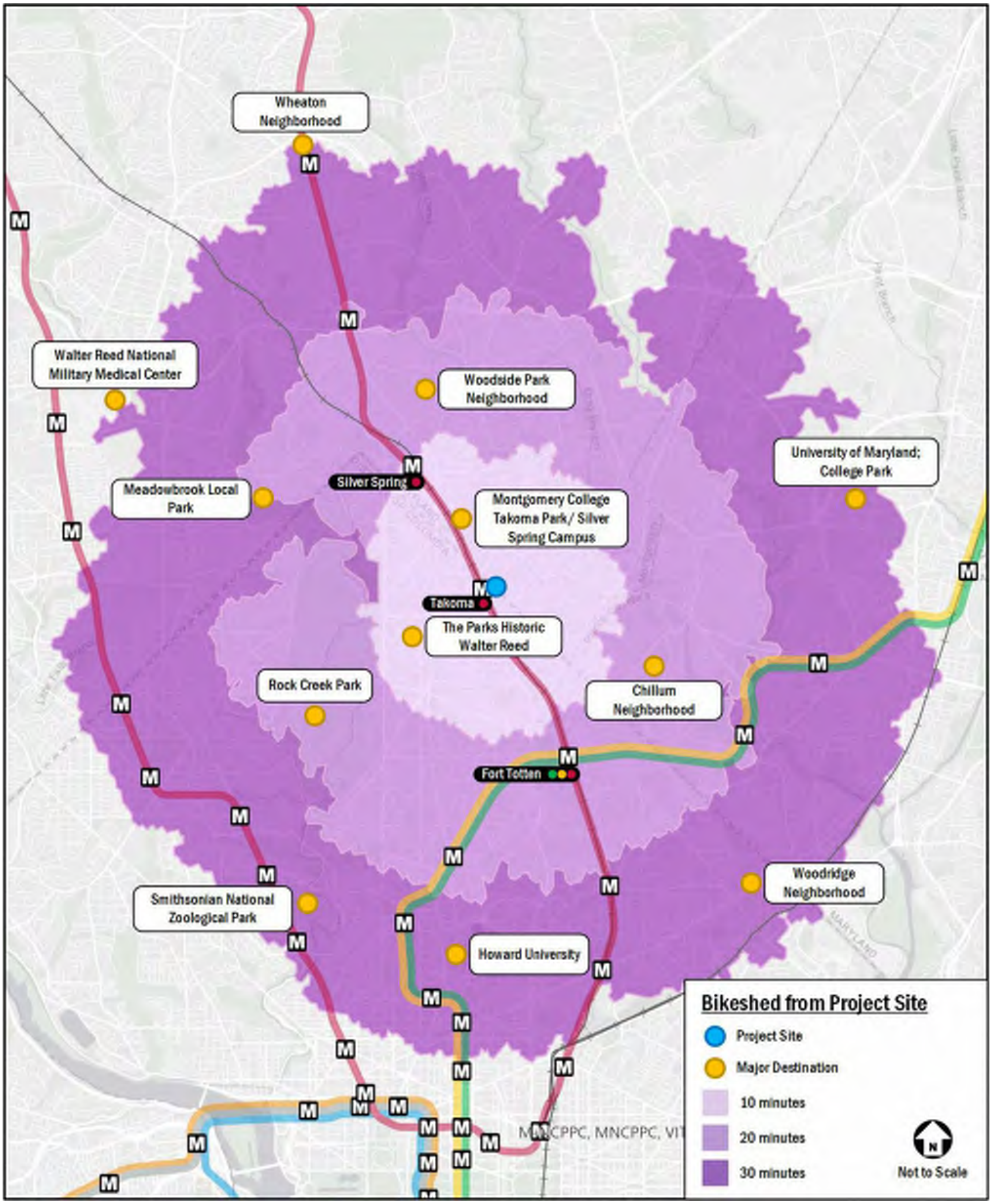


Figure 30: Bikeshed from Project site

Safety Analysis

This chapter reviews any vehicle, pedestrian, or bicycle conflicts at the study area intersections or street links within the study area. This review notes any intersections within the study area that have been identified by DDOT as high crash locations and makes recommendations to improve safety conditions. These recommendations are presented for DDOT's consideration, not for the Applicant to complete as part of the Project.

These analyses assess existing conditions at the nearby intersections and are not caused by the proposed Project. The results are for informational purposes to be reviewed by DDOT.

Summary of Safety Analysis

A safety analysis was performed to determine if there are any intersections that pose obvious conflicts with vehicles, pedestrians, or bicyclists. This was determined based on data included in DDOT's most recent *Traffic Safety Statistics Report* (2018-2020), *Vision Zero Action Plan*, and Open Data DC Vision Zero Safety data.

Based on available data, no study intersections have been identified by DDOT as a top 20 hazardous/high crash intersection. Additionally, a qualitive review of the crash data available through the DDOT-maintained and publicly available "Crashes in DC" database was performed to identify study intersections in which conditions for vehicles, pedestrians, and bicyclists can be improved.

Based on a review of facilities in the area and crash data, one (1) intersection were identified for further evaluation. The following section details the potential conflicts at the identified study area intersections.

Potential Impacts

This section reviews the intersections identified to pose potential conflicts to vehicles, pedestrians, or bicyclists.

Blair Road and Cedar Street NW

While this intersection was not identified in DDOT's *Traffic Safety Statistics Report* (2018-2020) as having comparatively high rates of crash frequency, the DDOT-maintained "Crashes in DC" database shows a moderate number of crashes at this intersection since 2017, as shown on Figure 31, including two (2) pedestrian-involved crashes, as shown on Figure 32.

This intersection operates as a four-legged, signalized intersection. High-visibility crosswalks are currently provided at every leg. Curb ramps that include detectable warnings per ADA standards are also provided on every corner.

This report recommends that DDOT perform a safety audit at this intersection as part of its Traffic Safety Assessment program to further evaluate the extent of safety issues and determine if any action is needed.

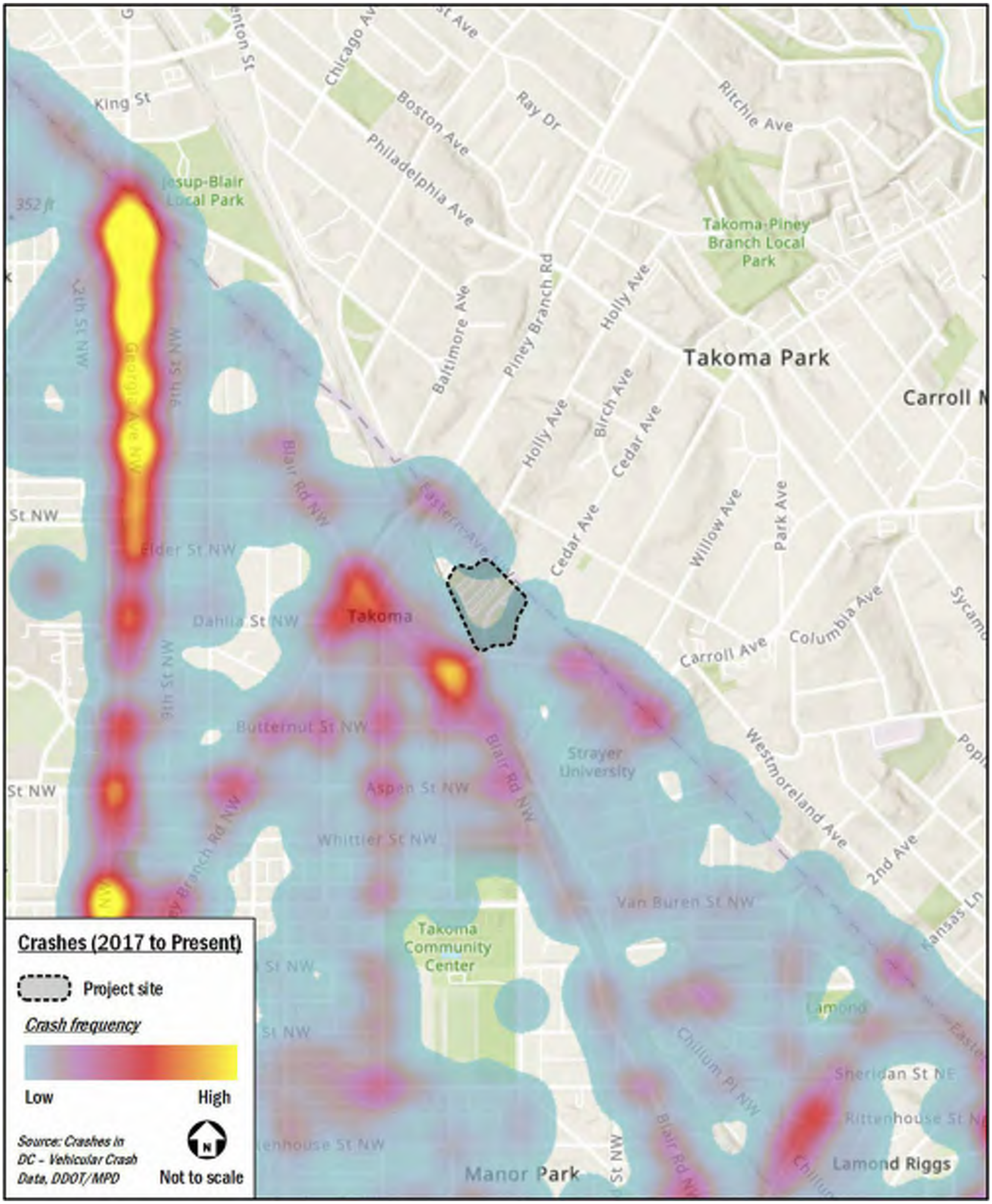


Figure 31: Crashes (2017 to present) (Only covers area within the District of Columbia)

Figure 32: Pedestrian-involved Crashes (2017 to present)

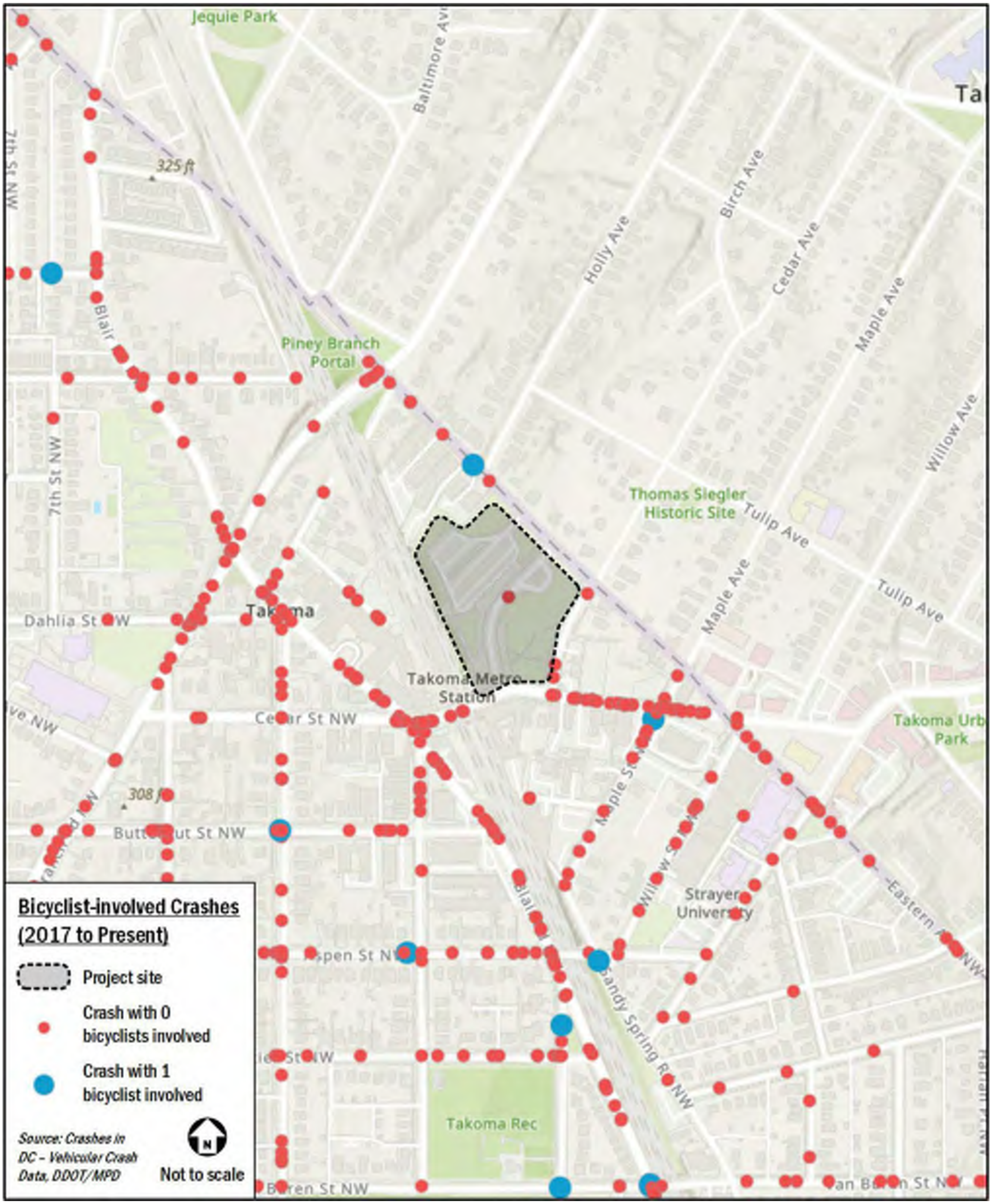


Figure 33: Bicycle-involved Crashes (2017 to present)

Summary and Conclusions

This report has presented a Comprehensive Transportation Review (CTR) in support of the Takoma Metro Multifamily PUD (the "Project").

The purpose of this CTR is to evaluate whether the Project will result in a detrimental impact to the transportation network surrounding the site. This evaluation is based on a technical comparison of Existing Conditions, Background Conditions, and Total Future Conditions.

This report concludes that the Project will not have a detrimental impact to the surrounding transportation network assuming the proposed site design elements are implemented.

Proposed Project

The Project site is bounded by Eastern Avenue NW to the northeast, Cedar Street NW to the east, Carroll Street NW to the south, and the Takoma Metro station to the west.

The existing site is currently improved with a WMATA Metro parking/kiss-and-ride lot, bus loop, and green space. The Project proposes to redevelop the existing site into a mixed-use development with approximately 440 multifamily residential units, 17,650 square feet of ground-floor retail space, and 230 garage parking spaces. As part of the Project, the WMATA facilities will be reconfigured within the remaining WMATA area adjacent to the Metro station.

Site Layout

The Project will occupy the northern portion of the site, with primary vehicular and loading access provided from a new curb cut on Cedar Street connecting a curbless driveway into the site. An additional garage access point will be provided from the WMATA bus-loop entrance from Eastern Avenue.

The WMATA Metro station vehicular circulation will be reconfigured to allow for inbound and outbound bus access from Eastern Avenue and Carroll Street via a new internal roadway separating the Project from the Metro station. Kiss-and-ride service will be accommodated via inbound movements from Carroll Street that will become median divided from the bus-loop once internal to the site. Kiss-and-ride vehicles will exit the site via Eastern Avenue. No WMATA or Metro station parking will be provided with the reconfigured layout.

A new traffic signal is proposed at the Carroll Street intersection with the WMATA access road. This traffic signal will allow for protected pedestrian movements and left turn movements at the intersection and will include new concrete curb extensions, addition of the missing crosswalk on the east leg of Carroll Street and other pedestrian improvements.

The Project also includes a proposal to provide kiss-and-ride spaces along Carroll Street beneath the bridge.

Multimodal Overview

Trip Generation

The Project is expected to generate new trips within the surrounding transportation network across all transportation modes during the morning and afternoon peak hours. However, with the Project's proposed Transportation Demand Management (TDM) plan, the resulting new trips generated by the Project will not have a detrimental impact on the area transportation network. The multimodal trip generation for the Project, without reductions taken for existing uses to be removed, is as follows:

	AM Peak Hour	**PM Peak Hour**
Vehicle Trips	115	136
Transit Trips	102	146
Bicycle Trips	15	21
Pedestrian Trips	30	63

Transit

The Project is located at the Takoma Metro station on the Red Line and is served by several local bus routes.

The Project is expected to generate a manageable amount of transit trips, and the existing service can accommodate these new trips.

Pedestrian

The site is surrounded by a generally adequate pedestrian network. Despite some incidences of missing sidewalks, curb ramps, and crosswalks on minor streets near the project site, there are generally adequate pedestrian facilities along primary walking routes between the site and major local destinations.

The Project is expected to generate a manageable amount of pedestrian trips, and the existing and proposed pedestrian facilities can accommodate these new trips.

Further, the Project will include upgrading pedestrian infrastructure along portions of the site perimeter on Eastern Avenue, Cedar Street and Carroll Street, as well as internal pedestrian facilities.

A bike and pedestrian pathway will also be provided through the site connecting Eastern Avenue with Cedar Street and Carroll Street.

Bicycle

The site is located 0.1 miles from the protected bike lanes on Piney Branch Road NW and the bike trail along Takoma Avenue and Fenton Street in Takoma Park. The site is also adjacent to the future extension of the Metropolitan Branch Trail which is expected to open in 2024. Using these facilities, bicyclists have access to several other regional bicycle facilities.

The Project will include long-term bicycle parking inside the building and short-term bicycle parking along the building perimeter that meets or exceeds zoning requirements. The Project will also provide a shared use path along its southern and eastern sides which will connect with the Metropolitan Branch Trail extension.

Additionally, bike parking and lockers will be available adjacent to the Project at the Takoma Metro station.

The Project is expected to generate a manageable amount of bicycle trips, and the existing bicycle facilities can accommodate these new trips.

Vehicular

The project is accessible via Carroll Street NW, a minor arterial, and Eastern Avenue NW and Cedar Street NW, collectors, which connect the site to principal arterials such as Georgia Avenue NW, Missouri Avenue NW, and New Hampshire Avenue NW which becomes a designated major highway in Montgomery County, Maryland. These principal arterials and highways connect with expressways within the District and Maryland such as the Capital Beltway (I-495), the Anacostia Freeway (DC-295), the Southeast Freeway (I-695), and the Southwest Freeway (I-395). These expressways connect with other regional Interstates.

To determine the Project's impact on the transportation network, future conditions were analyzed with and without the Project based on the number of trips the Project is expected to generate. Intersection analyses were performed to obtain the average delay and queue a vehicle will experience. These average delays and queues were compared to the acceptable levels of delay set by DDOT standards as well as existing and background queues to determine if the Project will negatively impact the study area.

The analysis concluded that one (1) of the 11 intersections studied (Cedar Street & Carroll Street NW) meets DDOT's delay- or queuing-related thresholds for potential mitigation.

A potential improvement was identified that would reduce delays below background conditions that includes signal timing adjustments at the intersection; however, the Project's impact at this location is proposed to be mitigated via the Project's robust TDM plan that will encourage non-auto modes of travel for site users.

Further, it should be noted that a primary driver of this intersection's increased delay under background future conditions with the Metro reconfiguration is that we have added additional bus and kiss-and-ride traffic to the road network to represent full potential kiss-and-ride use based on historical WMATA metro usage data for pre-covid conditions.

Safety Recommendations

A qualitative review of the crash data available through the DDOT-maintained and publicly-available "Crashes in DC" database was performed to identify study intersections in which conditions for vehicles, pedestrians, and bicyclists can be improved.

Based on a review of facilities in the area and crash data, one (1) intersection was identified for DDOT to evaluate further. Recommendations for these intersections, **presented for DDOT's consideration and not for the Applicant to complete as part of the Project, are summarized below:**

Blair Road and Cedar Street NW

DDOT should consider performing a safety audit at this intersection as part of DDOT's Traffic Safety Assessment program to further evaluate the extent of safety issues and determine if any action is needed.

Transportation Demand Management (TDM) Plan

Per the DDOT CTR guidelines, the goal of implementing TDM measures is to reduce the number of single occupancy vehicles and vehicle ownership within the District. The promotion of various programs and existing infrastructure includes maximizing the use of transit, bicycle, and pedestrian facilities. DDOT has outlined expectations for TDM measures in the CTR guidelines, and this Project is proposing to implement a TDM plan consistent with these guidelines, as discussed in the Project Design section of this report.

Loading Management Plan (LMP)

Per DDOT scoping comments, this report includes a Loading Management Plan (LMP), whose goals are to maintain a safe environment for all users of the site, loading area, streets, and nearby intersections, minimize undesirable impacts to pedestrians and to employees, reduce conflicts between truck traffic using the loading facilities and other street users, and ensure smooth operation of the loading facilities through appropriate levels of management and schedule operations.

Summary

This report concludes that the Project will not have a detrimental impact on the surrounding transportation network assuming the proposed site design elements are implemented.

The Project has several positive design elements that minimize potential transportation impacts, including:

- The Project’s proximity to transit service and bicycle infrastructure, located at the Takoma Metro Station;
- The Project’s location within in a generally adequate pedestrian network along major walking routes;
- The Project’s loading facilities, which maintain loading activity within private property and provide loading circulation that ensures head-in/head-out truck movements are performed from the public roadway network;
- The inclusion of secure long-term bicycle parking spaces that meet zoning requirements;
- The inclusion of short-term bicycle parking spaces along the frontage of the site that meet zoning requirements;
- The inclusion of a shared use path connecting to nearby bicycle facilities;
- The inclusion of extensive pedestrian improvements around the property and at the Carroll Street intersection with the WMATA bus-loop, including signalization, curb extensions and installation of the missing crosswalk on the east leg of Carroll Street;
- A Loading Management Plan (LMP) that facilities safe and orderly loading operations; and
- A TDM plan that reduces the demand of single-occupancy, private vehicles during peak period travel times and shifts single-occupancy vehicular demand to off-peak periods.

Transportation Technical Attachments

Takoma Metro Multifamily Development

Washington, DC

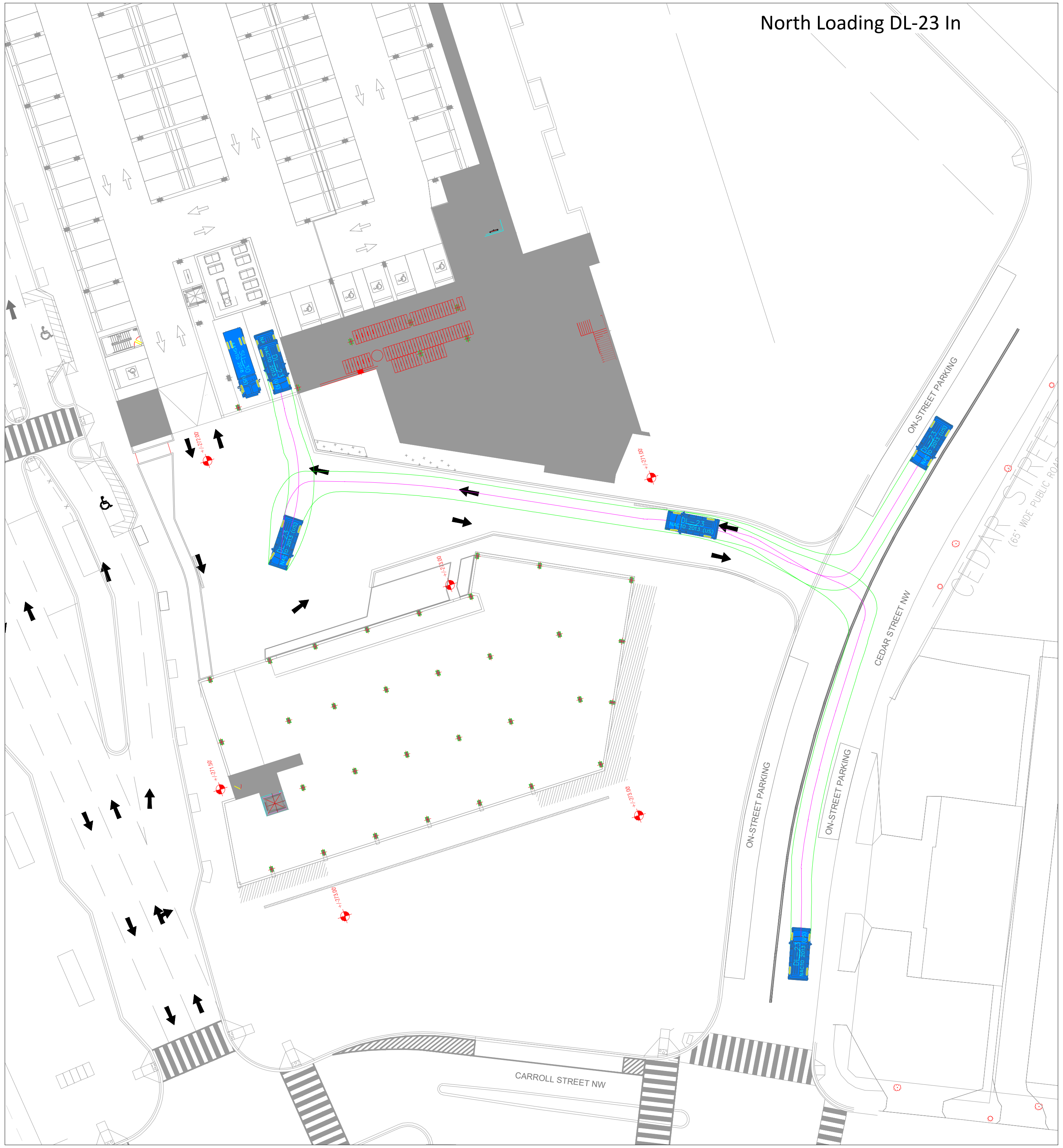
April 26, 2023

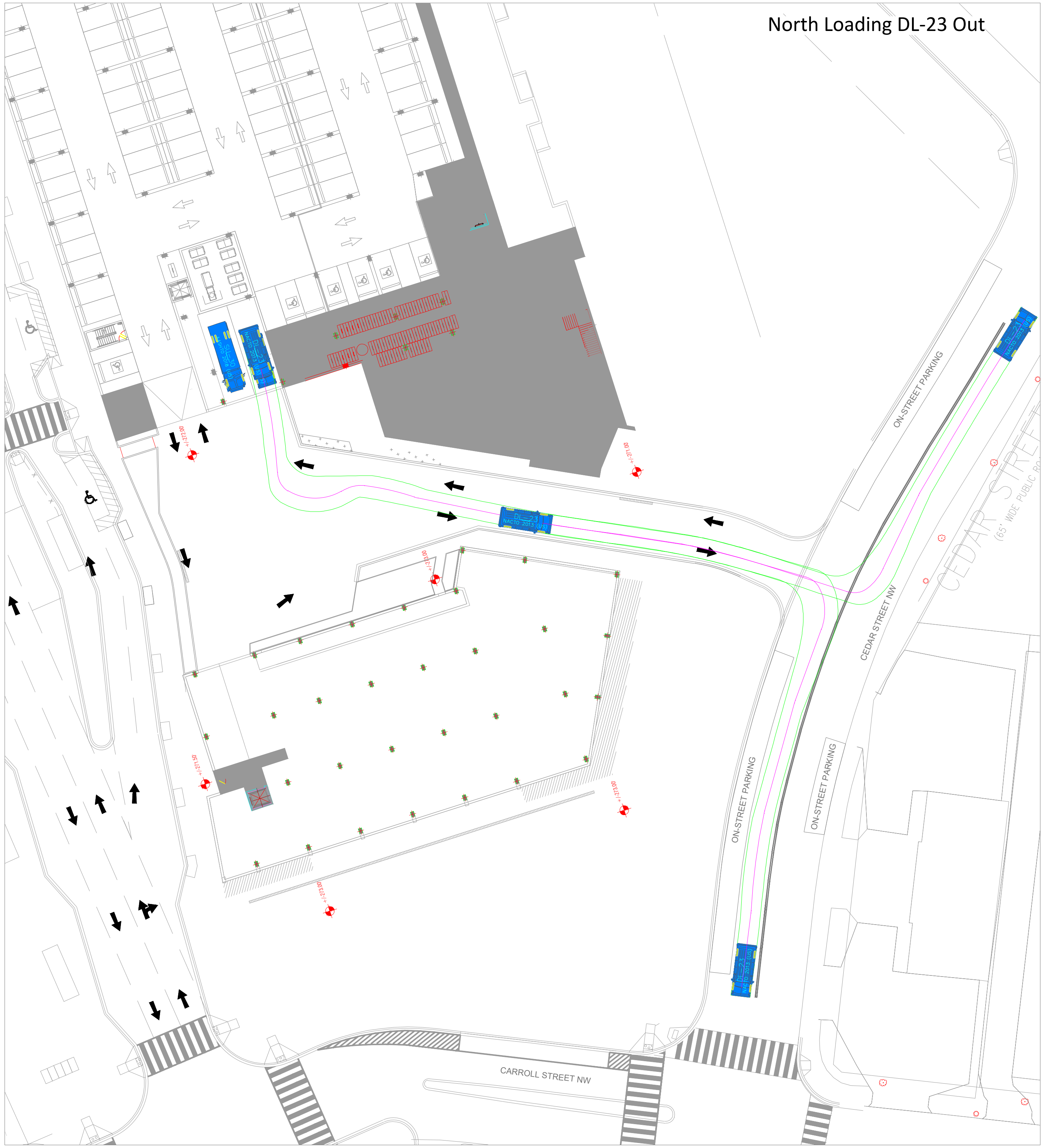
GOROVE SLADE
Transportation Planners and Engineers

CONTENTS

(Note: Click on heading to navigate directly to each section of the Technical Attachments)

A. Truck Maneuvering Diagrams





GOROVE **SLADE**
Transportation Planners and Engineers

Takoma Loading AutoTurn: DL-23

February 6, 2023
Sheet 1 of 8

0 30' 60'

DRAWN MAK	DESIGNED MAK	CHECKED DSA

REV.1
REV.2
REV.3

TRUCK MANEUVERING DIAGRAMS

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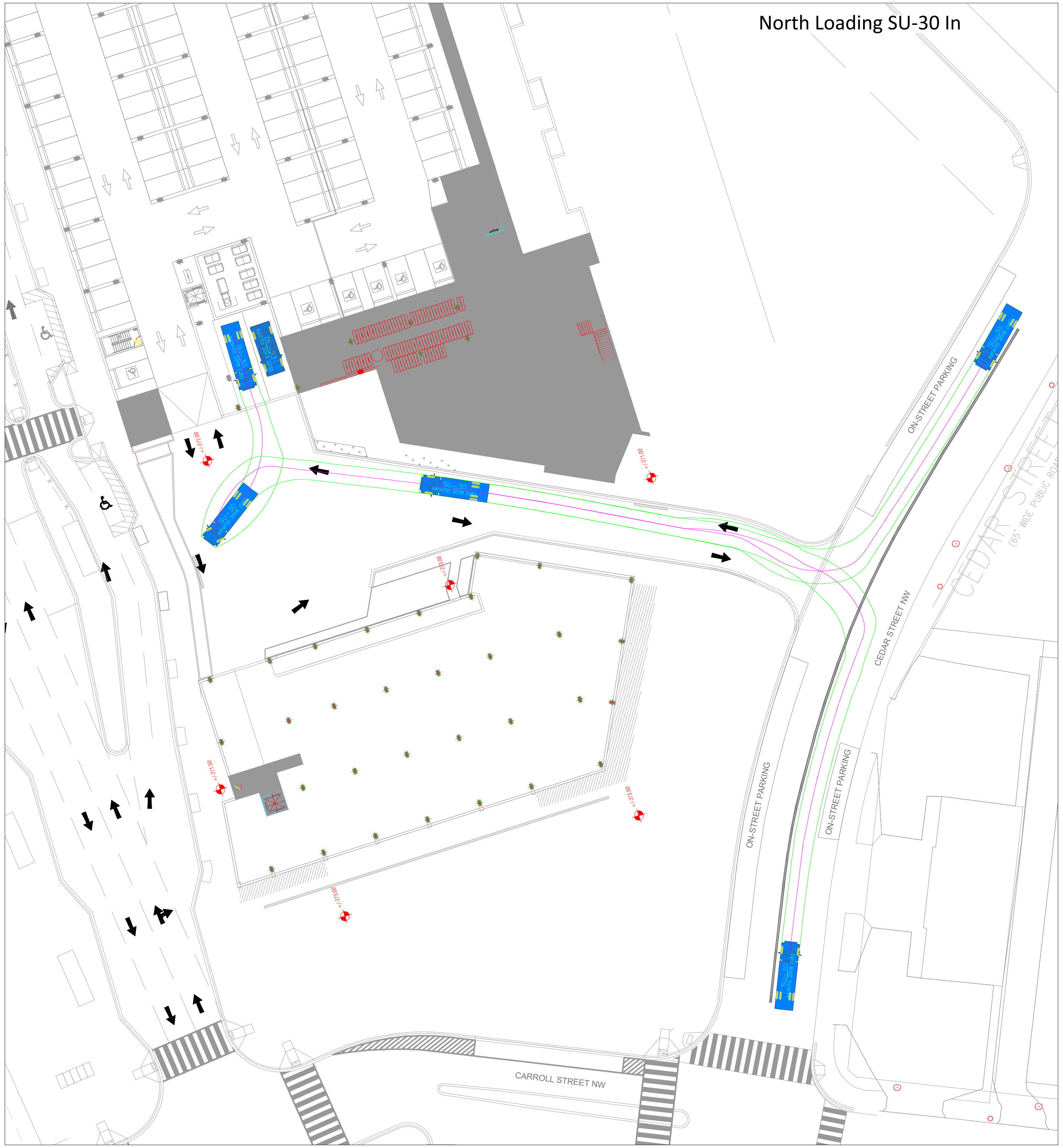
PROJECT NO. 2592-015

SHEET
PP-1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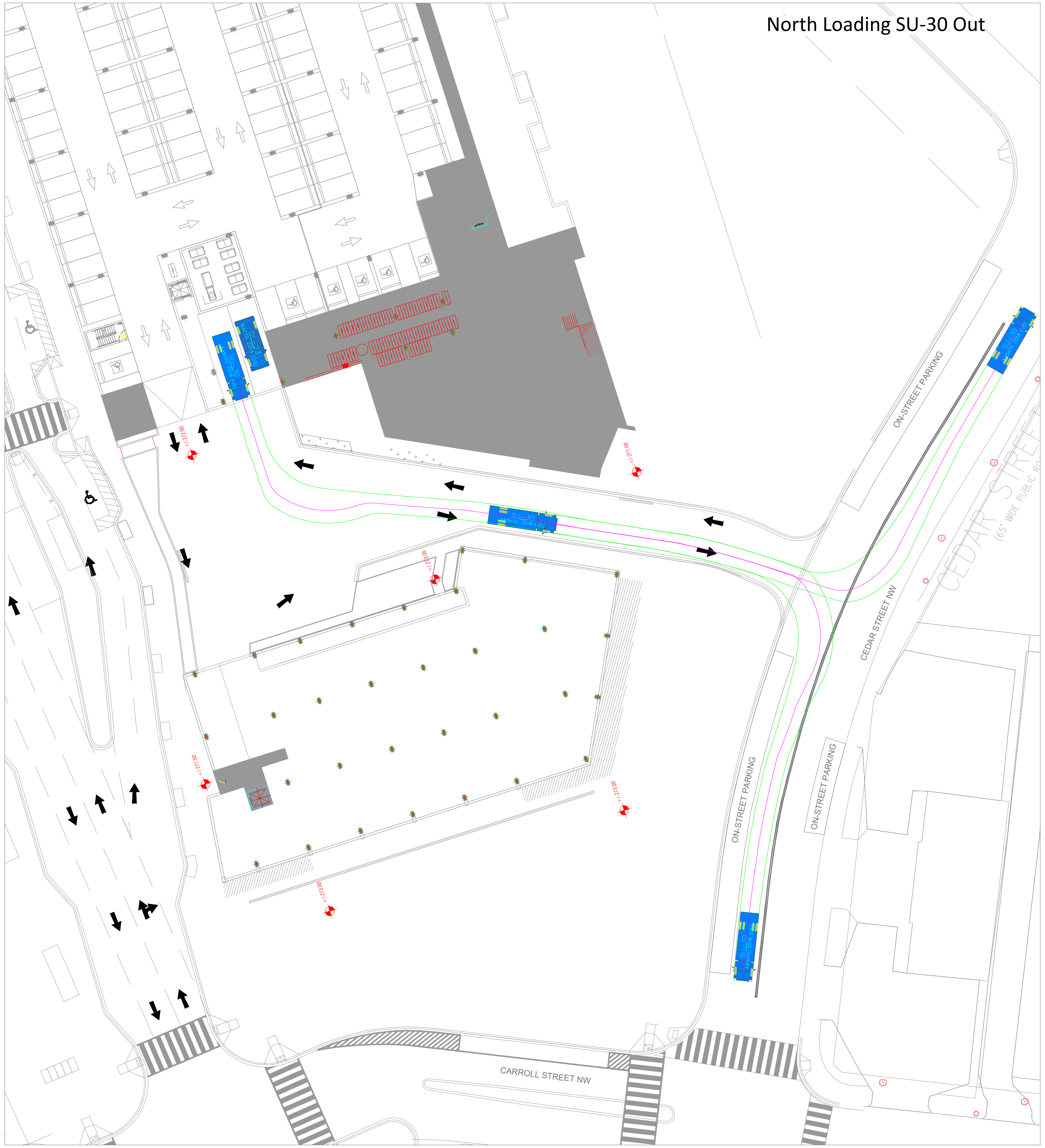
North Loading SU-30 Out

GOROVE SLADE
Transportation Planners and Engineers

Takoma Loading AutoTurn: SU-30
February 6, 2023
Sheet 2 of 8

0 30' 60'

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MAK	MAK	DSA

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REV.2	
REV.3	

TRUCK MANEUVERING DIAGRAMS

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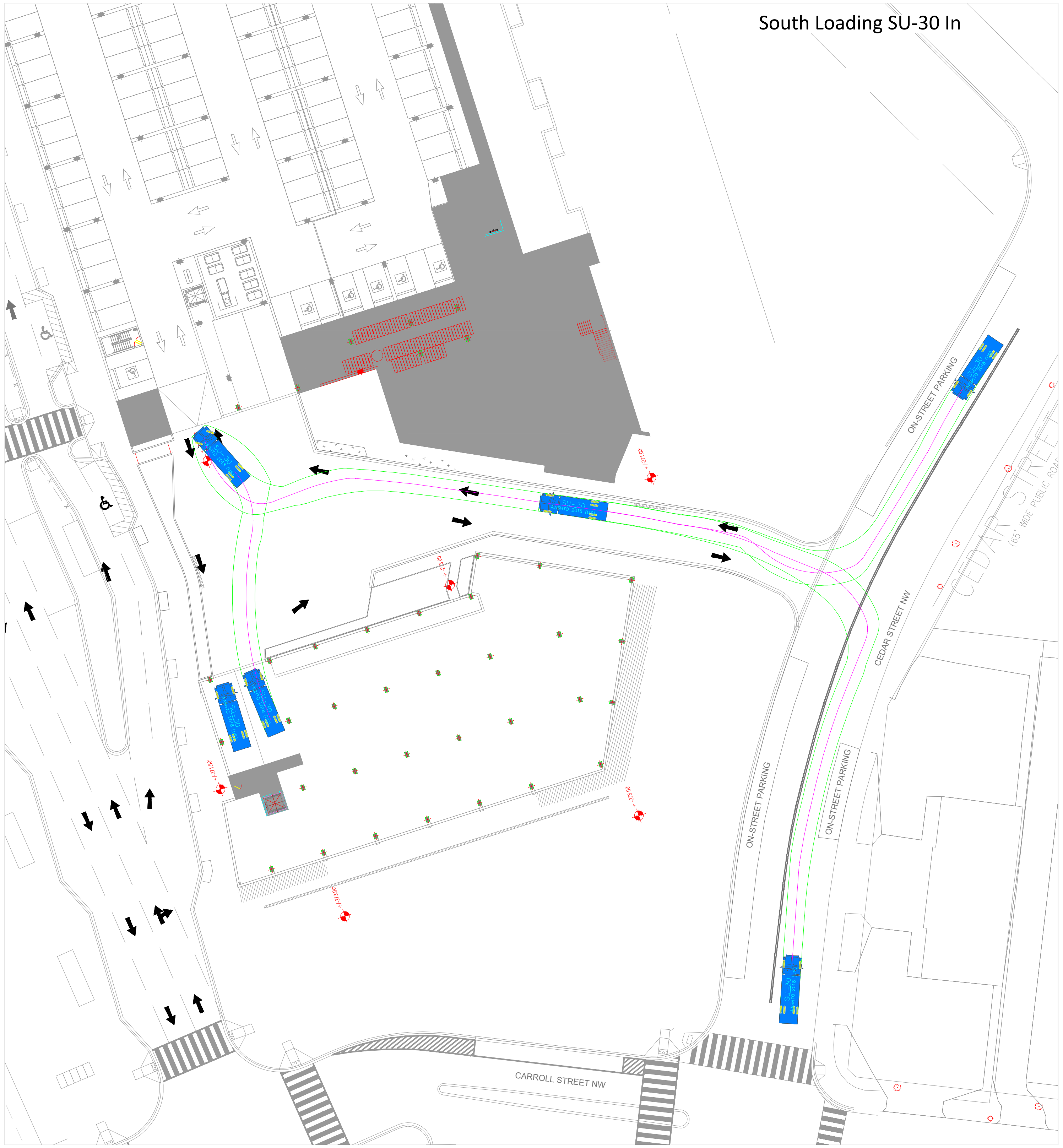
PROJECT NO. 2592-015

SHEET
PP-2



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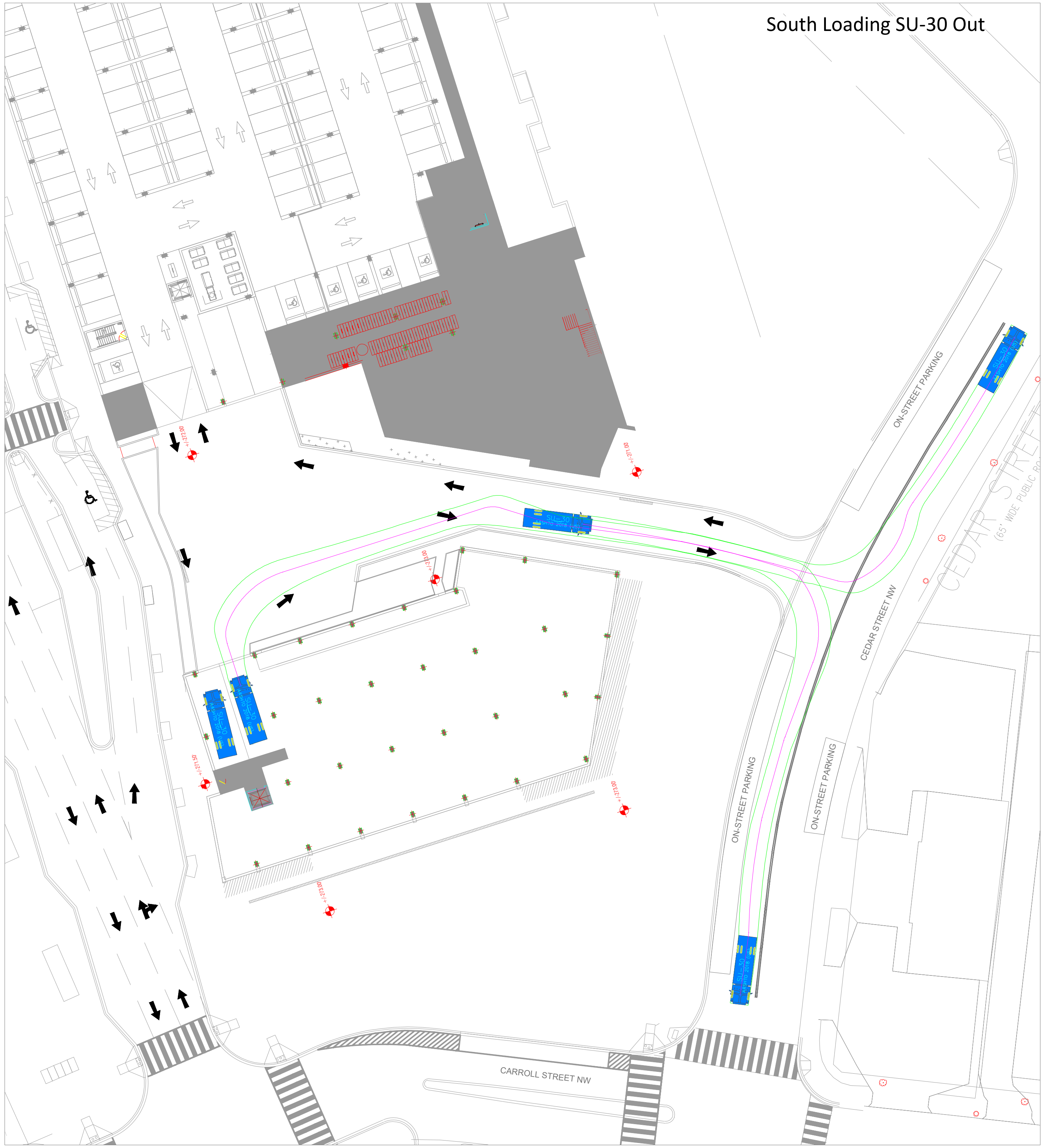

South Loading SU-30 Out

GOROVE SLADE
Transportation Planners and Engineers

Takoma Loading AutoTurn: SU-30

February 6, 2023
Sheet 3 of 8

0 30' 60'

DRAWN MAK
DESIGNED MAK
CHECKED DSA

REV.1
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REV.3

TRUCK MANEUVERING DIAGRAMS

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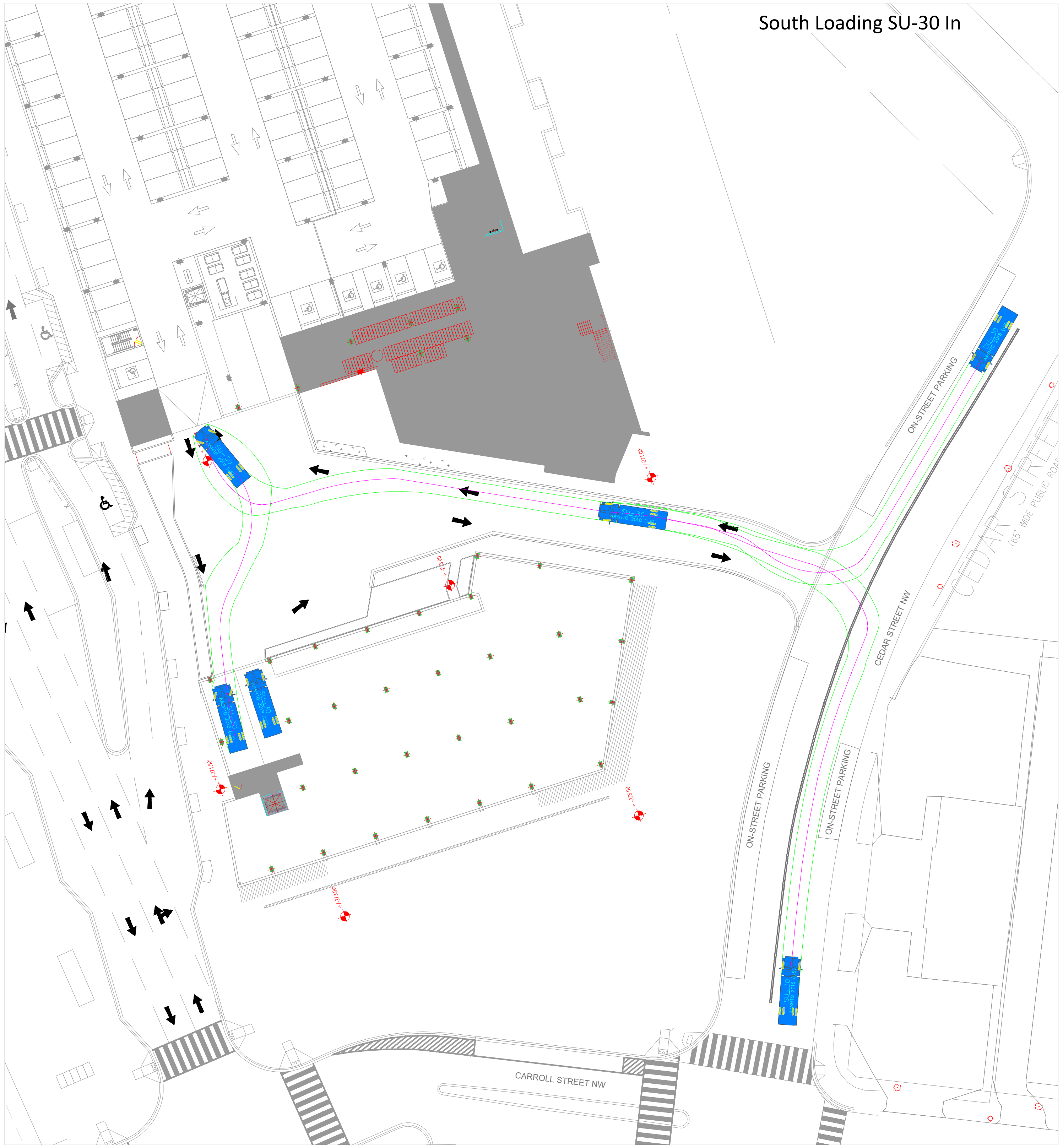
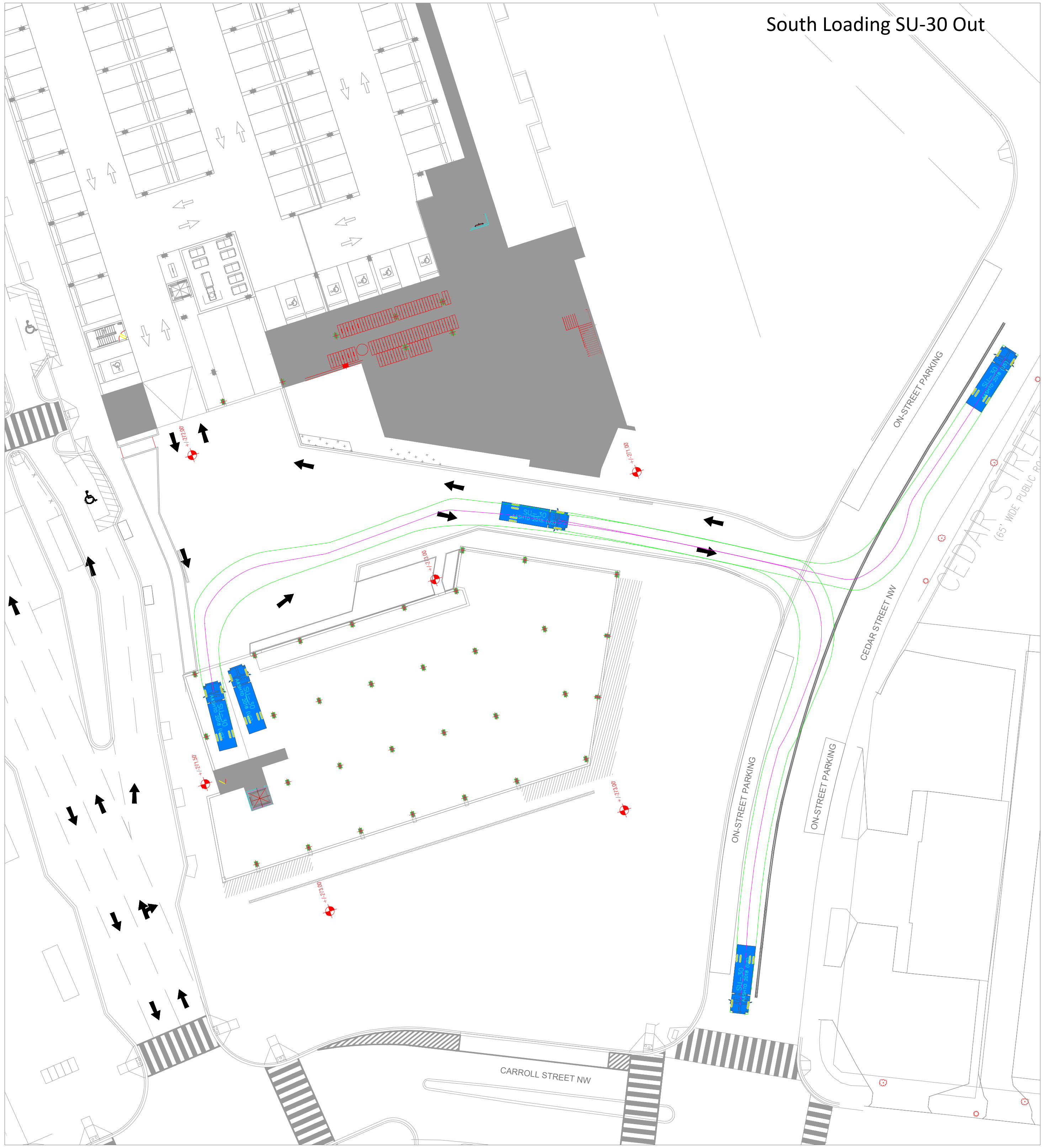
PROJECT NO. 2592-015

SHEET PP-3





GOROVE SLADE
Transportation Planners and Engineers

Takoma Loading AutoTurn: SU-30

February 6, 2023
Sheet 4 of 8

0 30' 60'

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TRUCK MANEUVERING DIAGRAMS

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PROJECT NO. 2592-015

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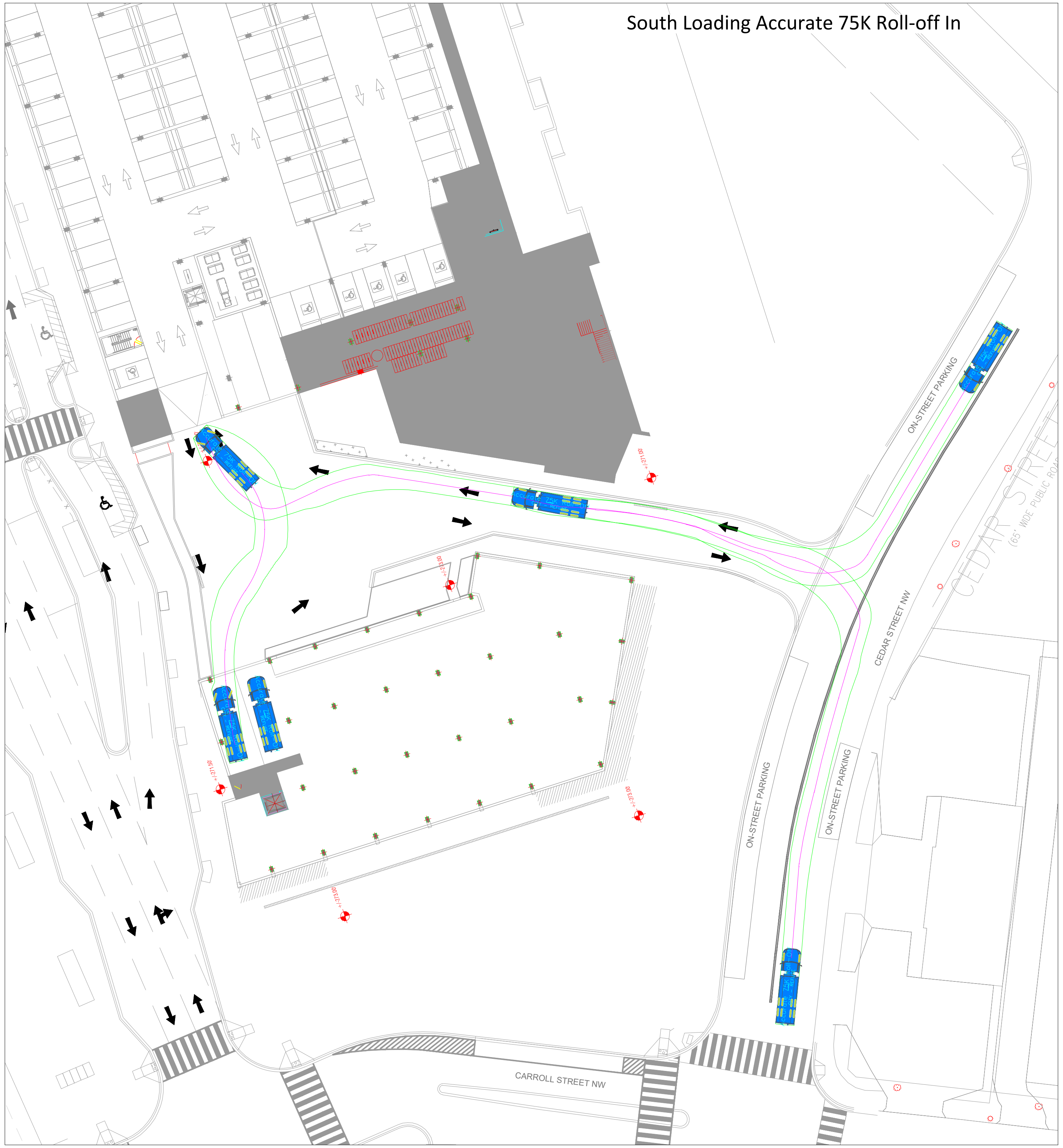
PP-4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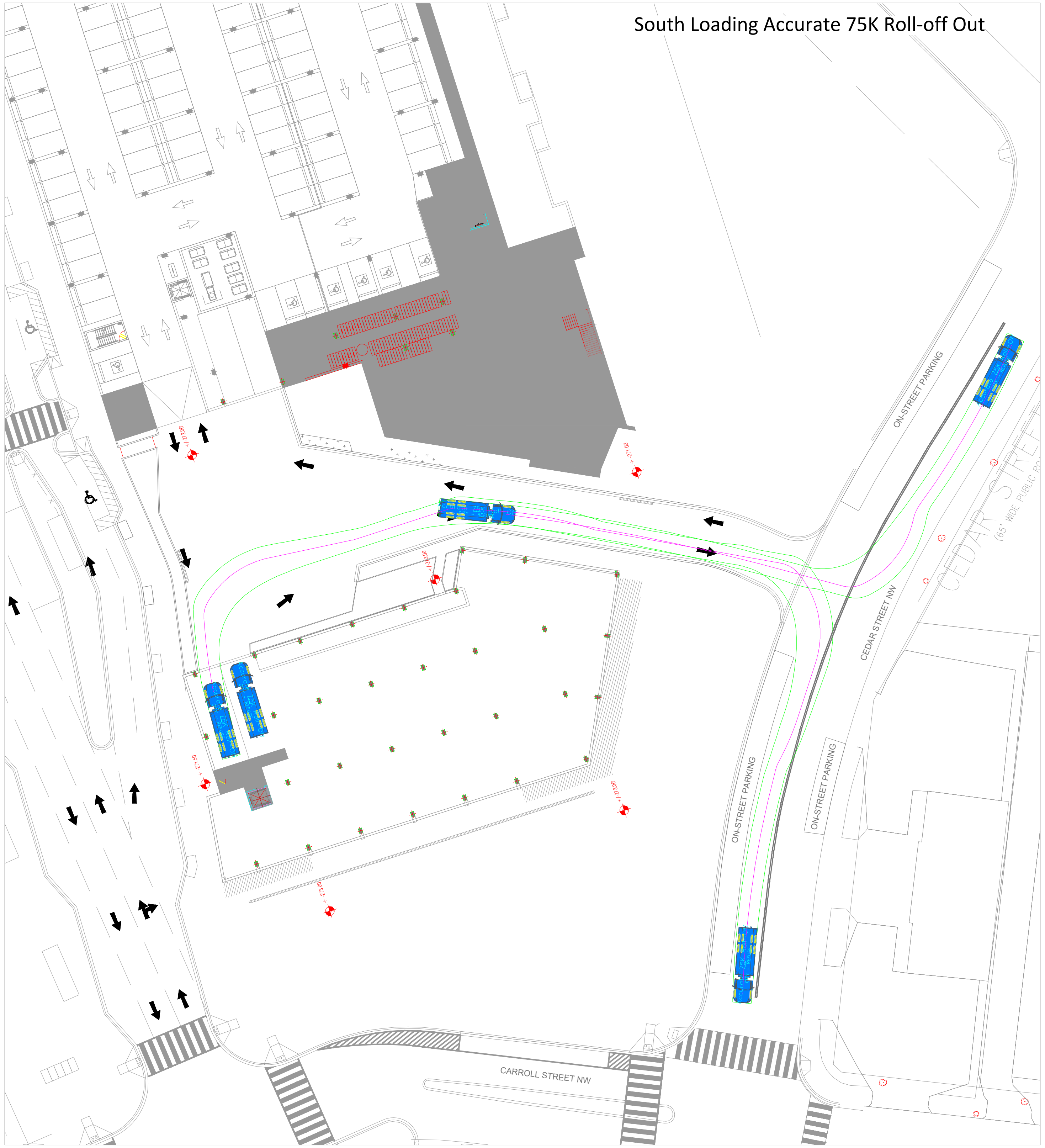
South Loading Accurate 75K Roll-off Out

GOROVE **SLADE**
Transportation Planners and Engineers

Takoma Loading AutoTurn: 75K

February 6, 2023
Sheet 5 of 8

0 30' 60'

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REV.2
REV.3

TRUCK MANEUVERING DIAGRAMS

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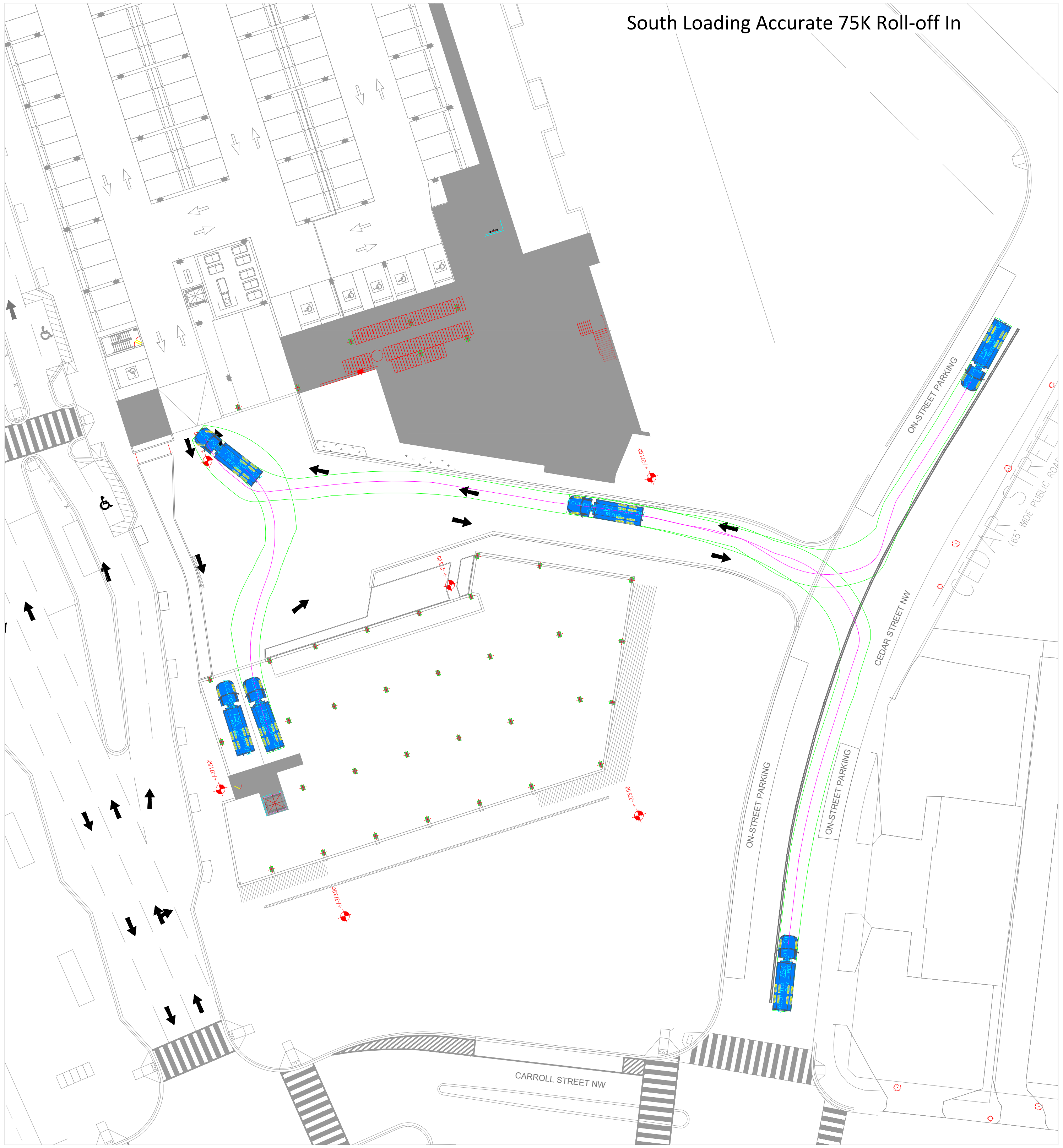
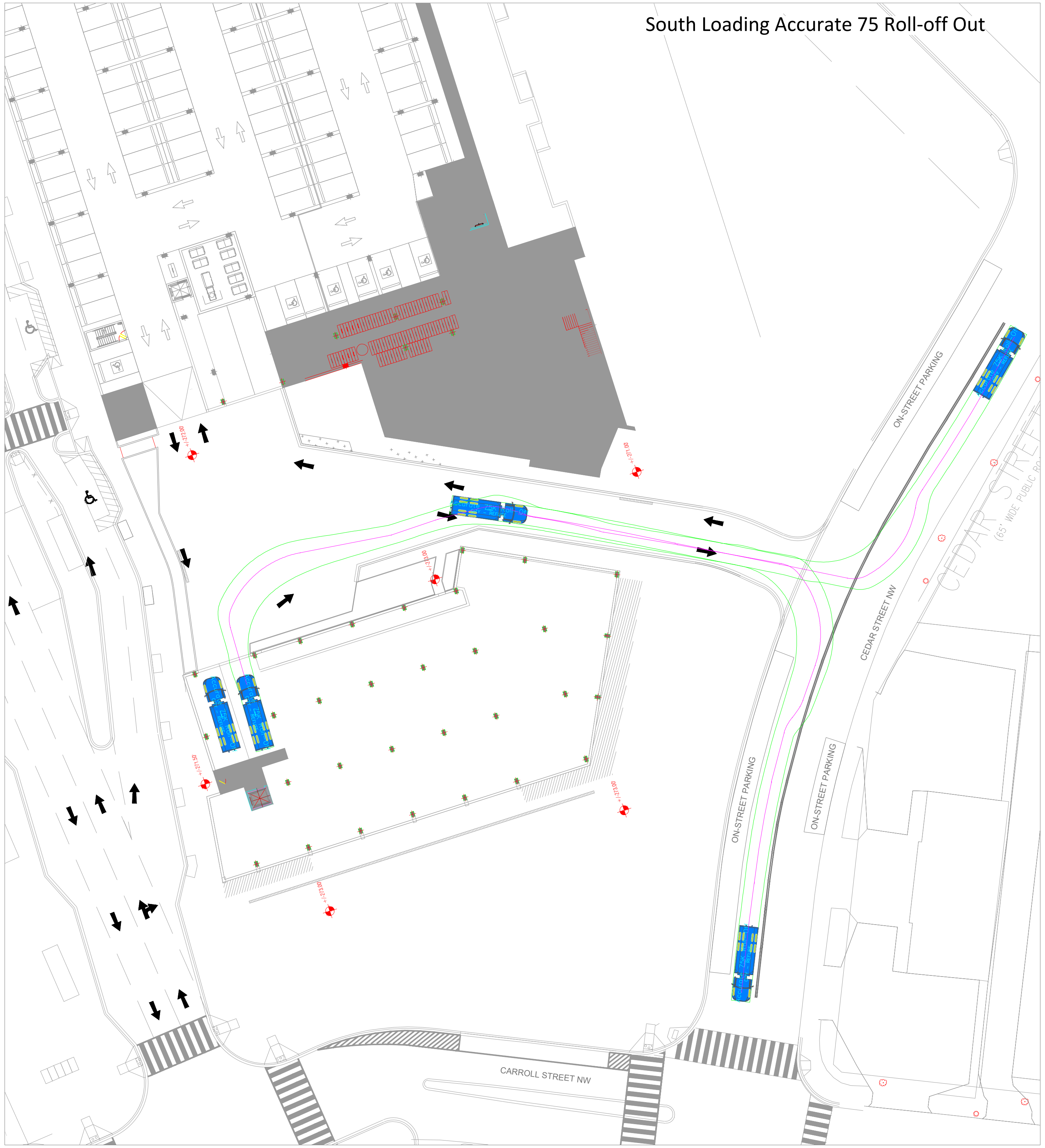
PROJECT NO. 2592-015

SHEET PP-5



South Loading Accurate 75K Roll-off In



South Loading Accurate 75 Roll-off Out

GOROVE SLADE
Transportation Planners and Engineers

Takoma Loading AutoTurn: 75K Roll-off

February 6, 2023
Sheet 6 of 8

0 30' 60'

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REV.3

TRUCK MANEUVERING DIAGRAMS

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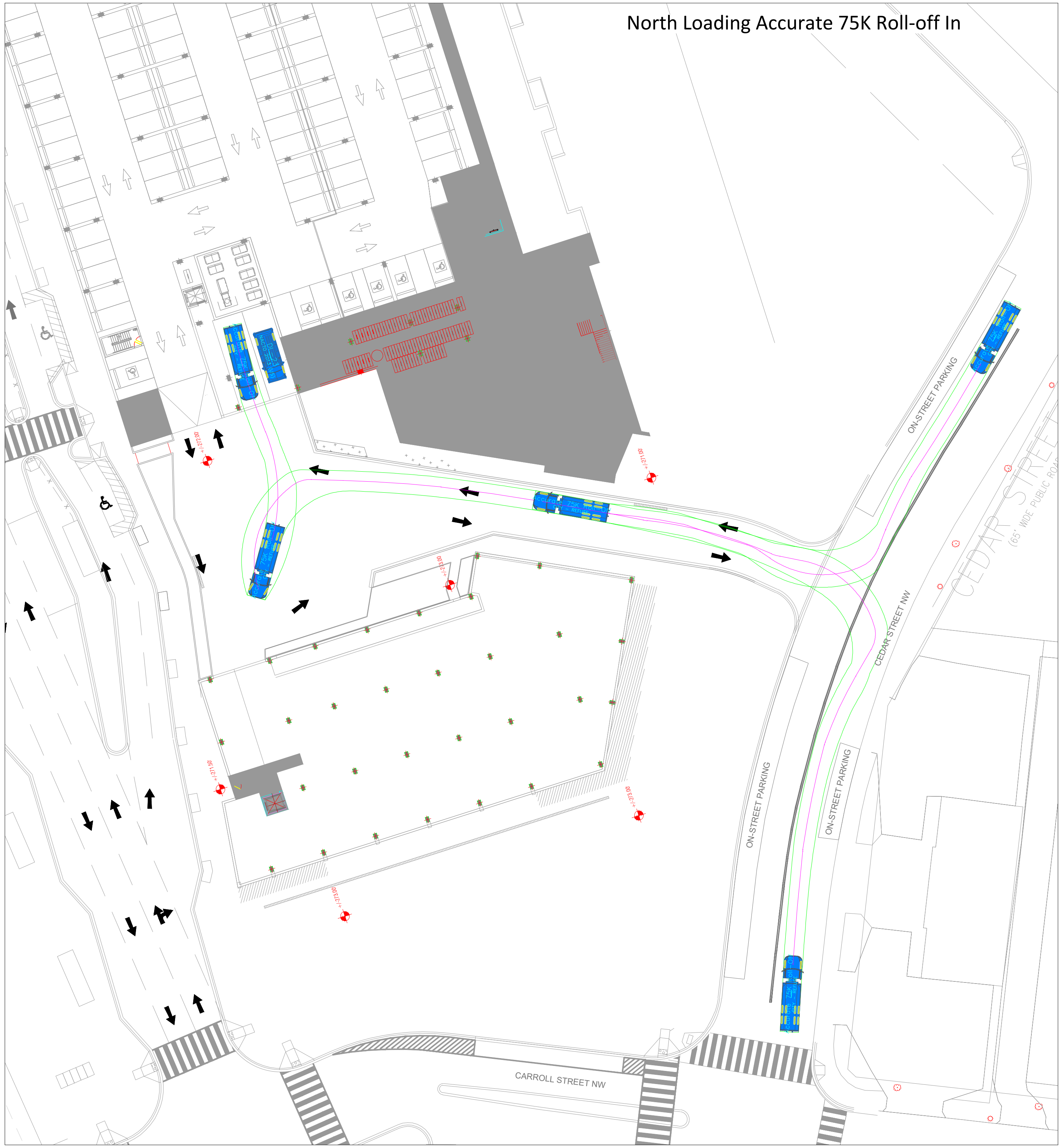
PROJECT NO. 2592-015

SHEET
PP-6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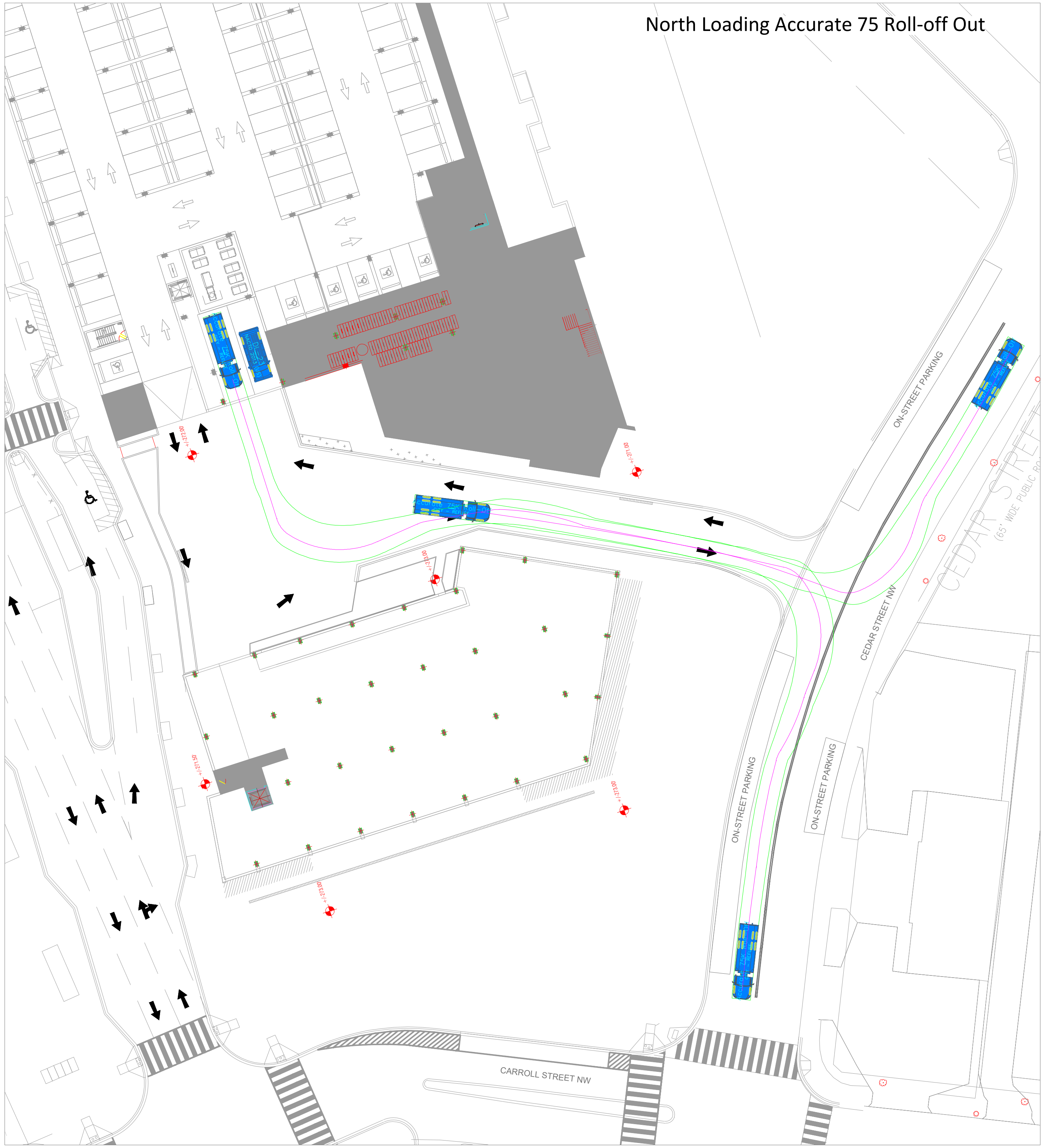
North Loading Accurate 75 Roll-off Out

GOROVE **SLADE**
Transportation Planners and Engineers

Takoma Loading AutoTurn: 75K Roll-off

February 6, 2023
Sheet 7 of 8

0 30' 60'

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TRUCK MANEUVERING DIAGRAMS

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PROJECT NO. 2592-015

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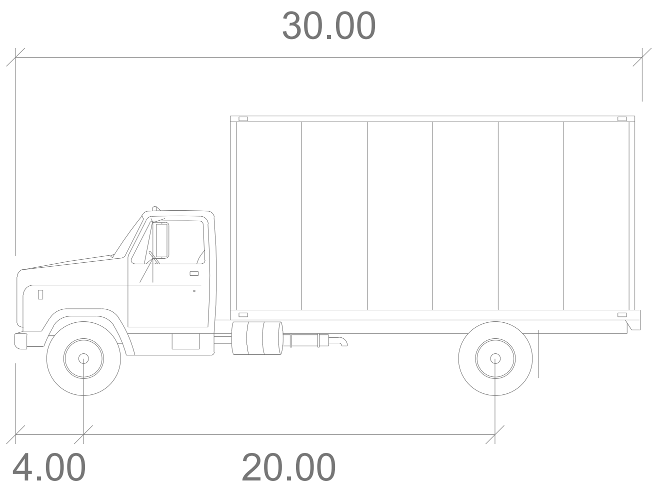
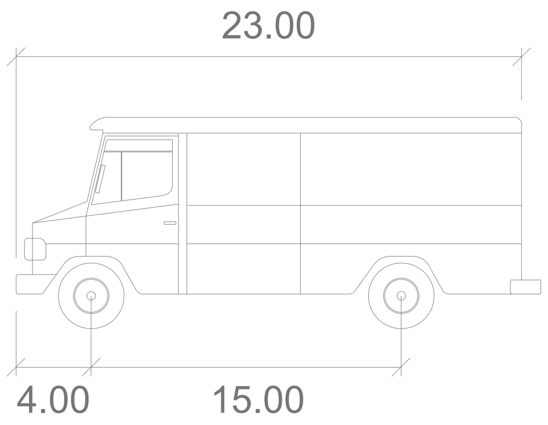


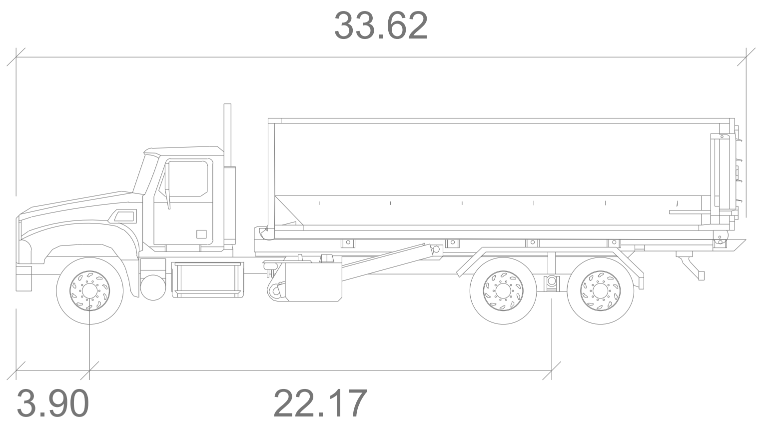
SU-30

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8



DL-23

	feet
Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 40.4



Accurate 75K Roll-Off

	feet
Width	: 8.17
Track	: 8.02
Lock to Lock Time	: 6.0
Steering Angle	: 32.7

GOROVE SLADE
Transportation Planners and Engineers

Takoma AutoTurn: Vehicle Profile
February 6, 2023
Sheet 8 of 8

Washington, DC

SCALE: N.T.S

P:\2592-015 Takoma Metro Multifamily Development (7301-3191)\CAD\Takoma - AutoTURN 02.06.2023.dwg - 2/6/2023 6:32 PM

B. Scoping Information

District Department of Transportation (DDOT)
Comprehensive Transportation Review (CTR) Scoping Form

The purpose of the Comprehensive Transportation Review (CTR) study is to evaluate potential impacts to the transportation network that can be expected to result from an approved action by the Zoning Commission (ZC), Board of Zoning Adjustment (BZA), Public Space Committee (PSC), a Federal or District agency, or an operational change to the transportation network. The Scoping Form accompanies the *Guidance for Comprehensive Transportation Review* and provides the Applicant an opportunity to propose a scope of work to evaluate the potential transportation impacts of the project.

Directions: The *CTR Scoping Form* contains study elements that an Applicant is expected to complete to determine the scope of the analysis. An Applicant should fill out this *Scoping Form* with a proposed scope of analysis commensurate with the requested action and submit to DDOT in Word format for review and concurrence. Accordingly, not all elements and figures identified in the *Scoping Form* are required for every action, and there may be situations where additional analyses and figures may be necessary. The Applicant should fill out as many sections as possible and leave blank any sections that are not relevant to their project. Once a completed *Scoping Form* is submitted, DDOT will provide feedback on the initial proposed scope. DDOT's turnaround times are four (4) weeks for CTRs with a Traffic Impact Analysis (TIA) and three (3) weeks for all other lower tier studies. After the *Scoping Form* has been finalized and agreed to by DDOT, the Applicant is required to expand upon the elements outlined in this *Form* within the study and comply with all CTR requirements not specifically addressed in this *Form*.

Scoping Information
Date(s) Scoping Form Submitted to DDOT: 11/22/2022
DDOT Case Manager: Emma Blondin
Date(s) Scoping Form Comments Returned to Applicant: 4/18/2023
Date Scoping Form Finalized:

Project Overview	**Proposed Development Program**
Project Name: Takoma Metro Multifamily Development	**Use(s)**
Case Type & No. (ZC, BZA, PSC, etc.): PUD; ZC Case # TBD	**Residential (dwelling units):** 440
Applicant/Developer Name: EYA	**Retail (square feet):** 17,650
Transportation Consultant and Contact Info: Gorove Slade Associates, Inc., 1140 Connecticut Avenue NW, Suite 1010, Washington, DC 20036 Dan VanPelt, 202-540-1924, dbv@goroveslade.com Will Zeid, 571-466-6605, william.zeid@goroveslade.com	**Office (square feet):** N/A
Land Use Counsel and Contact Info: Paul Tummonds, 202-721-1157, PTummonds@goulstonstorrs.com Goulston & Storrs	**Hotel (rooms):** N/A

Site Street Address: Takoma Metro station (site bounded by Carroll St NW, Cedar St NW, Eastern Ave NW, Metro station)	**Other:** N/A
Site Square & Lot: Square 3352, Lots 806, 811, 812, 813, 820, 822, 823, 829, 831, 839, 840, 841, 846, 847, 848, 849, 850, 851	**# of Vehicle Parking Spaces:** 230
Current Zoning and/or Overlay District: Existing: MU-4, NC-2, RA-1 Proposed: MU-5A	**# of Carshare spaces:** TBD
Estimated Date of Hearing: TBD	**# of Electric Vehicle Stations:** 5
ANC/SMD No. & SMD Commissioner Name: 4B01; Evan Yeats	**Bicycle Parking Facilities**
OP Small Area Plan (if applicable):	**Long-term / Short-Term spaces:** Long term: at least 149 provided (149 required) Short term: at least 27 provided (27 required) Note: Bike parking totals shown in this form assume a 440 DU and 17,650 SF retail development program. The most recent PUD plans show only 434 DU's and thus a slightly lower bike parking count. The final bike parking counts will be determined by the final development program.
DDOT Livability Study (if applicable): Rock Creek East I Livability Study	**Showers / Lockers (non-residential):** Showers: 0 required (0 provided) Lockers: 1 required (1 provided)
Within ½ Mile of Metrorail or ¼ mile of Priority Bus/Streetcar?: Yes for both	**Loading Berths/Spaces:** Required: 1 loading berth and 1 service/delivery space Provided: 2 loading berths and 1 service/delivery space

Documents to be Submitted to DDOT: *Any action requiring a CTR or some other evaluation of on-site or off-site transportation facilities must submit one of the following documents to DDOT. It must be appropriately scoped for the specific action proposed and document all relevant site operations and transportation analyses.*

☒ **CTR Study** (100 or more total peak hour person trips OR 25 or more peak hour vehicle trips in peak direction, or as deemed necessary by DDOT)

  ☐ **TIA Component of CTR Study Triggered** (25 or more peak hour vehicle trips in peak direction, or as deemed necessary by DDOT)

☐ **Transportation Statement** (limited scope based on specifics of project OR if Low Impact Development Exemption from CTR and TIA is requested)

☐ **Standalone TIA** (project proposes a change to roadway capacity, operations, or directionality, has a site access challenge, or as deemed necessary by DDOT)

☐ **Other, specify:** ____

☐ Include PDF of report with appendices, traffic analysis files, and traffic counts in DDOT spreadsheet format (total size of all digital files under 15 MB, if possible)

Existing Site and Description of Action: *Describe the type(s) of regulatory approval(s) being requested and any background information on the project relevant to the requested action such as the existing uses, amount of vehicle parking, and other notable proposed changes on-site. Also note any other needed regulatory approvals outside of the zoning action discussed in this Form (e.g., Surveyor's Order for alley closure).*

The Applicant is seeking Zoning Commission approvals for a mixed use development at the Takoma Metro station site. The project site is generally bounded by Eastern Avenue NW to the northeast, Cedar Street NW to the east, Carroll Street NW to the south, and the Takoma Metro station to the west. The existing site is currently improved with a Metro parking/kiss-and-ride lot, bus loop, and green space.

The proposed project will redevelop the existing site into a mixed-use development with approximately 440 multifamily residential units and 17,650 square feet of ground-floor retail space.

The proposed project includes the removal of one driveway (the current bus access driveway at Eastern Avenue NW) and the addition of one new driveway (from Cedar Street NW between Carroll Street and Eastern Avenue). The two additional existing driveways will be reconstructed with the site reconfiguration. The proposed project also includes relocating the existing bus loop and consolidating it with the kiss-and-ride function. Approximately 230 parking spaces in a garage are proposed for the residential and retail components of the project.

The new driveway proposed on Cedar Street would be constructed as a curbless "woonerf" type facility to provide primary access to retail parking, residential parking and both retail and residential loading facilities. An additional connection to the residential parking would be provided from the internal drive south of the Eastern Avenue driveway intersection.

Prior Related Action(s), Conditions, and Commitments: *Note any prior approvals by ZC, BZA, or PSC (e.g., Campus Master Plan, First Stage PUD, student/faculty cap, etc.) for the site and list all relevant conditions and proffers still in effect from the previous approval and status of completion. Attach a copy of the Decision section from the previous Zoning Order if still in effect.*

N/A

Section 1: SITE DESIGN

DDOT reviews the site plan to evaluate consistency with DDOT's standards, policies, and approach to access as documented in the most recent Design and Engineering Manual (DEM). If the proposal for use of public space is found to be inconsistent with the agency approach, DDOT will note this regardless of its relevance to the action. It is DDOT's position that issues regarding public space be addressed at the earliest possible opportunity to ensure the highest quality project design and to minimize project delays and the need to re-design a site in the future.

CATEGORY & GUIDELINES	APPLICANT PROPOSAL	DDOT COMMENTS
Site Access and Connectivity Show site access points for all modes. Include proposed curb cut locations, curb cuts to be closed, access controls (e.g., right-in/out, signalized), sight distances and sight triangles from access points and new intersections, driveway widths and spacing, on- and off-site parking locations, inter-parcel connections, public/private status of driveways, alleys, and streets, and whether easements, dedications, or ROW closures are proposed. *See Section 1.1 of the CTR Guidelines for more detailed guidance.*	Site access points for vehicles, pedestrians, and bicyclists will be highlighted in the CTR. Access to the parking garage will occur from: • A new internal driveway/turnaround accessed from Cedar Street NW; and • A new driveway accessed from the relocated bus loop. Loading access will occur from the new internal driveway/turnaround accessed from Cedar Street NW. The following curb cut modifications will occur with the project: • One existing curb cut removed on Eastern Avenue NW (serving the former bus loop) • One new curb cut on Cedar Street NW (serving the new internal driveway/turnaround) • Reconstruction and relocation of the two existing curb cuts to remain on Eastern Avenue and Carroll Street Pedestrian access to the project will be provided as shown on the pedestrian connectivity diagram.	Shared bicycle/pedestrian facilities on Carrol and Cedar street must meet DDOT and AASHTO standards – a minimum of 10ft wide. Please include detailed design during public space permitting Response: 10' is the target width. However, there are existing trees being preserved adjacent to the shared use path that may prevent 10' at all locations. Detailed designs will be provided during the Public Space process. DDOT Concurs. Include pinch points in design documents. Note that 10' is the minimum – design constraints are understood, but if there are

	Bicycle access to the project will be at the short-term bicycle racks around the perimeter of the site, and the long-term bicycle parking spaces in the garage accessed from either the bus loop or the new internal driveway/turnaround off Cedar Street NW. Access to the loading area will be from the new internal driveway/turnaround off Cedar Street NW. Sight distances and sight triangles will be provided in the CTR. ☒ *Scoping Graphic: Project Location Map* ☒ *Scoping Graphic: Site Circulation Plan* ☒ *Scoping Graphic: Plat for Site's Square and Lot from Office of the Surveyor (if official plat not available, provide copy from SURDOCS)*	areas that can accommodate more than 10ft, please widen to 12 or 14. GS response: Acknowledged. The diagonal crossing of the shared-use path at the driveway off of Cedar Street could have improved sightlines and shorten the amount of time it takes to cross if the path were made perpendicular to the driveway. It could be worthwhile to make this a raised crossing or provide some visual indication to vehicles that they are crossing over a shared use path. Response: The diagonal crossing will be repositioned to minimize crossing distance. This will be reflected in the next PUD resubmission. DDOT Concurs. Include width of curb cut and proposed crossing in submission. Crossing should be designed as a continuation of the path – at grade and the same materials as the sidewalk rather than the driveway. GS response: Confirmed, the crosswalk will be consolidated perpendicular to the driveway at Cedar Street. Extend shared use path all the way north to the end of the property line along Eastern Avenue and extend sidewalk around bus turnaround on-site. Response: There is a heritage tree behind the existing retaining wall that cannot be removed or encroached upon. Therefore, the driveway and retaining wall will remain in the existing location and the sidewalk cannot be widened between there and the northwest property line. Understood – but pedestrian paths will need to be accommodated,

		either through a sidewalk or a safe pedestrian crossing. Pedestrian paths should be shown in the site plan/circulation diagram including how they get west of the site on Eastern Ave GS response: The paved area adjacent to the WMATA bus standing zone was requested by WMATA and is not intended for public use. Therefore, it will not connect to the existing sidewalk network. See attached revised site plans. The parking/loading/PUDO will create conflicts in the shared driveway at the center of the development. Please provide details on how this space will be designed for interactions between vehicles, loading, and cyclists. Provide more information on how the motor court is expected to operate and why a more circular design is not being pursued? Response: The PUD drawing L502 has been updated to provide additional safety measures for the internal driveway. This update includes 1.) decreased contrast between field and bands 2.) Illustrate flush curb with accent paving color 3.) Darker paving at vehicle section 4.) Identify pedestrian crossing locations 5.) Added bollards between pedestrian and vehicular areas. DDOT Concurs. We may have additionally comments once we receive these updated drawings. GS response: Acknowledged. Ensure the internal driveway to Cedar has sidewalks leading to the doors. Provide information about the pedestrian porosity through this space over to the kiss n ride crosswalk.

		Response: the current design includes pedestrian paths from Cedar Street into the building on both sides of the woonerf, which will be curbless with bollards, pavement transitions and defined crosswalk areas to separate pedestrians from other modes. Please see sheet L502 from PUD submission for information. DDOT Concurs – though the driveway should not be referred to as a woonerf, as the high volumes require separation of vehicles and pedestrians. GS response: Understood, we will not use the woonerf terminology. Provide details on circulation for vehicles.the circulation diagram does not show how vehicles will be exiting. Response: Circulation diagrams will be included in the CTR that show this. Additionally, vehicle circulation in the internal woonerf is diagramed on sheet L503 of the latest PUD resubmission. DDOT Concurs Can the crosswalks be raised at least through the kiss & ride? Response: WMATA expressed opposition to raised crossings within the bus loop. DDOT Concurs with the bus loop – the question was specific to the kiss & ride section. GS response: WMATA was opposed to a raised crossing on both the bus loop and kiss and ride, but we will coordinate with WMATA to try to add the raised crossing on only the kiss and ride.

Loading

Discuss and show the quantity and sizes of loading berths/delivery spaces, trash storage locations, on- and off-site loading locations, turnaround design, nearby commercial loading zones, and anticipated demand, operations, and routing of delivery and trash vehicles. Identify the sizes of trucks anticipated to serve the site and design vehicles to be used in truck turning diagrams. Provide truck turning diagrams in the body of the report not the appendix. Include a Loading Management Plan (LMP) if zoning relief, back-in loading, or curbside loading is proposed.

See Section 1.2 of the CTR Guidelines for more detailed guidance. A template LMP is provided in Appendix E.

The development will provide on-site loading facilities within the building. ZR16 loading requirements are shown below.

Land Use	Size	ZR16 required loading		Proposed loading	
		Berths	Service/delivery spaces	Berths	Service/delivery spaces
Residential	440 DU	1	1	1	1
Retail	17,650 SF	1	0	1	0
Total		**1** [1]	**1**	**2**	**1**

[1] Per Subtitle C § 902.2, the residential and retail uses may share their loading facilities.

Based on these requirements, the project is required to provide one (1) berth and one (1) service/delivery space. The Applicant is proposing to provide two (2) 12' x 30' berths and one (1) 10' x 20' service/delivery space.

Truck turning diagrams will be provided in the CTR.

☒ *Scoping Graphic: Location of loading area with internal building routing*

☐ *Scoping Graphic: Truck Turning Diagrams (to/from the site, alley, truck routes)*

Submit a loading management plan with your CTR

Response: Acknowledged.

The motor court has loading on both sides –design still needs to address potential conflicts between loading and vehicle parking access.

GS response: Loading conflicts will be addressed with the LMP to be detailed in the CTR.

Vehicle Parking

Identify all off-street parking locations (on- and off-site) and justify the amount of on-site vehicle parking, including a comparison to the number of spaces required by ZR16 and DDOT's Preferred Maximum rates (Figure 10). Provide parking calculations and parking ratios by land use, including any eligible ZR16 vehicle parking reductions (i.e., within ¼ mile of Priority Bus Route, within ½ mile of Metrorail Station, providing carshare spaces, located within a D zone, etc.). Confirm whether ZR16 TDM Measures will be required per Subtitle C § 707.3 for providing more than double the required amount of parking.

See Section 1.3 of the CTR Guidelines for more detailed guidance.

The project's baseline ZR16 requirement is 164 spaces. This requirement is reduced to 82 spaces with the 50 percent reduction that the project is eligible given its location adjacent to a Metro station, while its DDOT-preferred maximum is 128 spaces.

The proposed parking supply for the project is 230 parking spaces for the residential and retail uses. The proposed parking supply does not trigger zoning mitigation for excess parking.

Land Use	Size	DC Zoning Regulations (ZR16) [1]			DDOT-preferred maximum [2]		Proposed spaces
		Calculation	Spaces	With 50% Reduction	Calculation	Spaces	
Residential	440 DU	1 per 3 units in excess of 4 units	145	-	0.25 per unit	110	163
Retail	17,650 SF	1.33 per Ksf in excess of 3 Ksf	19	-	1.00 per Ksf	18	67
Total			**164**	**82**		**128**	**230**

[1] Includes 50% reduction for being within ½ mile of Metro station

[2] Rate for developments less than ¼ mile from Metrorail

☒ *Scoping Table: Parking Calculations with Comparison to ZR16 and DDOT's Preferred Maximum Vehicle Parking (Figure 10)*

☐ *Scoping Graphic: Off-Street Parking Locations (both on- and off-site)*

This is very overparked for a development at a metro station and bus hub. CTR Guidelines state sites within 1/8 mile of a Metro Station should start with 0 parking and make a case for providing any. DDOT strongly encourages the applicant to take the 50% reduction for parking spaces. If the parking ratio is not improved either by reducing parking or increase size of building, physical mitigations will be required.

Response: Significant TDM commitments and physical transportation improvements will be proposed with the project.

DDOT would like to see either reduced parking, increase units, or reassigning parking spaces for other uses (visitor parking, ADA parking, additional bicycle parking, car share). It is noted that both OP and WMATA share the concern regarding the development being over parked.

GS response: The Applicant is providing substantial pedestrian improvements and a robust TDM

		plan that offsets the parking ratio. These mitigations will be outlined in detail in the CTR. Provide detail on how the proposed spaces will be programmed. With the 163 spaces for residential, the residential auto mode share will need to be increased to accommodate the over parking. How will the parking be designed to discourage additional queuing and kiss and ride through the parking garage? Response: The mode share has been increased, as requested. We have coordinated with WMATA to propose an adequate amount of kiss-and-ride space. The residential portion of the garage will be access-restricted to residents only. The retail portion will be paid parking at market rate. DDOT Concurs The significant amount of parking will also create conflicts in the shared driveway at the center of the development. Please provide details on how this space will be designed for interactions between vehicles, loading, and cyclists. Response: See previous response. The center court has been updated and includes better delineation of paths. DDOT Concurs
Bicycle Parking Identify the locations of proposed bicycle parking and justify the amount of long- and short-term spaces proposed. Provide a calculation of the number of spaces required by ZR16, as well as showers and lockers for non-residential uses, and ensure they are designed appropriately into the project. *See Section 1.4 and Appendix F of the CTR Guidelines, and the latest DDOT*	The project's ZR16 bike parking requirement is 149 long-term spaces and 27 short-term spaces as shown below. The development will meet ZR16 short-term requirements by providing 27 short term bicycle parking spaces along the site perimeter. The location of these spaces will be noted in the CTR if that data is available. The development will exceed ZR16 long-term requirements by providing at least 149 long-term bicycle parking spaces. The location of these spaces will be noted in the CTR if that data is available.	Confirm the existing 10 bicycle parking racks near the metro entrance will remain where they are Response: The total number of bike racks in the Metro entrance will not be reduced. WMATA is considering relocating and/or replacing these spaces with other types of bike parking in that general location as close to the entrance as possible.

Bike Parking Guide, for more detailed design guidance.

Land Use	Size	ZR16 Bicycle Parking Rate		ZR16-required Bicycle Parking Spaces [1]		DCMR 18-1214 Calculation [2]	DCMR 18-1214 Requirement	Proposed Bicycle Parking Spaces	
		Long Term	Short Term	Long Term	Short Term	Long Term	Long Term	Long Term	Short Term
Residential	440 DU	1 per 3 du's	1 per 20 du's	98	22	1 per 3 du's	146.67	147	22
Retail	17,650 SF	1 per 10,000 sf	1 per 3,500 sf	2	5	N/A	N/A	2	5
Total				**100**	**27**		**146.67 (147)**	**149**	**27**

[1] Rate applied at 50% after first 50 spaces per ZR16 11C802.2

[2] No 50% reduction after first 50 spaces

ZR16 requires 0 showers and one (1) locker for the project. One (1) locker will be provided but its location is still being determined.

Land Use	Size	ZR16 shower and locker rates		ZR16 required showers and lockers		Proposed showers and lockers	
		Shower	Locker	Shower	Locker	Shower	Locker
Retail	16,635 sf	2 for first 25,000 sf + 2 per each additional 50,000 sf up to 6 max	0.6 per required long-term bicycle parking space for non-residential uses	0	1	0	1
Total				**0**	**1**	**0**	**1**

☐ *Scoping Graphic: Locations of internal bicycle parking spaces, routing to these spaces, and related support facilities including locker rooms, showers, storage areas, and service repair rooms*

DDOT Concurs

How are the long-term bicycle rooms divided? They should all be in one location on the ground floor (not G1, but level 1) Is the bike room with an entrance via the loading circle on the ground floor?

Response: The small bike parking area in the garage will be to accommodate the small retail long-term requirement. The primary residential bike parking room will be located on Level 1 with access from the woonerf. A secondary residential bike room will be provided on G1 to accommodate overflow bike parking demand.

DDOT Concurs. Zoning required long-term bicycle parking for residential should all be accommodated in the main room on Level 1.

GS response: All zoning-required long-term bike parking will be located in the main bike room on Level 1. Some of the short-term bicycle parking will also be located in a publicly accessible area within the garage, near the long-term bike room. Please see attached revised site plan.

Streetscape and Public Realm

Provide a conceptual layout of the streetscape and public realm including at minimum: curb cuts, vaults, sidewalk widths, street trees, grade changes, building projections, short-term bicycle parking, and any existing bus stops. Also provide the permit tracking numbers and PSC hearing date, if known, for any approved public space designs. Note any non-compliant public space elements requiring a DCRA code modification or PSC approval.

See Section 1.5 of the CTR Guidelines for more detailed guidance. A summary of public space best practices and DDOT

A conceptual layout will be provided in the CTR. Detailed layouts will be included in site plans submitted with the Application as part of the Zoning process.

☐ *Scoping Graphic: Preliminary Public Space Concept*

Developer is responsible for payment for replacement of existing 19-dock Capital Bikeshare station and four-dock expansion. This will cost approximately $92,000.

Response: The current intent is to reuse the CaBi station equipment. Upon completion of the project, the site will continue to have a CaBi station. The developer will work with CaBi and WMATA on maintenance or replacement of the existing station.

The existing station is in need of replacement (it is one of the oldest

standards are also documented in the DEM, Public Realm Design Manual, and corridor Streetscape Guidelines (if applicable).		CaBi stations) and expansion due to increased demand by this development. Work with DDOT on replacement of existing station. GS response: Acknowledged. Shared bicycle/pedestrian facilities on Carrol and Cedar street must meet DDOT and AASHTO standards – a minimum of 10ft wide. Please include detailed design during public space permitting Response: see previous response regarding the pedestrian path. DDOT Concurs Include the curb extensions and proposed roadway modifications in the site plan. Response: Acknowledged. DDOT Concurs Because of the excess parking and therefore increased vehicle access to the site, the vehicle paths and pedestrian/cyclist paths in the site should be clearly distinguished. Response: These updates are reflected on Sheet L502 and L503 of the latest PUD plans. DDOT Concurs Provide pedestrian connection along back side of bus loop to connect to eastern ave Response: WMATA does not want this area to be publicly accessible. This area is only meant for buses to temporarily stop between routes. Understood – but this will result in pedestrians crossing at an unmarked location. Please include a means for pedestrians to access Eastern Avenue from the north end of the bus loop (may require an additional pedestrian crossing)

		GS response: See previous response regarding the WMATA bus standing zone.
Sustainable Transportation Elements Identify all sustainable transportation elements, such as electric vehicle (EV) charging stations and carshare spaces proposed to be included in the project. Electrical conduit should be installed in parking garage so that additional EV stations can be provided later. DDOT recommends 1 per 50 vehicle spaces be served by an EV station. Note that District regulations for EV infrastructure is fast evolving and additional requirements may go into effect. *See Section 1.6 of the CTR Guidelines for more detailed guidance.*	Sustainable transportation elements will be identified as part of the CTR. Section 1.6 of the DDOT CTR guidelines recommends that one (1) out of every 50 spaces be served by an EV charging station. Therefore, five (5) of the 230 proposed parking spaces will have an EV charging station.	
Heritage, Special, and Street Trees Heritage Trees are defined as having a circumference of 100 inches or more. They are protected by District law and must be preserved if deemed non-hazardous by Urban Forestry Division (UFD). Special Trees are between 44 inches and 99.99 inches in circumference and may be removed with a permit. Note whether there are existing Heritage Trees on-site or in adjacent public space. The presence of Heritage Trees will impact site design since they may not be cut down. Conduct an inventory of existing and missing street trees within a 2-block radius of the site. Provide a screenshot from UFD's map of existing and missing street trees. *See Section 1.7 of the CTR Guidelines for more detailed guidance.*	There are four (4) Heritage Trees on-site. Two will remain, one will be relocated, and one will be removed per a previously approved special tree removal permit application #38839. The location of these Heritage Trees is shown in the scoping attachments. The scoping attachments also include a screenshot of the street tree inventory for the area surrounding the site using DC UFD mapping layer of Street Trees in Washington, DC.	The CTR Scoping Form calls out 4 Heritage Trees on the property, however, it does not mention other trees on the site some of which may be Special (i.e. >14" diameter) in size. Please have the applicant contact DDOT Arborists Joel Conlon (joel.conlon@dc.gov) and John O'Neill (john.oneill@dc.gov) to discuss next steps and requirements regarding tree preservation, tree relocation and tree removal. They can also refer to the DDOT UFD website for more information on the preservation, relocation and removal processes – DDOT Urban Forestry (arcgis.com) Response: The applicant is coordinating with UFD.

Section 2: MULTI-MODAL TRIP GENERATION

CATEGORY & GUIDELINES	APPLICANT PROPOSAL	DDOT COMMENTS

Mode Split

Provide mode split assumptions with sources and justification. Adjustments to mode split assumptions may be made, as appropriate, if the number of vehicle parking spaces proposed is significantly lower or higher than expected for the context of the neighborhood.

The agreed upon mode split assumptions may not be revised between scoping and CTR submission without amending the scoping form and receiving DDOT concurrence.

See Section 2.1 of the CTR Guidelines for acceptable data sources and methodologies.

We propose the following mode split assumptions. The proposed mode split is primarily derived from WMATA ridership survey and mode split for similar land use in the area, as well as the proposed parking supply. A detailed breakdown of these assumptions is included in the scoping form attachments.

Land Use	Mode			
	Drive	Transit	Bike	Walk
Residential	55%	35%	5%	5%
Retail	35%	35%	5%	25%

☒ *Scoping Table: Mode Split Assumptions by Land Use*

Residential auto share seems low. Considering the site is in proximity of Maryland, and that the O-D graphics in the scoping attachments shows a majority of O-Ds lie in MoCo and PG County, a greater number of driving commuters is expected. The site also provides excessive parking spaces that may lead to increased auto mode share. **Increase Auto mode share to 55%**

Response: We have updated the mode split, as requested.

DDOT Concurs

Trip Calculations

Provide site-generated person trip estimates, utilizing the most recent version of ITE *Trip Generation Manual* or another agreed upon methodology such as manual doorway or driveway counts at similar facilities. Estimates must be provided by mode, type of trip, land use, and development phase during weekday AM and PM commuter peaks, Saturday mid-day peak, and daily totals. CTR must also include existing site trip generation based on observed counts. Include estimates for the transit, bicycle, walk, and automobile modes.

The agreed upon trip generation methodology may not be revised between scoping and CTR submission without amending the scoping form and receiving DDOT concurrence. Consult the DDOT Case Manager if site plan, development program, land uses, or density changes significantly.

See Section 2.2 of the CTR Guidelines for guidance on auto occupancy rates, acceptable trip reductions, and other methodologies.

Multi-modal trip generation was calculated using ITE *Trip Generation* 11th Edition rates for land use 221 (Multifamily Housing Mid-Rise 3-10 floors) and land use 822 (Strip Retail Plaza) using the corresponding proposed sizes. The ITE trip generation for the proposed project is shown below and included in the attachments.

Mode	Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour			Weekday Total
				In	Out	Total	In	Out	Total	
Auto (veh/hr)	Residential	440 du	55%	24	76	100	58	37	95	1,129
	Retail	17,650 sf	35%	9	6	15	20	21	41	341
	Total			**33**	**82**	**115**	**78**	**58**	**136**	**1,470**
Transit (ppl/hr)	Residential	440 du	35%	18	57	75	43	28	71	847
	Retail	17,650 sf	35%	16	11	27	37	38	75	621
	Total			**34**	**68**	**102**	**80**	**66**	**146**	**1,468**
Bike (ppl/hr)	Residential	440 du	5%	3	8	11	6	4	10	121
	Retail	17,650 sf	5%	2	2	4	5	6	11	89
	Total			**5**	**10**	**15**	**11**	**10**	**21**	**210**
Walk (ppl/hr)	Residential	440 du	5%	3	8	11	6	4	10	121
	Retail	17,650 sf	25%	12	7	19	27	26	53	444
	Total			**15**	**15**	**30**	**33**	**30**	**63**	**565**

☒ *Scoping Table: Multi-Modal Trip Gen Summary (with mode split and applicable reductions, as appropriate)*

Update trip generation estimates to reflect mode share changes

Response: The trip generation has been updated.

DDOT Concurs

Section 3: MULTI-MODAL NETWORK EVALUATION

A multi-modal network evaluation is required in the CTR or Transportation Statement if the project generates 100 or more total person trips (combined inbound and outbound) OR 25 or more vehicle trips in the peak direction (highest of inbound or outbound) during any peak hour period. Existing site traffic, pass-by, TDM, internal capture or other reductions may not be taken in the calculation to determine if the project meets these thresholds. However, the reductions may be applied in the analysis, as appropriate, if a study is triggered. Multi-modal analyses in this section are required in all CTRs, unless otherwise specified. A Transportation Statement may only require some of the following sections depending on the specifics of the project and zoning action.

Requirement for a CTR may be waived if site is within ½ mile from Metrorail or ¼ mile from Priority Transit, total vehicle parking supply is below the max amount for its distance to transit (see Figure 10), site has a maximum of 100 parking spaces, a Baseline TDM Plan is implemented, site access and loading design are acceptable, an off-site safety or non-auto improvement is constructed, and long-term bike parking requirements are exceeded. Additional criteria may be found in the Low Impact Development Exemption section of the *CTR Guidelines*.

CATEGORY & GUIDELINES	APPLICANT PROPOSAL	DDOT COMMENTS
Strategic Planning Elements List any relevant planning efforts and demonstrate how the proposed action is consistent with District-wide planning documents, as well as localized studies. Note in any recommendations from these documents relevant to the development proposal. *See Section 3.1 of CTR Guidelines for a list of strategic planning documents. Details on additional relevant plans and studies may be provided by the DDOT Case Manager.*	The CTR will consider the following relevant planning efforts: • MoveDC and its relevant modal elements • Rock Creek East I Livability Study • District of Columbia Comprehensive Plan • Vision Zero Action Plan • Capital Bikeshare Development Plan	DDOT concurs. Response: Acknowledged.
Pedestrian Network Evaluate the condition of the existing pedestrian network and forecast the project's impact. Evaluation must include, at a minimum, critical walking routes, sidewalk widths, network completeness, and whether facilities meet DDOT and ADA standards. Study area will include, at a minimum, all roadway segments and multi-use trails within a ¼ mile radius from the site, with a focus on connectivity to Metrorail, transit stops, schools, and activity centers, and other neighborhood amenities. *See Section 3.2 of the CTR Guidelines for more detailed guidance.*	The study will review pedestrian walking routes to and from the site along with an assessment of facilities along these walking routes and on all pedestrian facilities within ¼ mile of the site following section 3.2 of DDOT's CTR guidelines. The assessment will qualitatively evaluate whether facilities meet DDOT and ADA standards. ☒ *Scoping Graphic: Pedestrian Study Area with Walking Routes to Transit, Schools, Activity Centers, and Neighborhood Amenities*	DDOT concurs. Response: Acknowledged.
Bicycle Network Evaluate the condition of the existing bicycle network and forecast the project's impact, including to Capital Bikeshare (CaBi). Evaluation must include, at a minimum, bicycle network completeness, types of facilities, and adequacy of CaBi locations and availability. Study area will include, at a	A review of existing and planned bicycle facilities serving the site within a ½ mile will be included with an assessment of connections between the site and major facilities, including a qualitative review of how cyclists going to and from the site will access major facilities (paths, bike lanes, etc.). The review of bicycle facilities will follow DDOT's CTR guidelines found in section 3.3.1.	All of the Cabi stations are missing from the map, including at the project site. The legend shows that CaBi should be a part of this map. The future MBT Alignment isn't quite accurate, there are no plans for an alignment on 3rd St. The trail will go from Blair Rd to Whittier St

minimum, all roadway segments and multi-use trails within a ½ mile radius from the site, with a focus on connectivity to Metrorail, transit stops, schools, major activity centers, and other bicycle trails or facilities. Look for opportunities to convert traditional bike lanes to protected bike lanes. *See Section 3.3 of the CTR Guidelines for more detailed guidance.*	☒ *Scoping Graphic: Bicycle Study Area with Bicycling Routes to Transit, Schools, Activity Centers, and Other Bicycle Facilities and Trails*	and then north on 4th St. A separate bike lane connection will connect Blair Rd via 4th St and Van Buren St. Response: The updated figures are attached and will be included in the CTR. DDOT Concurs
Transit Network Evaluate, at a minimum, existing transit stop locations, adjacent bus routes and Metro headways, planned transit improvements, and an assessment of existing transit stop conditions (e.g., ADA compliance, bus shelters, benches, wayfinding, etc.). Study area is 1.0 mile for Metrorail stations and ½ mile for Streetcar, Circulator, and buses. *See Section 3.4 of the CTR Guidelines for more detailed guidance.*	The study will discuss transit routes and schedules, including headway and span of service for Metrorail stations within one (1) mile of the site and for WMATA bus stops within ½ mile of the site. The study will evaluate the sufficiency of the identified services and access to those services from a qualitative standpoint. Additionally, transit stop locations will be evaluated. Any planned transit improvements will be included in the report. This study will not include a quantitative study of boarding and alighting volumes at specific transit stops. All transit network evaluations will follow guidance as outlined in section 3.4 of DDOT's CTR guidelines. ☒ *Scoping Graphic: Transit Study Area with Adjacent Routes and Stations* ☒ *Scoping Graphic: Screenshots from DDOT Transit Maps Showing Where the Site Falls within Buffers from Metrorail and Priority Transit (Figures 11 and 12)*	DDOT concurs. Response: Acknowledged.
Safety Analysis Qualitatively evaluate safety conditions at intersections and along blocks within the vehicle study area using professional expertise. This might identify geometric design issues, missing critical signage or restrictions, or unforeseen pedestrian desire lines, for example. Perform a review of DDOT Vision Action Plan. Note whether any study intersections have been identified by DDOT as high crash locations, if any safety studies have been previously conducted, and discuss the recommendations. *See Section 3.5 of the CTR Guidelines for more detailed guidance.*	A qualitative evaluation of safety conditions within the proposed study area will be included in the CTR following the guidance set forth in section 3.6 of DDOT's CTR guidelines.	DDOT concurs. Response: Acknowledged.
Curbside Management Propose a preliminary curbside management plan that is consistent with current DDOT policies and practices. Curbside signage / restrictions reset with new development and the Applicant is responsible for installing meters if required. The curbside management plan must delineate existing and proposed on-street parking	A curbside management plan will be provided in the CTR, including existing and proposed curbside designations within two (2) blocks of the site. ☐ *Scoping Graphic: Existing Curbside Designations (minimum 2 block radius of site)*	DDOT concurs. Response: Acknowledged.

designations/restrictions, including but not limited to pick-up/drop-off zones, loading zones, multi-space meters, RPP, and net change in number of on-street spaces as a result of the proposal. *See Section 3.6 of the CTR Guidelines for more detailed guidance.*		
Pick-Up and Drop-Off Plan Required for all new and existing schools and daycares with 20 or more students. May also be required for churches, hotels, or any other use expected to have significant pick-up/drop-off operations, as necessary. The plan will identify pick-up/drop-off locations and demonstrate adequate circulation so that the flow of bicycles and vehicles on adjacent street is not impeded and queueing does not occur through the pedestrian realm. *See Section 3.6.4 of the CTR Guidelines for more detailed guidance.*	A pick-up and drop-off plan is not necessary. The intensity of the residential/retail development program is not expected to have significant pick-up and drop-off operations. WMATA PUDO for Kiss and Ride will occur adjacent to the new bus loop.	Where is PUDO for the residential building proposed… kiss n ride, withing motor court, or curbside on Cedar? In previous meetings, we've discussed all these options but it's not clear which is being proposed. Response: PUDO is proposed within the internal court along the woonerf. Include a diagram with PUDO location and circulation. GS response: A designated PUDO area/layby will be provided along the driveway as shown on the attached revised site plan. Additional details will be provided with the CTR.
On-Street Parking Occupancy Study This analysis is required if relief from 5 or more on-site vehicle parking spaces is being requested. It may also be required as part of a zoning or permitting case if DDOT has concerns about site-generated vehicles parking in adjacent residential neighborhoods. *See Section 3.6.5 of the CTR Guidelines for more detailed guidance on study periods and analysis requirements.*	Zoning relief for parking is not being sought, therefore this section is not applicable. ☐ *Scoping Graphic: Study Area and Block Faces*	DDOT concurs. N/A Response: Acknowledged.
Parking Garage/Drive-Thru Queuing Analysis If site contains 150 or more vehicle parking spaces AND direct access to a public street OR site contains a drive-thru, evaluate on-site vehicle queueing demand and provide analysis demonstrating parking entrance/ramps or drive aisle can properly process vehicles without queuing onto public streets.	The proposed garage does have direct access to a public street; therefore this section is not applicable.	DDOT concurs. N/A Response: Acknowledged.

See Section 1.3.4 of CTR Guidelines for more detailed guidance.		
Motorcoaches Propose methodology for data collection and analysis. Describe and show the parking locations, anticipated demand, existing areas on- and off-site for loading and unloading (and desired loading times restrictions, if any), and potential routes to and from designated truck routes. If on-street motorcoach parking is proposed, a plan for installation of signage and meters is required, subject to DDOT approval. This section is typically only required for uses that generate significant tourist activity (hotels, museums, cruises, concerts, etc.). *See Section 3.7 of the CTR Guidelines for more detailed guidance.*	No motorcoach activity is anticipated to occur at the proposed development; therefore this section is not applicable.	DDOT concurs. N/A Response: Acknowledged.

Section 4: TRAFFIC IMPACT ANALYSIS (TIA)

The TIA component of a CTR is required when a development generates 25 or more vehicle trips in the peak direction (higher of either inbound or outbound vehicles) during any of the critical peak hour periods, after mode split is applied. Existing site traffic, pass-by, TDM, internal capture or other reductions may not be applied when calculating whether a TIA is required. However, trip reductions may be used in the multi-modal trip generation summary and assignment of trips within the TIA, as appropriate and agreed to by DDOT. A standalone TIA may also be required if the project proposes a change to roadway capacity, operations, or directionality; has a site access challenge; or as otherwise deemed necessary by DDOT.

CATEGORY & GUIDELINES	APPLICANT PROPOSAL	DDOT COMMENTS
TIA Study Area and Data Collection Identify study intersections commensurate with the impact of the proposed project and the travel demand it will generate. Study area must include all major signalized and unsignalized intersections, intersections expected to realize large numbers of new traffic, and intersections that may experience changing traffic patterns. *See Sections 4.1 and 4.2 of the CTR Guidelines for more detailed guidance on study intersection selection and TMC count periods.*	We propose the following study intersections: 1. Piney Branch Rd & Eastern Ave 2. Eastern Ave & Holly Ave 3. Eastern Ave & Metro Station/Site Dwy 4. Eastern Ave & Removed Bus Access 5. Eastern Ave & Cedar Ave/Cedar St 6. Cedar St & Site Dwy 7. Blair Rd & 4th St & Cedar St 8. Metro Station & Cedar St/Carroll St 9. Cedar St & Carroll St 10. Maple St & Carroll St ☒ *Scoping Graphic: Proposed Study Intersections* ☒ *Will provide hard copies of TMCs in CTR appendix and electronic copies in DDOT spreadsheet format at time of submission.*	DDOT concurs. Response: Acknowledged.

Takoma Metro Multifamily Development – 11/22/2022, DDOT Comments 4.18.23, GS responses 4.21.23, DDOT responses 4.24.23, GS responses 4.26.23

TIA Study Scenarios Propose an appropriate set of scenarios to analyze. These commonly include Existing, Background (No Build), Total Future, and Future with Mitigation. Note the anticipated build-out year and project phasing. *See Section 4.3 of CTR Guidelines for guidance on study scenarios.*	We propose to include the following scenarios following section 4.3 of DDOT's CTR guidelines: • Existing Conditions (2022 Existing Conditions) • 2027 Future Conditions without the project (2027 Background Conditions) • 2027 Future Conditions with the project (2027 Total Future Conditions) o *2027 Mitigated Future Conditions with the project (2027 Mitigated Total Future Conditions), as necessary*	Update to 2023 for Existing Conditions or has data already been collected in 2022? Response: Data was collected in 2022.
TIA Methodology Propose an appropriate methodology for the capacity analysis including the type of software program to be used. Per DEM 38.3.5.1, HCM methodology will be used to determine Level of Service (LOS), v/c, and vehicle queue lengths. LOS must be reported by intersection approach and v/c by lane group. DDOT prefers Synchro 9 or newer software for capacity and queueing analyses. *See Section 4.4 of the CTR Guidelines for more detailed guidance. DDOT's required standard Synchro and SimTraffic inputs/settings are provided in Appendix H.*	Capacity analyses will be performed using Highway Capacity Manual (HCM) methodologies using an industry recognized software package. We propose performing the analysis in Synchro 10 and reporting the results in delay and LOS using HCM 2000 methodologies. We propose to analyze the weekday morning and afternoon commuter peak hours, using the system peaks at all study area intersections. Synchro files will be obtained from DDOT for use in the vehicular capacity analysis. Signal timings for the study area intersections will be obtained from DDOT. Field visits will be performed to update existing geometric information into the Synchro models, and update Synchro files with current traffic signal timing plans. We will apply this methodology to the following analysis scenarios: • Existing Conditions (2022 Existing Conditions) • 2027 Future Conditions without the project (2027 Background Conditions) • 2027 Future Conditions with the project (2027 Total Future Conditions) o *2027 Mitigated Future Conditions with the project (2027 Mitigated Total Future Conditions), as necessary* The capacity analysis results will show the average delay, v/c, and the resulting LOS for each approach and for the overall intersection (where available), as well as the queuing results obtained from Synchro 10 for the average and 95th percentile queue for each lane group. • We will highlight all LOS E or LOS F conditions per intersection and approach. • We will propose mitigation measures at intersections or approaches that degrade to an LOS E or F as a result of the development, or intersections or approaches operating under LOS E or F under background conditions that observe an increase in delay of greater than 5 percent, when compared to background scenario. • We will highlight all locations where the 95th percentile queue length exceeds the length of storage. We will note where the proposed project causes the 95th percentile queue length to exceed the available capacity of a lane group when it does not in the background scenario. • We will propose mitigation measures at intersections where the proposed project causes any 95th percentile queue lengths that exceed the available capacity to experience an increase in length of greater than 150 feet along any lane group. An assessment of feasibility given the existing ROW at each location will be given for each mitigation measure. ☒ *Will provide copies of Synchro, SimTraffic, and other analysis software printouts in study appendix and electronic copies of analysis files at time of CTR submission.*	DDOT concurs. Response: Acknowledged.
Transportation Network Improvements List and map all roadway, transit, bicycle, and pedestrian projects funded by DDOT or WMATA, or proffered by others, in the vicinity of the study area and expected to open for public use	From the District Government: • Metropolitan Branch Trail extension (expected completion 2024) ☒ *Scoping Graphic: Locations of Background Transportation Network Improvements and Anticipated Completion Years*	How is this trail being accommodated by the project? Response: The Applicant met with DDOT to confirm that the MBT will not route through or adjacent to the property. The alignment will be south and west of the tracks.

prior to the proposal's anticipated build-out year. Review the STIP, CLRP, and proffers/commitments for other nearby developments. *See Section 4.5 of the CTR Guidelines for more detailed guidance.*		DDOT Concurs
Background Development / Local Growth List and map developments to be analyzed as local background growth. This will include known matter-of-right and zoning-approved developments within ¼ mile of site and others more than ¼ mile from site if their traffic is distributed through study intersections. Document the portions of developments anticipated to open by the projected build-out year. *See Section 4.6.1 of the CTR Guidelines for more detailed guidance.*	We will consider the following background developments: 1. Fern Street Townhomes 2. The Hartley 3. Kite House 4. Reynard 5. Aspen Street Townhomes 6. 218 Cedar Street 7. Gilbert & Wood ☒ *Scoping Graphic: Background Development Projects Near Study Area* ☐ *Scoping Table: Completion Amounts/Portions Occupied of Background Developments*	DDOT concurs. Response: Acknowledged.
Regional Traffic Growth Propose a methodology to account for growth in regional travel demand passing through the study area. An appropriate methodology could include reviewing historic AADT traffic counts, MWCOG model growth rates, data from other planning studies, or recently conducted nearby CTRs. These sources should only be used as a guide. Generally, maximum annually compounding growth rates of 0.5% in peak direction and 2.0% in non-peak direction are acceptable. Adjustments to the rates may be necessary depending on the amount of traffic assumed from local background developments or if there were recent changes to the transportation network. *See Section 4.6.2 of the CTR Guidelines for more detailed guidance.*	We propose to examine volumes contained in the MWCOG regional model, as well as historical DDOT AADTs (where available), to develop an average annual growth rate for study area roadways following section 4.6.2 of DDOT's CTR guidelines. A summary of COG model volumes and trends for the study area are attached to this scoping form. This methodology accounts for all future projects and developments in the COG model and allows for district growth rates by direction and time of day. We based growth rates between 2022 (existing conditions) and 2027 (project completion) on the differences between the year 2022 and 2027 COG model scenarios. Where the COG model showed negative or minimal growth, we assumed a conservative 0.1% per year minimum growth. Maximum growth rates of 0.5% in the peak direction and 2.0% in the non-peak direction were used. Proposed growth rates for each roadway for the 2022-2027 period are shown below.	Growth rate calculation information is missing or not properly shown on multiple sheets in the Attachments, e.g., Pages 30, 32, 38, 40, 45 Response: These pages were extraneous (showing that AADT and/or MWCOG data was not available for the selected roadway) and have been removed in the updated attachments. DDOT Concurs

Roadway	Dir.	Proposed Annual Growth Rate Between 2022 and 2027		Proposed Total Growth Between 2022 and 2027	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Carroll St/Cedar St NW	EB	0.10%	0.10%	0.50%	0.50%
	WB	0.10%	0.10%	0.50%	0.50%
Piney Branch Rd NW	NB	0.40%	0.50%	2.02%	2.53%
	SB	0.50%	0.20%	2.53%	1.00%
Eastern Ave/Cedar St NW	NB	0.10%	2.00%	0.50%	10.41%
	SB	2.00%	0.10%	10.41%	0.50%
Blair Rd NW	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.50%	0.10%	2.53%	0.50%
5th St NW	NB	1.30%	0.50%	6.67%	2.53%
	SB	0.50%	0.10%	2.53%	0.50%
4th St NW [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Butternut St NW [1]	EB	0.10%	0.10%	0.50%	0.50%
	WB	0.10%	0.10%	0.50%	0.50%
Maple St NW [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Holly Ave [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Cedar Ave [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%

[1] AADT and/or MWCOG data is not available for this street; therefore a conservative 0.1% growth rate per year was used.

☒ *Scoping Table and Graphic: Projected Regional Growth Assumptions (dependent on methodology), Show Growth rates by Road, Direction, and Time of Day*

Trip Distribution

Provide sources and justification for proposed percentage distribution of site-generated trips. Additionally, document proposed pass-by distributions and the re-routing of existing or future vehicles based on any changes to the transportation network. Percentage distributions must be shown turning at intersections throughout the transportation network and at site driveways and garage

Trip distribution for the site was determined based on CTPP TAZ flow data. Attached to this scoping form are figures depicting the CTPP TAZ flow data for:

- Residents of the project TAZ commuting by vehicle to other TAZs
- Employees working in the project TAZ commuting by vehicle from other TAZs

The resulting proposed trip distributions are illustrated on the attached graphics. Also shown in the attached graphics are local residential and retail trip distributions within the site area to the two site driveways.

☒ *Scoping Graphic(s): Percentage Distribution by Land Use, Direction, Time of Day (must be shown turning at intersections and driveways)*

DDOT concurs.

Response: Acknowledged.

entrances to ensure appropriate routing assumptions. The agreed upon trip distribution methodology may not be revised between scoping and CTR submission without amending this scoping form and receiving concurrence by DDOT Case Manager. *See Section 4.7 of the CTR Guidelines for more detailed guidance.*		

Section 5: MITIGATION

The completed CTR must detail all proposed mitigations. The purpose of discussing mitigation at the scoping stage is to highlight DDOT's Significant Impact Policy, DDOT's approach to mitigation, and to give the Applicant an opportunity to gain initial feedback on potential mitigations that are under consideration. Any mitigation strategies discussed and included in the *Scoping Form* are considered non-binding until formally evaluated in the study and committed to in documentation submitted as part of the case record.

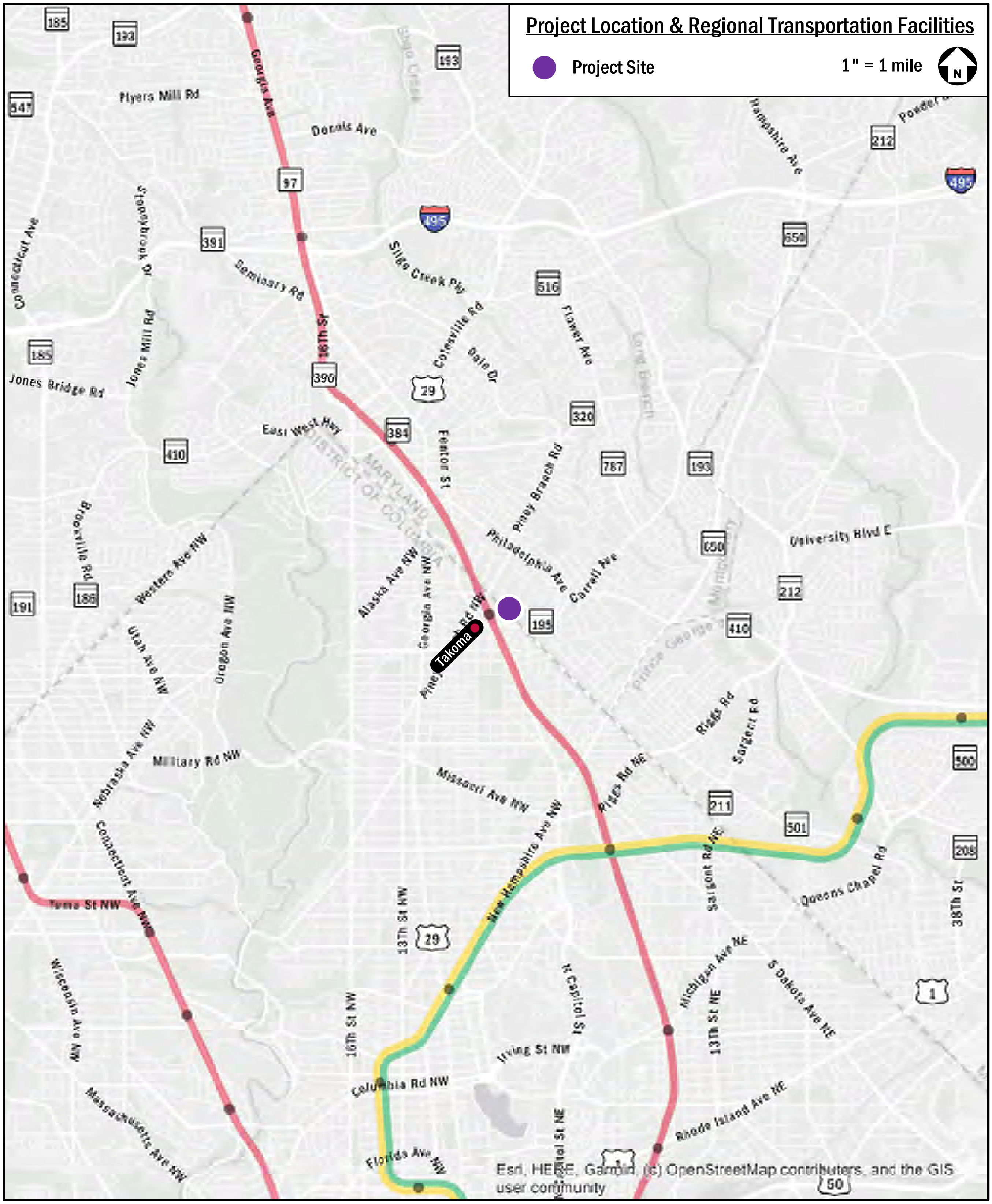
CATEGORY & GUIDELINES	APPLICANT PROPOSAL	DDOT COMMENTS
DDOT Significant Impact Policy DDOT has two primary impact mitigation tests for development projects: 1) off-street vehicle parking supply, and 2) capacity impacts at intersections. *See Section 5.1 of the CTR Guidelines for detailed policies and metrics for each of the two impact tests.*	☒ *The Applicant acknowledges DDOT's Significant Impact Policy in Section 5.1 of the CTR Guidelines.* ☒ *The study will comply with all other policies in the CTR Guidelines not explicitly documented in the Applicant Proposal or DDOT Comments columns.* ☒ *The study will include all of the required graphics, tables, and deliverables for the relevant sections determined during scoping, as shown in Figure 7 of the CTR Guidelines.*	DDOT concurs. Response: Acknowledged.
DDOT's Approach to Mitigation DDOT's approach to mitigation prioritizes (in order of preference) optimal site design, reducing vehicle parking, implementing TDM strategies, making non-automotive network improvements, and making a monetary contribution to DDOT's Mitigation Fund for non-auto improvements, before considering options that increase roadway capacity or alter roadway operations. *See Section 5.2 and Figure 18 of the CTR Guidelines for more detailed guidance on mitigation selection.*	☒ *The Applicant acknowledges DDOT's approach to mitigation in Section 5.2 of the CTR Guidelines.*	DDOT concurs. Response: Acknowledged.

Transportation Demand Management (TDM) A TDM Plan is typically required to offset site-generated impacts to the transportation network or in situations where a site provides more parking than DDOT determines is practical for the use and surrounding context. Document all existing TDM strategies being implemented on-site (even outside of a formal TDM Plan) and those being proposed and committed to by the Applicant. Elements of the TDM Plan included in CTR must be broken down by land use and user. *See Section 5.3 of the CTR Guidelines for more detailed guidance. Sample TDM plans by land use and tier can be found in Appendix C.*	☒ *The study will include at least a Baseline TDM Plan. The TDM plan will increase to depending on the parking supply and other impacts identified in the study.*	Developer is responsible for payment for replacement of existing 19-dock Capital Bikeshare station and four-dock expansion. This will cost approximately $92,000. Response: See previous response regarding the CaBi Station. See DDOT's previous response
Performance Monitoring Plan (PMP) DDOT may require a PMP in situations where anticipated vehicle trips are large in magnitude, unpredictable, or necessitate a vehicle trip cap. Typically, this is required for campus plans, schools, or large developments expected to have a significant amount of single occupancy vehicle trips. Document any existing performance monitoring Plans in effect and any proposed changes. *See Section 5.4 of the CTR Guidelines for more detailed guidance. Sample PMPs can be found in Appendix D.*	Acknowledged.	DDOT acknowledged. Response: Acknowledged.
Roadway Operational and Geometric Changes Describe all proposed roadway operational and geometric changes in CTR with supporting analysis and warrants in the study appendix. Detail must be provided on any ROW implications of proposed mitigations. Note any preliminary ideas being considered. *See Section 5.7 of the CTR Guidelines for more detailed guidance.*	The proposed project includes the following roadway changes: • Realigning the bus loop around the project building and adding kiss & ride and project garage access functions to it • Slightly shifting the current parking/kiss & ride driveway on Eastern Avenue NW to serve as access to the new bus loop and secondary residential garage access • Removing the current bus loop driveway at Eastern Avenue NW • Narrowing and relocating the current bus loop driveway at Carroll Street NW and consolidating it with kiss & ride access. This intersection is proposed to be signalized • Adding a new site driveway from Cedar Street NW that will provide access to loading facilities and residential/retail garage • Modifications to Carroll Street to include curb extensions, new curbside parking, high visibility crosswalks, concrete medians and a new kiss and Ride along eastbound Carroll Street beneath the bridge	How is the removed Metro parking lot being compensated and how is the proposed kiss-and-ride operations going to work? Response: The Kiss-and-Ride will be separated from the bus loop with physical median and signage. That will be operated and maintained by WMATA. Additionally, WMATA has determined that on-site parking is not required for this station and will not be replaced. To note, the existing WMATA vehicle spaces onsite are classified as kiss-n-ride

	These proposed roadway changes are shown on the aerial and site circulation exhibits in the attachments.	and only meant for pick up and drop off, not long term parking. Will retail spaces require validation or limited time use? GS response: Parking will not be time-limited, but the price will escalate with increased duration. Retail parking will not be validated, but will be pay-to-park at market rate. Proposed signalization at Carroll St & Driveway is less than 300 feet from the adjacent traffic signal at Carroll St and Cedar St, which violates DEM guidelines. Detailed signal warrant analysis should be conducted in the report and signal timing plan should be proposed. DDOT will further evaluate the proposed signalization. Response: Peak Hour warrants for signalization will be included in the CTR. DDOT Concurs Provide more detailed drawing or graphic showing the changes to Carroll Street, including the locations of new curbside parking, and new kiss and ride. Why is the new kiss and ride provided beneath the bridge? Response: This information will be provided in the CTR. The kiss-and-ride beneath the bridge was required by WMATA to meet their design requirements for the minimum number of kiss-and-ride spaces and to account for the fact that it is currently happening and can be appropriately accommodated as proposed. DDOT Concurs

Section 6: ADDITIONAL TOPICS FOR DISCUSSION DURING SCOPING

CATEGORY & GUIDELINES	APPLICANT PROPOSAL	DDOT COMMENTS
ANC Discussions and Feedback Provide an update on the status of Community Benefits Agreement (CBA), any on-going ANC discussions/meetings, and any concerns expressed by the community. DDOT can provide ideas and a feasibility check for transportation items to be included in the CBA.	ANC discussions are ongoing. The applicant has also engaged the neighbors to the north of the DC-MD line. Some feedback received to date includes the desire for modification/removal of the traffic diverter at Cedar Avenue/Eastern Avenue and bike lanes along Eastern Avenue.	DDOT appreciates the update. Response: Acknowledged.
Miscellaneous Items for Discussion Any relevant on-going conversations with DOEE, SHPO, DMPED, GSA, NPS, neighboring jurisdictions, Historic Preservation, etc.? Seeking direction on other types of analyses such as traffic calming, TOPP, TMP, IMR/IJR, etc.? Anything unusual proposed not covered under other sections, such as air-rights, right-of-way actions, removal from Highway Plan, removal of BRLs, or construction under or close to a bridge?		N/A Response: Acknowledged.

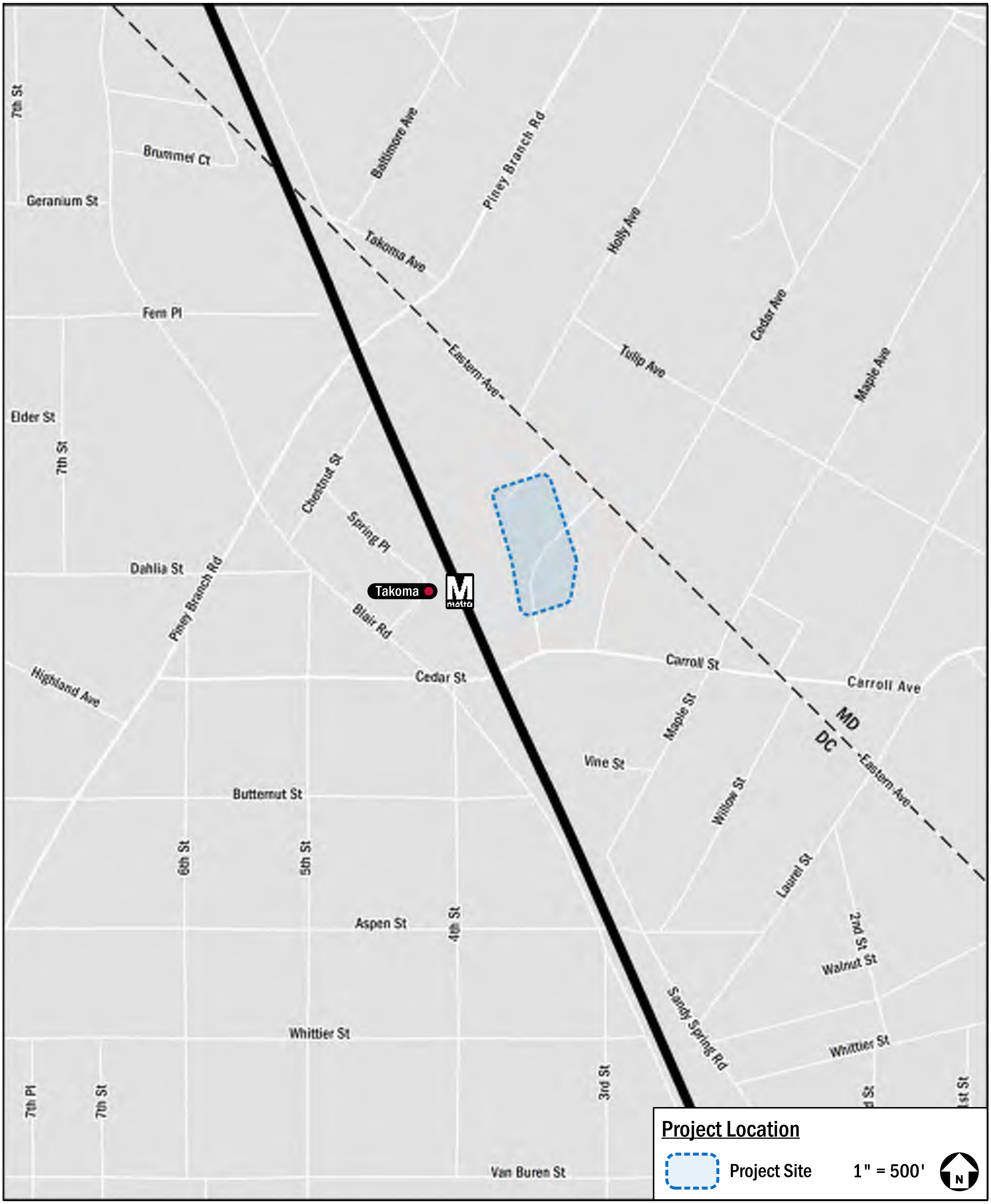


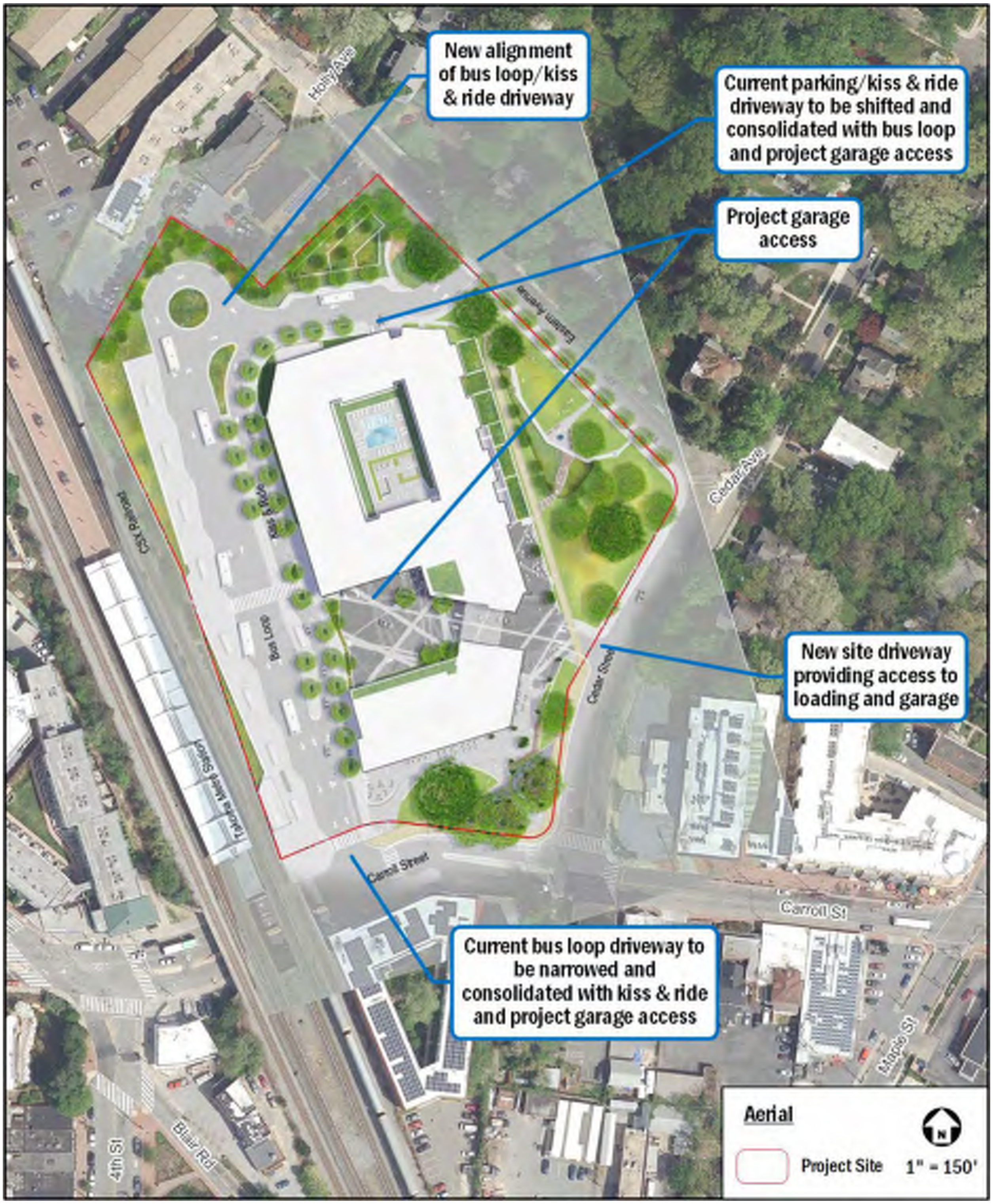
Project Location & Regional Transportation Facilities

● Project Site

1" = 1 mile

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community


7th St
Brummel Ct
Geranium St
Baltimore Ave
Piney Branch Rd
Holly Ave
Takoma Ave
Fern Pl
Eastern Ave
Tulip Ave
Cedar Ave
Maple Ave
Elder St
7th St
Chestnut St
Spring Pl
Dahlia St
Piney Branch Rd
Takoma
Blair Rd
Highland Ave
Cedar St
Carroll St
Carroll Ave
MD
DC
Eastern Ave
Maple St
Vine St
Butternut St
Willow St
6th St
5th St
Laurel St
Aspen St
4th St
2nd St
Walnut St
Sandy Spring Rd
Whittier St
Whittier St
7th Pl
7th St
3rd St
Van Buren St
Project Location
Project Site
1" = 500'
N



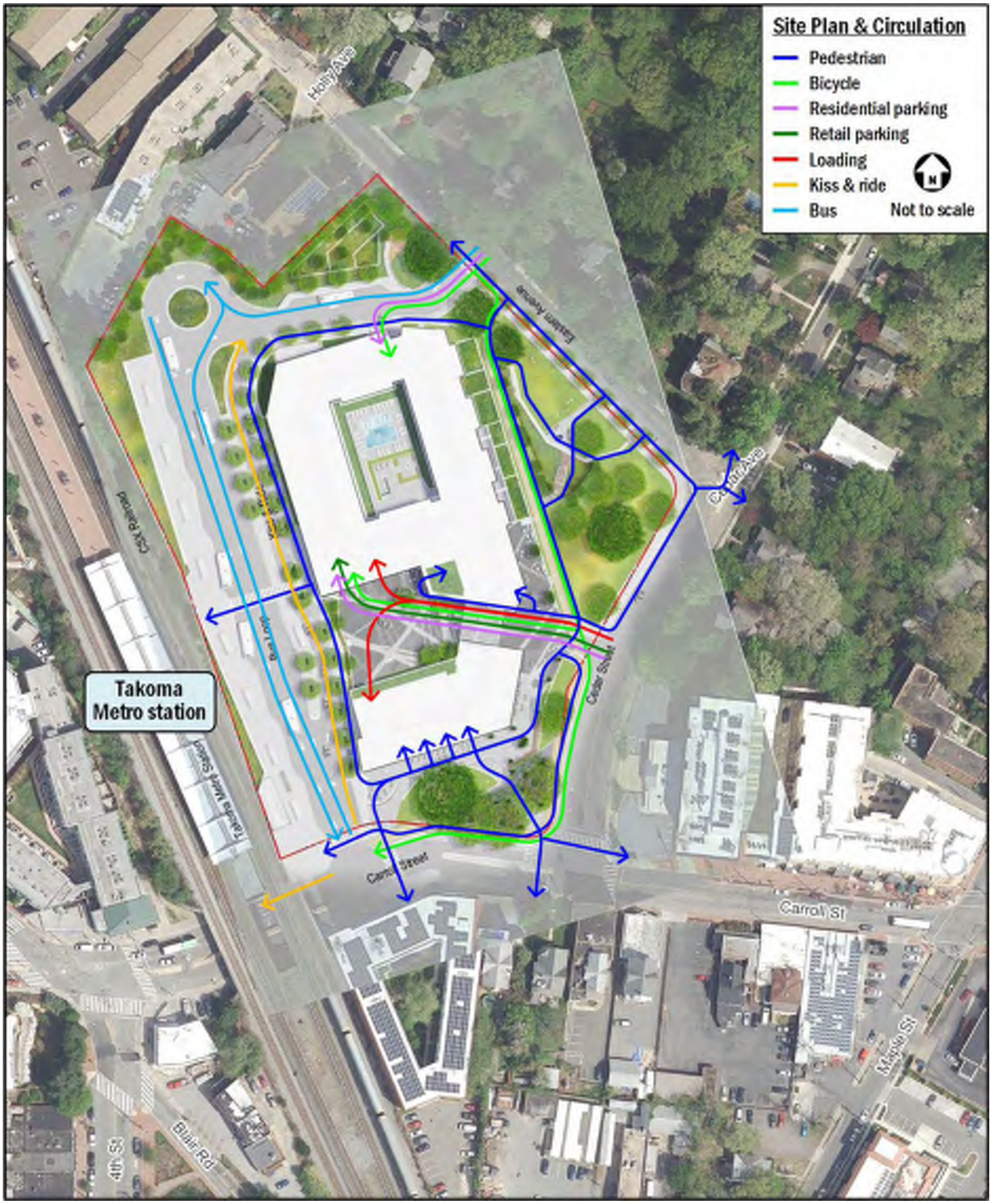
New alignment of bus loop/kiss & ride driveway

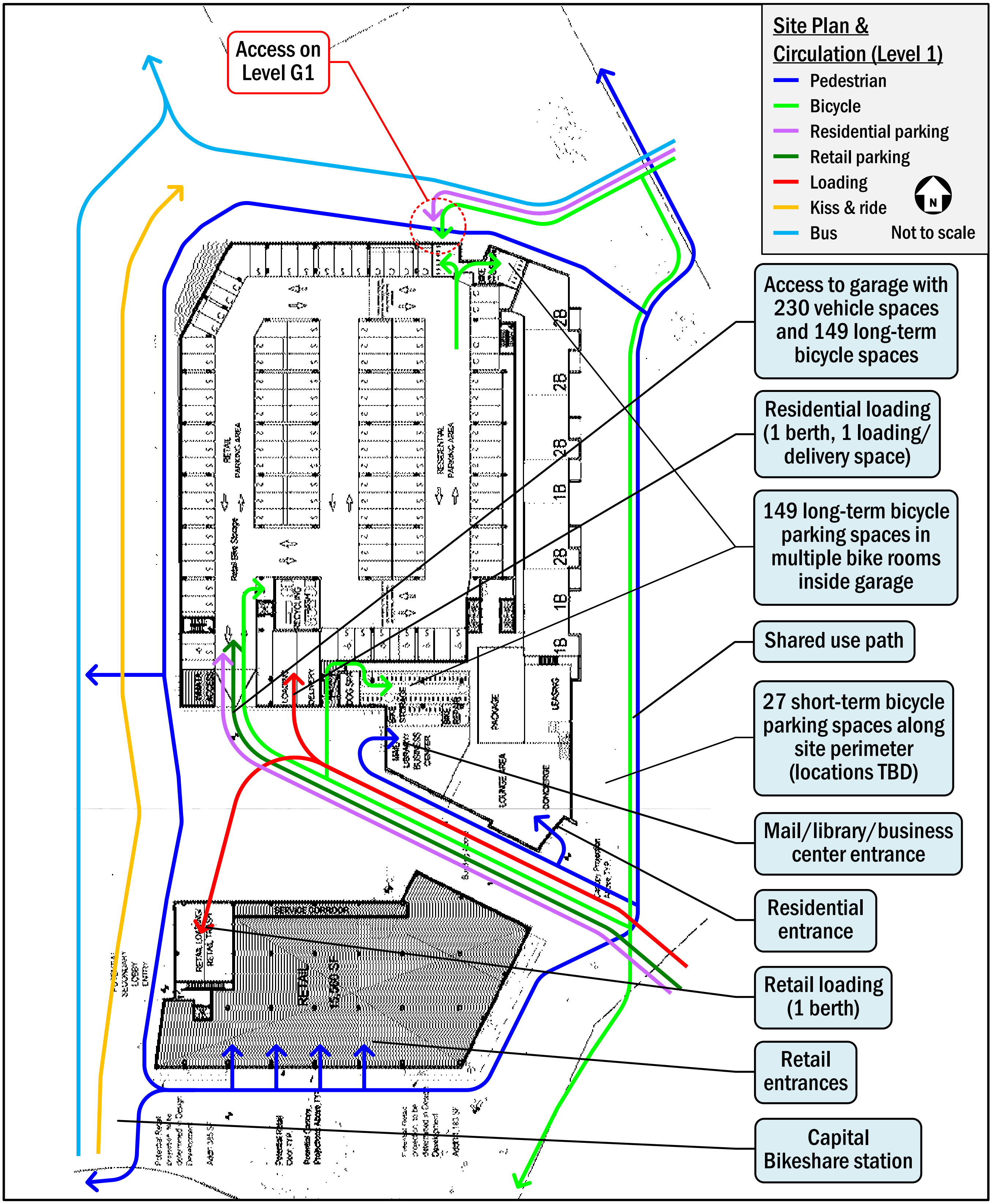
Current parking/kiss & ride driveway to be shifted and consolidated with bus loop and project garage access

Project garage access

New site driveway providing access to loading and garage

Current bus loop driveway to be narrowed and consolidated with kiss & ride and project garage access


Site Plan & Circulation
Pedestrian
Bicycle
Residential parking
Retail parking
Loading
Kiss & ride
Bus
N
Not to scale
Holly Ave
Eastern Avenue
Cedar Ave
CSX Railroad
Bus Loop
Takoma Metro station
Takoma Metro Station
Cedar Street
Carroll Street
Carroll St
Maple St
Blair Rd
4th St



Site Plan & Circulation (Level 1)

Access on Level G1

Access to garage with 230 vehicle spaces and 149 long-term bicycle spaces

Residential loading (1 berth, 1 loading/ delivery space)

149 long-term bicycle parking spaces in multiple bike rooms inside garage

Shared use path

27 short-term bicycle parking spaces along site perimeter (locations TBD)

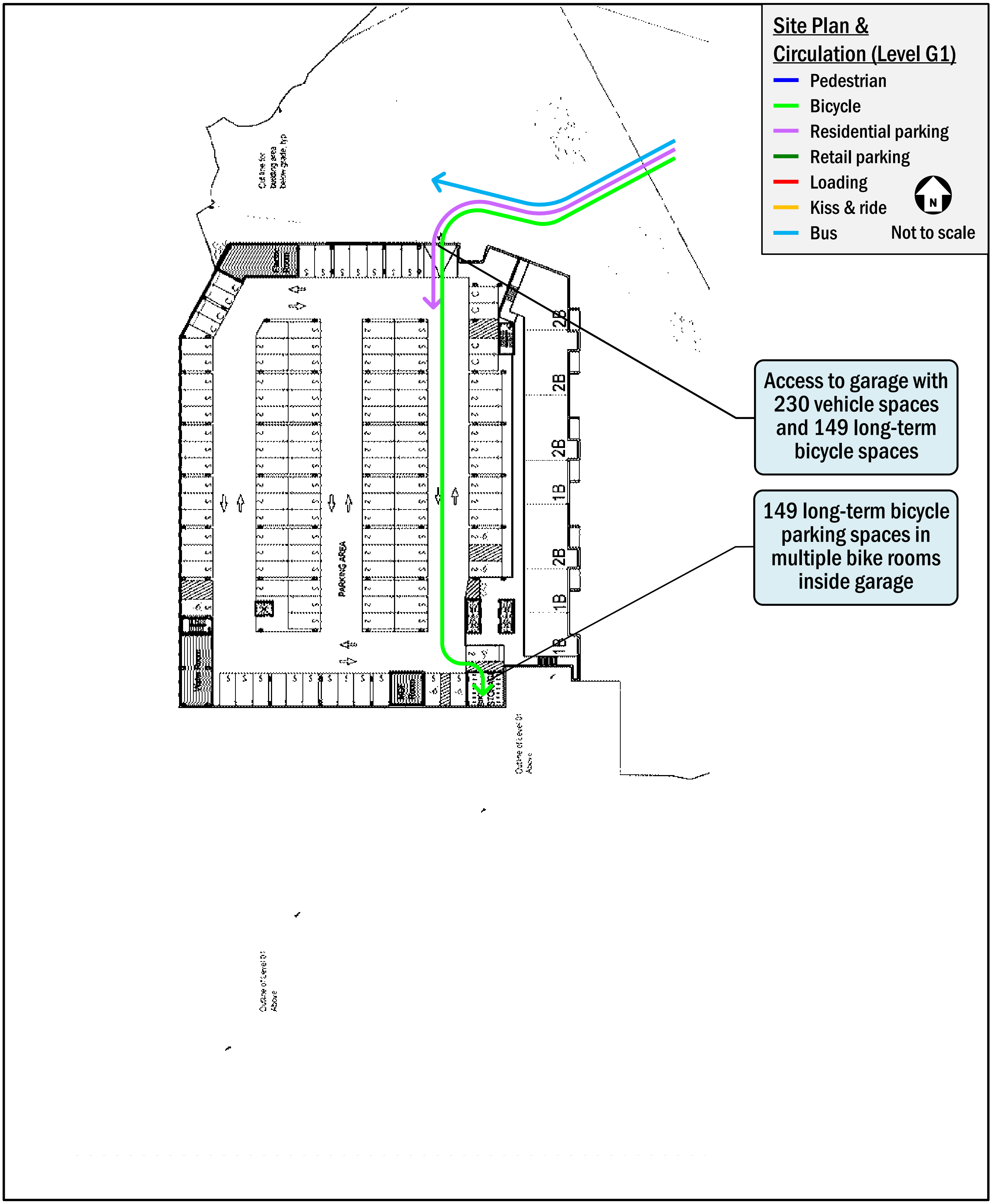
Mail/library/business center entrance

Residential entrance

Retail loading (1 berth)

Retail entrances

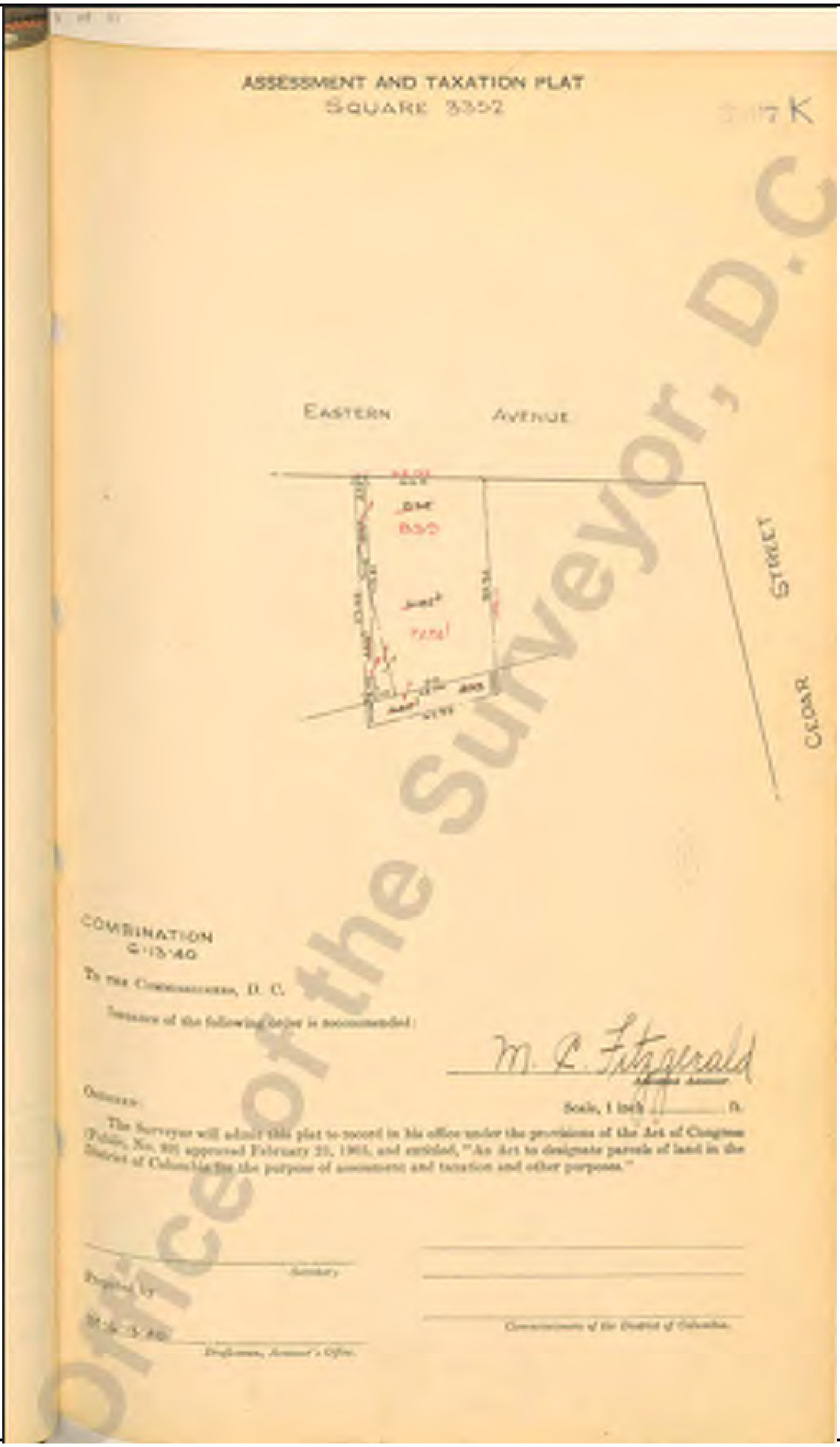
Capital Bikeshare station



Site Plan & Circulation (Level G1)

Access to garage with 230 vehicle spaces and 149 long-term bicycle spaces

149 long-term bicycle parking spaces in multiple bike rooms inside garage



ASSESSMENT AND TAXATION PLAT

SQUARE 3352

COMBINATION
6-13-40

To the Commissioners, D. C.

Issuance of the following order is recommended:

M. C. Fitzgerald
Assistant Assessor

Ordered:

Scale, 1 inch .... ft.

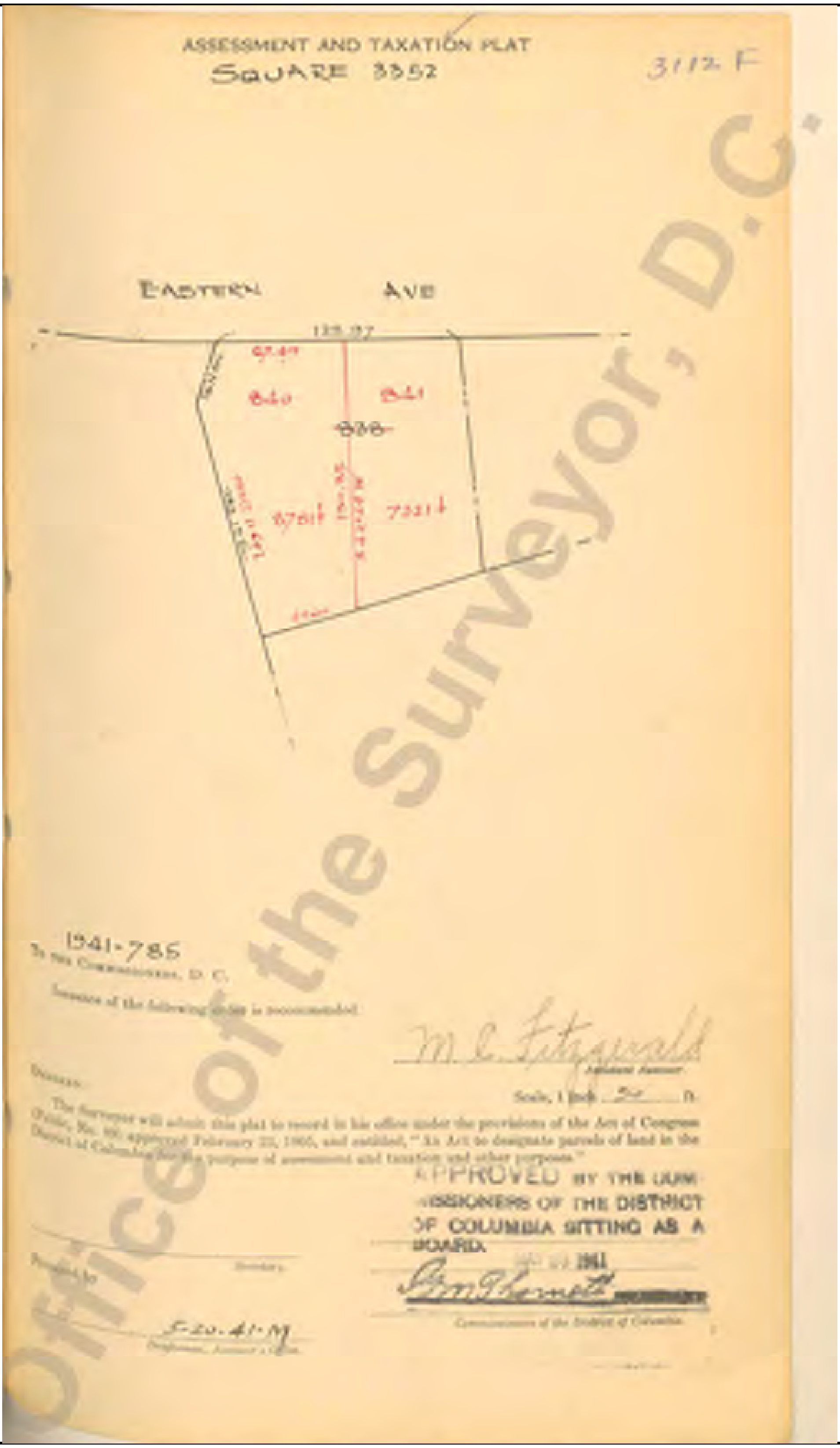
The Surveyor will admit this plat to record in his office under the provisions of the Act of Congress (Public, No. 93) approved February 25, 1905, and entitled, "An Act to designate parcels of land in the District of Columbia for the purpose of assessment and taxation and other purposes."

Surveyor.

Prepared by

M-6-3-40
Draftsman, Assessor's Office.

Commissioners of the District of Columbia.



ASSESSMENT AND TAXATION PLAT
SQUARE 3352

3112 F

1941-785

To the Commissioners, D. C.

Issuance of the following order is recommended:

M. C. Fitzgerald
Assistant Assessor

Scale, 1 inch = 50 ft.

Ordered:

The Surveyor will admit this plat to record in his office under the provisions of the Act of Congress (Public, No. 90) approved February 23, 1905, and entitled, "An Act to designate parcels of land in the District of Columbia for the purpose of assessment and taxation and other purposes."

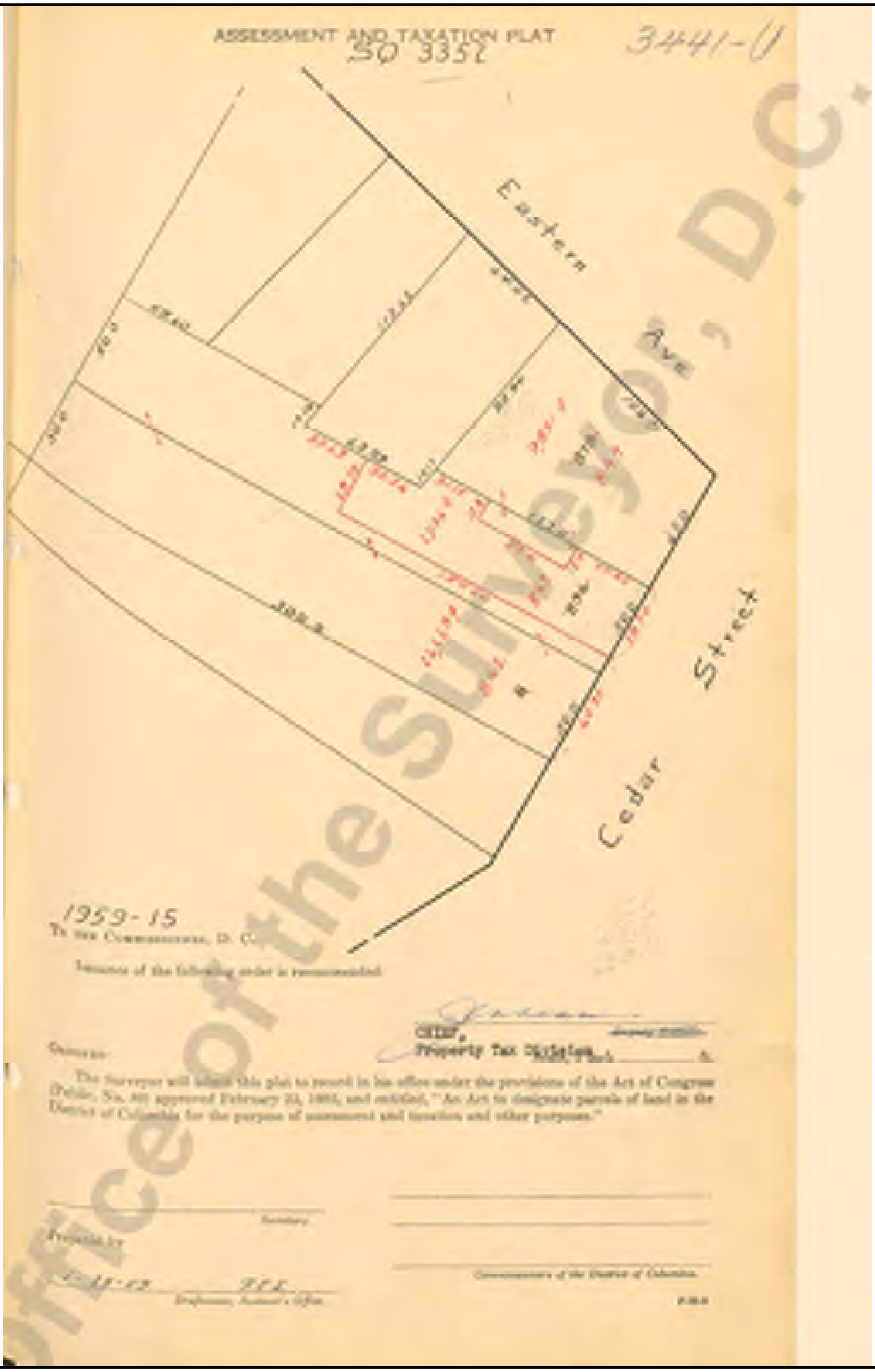
APPROVED BY THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA SITTING AS A BOARD.
[illegible] 1941

Secretary.

Commissioners of the District of Columbia.

Prepared by

5-20-41-M
Draftsman, Assessor's Office.



ASSESSMENT AND TAXATION PLAT
SQ 3352

3441-U

1959-15
To the Commissioners, D. C.

Issuance of the following order is recommended.

CHIEF,
Property Tax Division
~~Deputy~~

Ordered:

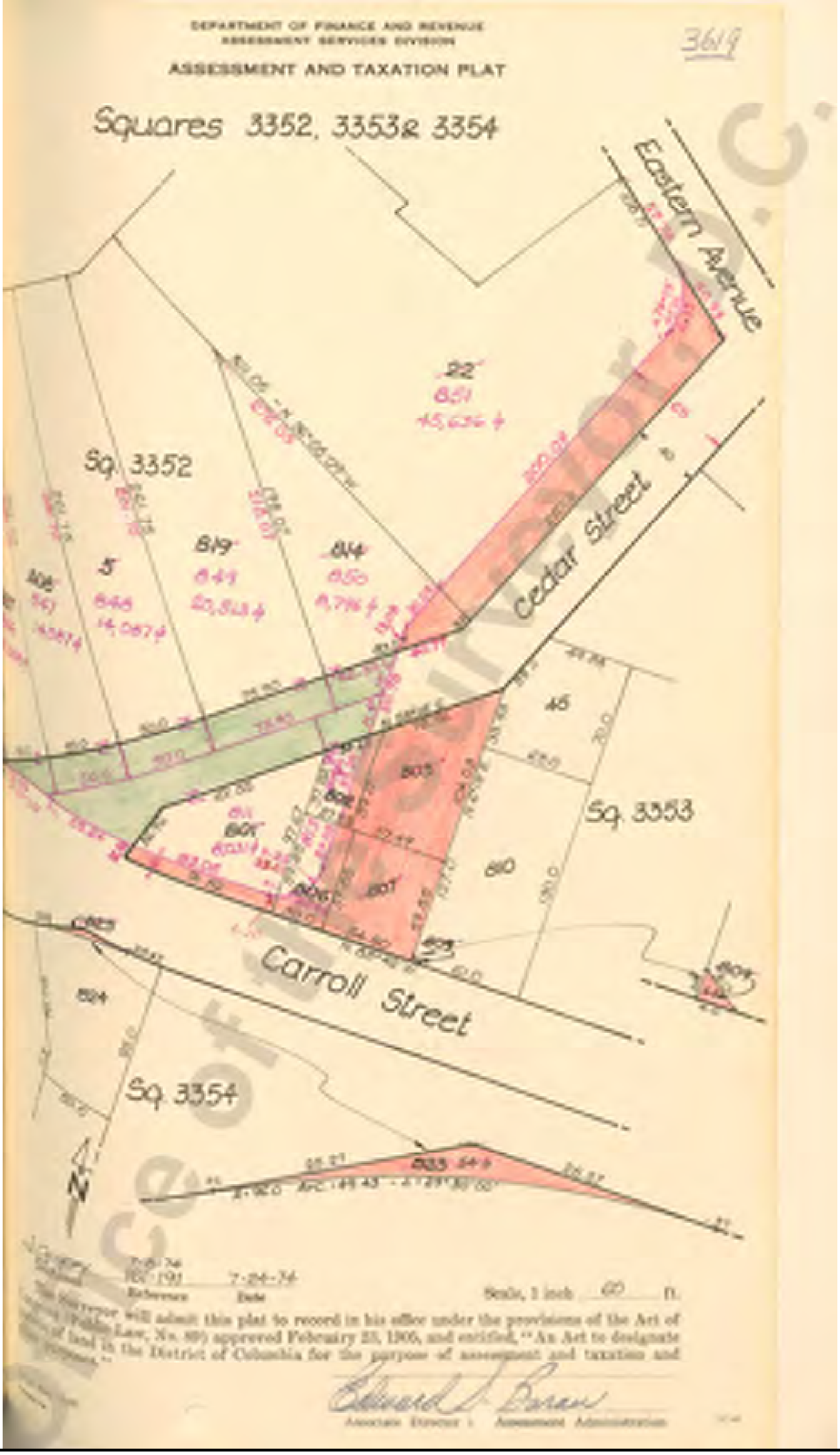
The Surveyor will admit this plat to record in his office under the provisions of the Act of Congress (Public, No. 80) approved February 23, 1895, and entitled, "An Act to designate parcels of land in the District of Columbia for the purpose of assessment and taxation and other purposes."

Secretary

Prepared by

2-18-59 FFL
Draftsman, Surveyor's Office

Commissioners of the District of Columbia

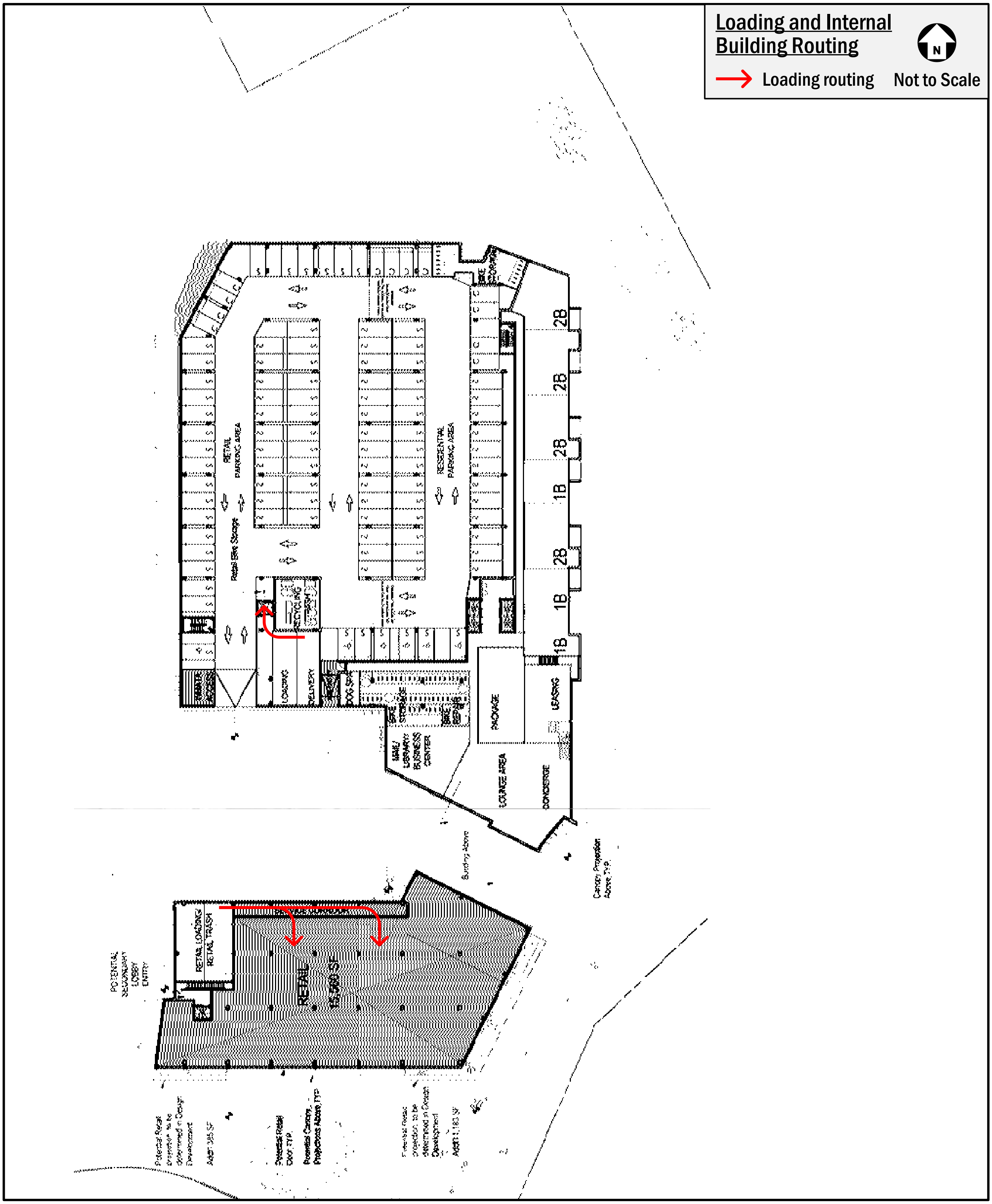


7-8-74
PC-191 7-24-74
Reference Date

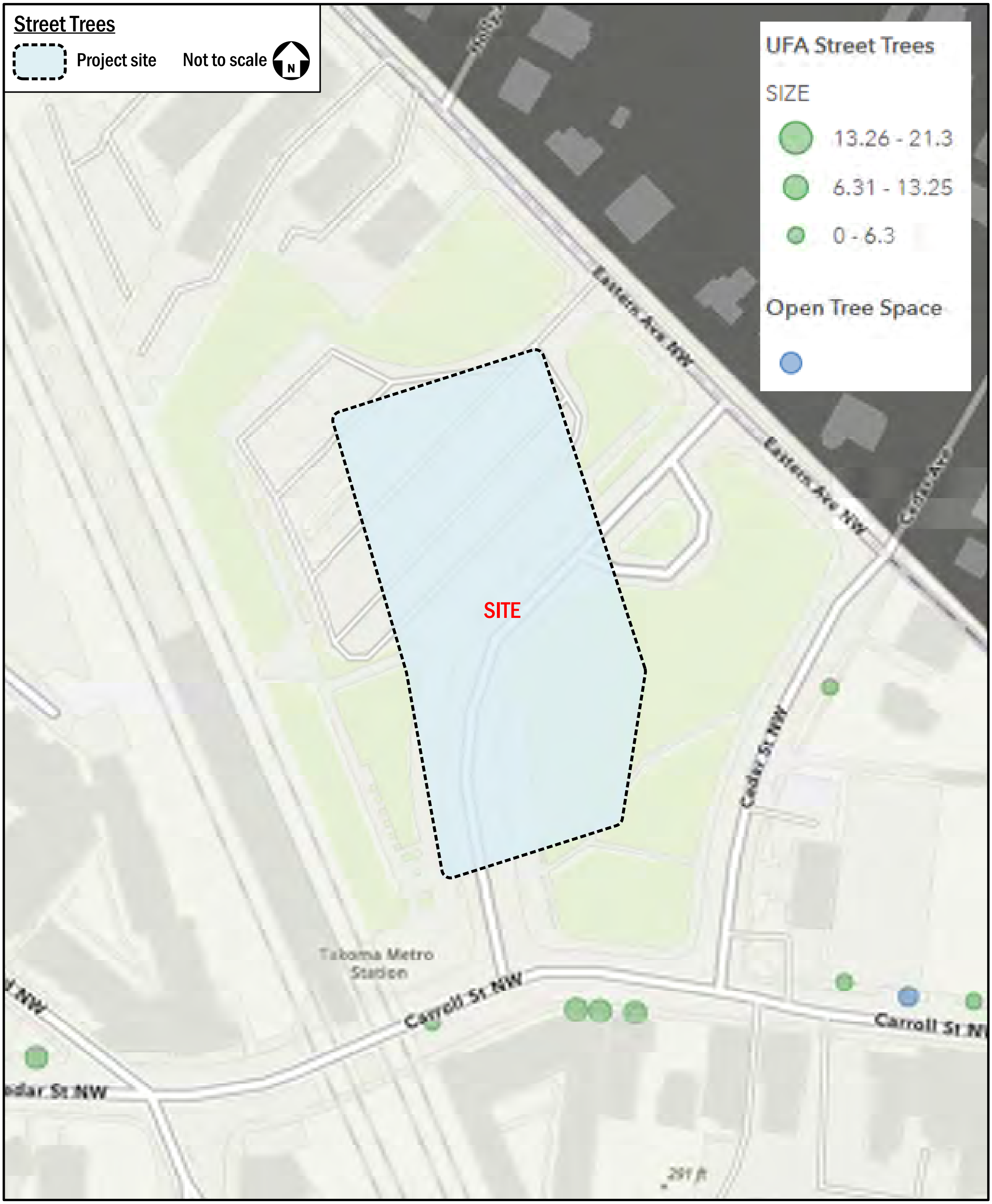
Scale, 1 inch 60 ft.

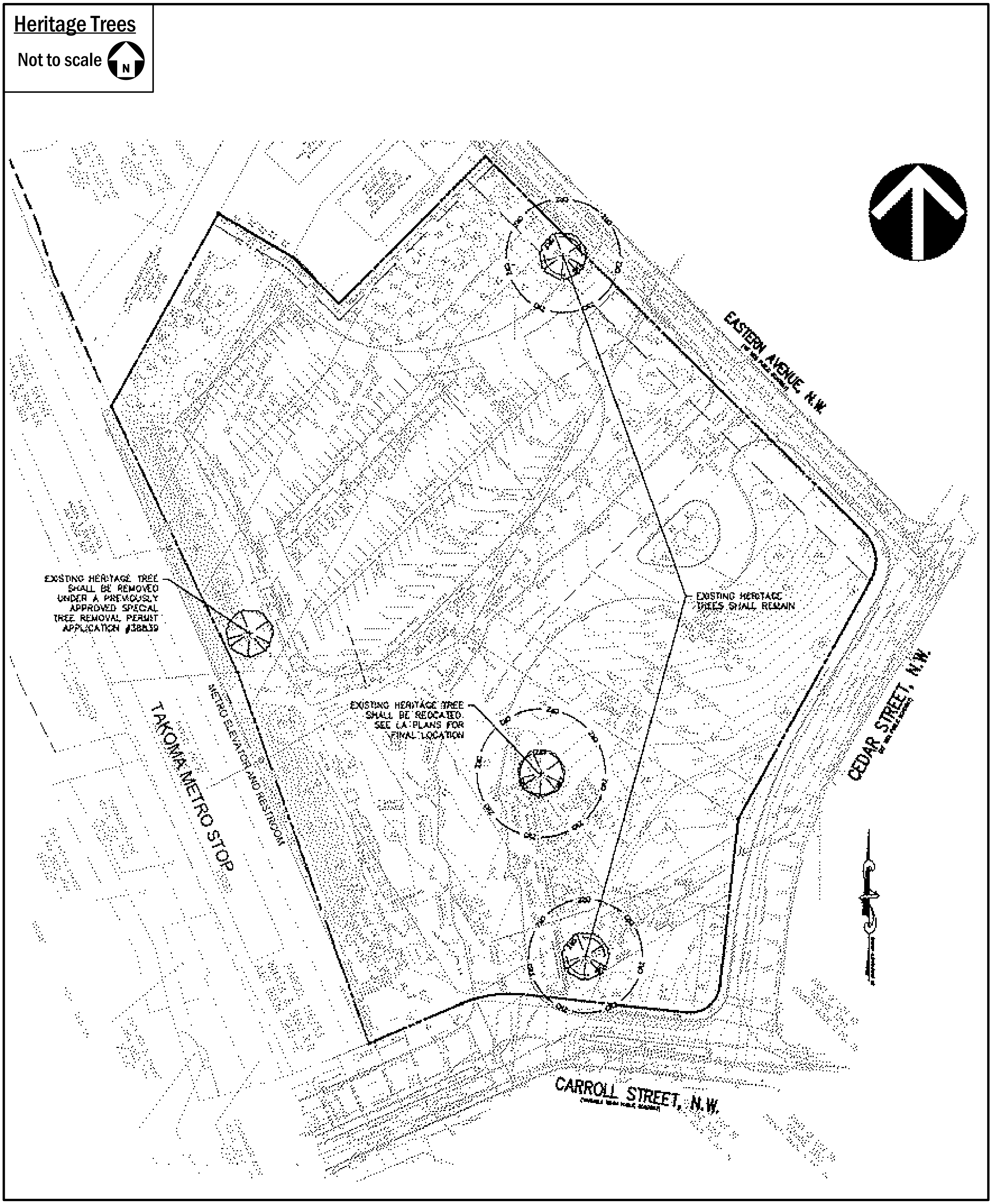
The Surveyor will admit this plat to record in his office under the provisions of the Act of Congress (Public Law, No. 89) approved February 23, 1906, and entitled, "An Act to designate ... of land in the District of Columbia for the purpose of assessment and taxation and other purposes."

Edward S. Baran
Associate Director : Assessment Administration



Loading and Internal Building Routing


Street Trees
Project site
Not to scale
N
UFA Street Trees
SIZE
13.26 - 21.3
6.31 - 13.25
0 - 6.3
Open Tree Space
SITE
Eastern Ave NW
Eastern Ave NW
Cedar St NW
Carroll St NW
Carroll St NW
Cedar St NW
Takoma Metro Station
291 ft



Heritage Trees

Not to scale

Mode Split Assumptions - Takoma Metro Station Development

Residential Component

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
Census Tract 17.02 Residents	31%	8%	42%	-	5%	12%	2%
CTPP - TAZ Residents (TAZ 20250)	43%	0%	46%	2%	1%	8%	0%
State of the Commute 2016 (of District residents)	35%	4%	42%	16%		3%	
WMATA Ridership Survey Table 9 (average for *Friendship Heights Station Area*)	55%		35%	10%		---	
WMATA Ridership Survey Table 10 (CBD avg)	18%		56%	26%		---	
WMATA Ridership Survey Table 10 (Suburban-Inside the Beltway avg)	39%		49%	14%		---	

Mode Split assumed in TIS:

Land Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Residential Mode Split [1]	55%	35%	5%	5%	---

[1] Residential mode split based on project's census data, parking supply, and direct adjacency to a Metro station. Census data shows approximately 1.2 vehicles per household for this TAZ, which is made up primarily of single family homes further from Metrorail. Conversely, it is expected the proposed project will attract residents because of its adjacency to a Metro station, thereby further reducing its commuter peak hour driving mode split compared to the rest of the TAZ.

Retail Component

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
CTPP - TAZ Employees (TAZ 20250)	58%	6%	24%	1%	4%	7%	0%
CTPP - adjacent TAZ Employees (TAZ 10123)	33%	6%	0%	1%	7%	53%	0%
WMATA Ridership Survey Table 15 (average for *Retail Sites*)	36%		37%	27%		---	

Mode Split assumed in TIS:

Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Retail Mode Split [2]	35%	35%	5%	25%	---

[2] Retail mode split based on project's TAZ and adjacent TAZ census data, parking supply, and direct adjacency to a Metro station. The proposed Project's retail is expected to be primarily neighborhood-serving, hence the walking mode split assumption.

Residential Trip Generation

440 du

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Apartments	221	440 du	42 veh/hr	140 veh/hr	182 veh/hr	105 veh/hr	67 veh/hr	172 veh/hr	2052 veh
Calculation Details:			*23%*	*77%*	*=0.44X/1000-11.61*	*61%*	*39%*	*=0.39X+0.34*	*=4.77X/1000-46.46*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	Total
Apartments	1.18 ppl/veh	50 ppl/hr	165 ppl/hr	215 ppl/hr	124 ppl/hr	79 ppl/hr	203 ppl/hr	2421 ppl

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Apartments	Auto	55%	28 ppl/hr	90 ppl/hr	118 ppl/hr	68 ppl/hr	44 ppl/hr	112 ppl/hr	1332 ppl
Apartments	Transit	35%	18 ppl/hr	57 ppl/hr	75 ppl/hr	43 ppl/hr	28 ppl/hr	71 ppl/hr	847 ppl
Apartments	Bike	5%	3 ppl/hr	8 ppl/hr	11 ppl/hr	6 ppl/hr	4 ppl/hr	10 ppl/hr	121 ppl
Apartments	Walk	5%	3 ppl/hr	8 ppl/hr	11 ppl/hr	6 ppl/hr	4 ppl/hr	10 ppl/hr	121 ppl

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	Total
Apartments	1.18 ppl/veh	24 veh/hr	76 veh/hr	100 veh/hr	58 veh/hr	37 veh/hr	95 veh/hr	1129 veh

Trip Gen Summary for Residential

Mode	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
Auto	24 veh/hr	76 veh/hr	100 veh/hr	58 veh/hr	37 veh/hr	95 veh/hr	1129 veh
Transit	18 ppl/hr	57 ppl/hr	75 ppl/hr	43 ppl/hr	28 ppl/hr	71 ppl/hr	847 ppl
Bike	3 ppl/hr	8 ppl/hr	11 ppl/hr	6 ppl/hr	4 ppl/hr	10 ppl/hr	121 ppl
Walk	3 ppl/hr	8 ppl/hr	11 ppl/hr	6 ppl/hr	4 ppl/hr	10 ppl/hr	121 ppl

Retail Trip Generation

17,650 sf

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Retail	822	17,650 sf	25 veh/hr	17 veh/hr	42 veh/hr	59 veh/hr	58 veh/hr	117 veh/hr	975 veh
Calculation Details:			*60%*	*40%*	*Ln(T)=0.66Ln(X/1000)+1.84*	*50%*	*50%*	*Ln(T)=0.71Ln(X/1000)+2.72*	*42.2(X/1000)+229.6*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	Total
Retail	1.82 ppl/veh	46 ppl/hr	30 ppl/hr	76 ppl/hr	107 ppl/hr	106 ppl/hr	213 ppl/hr	1775 ppl

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Retail	Auto	35%	16 ppl/hr	11 ppl/hr	27 ppl/hr	37 ppl/hr	38 ppl/hr	75 ppl/hr	621 ppl
Retail	Transit	35%	16 ppl/hr	11 ppl/hr	27 ppl/hr	37 ppl/hr	38 ppl/hr	75 ppl/hr	621 ppl
Retail	Bike	5%	2 ppl/hr	2 ppl/hr	4 ppl/hr	5 ppl/hr	6 ppl/hr	11 ppl/hr	89 ppl
Retail	Walk	25%	12 ppl/hr	7 ppl/hr	19 ppl/hr	27 ppl/hr	26 ppl/hr	53 ppl/hr	444 ppl

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	Total
Retail	1.82 ppl/veh	9 veh/hr	6 veh/hr	15 veh/hr	20 veh/hr	21 veh/hr	41 veh/hr	341 veh

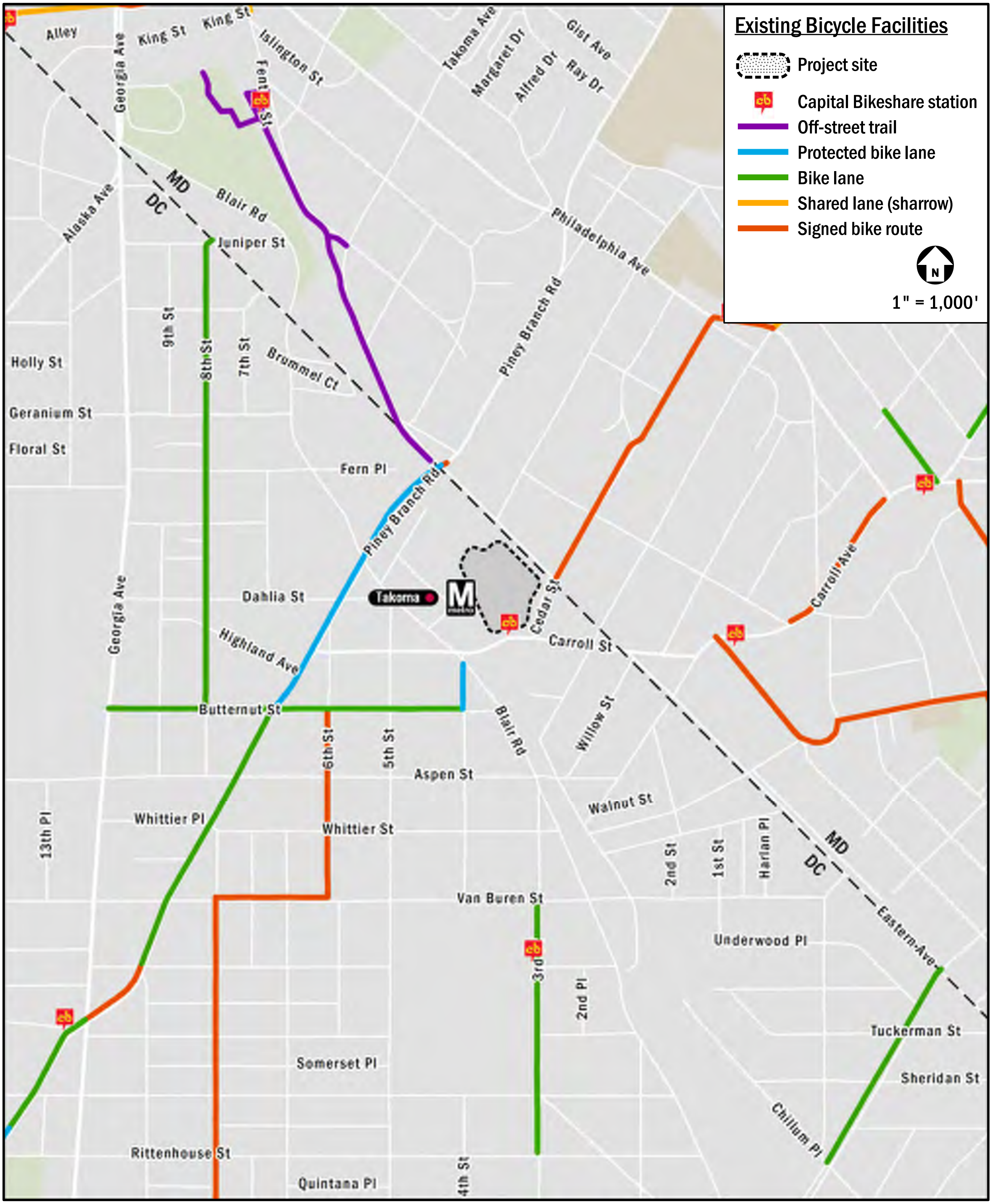
Trip Gen Summary for Retail

Mode	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
Auto	9 veh/hr	6 veh/hr	15 veh/hr	20 veh/hr	21 veh/hr	41 veh/hr	341 veh
Transit	16 ppl/hr	11 ppl/hr	27 ppl/hr	37 ppl/hr	38 ppl/hr	75 ppl/hr	621 ppl
Bike	2 ppl/hr	2 ppl/hr	4 ppl/hr	5 ppl/hr	6 ppl/hr	11 ppl/hr	89 ppl
Walk	12 ppl/hr	7 ppl/hr	19 ppl/hr	27 ppl/hr	26 ppl/hr	53 ppl/hr	444 ppl

Multimodal Trip Generation Summary

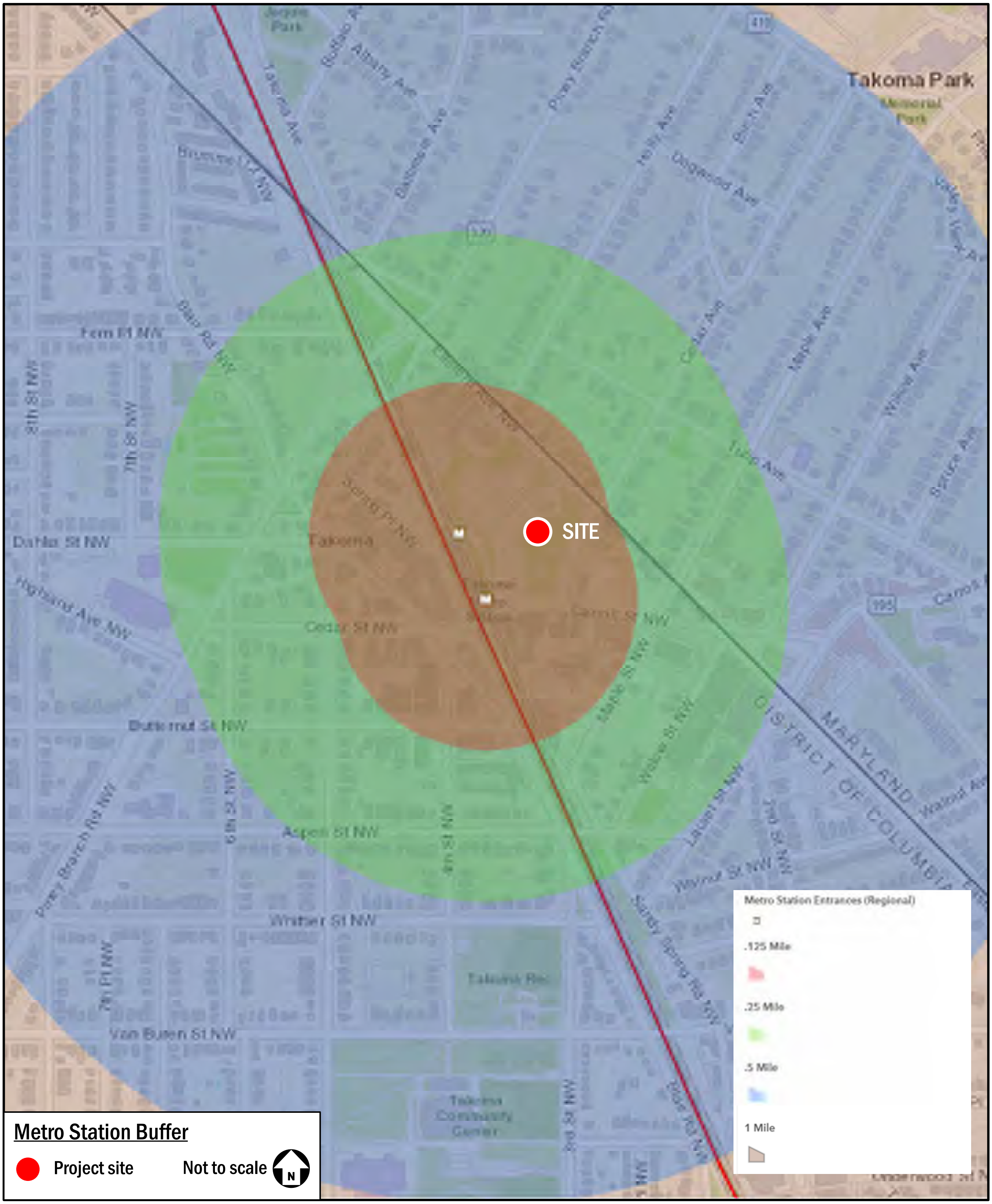
Mode	Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour			Weekday Total
				In	Out	Total	In	Out	Total	
Auto (veh/hr)	Residential	440 du	55%	24	76	100	58	37	95	1,129
	Retail	17,650 sf	35%	9	6	15	20	21	41	341
	Total			**33**	**82**	**115**	**78**	**58**	**136**	**1,470**
Transit (ppl/hr)	Residential	440 du	35%	18	57	75	43	28	71	847
	Retail	17,650 sf	35%	16	11	27	37	38	75	621
	Total			**34**	**68**	**102**	**80**	**66**	**146**	**1,468**
Bike (ppl/hr)	Residential	440 du	5%	3	8	11	6	4	10	121
	Retail	17,650 sf	5%	2	2	4	5	6	11	89
	Total			**5**	**10**	**15**	**11**	**10**	**21**	**210**
Walk (ppl/hr)	Residential	440 du	5%	3	8	11	6	4	10	121
	Retail	17,650 sf	25%	12	7	19	27	26	53	444
	Total			**15**	**15**	**30**	**33**	**30**	**63**	**565**

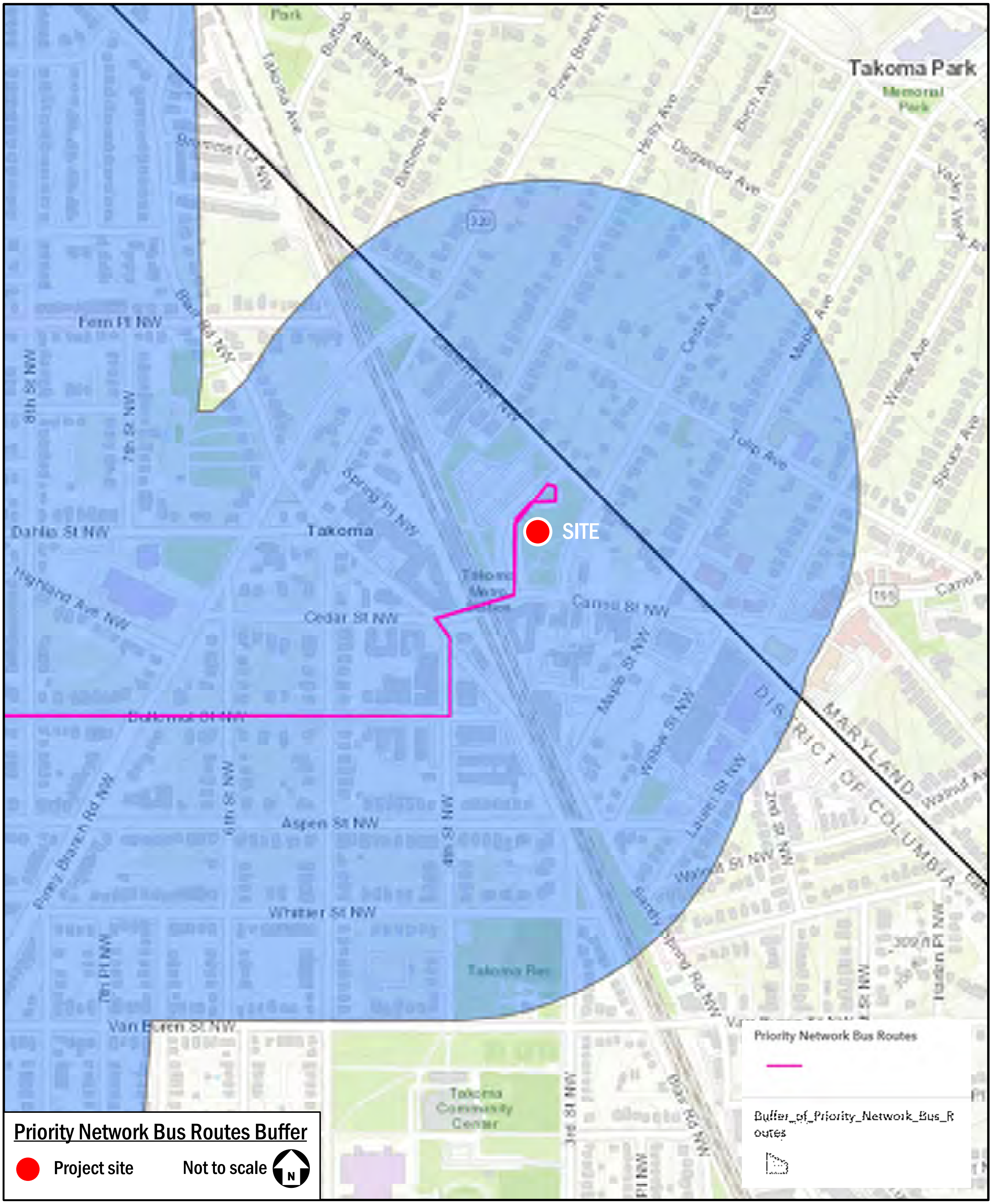

Pedestrian Study Area
Project site
Pedestrian study area
N
1" = 500'
7th St
Brummer Ct
Geranium St
Baltimore Ave
Piney Branch Rd
Takoma Ave
Holly Ave
Fern Pl
Cedar Ave
Tulip Ave
Eastern Ave
Maple Ave
Elder St
7th St
Chestnut St
Spring Pl
Dahlia St
Piney Branch Rd
Blair Rd
Highland Ave
Cedar St
Carroll St
Carroll Ave
MD
DC
Maple St
Vine St
Eastern Ave
Willow St
Butternut St
6th St
5th St
Laurel St
Aspen St
4th St
2nd St
Walnut St
Sandy Spring Rd
Whittier St
Whittier St
7th Pl
7th St
3rd St
Van Buren St

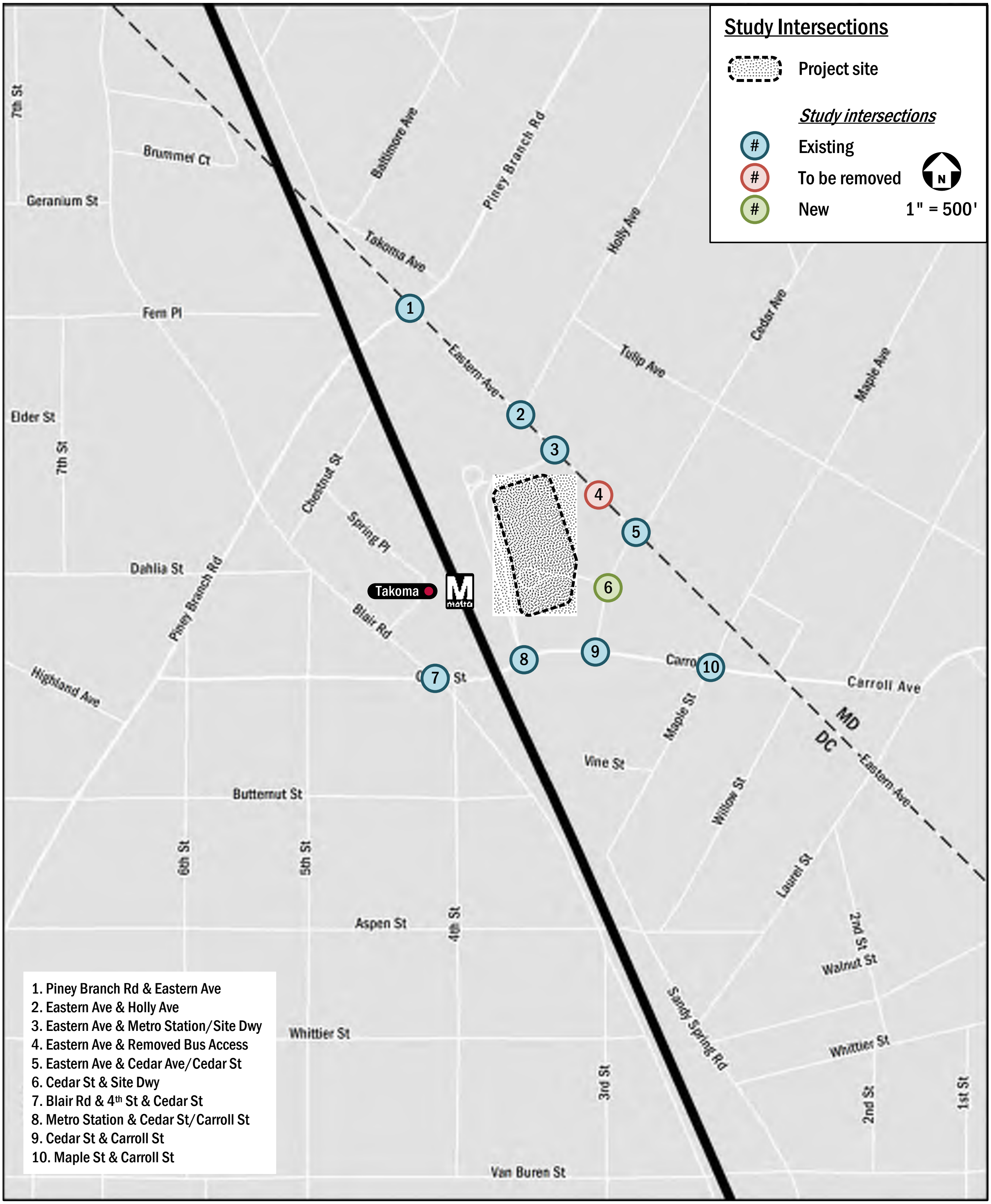

Existing Bicycle Facilities
Project site
Capital Bikeshare station
Off-street trail
Protected bike lane
Bike lane
Shared lane (sharrow)
Signed bike route
N
1" = 1,000'
Alley
Georgia Ave
King St
King St
Islington St
Fenton St
Takoma Ave
Margaret Dr
Alfred Dr
Gist Ave
Ray Dr
MD
DC
Blair Rd
Alaska Ave
Juniper St
Philadelphia Ave
Piney Branch Rd
9th St
8th St
7th St
Brummel Ct
Holly St
Geranium St
Floral St
Fern Pl
Piney Branch Rd
Dahlia St
Takoma
M
Cedar St
Carroll St
Carroll Ave
Georgia Ave
Highland Ave
Butternut St
6th St
5th St
Aspen St
Blair Rd
Willow St
Walnut St
13th Pl
Whittier Pl
Whittier St
2nd St
1st St
Harlan Pl
MD
DC
Van Buren St
Underwood Pl
Eastern Ave
3rd St
2nd Pl
Tuckerman St
Somerset Pl
Sheridan St
Chillum Pl
Rittenhouse St
Quintana Pl
4th St

Existing and Planned Bicycle Facilities

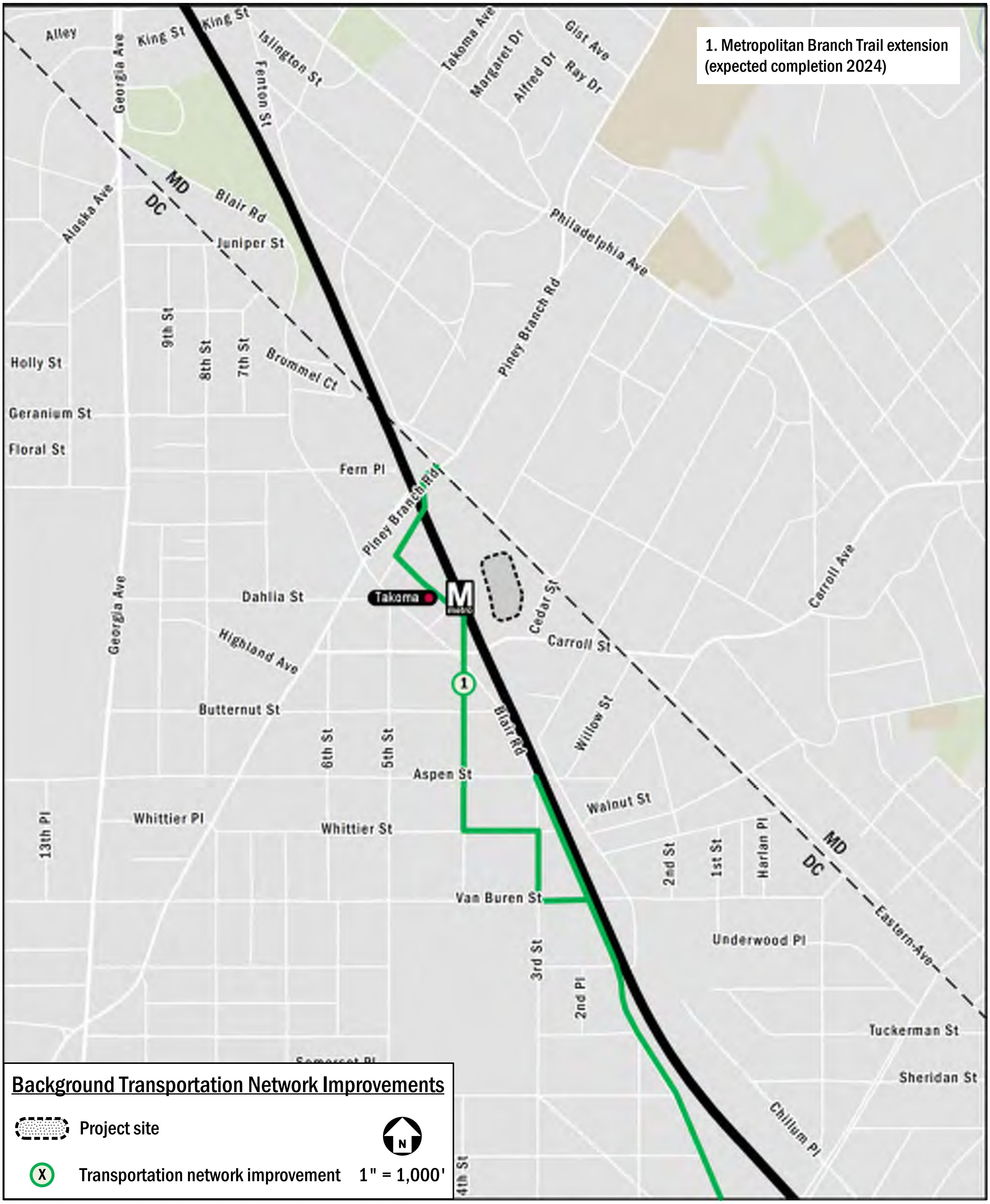
Existing Transit Facilities


Takoma Park
Memorial Park
Takoma Ave
Albany Ave
Baltimore Ave
Piney Branch Rd
Holly Ave
Dogwood Ave
Fern Pl NW
Blair Rd NW
8th St NW
7th St NW
Cedar Ave
Maple Ave
Willow Ave
Tulip Ave
Spruce Ave
Carroll Ave NW
Dahlia St NW
Takoma
Sandy Pl NW
SITE
Highland Ave NW
Cedar St NW
Carroll St NW
Maple St NW
Willow St NW
Butternut St NW
Piney Branch Rd NW
6th St NW
4th St NW
Aspen St NW
Laurel St NW
Walnut St NW
DISTRICT OF COLUMBIA
MARYLAND
Whittier St NW
7th Pl NW
Takoma Rec
Sandy Spring Rd NW
Van Buren St NW
Takoma Community Center
3rd St NW
Blair Rd NW
Metro Station Entrances (Regional)
.125 Mile
.25 Mile
.5 Mile
1 Mile
Metro Station Buffer
Project site
Not to scale
N


Priority Network Bus Routes Buffer
Project site
Not to scale
N
SITE
Priority Network Bus Routes
Buffer_of_Priority_Network_Bus_Routes
Takoma Park
Memorial Park
Takoma
Fern Pl NW
Dahlia St NW
Highland Ave NW
Cedar St NW
Carroll St NW
Butternut St NW
Aspen St NW
Whittier St NW
Van Buren St NW
8th St NW
7th St NW
6th St NW
4th St NW
3rd St NW
2nd St NW
7th Pl NW
Piney Branch Rd NW
Blair Rd NW
Spring Pl NW
Maple St NW
Willow St NW
Laurel St NW
Eastern Ave NW
Cedar Ave
Tulip Ave
Maple Ave
Willow Ave
Spruce Ave
Holly Ave
Birch Ave
Dogwood Ave
Takoma Ave
Albany Ave
Buffalo Ave
Park Ave
Sandy Spring Rd NW
DISTRICT OF COLUMBIA
MARYLAND
Takoma Metro Station
Takoma Rec
Takoma Community Center
410
320
195



1. Piney Branch Rd & Eastern Ave
2. Eastern Ave & Holly Ave
3. Eastern Ave & Metro Station/Site Dwy
4. Eastern Ave & Removed Bus Access
5. Eastern Ave & Cedar Ave/Cedar St
6. Cedar St & Site Dwy
7. Blair Rd & 4th St & Cedar St
8. Metro Station & Cedar St/Carroll St
9. Cedar St & Carroll St
10. Maple St & Carroll St


1. Metropolitan Branch Trail extension (expected completion 2024)
Alley
Georgia Ave
King St
King St
Islington St
Fenton St
Takoma Ave
Margaret Dr
Alfred Dr
Gist Ave
Ray Dr
MD
DC
Blair Rd
Alaska Ave
Juniper St
Philadelphia Ave
Piney Branch Rd
9th St
8th St
7th St
Brummel Ct
Holly St
Geranium St
Floral St
Fern Pl
Piney Branch Rd
Takoma
Dahlia St
Cedar St
Carroll St
Carroll Ave
Georgia Ave
Highland Ave
1
Butternut St
Blair Rd
Willow St
6th St
5th St
Aspen St
Walnut St
13th Pl
Whittier Pl
Whittier St
2nd St
1st St
Harlan Pl
MD
DC
Van Buren St
Eastern Ave
Underwood Pl
3rd St
2nd Pl
Tuckerman St
Somerset Pl
Sheridan St
Chillum Pl
4th St
Background Transportation Network Improvements
Project site
X Transportation network improvement
N
1" = 1,000'

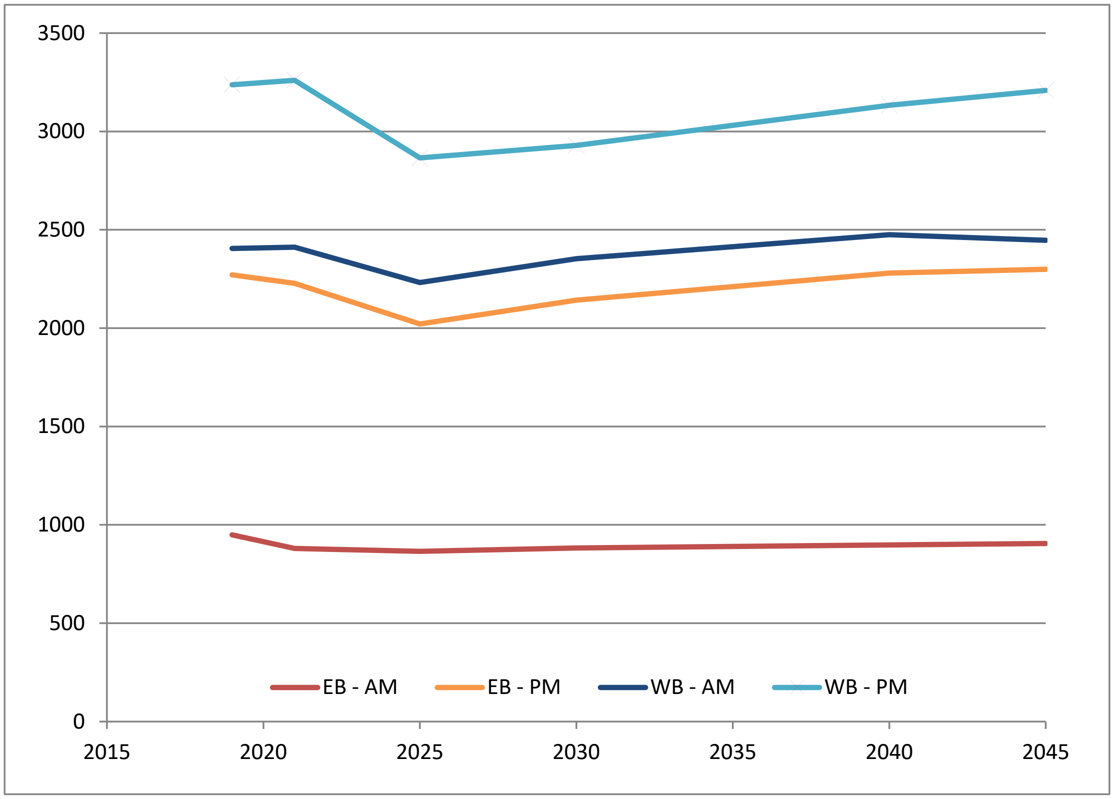

1. Fern Street Townhomes
2. The Hartley
3. Kite House
4. Reynard
5. Aspen Street Townhomes
6. 218 Cedar Street
7. Gilbert & Wood
Background Developments
Project site
Background development
1" = 1,000'
N
Takoma
M
MD
DC
Alley
King St
Georgia Ave
Islington St
Fenton St
Takoma Ave
Margaret Dr
Alfred Dr
Gist Ave
Ray Dr
Blair Rd
Alaska Ave
Juniper St
Philadelphia Ave
Piney Branch Rd
9th St
8th St
7th St
Brummel Ct
Holly St
Geranium St
Floral St
Fern Pl
Dahlia St
Highland Ave
Cedar St
Carroll St
Carroll Ave
Butternut St
6th St
5th St
Aspen St
Willow St
Walnut St
13th Pl
Whittier Pl
Whittier St
2nd St
1st St
Harlan Pl
Van Buren St
Underwood Pl
Eastern Ave
3rd St
2nd Pl
Tuckerman St
Sheridan St
Somerset Pl
Chillum Pl
4th St

Growth Rate Information & Assumptions

Carroll St btwn Blair St and Eastern Ave

MWCOG Model Volumes (v2.4)

Direction/Period	2019	2021	2025	2030	2040	2045
EB - AM	949	880	865	882	898	905
EB - PM	2271	2228	2021	2142	2280	2299
WB - AM	2405	2412	2232	2353	2475	2447
WB - PM	3237	3260	2865	2929	3133	3209



Year of data collection: 2022
Project completion date: 2027

Direction/Period	Growth per year between 2021 & 2027
EB - AM	-0.43%
EB - PM	-2.41%
WB - AM	-1.92%
WB - PM	-3.18%

Growth Rate Information & Assumptions

Carroll St btwn Blair St and Eastern Ave

Historical DDOT AADTs in thousands

Location	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Carroll St	11.0	11.1	11.0	11.0			9.0	9.0	10.0	10.0

Growth per year since:	2010	2013	2016
	-0.9%	-1.4%	2.7%

Proposed Growth Rates for Use in Study:

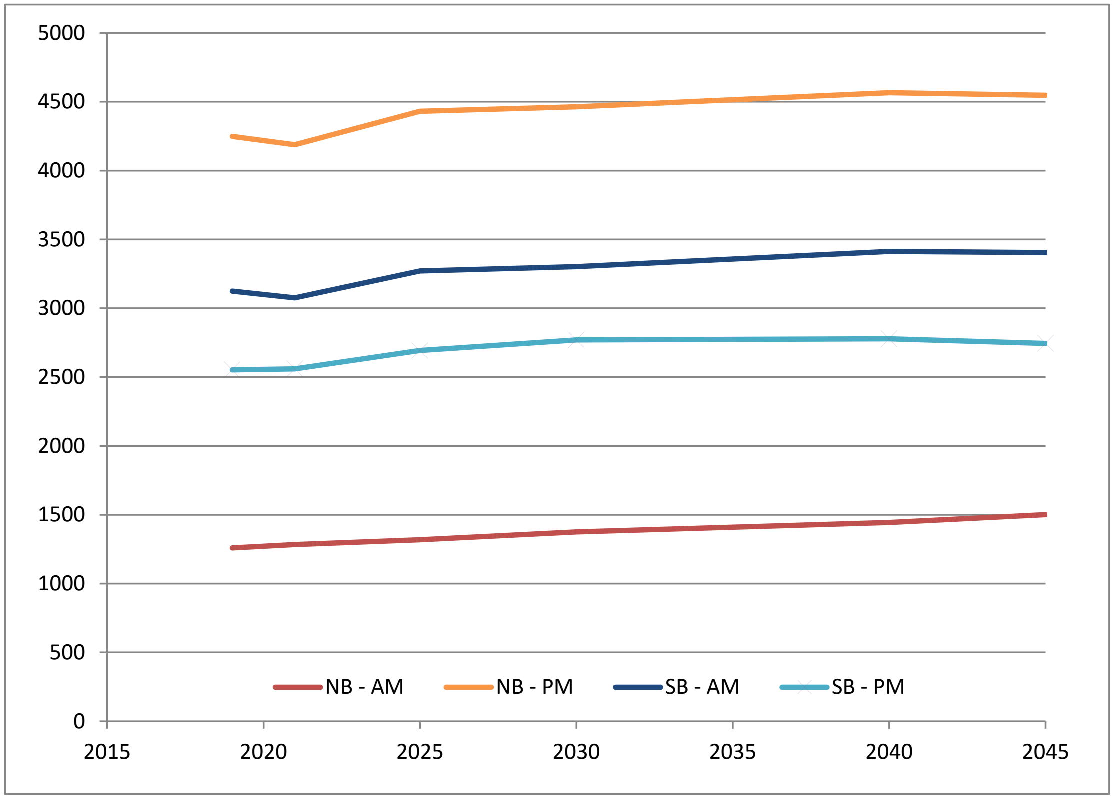
Direction/Period	Per year btwn 2022 & 2027	Total btwn 2022 & 2027
EB - AM	0.10%	0.50%
EB - PM	0.10%	0.50%
WB - AM	0.10%	0.50%
WB - PM	0.10%	0.50%

Growth Rate Information & Assumptions

Piney Branch Rd north of Eastern Ave

MWCOG Model Volumes (v2.4)

Direction/Period	2019	2021	2025	2030	2040	2045
NB - AM	1259	1284	1319	1376	1444	1501
NB - PM	4248	4187	4431	4463	4565	4547
SB - AM	3124	3076	3271	3302	3412	3404
SB - PM	2553	2560	2693	2770	2778	2744



Year of data collection: 2022
Project completion date: 2027

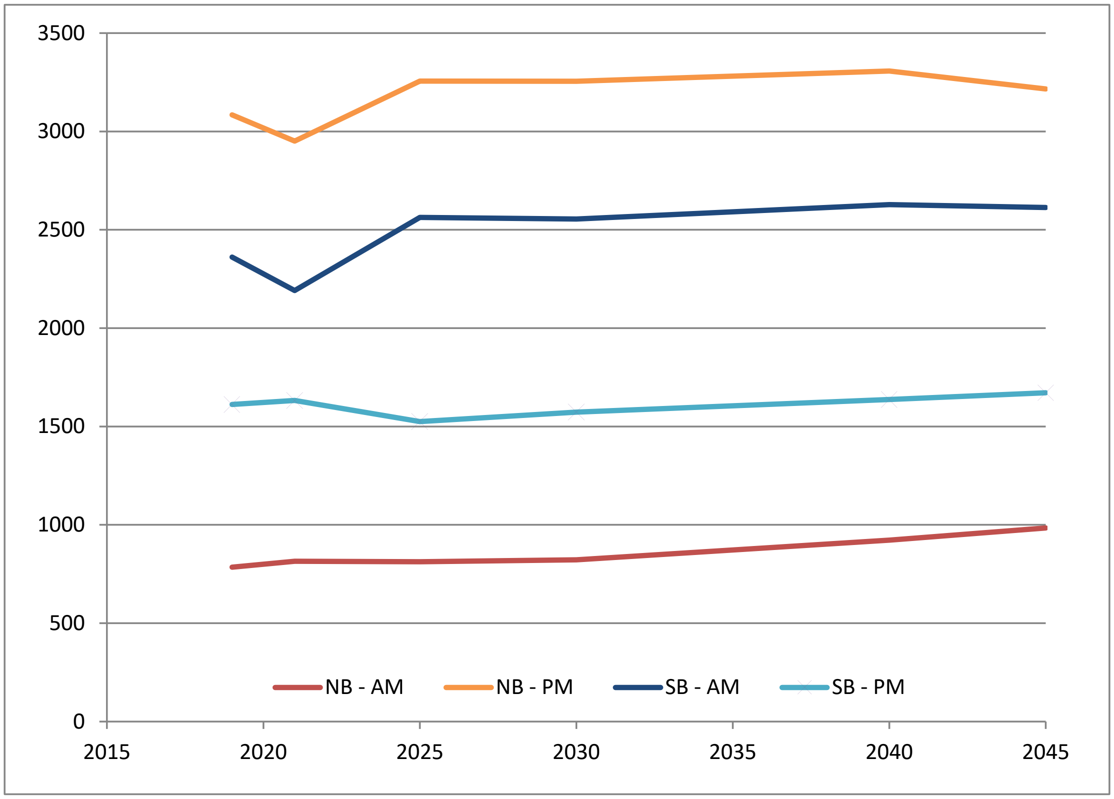
Direction/Period	Growth per year between 2021 & 2027
NB - AM	0.67%
NB - PM	1.43%
SB - AM	1.55%
SB - PM	1.27%

Growth Rate Information & Assumptions

Piney Branch Rd south of Eastern Ave

MWCOG Model Volumes (v2.4)

Direction/Period	**2019**	**2021**	**2025**	**2030**	**2040**	**2045**
NB - AM	785	815	812	822	922	984
NB - PM	3084	2951	3256	3255	3307	3216
SB - AM	2361	2191	2563	2555	2628	2613
SB - PM	1612	1632	1525	1573	1637	1671



Year of data collection:	2022
Project completion date:	2027

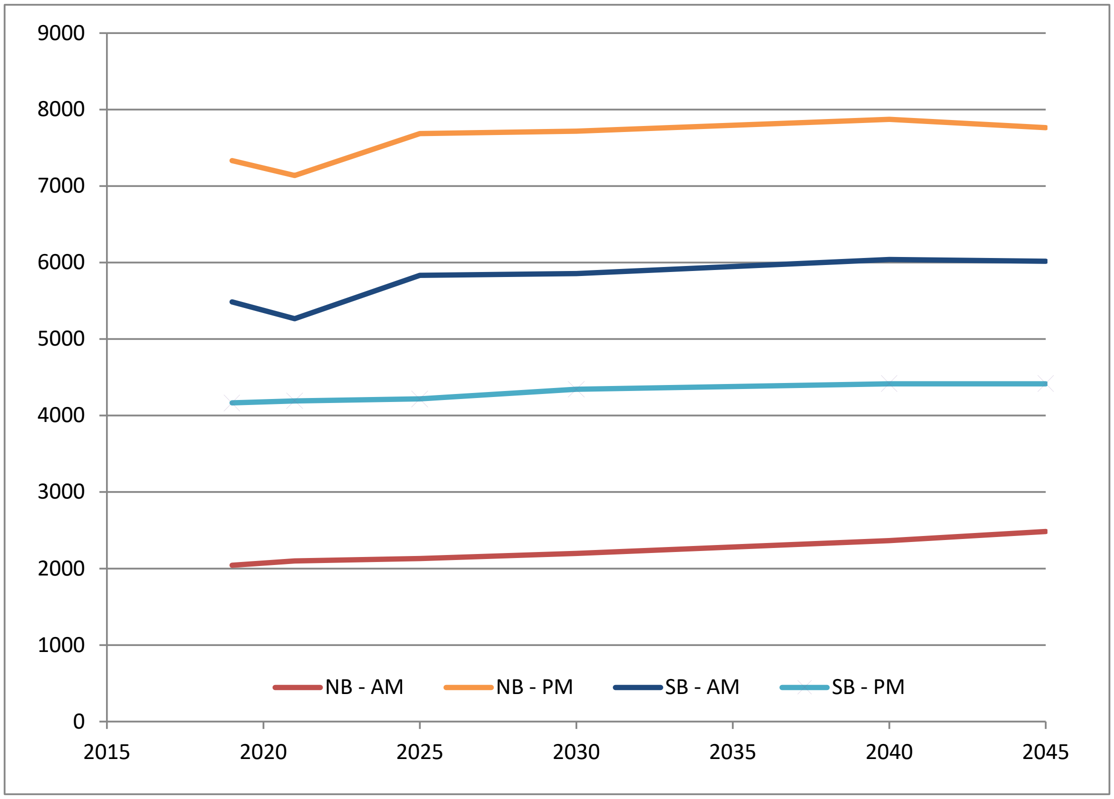
Direction/Period	**Growth per year between 2021 & 2027**
NB - AM	-0.09%
NB - PM	2.49%
SB - AM	4.00%
SB - PM	-1.68%

Growth Rate Information & Assumptions

Piney Branch Rd aggregate

MWCOG Model Volumes (v2.4)

Direction/Period	2019	2021	2025	2030	2040	2045
NB - AM	2044	2099	2131	2198	2366	2485
NB - PM	7332	7138	7687	7718	7872	7763
SB - AM	5485	5267	5834	5857	6040	6017
SB - PM	4165	4192	4218	4343	4415	4415



Year of data collection:	2022
Project completion date:	2027

Direction/Period	Growth per year between 2021 & 2027
NB - AM	0.38%
NB - PM	1.87%
SB - AM	2.59%
SB - PM	0.15%

Growth Rate Information & Assumptions

Piney Branch Rd aggregate

Historical DDOT AADTs in thousands

Location	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Piney Branch Rd	15.0	15.1	15.0	15.0	12.1	12.5	13.0	13.0	13.0	13.0

Growth per year since:	**2010**	**2013**	**2016**
	-1.4%	-2.0%	0.0%

Proposed Growth Rates for Use in Study:

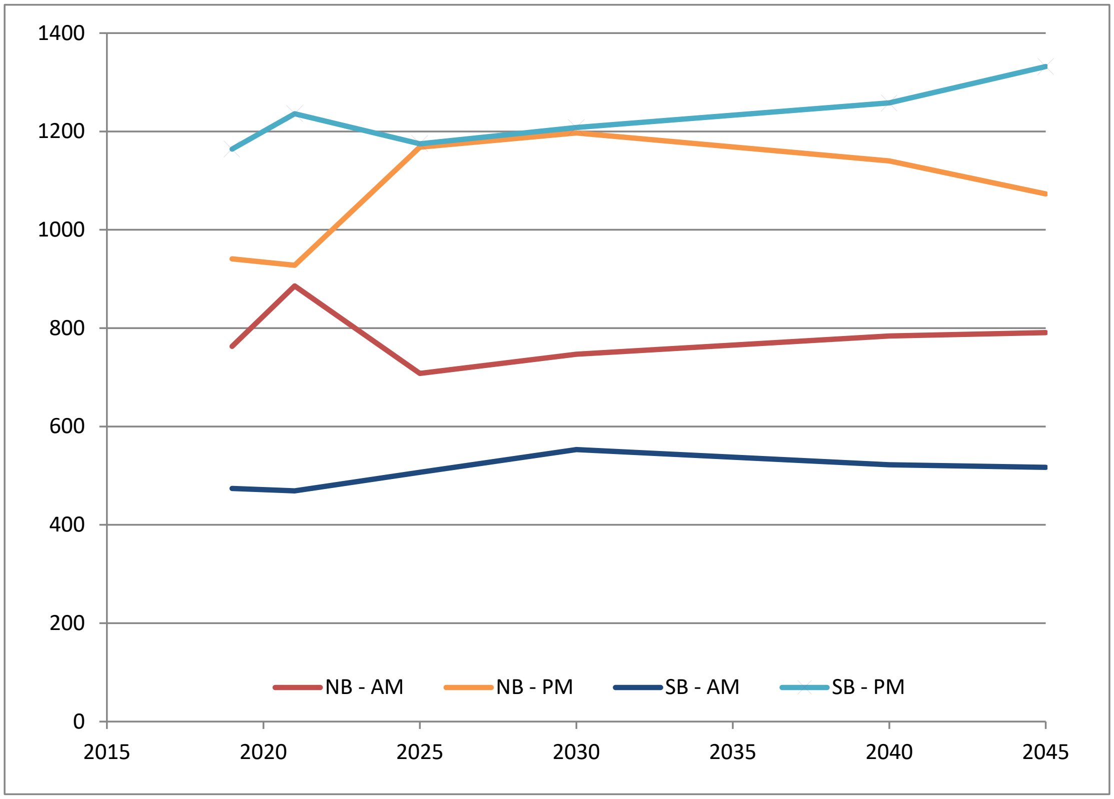
Direction/Period	**Per year btwn 2022 & 2027**	**Total btwn 2022 & 2027**
NB - AM	0.40%	2.02%
NB - PM	0.50%	2.53%
SB - AM	0.50%	2.53%
SB - PM	0.20%	1.00%

Growth Rate Information & Assumptions

Eastern Ave/Cedar Street

MWCOG Model Volumes (v2.4)

Direction/Period	**2019**	**2021**	**2025**	**2030**	**2040**	**2045**
NB - AM	763	886	708	747	784	791
NB - PM	941	928	1168	1197	1140	1073
SB - AM	474	469	507	553	522	517
SB - PM	1164	1236	1175	1208	1258	1332



Year of data collection:	2022
Project completion date:	2027

Direction/Period	**Growth per year between 2021 & 2027**
NB - AM	-5.45%
NB - PM	5.92%
SB - AM	1.97%
SB - PM	-1.26%

Growth Rate Information & Assumptions

Eastern Ave/Cedar Street

Historical DDOT AADTs in thousands

Location	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Eastern Ave	6.8	6.9	6.8	6.8	7.0	7.2	5.0	5.0	5.0	5.0

Growth per year since:	**2010**	**2013**	**2016**
	-3.0%	-4.3%	0.0%

Proposed Growth Rates for Use in Study:

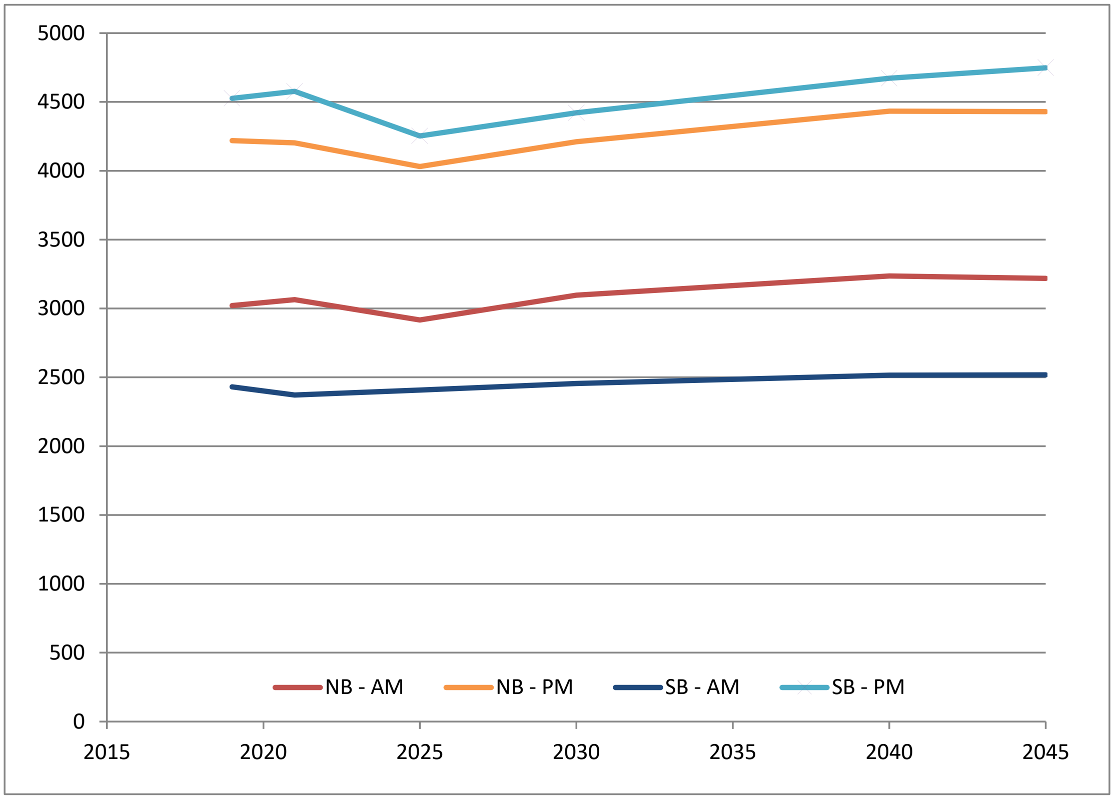
Direction/Period	**Per year btwn 2022 & 2027**	**Total btwn 2022 & 2027**
NB - AM	0.10%	0.50%
NB - PM	2.00%	10.41%
SB - AM	2.00%	10.41%
SB - PM	0.10%	0.50%

Growth Rate Information & Assumptions

Blair Rd north of Cedar St

MWCOG Model Volumes (v2.4)

Direction/Period	**2019**	**2021**	**2025**	**2030**	**2040**	**2045**
NB - AM	3021	3064	2916	3097	3236	3218
NB - PM	4219	4203	4031	4211	4433	4430
SB - AM	2431	2371	2408	2455	2515	2518
SB - PM	4526	4577	4253	4421	4672	4748



Year of data collection:	2022
Project completion date:	2027

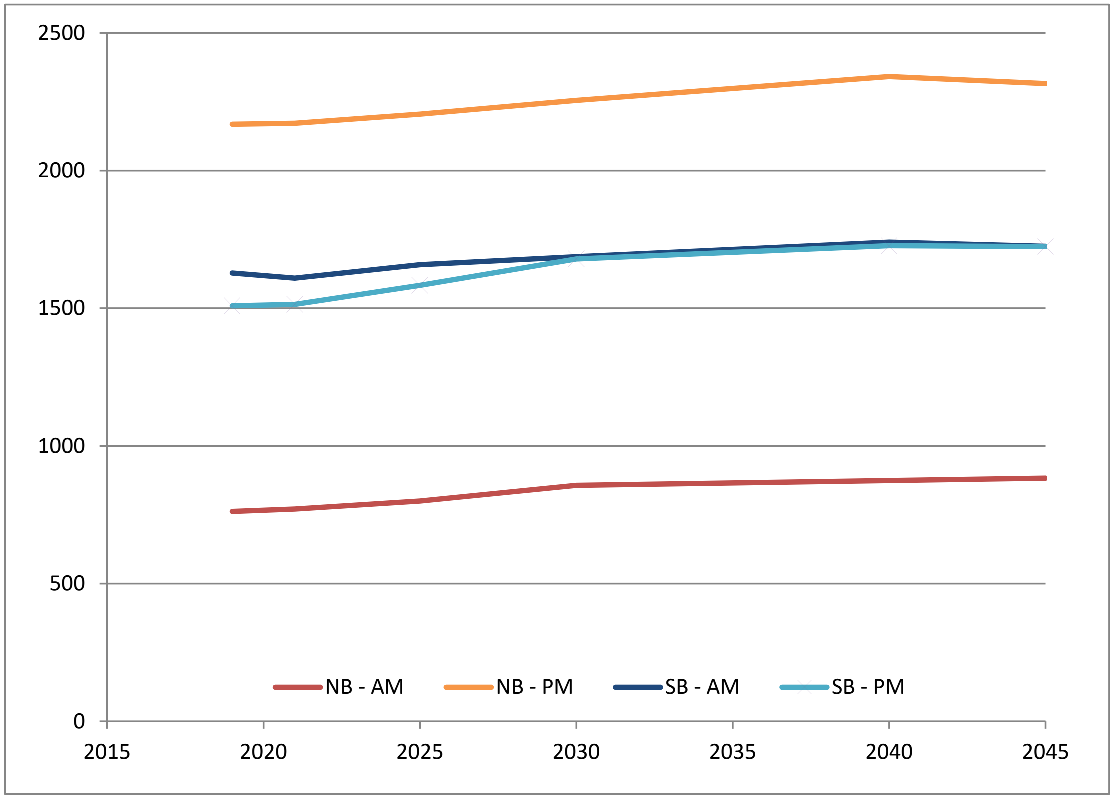
Direction/Period	**Growth per year between 2021 & 2027**
NB - AM	-1.23%
NB - PM	-1.04%
SB - AM	0.39%
SB - PM	-1.82%

Growth Rate Information & Assumptions

Blair Rd south of Cedar St

MWCOG Model Volumes (v2.4)

Direction/Period	2019	2021	2025	2030	2040	2045
NB - AM	762	771	800	857	874	883
NB - PM	2168	2172	2205	2255	2341	2316
SB - AM	1628	1609	1658	1687	1740	1725
SB - PM	1509	1514	1583	1679	1727	1724



Year of data collection:	2022
Project completion date:	2027

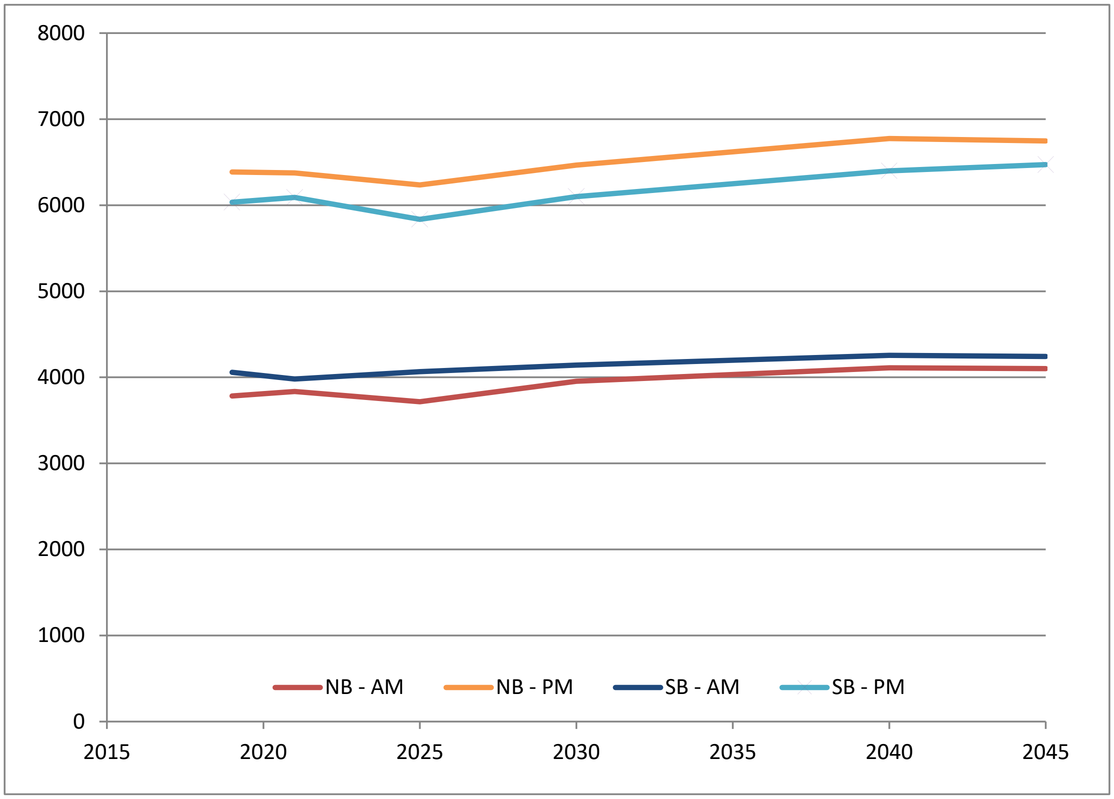
Direction/Period	Growth per year between 2021 & 2027
NB - AM	0.93%
NB - PM	0.38%
SB - AM	0.75%
SB - PM	1.12%

Growth Rate Information & Assumptions

Blair Rd aggregate

MWCOG Model Volumes (v2.4)

Direction/Period	2019	2021	2025	2030	2040	2045
NB - AM	3783	3835	3716	3954	4110	4101
NB - PM	6387	6375	6236	6466	6774	6746
SB - AM	4059	3980	4066	4142	4255	4243
SB - PM	6035	6091	5836	6100	6399	6472



Year of data collection:	2022
Project completion date:	2027

Direction/Period	Growth per year between 2021 & 2027
NB - AM	-0.78%
NB - PM	-0.55%
SB - AM	0.54%
SB - PM	-1.06%

Growth Rate Information & Assumptions

Blair Rd aggregate

Historical DDOT AADTs in thousands

Location	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Blair Rd	15.2	15.3	15.2	15.2			11.0	11.0	11.0	11.0

Growth per year since:	2010	2013	2016
	-3.2%	-4.5%	0.0%

Proposed Growth Rates for Use in Study:

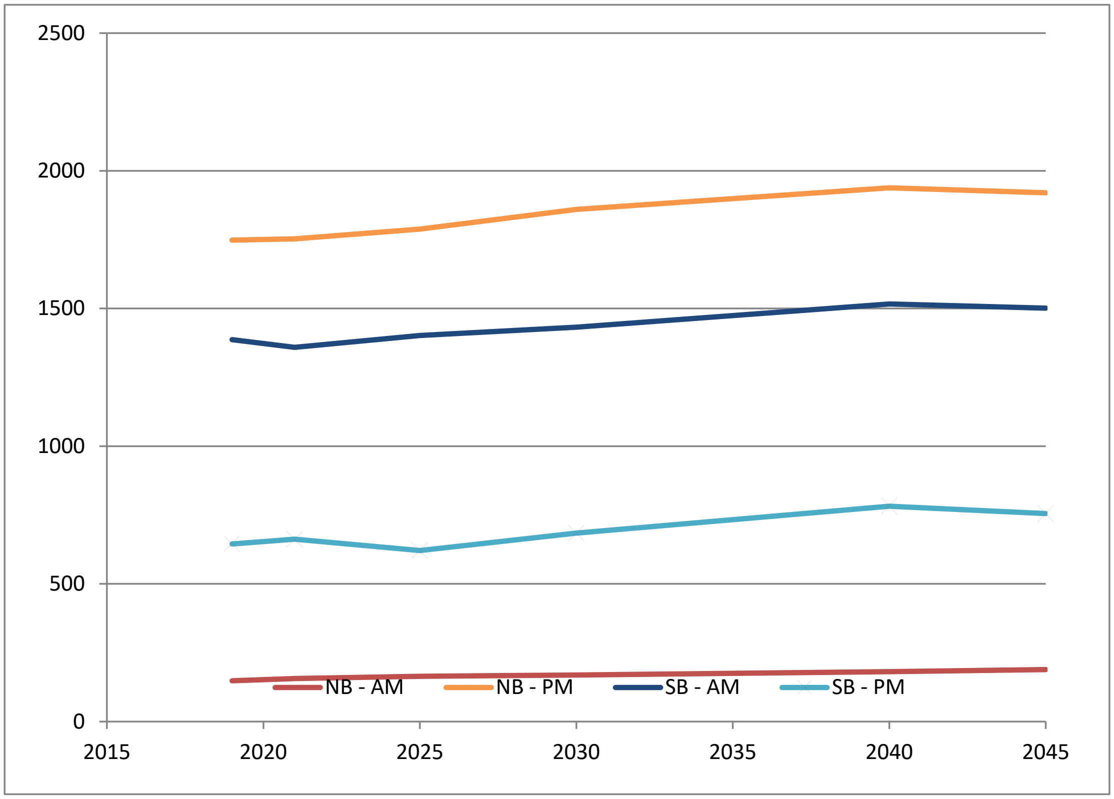
Direction/Period	Per year btwn 2022 & 2027	Total btwn 2022 & 2027
NB - AM	0.10%	0.50%
NB - PM	0.10%	0.50%
SB - AM	0.50%	2.53%
SB - PM	0.10%	0.50%

Growth Rate Information & Assumptions

5th St

MWCOG Model Volumes (v2.4)

Direction/Period	2019	2021	2025	2030	2040	2045
NB - AM	148	156	164	169	181	189
NB - PM	1748	1753	1788	1860	1938	1920
SB - AM	1387	1359	1402	1432	1516	1501
SB - PM	645	662	621	684	782	755



Year of data collection:	2022
Project completion date:	2027

Direction/Period	Growth per year between 2021 & 2027
NB - AM	1.26%
NB - PM	0.50%
SB - AM	0.78%
SB - PM	-1.59%

Growth Rate Information & Assumptions

5th St

Historical DDOT AADTs in thousands

Location	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
5th St	-	-	-	-	-	-	3.0	4.0	4.0	4.0

Growth per year since:	**2010**	**2013**	**2016**
	-	-	7.5%

Proposed Growth Rates for Use in Study:

Direction/Period	**Per year btwn 2022 & 2027**	**Total btwn 2022 & 2027**
NB - AM	1.30%	6.67%
NB - PM	0.50%	2.53%
SB - AM	0.50%	2.53%
SB - PM	0.10%	0.50%

Growth Rate Information & Assumptions

4th St

Historical DDOT AADTs in thousands

Location	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
4th St	1.6	1.6	1.6	1.1	1.1	1.2	-	-	1.0	1.0

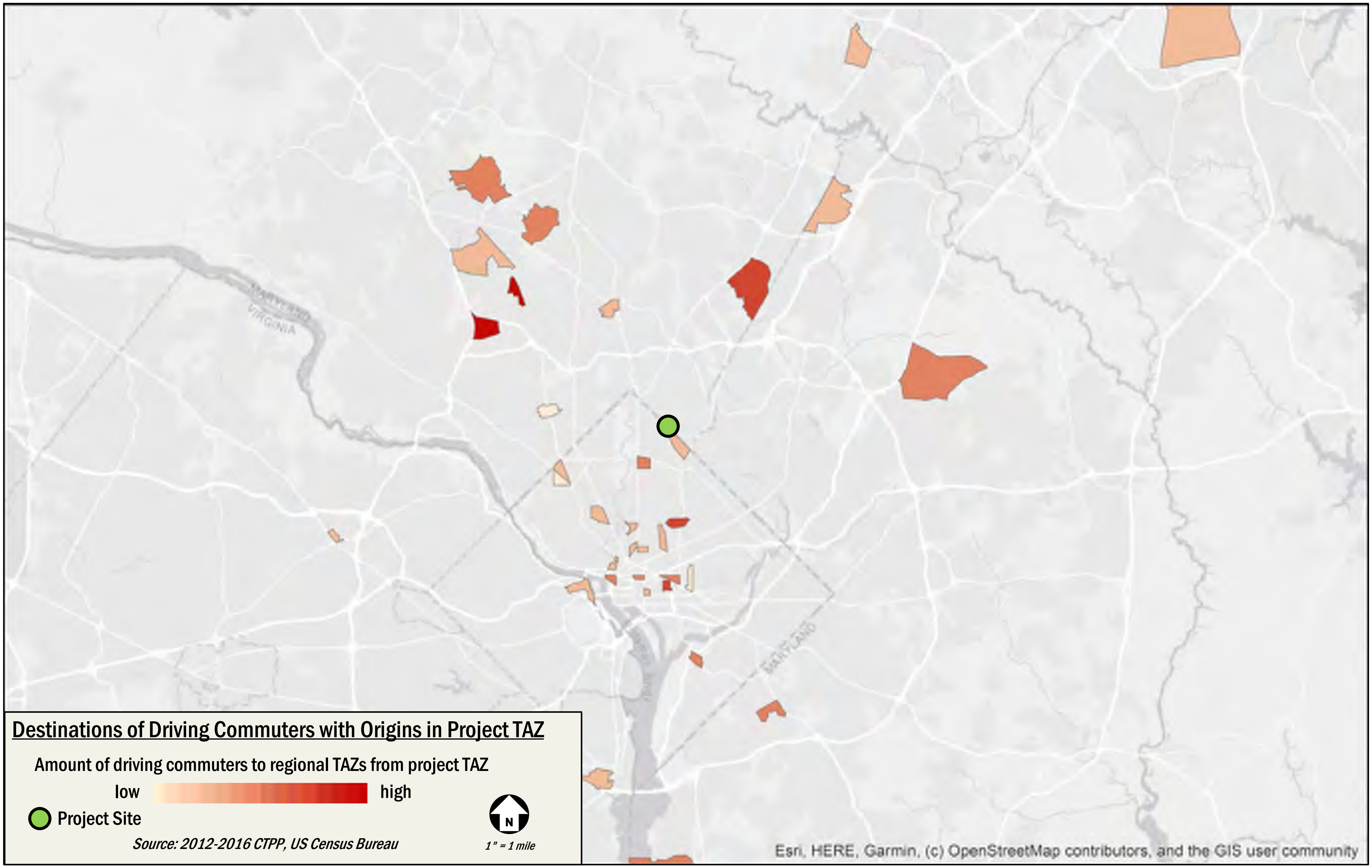
Growth per year since:	2010	2013	2016
	-4.6%	-1.4%	-

Proposed Growth Rates for Use in Study:

Direction/Period	Per year btwn 2022 & 2027	Total btwn 2022 & 2027
NB - AM	0.10%	0.50%
NB - PM	0.10%	0.50%
SB - AM	0.10%	0.50%
SB - PM	0.10%	0.50%

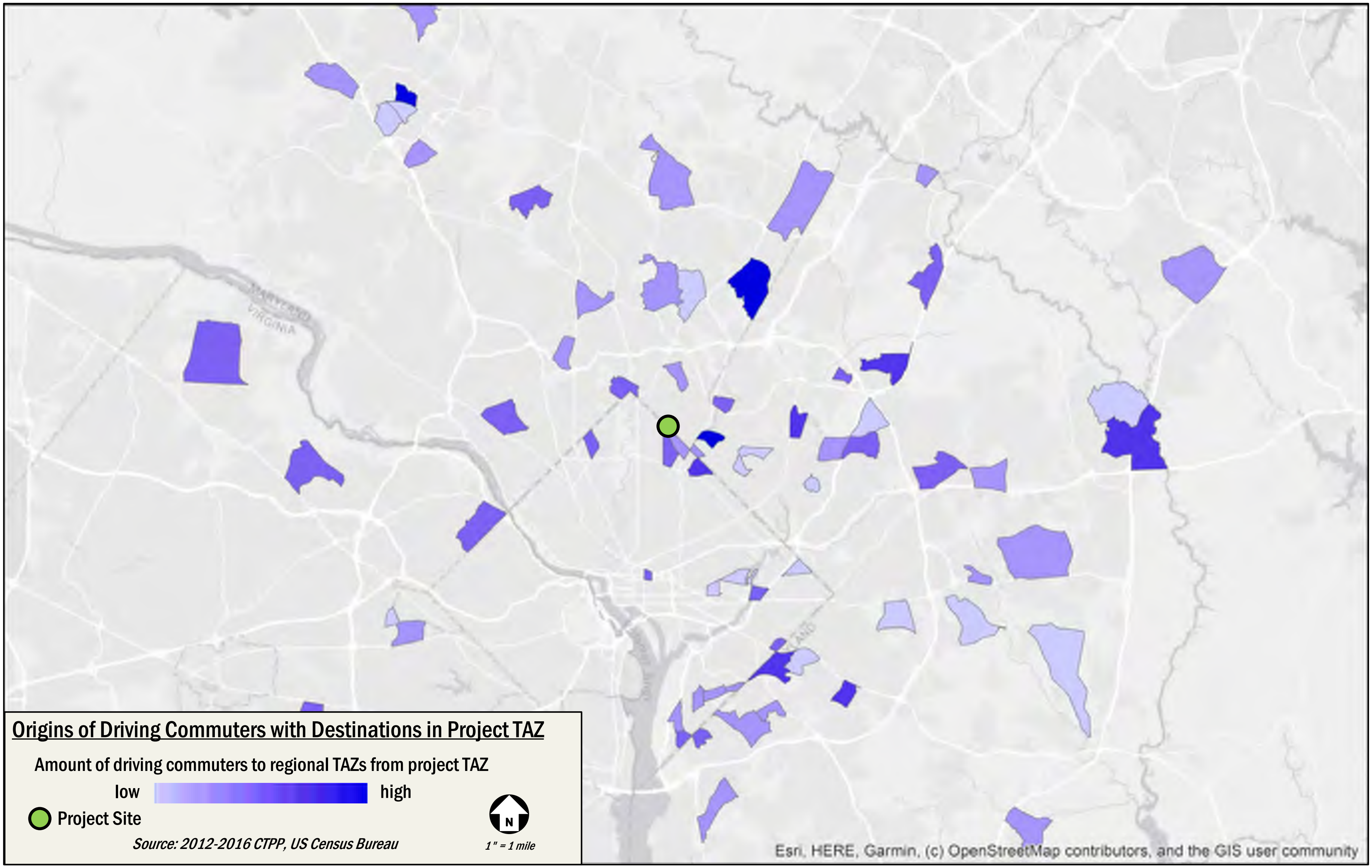
Roadway	Dir.	Proposed Annual Growth Rate Between 2022 and 2026		Proposed Total Growth Between 2022 and 2026	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Carroll St/Cedar St NW	EB	0.10%	0.10%	0.50%	0.50%
	WB	0.10%	0.10%	0.50%	0.50%
Piney Branch Rd NW	NB	0.40%	0.50%	2.02%	2.53%
	SB	0.50%	0.20%	2.53%	1.00%
Eastern Ave/Cedar St NW	NB	0.10%	2.00%	0.50%	10.41%
	SB	2.00%	0.10%	10.41%	0.50%
Blair Rd NW	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.50%	0.10%	2.53%	0.50%
5th St NW	NB	1.30%	0.50%	6.67%	2.53%
	SB	0.50%	0.10%	2.53%	0.50%
4th St NW [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Butternut St NW [1]	EB	0.10%	0.10%	0.50%	0.50%
	WB	0.10%	0.10%	0.50%	0.50%
Maple St NW [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Holly Ave [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%
Cedar Ave [1]	NB	0.10%	0.10%	0.50%	0.50%
	SB	0.10%	0.10%	0.50%	0.50%

[1] AADT and/or MWCOG data is not available for this street; therefore a conservative 0.1% growth rate per year was used.



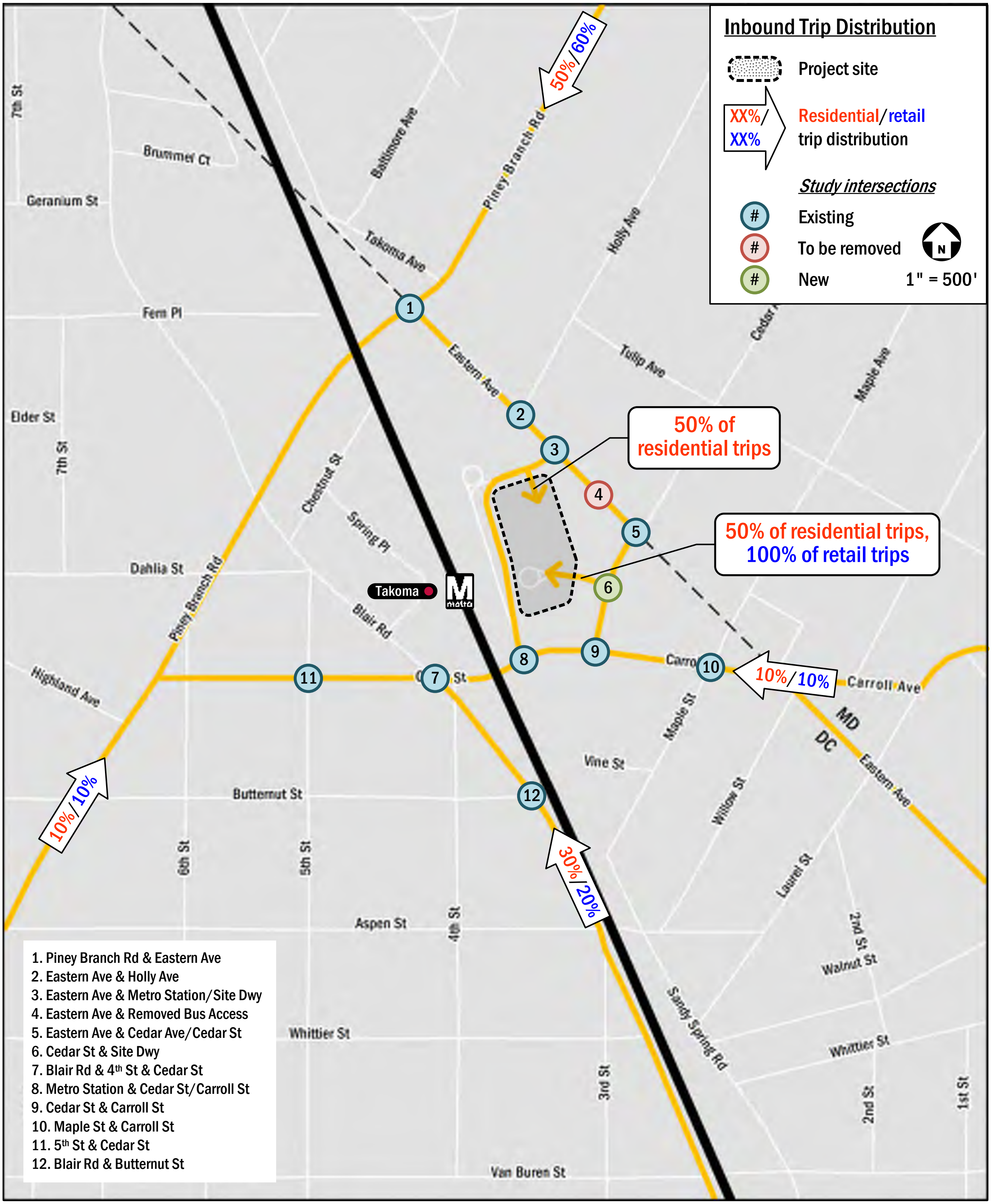
Destinations of Driving Commuters with Origins in Project TAZ

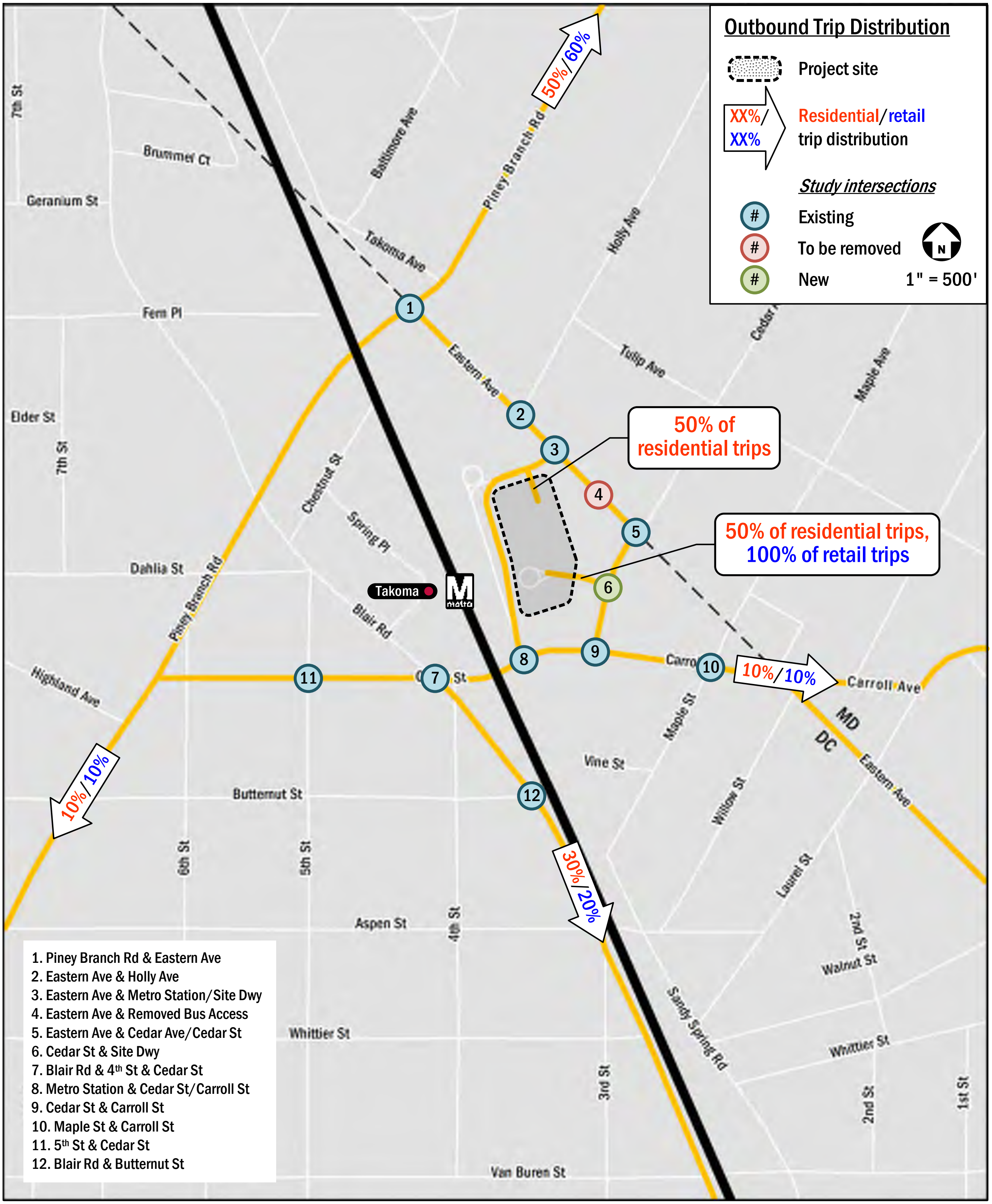
Source: 2012-2016 CTPP, US Census Bureau



Origins of Driving Commuters with Destinations in Project TAZ

Source: 2012-2016 CTPP, US Census Bureau


Inbound Trip Distribution
Project site
XX%/ XX%
Residential/retail trip distribution
Study intersections
Existing
To be removed
New
N
1" = 500'
50%/60%
50% of residential trips
50% of residential trips, 100% of retail trips
10%/10%
10%/10%
30%/20%
Takoma
M metro
MD
DC
7th St
Brummer Ct
Geranium St
Baltimore Ave
Piney Branch Rd
Takoma Ave
Holly Ave
Fern Pl
Eastern Ave
Tulip Ave
Cedar
Maple Ave
Elder St
7th St
Chestnut St
Spring Pl
Dahlia St
Piney Branch Rd
Blair Rd
Highland Ave
Carroll Ave
Carro
Maple St
Vine St
Eastern Ave
Butternut St
6th St
5th St
Willow St
Laurel St
Aspen St
4th St
2nd St
Walnut St
Sandy Spring Rd
Whittier St
Whittier St
3rd St
2nd St
1st St
Van Buren St
1 2 3 4 5 6 7 8 9 10 11 12
1. Piney Branch Rd & Eastern Ave
2. Eastern Ave & Holly Ave
3. Eastern Ave & Metro Station/Site Dwy
4. Eastern Ave & Removed Bus Access
5. Eastern Ave & Cedar Ave/Cedar St
6. Cedar St & Site Dwy
7. Blair Rd & 4th St & Cedar St
8. Metro Station & Cedar St/Carroll St
9. Cedar St & Carroll St
10. Maple St & Carroll St
11. 5th St & Cedar St
12. Blair Rd & Butternut St


Outbound Trip Distribution
Project site
XX%/
XX%
Residential/retail
trip distribution
Study intersections
#
Existing
#
To be removed
#
New
N
1" = 500'
50%/60%
50% of
residential trips
50% of residential trips,
100% of retail trips
10%/10%
10%/10%
30%/20%
1
2
3
4
5
6
7
8
9
10
11
12
7th St
Brummer Ct
Geranium St
Fern Pl
Elder St
7th St
Dahlia St
Highland Ave
Baltimore Ave
Piney Branch Rd
Takoma Ave
Eastern Ave
Holly Ave
Tulip Ave
Cedar
Maple Ave
Chestnut St
Spring Pl
Takoma
Blair Rd
Piney Branch Rd
St
Carro
Carroll Ave
MD
DC
Eastern Ave
Maple St
Vine St
Willow St
Laurel St
Butternut St
6th St
5th St
4th St
Aspen St
2nd St
Walnut St
Whittier St
Whittier St
Sandy Spring Rd
3rd St
2nd St
1st St
Van Buren St
1. Piney Branch Rd & Eastern Ave
2. Eastern Ave & Holly Ave
3. Eastern Ave & Metro Station/Site Dwy
4. Eastern Ave & Removed Bus Access
5. Eastern Ave & Cedar Ave/Cedar St
6. Cedar St & Site Dwy
7. Blair Rd & 4th St & Cedar St
8. Metro Station & Cedar St/Carroll St
9. Cedar St & Carroll St
10. Maple St & Carroll St
11. 5th St & Cedar St
12. Blair Rd & Butternut St

C. Vehicle Level of Service Definitions

A. LEVEL OF SERVICE DEFINITIONS

All capacity analyses are based on the procedures specified by the Transportation Research Board, Special Report 209: Highway Capacity Manual (HCM), 2000. Levels of service (LOS) range from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below.

SIGNALIZED INTERSECTIONS

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- **LOS A** describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.

- **LOS B** describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

- **LOS C** describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.

- **LOS D** describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is generally considered the lower end of the range of the acceptable level of service in urban areas.

- **LOS E** describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions.

- **LOS F** describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

UNSIGNALIZED INTERSECTIONS

At an unsignalized intersection, the major street through traffic and right turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn.

The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicate worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- **LOS A** describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.
- **LOS B** describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.
- **LOS C** describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.
- **LOS D** describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.
- **LOS E** describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- **LOS F** describes operations with average total delay of 50 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

D. Turning Movement Counts

Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:30 AM to 08:30 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection: **1. Piney Branch Road & Eastern Avenue NW**

ALL VEHICLES

Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Piney Branch Road**					**Eastern Avenue NW**					**Piney Branch Road**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	8	131	1	1	0	3	11	1	0	0	4	28	1	4	0	0	5	8	1
06:45 AM to 07:00 AM	0	8	138	0	0	0	3	15	2	0	0	2	35	2	3	0	0	8	9	0
07:00 AM to 07:15 AM	0	5	139	0	0	0	6	14	7	0	0	7	41	2	3	0	1	10	12	0
07:15 AM to 07:30 AM	0	10	143	0	2	0	4	23	11	0	0	4	44	4	1	0	0	17	15	0
07:30 AM to 07:45 AM	0	10	155	0	3	0	5	28	6	0	0	2	32	4	1	0	0	23	24	1
07:45 AM to 08:00 AM	0	5	112	0	5	0	17	32	10	0	0	11	42	0	2	0	1	25	24	0
08:00 AM to 08:15 AM	0	8	108	0	2	0	10	27	8	0	0	10	49	3	8	0	1	31	28	4
08:15 AM to 08:30 AM	0	9	135	0	3	0	11	31	4	0	0	12	55	3	4	0	0	22	35	2
08:30 AM to 08:45 AM	0	14	117	0	3	0	7	17	11	0	0	5	74	4	2	0	0	16	12	1
08:45 AM to 09:00 AM	0	14	122	0	3	0	6	27	12	0	1	10	66	3	2	0	0	16	9	2
09:00 AM to 09:15 AM	0	10	109	0	1	0	4	26	10	0	0	4	67	4	3	0	0	10	15	0
09:15 AM to 09:30 AM	0	8	131	0	2	0	6	17	9	0	0	8	49	5	3	0	0	17	16	0
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	542				13	189				0	223				15	214				7
07:30 AM to 08:30 AM	0	32	510	0		0	43	118	28		0	35	178	10		0	2	101	111	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.92**	n/a	0.80	0.82	n/a	**0.82**	n/a	0.63	0.92	0.70	**0.80**	n/a	0.73	0.81	0.63	**0.80**	n/a	0.50	0.81	0.79	**0.89**

HEAVY VEHICLES (FHWA 4+)

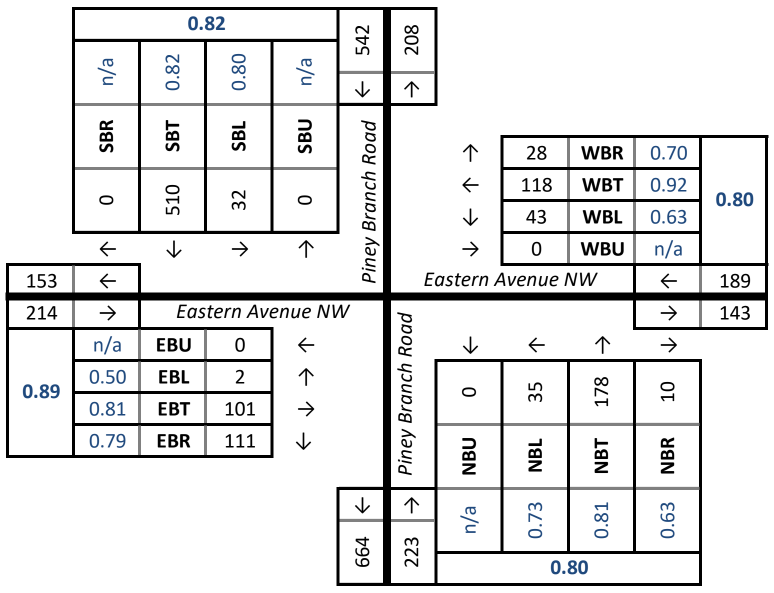
Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Piney Branch Road**					**Eastern Avenue NW**					**Piney Branch Road**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	1	3	0		0	0	1	1		0	0	1	0		0	0	2	0	
06:45 AM to 07:00 AM	0	2	8	0		0	0	0	0		0	0	1	0		0	0	1	0	
07:00 AM to 07:15 AM	0	0	4	0		0	1	1	1		0	0	1	0		0	0	0	0	
07:15 AM to 07:30 AM	0	0	6	0		0	0	1	2		0	0	1	1		0	0	4	0	
07:30 AM to 07:45 AM	0	2	1	0		0	0	0	0		0	0	1	0		0	0	0	0	
07:45 AM to 08:00 AM	0	0	4	0		0	0	2	1		0	0	0	0		0	1	0	0	
08:00 AM to 08:15 AM	0	1	4	0		0	1	1	1		0	0	0	0		0	0	1	1	
08:15 AM to 08:30 AM	0	2	0	0		0	1	0	0		0	1	0	1		0	0	0	0	
08:30 AM to 08:45 AM	0	0	2	0		0	0	2	1		0	0	0	0		0	0	1	1	
08:45 AM to 09:00 AM	0	2	2	0		0	0	2	0		0	0	1	0		0	0	1	0	
09:00 AM to 09:15 AM	0	0	3	0		0	0	1	1		0	0	4	0		0	0	0	0	
09:15 AM to 09:30 AM	0	0	5	0		0	1	0	0		0	1	3	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	14					7					3					3				
07:30 AM to 08:30 AM	0	5	9	0		0	2	3	2		0	1	1	1		0	1	1	1	
Heavy Vehicle % (PHV):	0.0%	15.6%	1.8%	0.0%	**2.6%**	0.0%	4.7%	2.5%	7.1%	**3.7%**	0.0%	2.9%	0.6%	10.0%	**1.3%**	0.0%	50.0%	1.0%	0.9%	**1.4%**
INT. PEAK HR (HV ONLY)	24					8					5					7				
06:30 AM to 07:30 AM	0	3	21	0		0	1	3	4		0	0	4	1		0	0	7	0	
Heavy Vehicle % (PHV):	0.0%	9.7%	3.8%	0.0%	**4.1%**	0.0%	6.3%	4.8%	19.0%	**8.0%**	0.0%	0.0%	2.7%	11.1%	**2.9%**	0.0%	0.0%	17.5%	0.0%	**8.2%**

BICYCLES

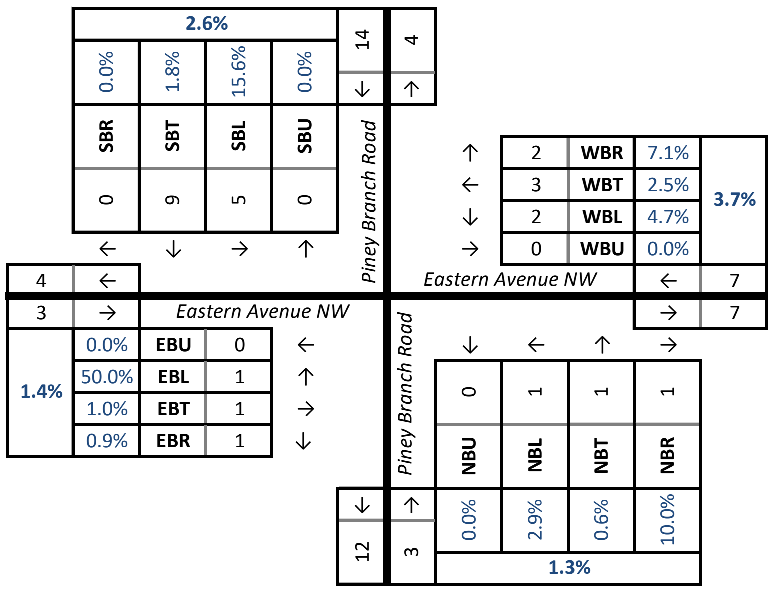
Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Piney Branch Road**					**Eastern Avenue NW**					**Piney Branch Road**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	2	
07:00 AM to 07:15 AM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	1	1	
07:15 AM to 07:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	3	
07:30 AM to 07:45 AM	0	0	1	0		0	0	1	0		0	0	0	0		0	0	0	4	
07:45 AM to 08:00 AM	0	0	2	0		0	1	3	0		0	0	0	1		0	0	2	0	
08:00 AM to 08:15 AM	0	0	1	0		0	0	1	0		0	0	0	0		0	0	0	1	
08:15 AM to 08:30 AM	0	0	0	0		0	0	1	0		0	1	0	0		0	0	1	0	
08:30 AM to 08:45 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
08:45 AM to 09:00 AM	0	0	0	0		0	1	0	0		0	0	0	2		0	0	1	0	
09:00 AM to 09:15 AM	0	0	1	0		0	0	2	0		0	0	0	0		0	0	0	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	4					7					2					8				
07:30 AM to 08:30 AM	0	0	4	0		0	1	6	0		0	1	0	1		0	0	3	5	
INT. PEAK HR (BIKES)	3					5					2					11				
07:00 AM to 08:00 AM	0	0	3	0		0	1	4	0		0	1	0	1		0	0	3	8	

DATA COLLECTION NOTES :

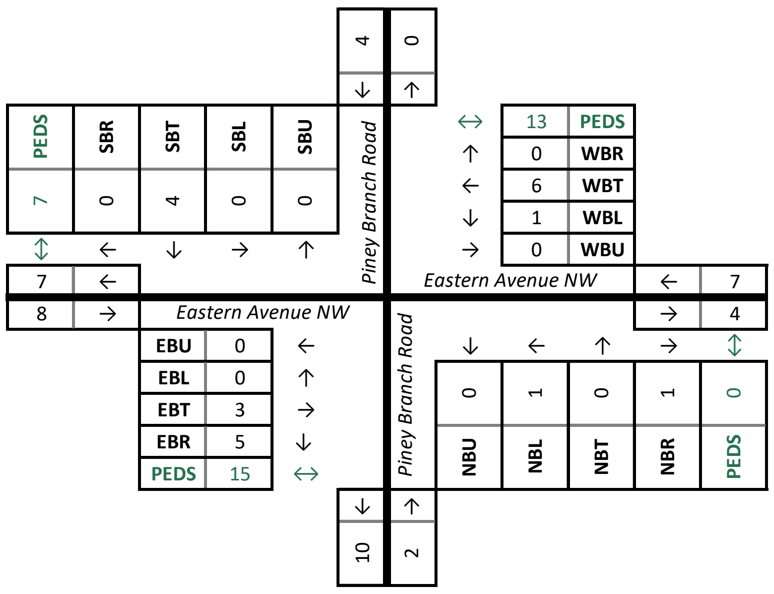
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:45 AM to 08:45 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection: 1. Holly Avenue/Apartments Entrance & Eastern Avenue NW

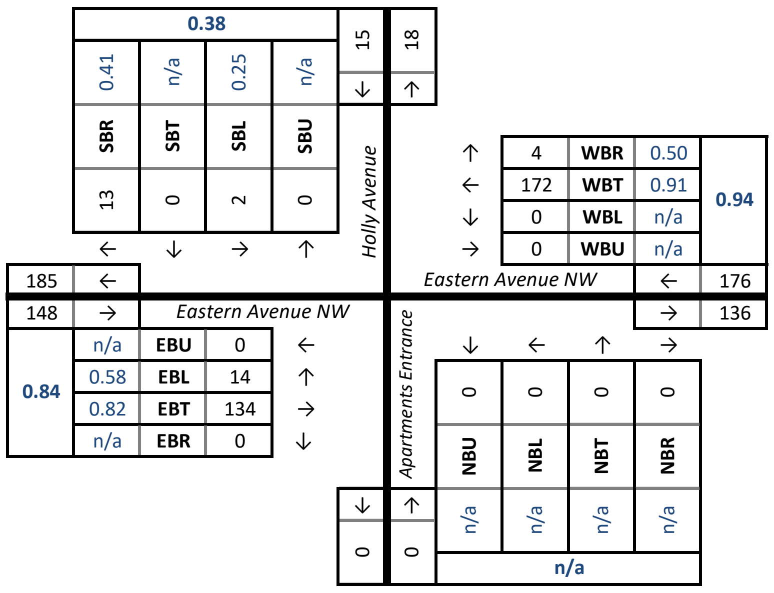
ALL VEHICLES	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Holly Avenue**					**Eastern Avenue NW**					**Apartments Entrance**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	0	0	1	1	0	0	12	0	0	0	0	0	1	3	0	0	11	0	0
06:45 AM to 07:00 AM	0	0	0	1	0	0	0	17	1	0	0	0	0	0	2	0	1	19	0	0
07:00 AM to 07:15 AM	0	0	0	1	1	0	0	29	1	2	0	0	0	1	2	0	0	17	0	0
07:15 AM to 07:30 AM	0	1	0	2	2	0	0	30	1	3	0	0	0	0	2	0	0	32	0	3
07:30 AM to 07:45 AM	0	0	0	2	2	0	0	41	1	4	0	0	0	0	2	0	5	24	0	0
07:45 AM to 08:00 AM	0	2	0	8	0	0	0	47	0	2	0	0	0	0	3	0	0	37	0	0
08:00 AM to 08:15 AM	0	0	0	1	2	0	0	44	1	1	0	0	0	0	11	0	6	32	0	0
08:15 AM to 08:30 AM	0	0	0	2	0	0	0	40	2	2	0	0	0	0	4	0	3	41	0	0
08:30 AM to 08:45 AM	0	0	0	7	1	0	0	34	1	3	0	0	0	0	4	0	2	31	0	0
08:45 AM to 09:00 AM	0	1	0	6	2	0	0	37	1	2	0	1	0	0	3	0	6	25	0	0
09:00 AM to 09:15 AM	0	1	0	1	1	0	0	32	1	0	0	0	0	0	6	0	6	15	0	0
09:15 AM to 09:30 AM	0	0	0	4	0	0	0	22	1	4	0	0	0	0	6	1	1	28	0	1
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	15				4	176				9	0				20	148				0
07:30 AM to 08:30 AM	0	2	0	13		0	0	172	4		0	0	0	0		0	14	134	0	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.90**	n/a	0.25	n/a	0.41	**0.38**	n/a	n/a	0.91	0.50	**0.94**	n/a	n/a	n/a	n/a	**n/a**	n/a	0.58	0.82	n/a	**0.84**

HEAVY VEHICLES (FHWA 4+)	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Holly Avenue**					**Eastern Avenue NW**					**Apartments Entrance**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	4	0	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	4	0		0	0	0	0		0	0	1	0	
07:15 AM to 07:30 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	5	0	
07:30 AM to 07:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
08:00 AM to 08:15 AM	0	0	0	0		0	0	4	0		0	0	0	0		0	1	1	0	
08:15 AM to 08:30 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
08:30 AM to 08:45 AM	0	0	0	1		0	0	2	0		0	0	0	0		0	0	1	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	2	0	
09:00 AM to 09:15 AM	0	0	0	0		0	0	2	1		0	0	0	0		0	0	1	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0					8					0					6				
07:30 AM to 08:30 AM	0	0	0	0		0	0	8	0		0	0	0	0		0	1	5	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	4.7%	0.0%	**4.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	7.1%	3.7%	0.0%	**4.1%**
INT. PEAK HR (HV ONLY)	0					8					0					12				
06:30 AM to 07:30 AM	0	0	0	0		0	0	8	0		0	0	0	0		0	0	12	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	9.1%	0.0%	**8.8%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	15.2%	0.0%	**15.0%**

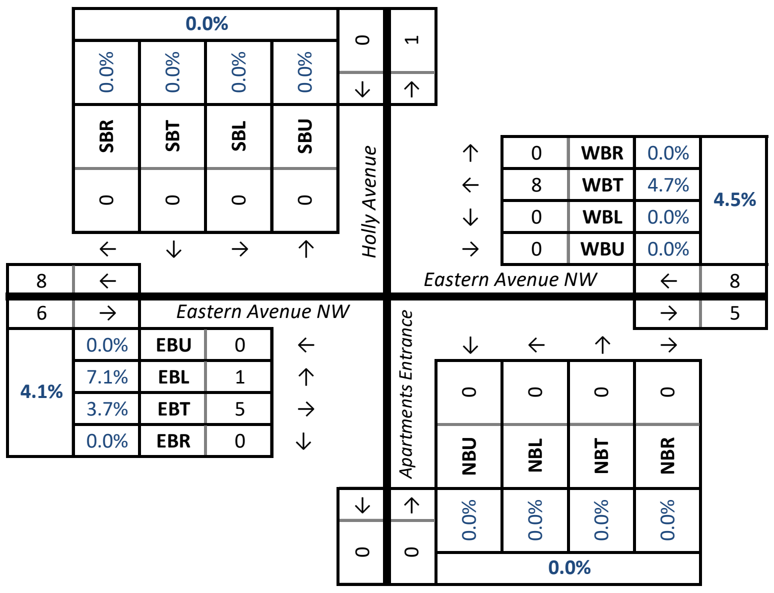
BICYCLES	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Holly Avenue**					**Eastern Avenue NW**					**Apartments Entrance**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
07:15 AM to 07:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:30 AM to 07:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
08:00 AM to 08:15 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
08:15 AM to 08:30 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	0	0	
08:30 AM to 08:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	2	1	0	
09:00 AM to 09:15 AM	0	0	0	1		0	0	0	0		0	0	0	0		0	0	1	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0					2					0					1				
07:30 AM to 08:30 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	1	0	
INT. PEAK HR (BIKES)	1					3					0					4				
08:15 AM to 09:15 AM	0	0	0	1		0	0	3	0		0	0	0	0		0	2	2	0	

DATA COLLECTION NOTES :

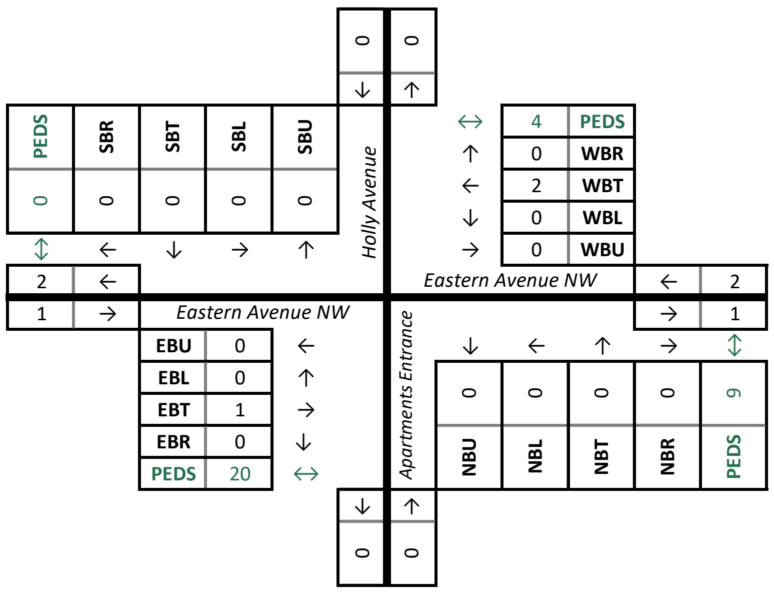
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:45 AM to 08:45 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection: **1. /Metro Station/Site Driveway & Eastern Avenue NW**

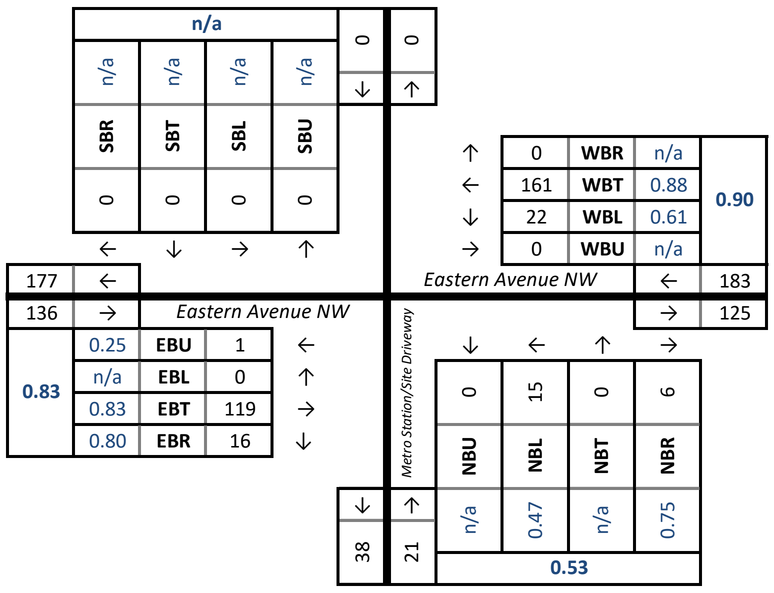
ALL VEHICLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Metro Station/Site Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	0	0	0	0	0	5	12	0	0	0	0	0	0	1	0	0	10	2	0
06:45 AM to 07:00 AM	0	0	0	0	0	0	9	17	0	0	0	1	0	1	1	0	0	14	5	0
07:00 AM to 07:15 AM	0	0	0	0	0	0	4	24	0	0	0	6	0	2	1	0	0	14	4	1
07:15 AM to 07:30 AM	0	0	0	0	0	0	8	26	0	0	0	5	0	1	3	0	0	24	9	1
07:30 AM to 07:45 AM	0	0	0	0	0	0	2	41	0	0	0	1	0	2	3	0	0	22	2	0
07:45 AM to 08:00 AM	0	0	0	0	0	0	5	46	0	0	0	1	0	1	1	0	0	34	5	0
08:00 AM to 08:15 AM	0	0	0	0	0	0	9	37	0	0	0	8	0	2	1	0	0	27	5	1
08:15 AM to 08:30 AM	0	0	0	0	0	0	6	37	0	0	0	5	0	1	5	1	0	36	4	0
08:30 AM to 08:45 AM	0	0	0	0	0	0	4	26	0	0	0	9	0	2	6	0	0	22	9	0
08:45 AM to 09:00 AM	0	0	0	0	0	0	3	34	0	0	0	4	0	2	1	0	0	23	3	0
09:00 AM to 09:15 AM	0	0	0	0	0	0	4	32	0	1	0	1	0	2	3	0	0	14	2	0
09:15 AM to 09:30 AM	0	0	0	0	0	0	5	20	0	0	0	3	0	3	3	0	0	25	3	0
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0				0	183				0	21				10	136				1
07:30 AM to 08:30 AM	0	0	0	0		0	22	161	0		0	15	0	6		1	0	119	16	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.92**	n/a	n/a	n/a	n/a	**n/a**	n/a	0.61	0.88	n/a	**0.90**	n/a	0.47	n/a	0.75	**0.53**	0.25	n/a	0.83	0.80	**0.83**

HEAVY VEHICLES (FHWA 4+) ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Metro Station/Site Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	4	0	
06:45 AM to 07:00 AM	0	0	0	0		0	1	0	0		0	0	0	0		0	0	2	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	2	0		0	2	0	0		0	0	1	0	
07:15 AM to 07:30 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	5	0	
07:30 AM to 07:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
08:00 AM to 08:15 AM	0	0	0	0		0	0	4	0		0	0	0	0		0	0	1	0	
08:15 AM to 08:30 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
08:30 AM to 08:45 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	1	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	2	0	
09:00 AM to 09:15 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	1	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0					8					0					5				
07:30 AM to 08:30 AM	0	0	0	0		0	0	8	0		0	0	0	0		0	0	5	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	5.0%	0.0%	**4.4%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	4.2%	0.0%	**3.7%**
INT. PEAK HR (HV ONLY)	0					7					2					12				
06:30 AM to 07:30 AM	0	0	0	0		0	1	6	0		0	2	0	0		0	0	12	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	3.8%	7.6%	0.0%	**6.7%**	0.0%	16.7%	0.0%	0.0%	**12.5%**	0.0%	0.0%	19.4%	0.0%	**14.6%**

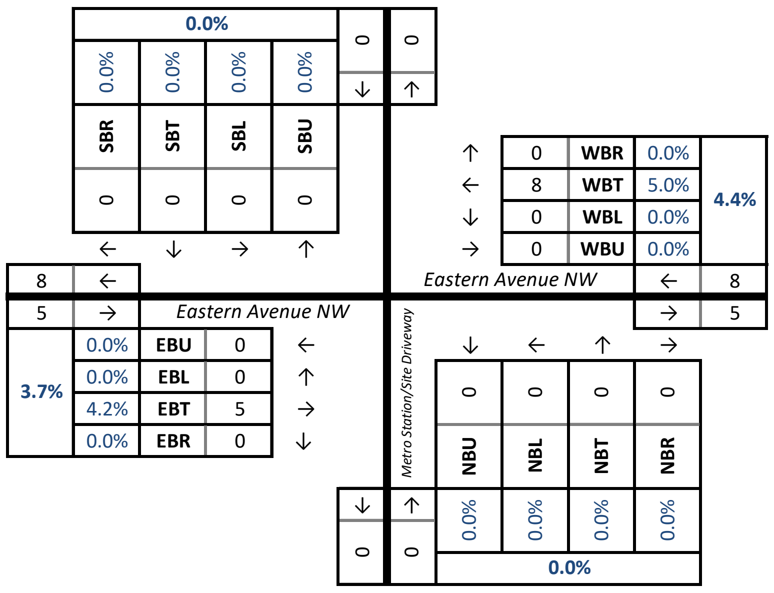
BICYCLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Metro Station/Site Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	1	
07:15 AM to 07:30 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	1	
07:30 AM to 07:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	2	0	
08:00 AM to 08:15 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	0	0	
08:15 AM to 08:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	3	0	
08:30 AM to 08:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	3	0	
09:00 AM to 09:15 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0					5					0					5				
07:30 AM to 08:30 AM	0	0	0	0		0	0	5	0		0	0	0	0		0	0	5	0	
INT. PEAK HR (BIKES)	0					5					0					5				
07:30 AM to 08:30 AM	0	0	0	0		0	0	5	0		0	0	0	0		0	0	5	0	

DATA COLLECTION NOTES :

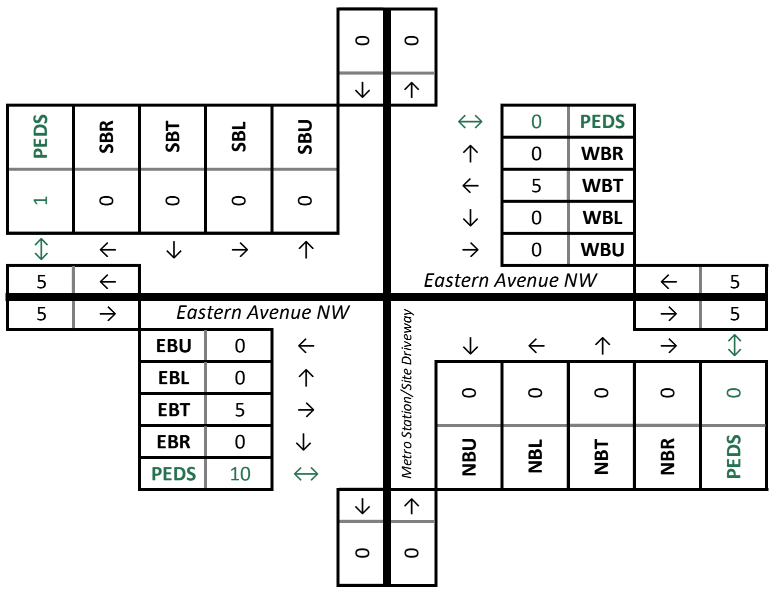
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:30 AM to 08:30 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

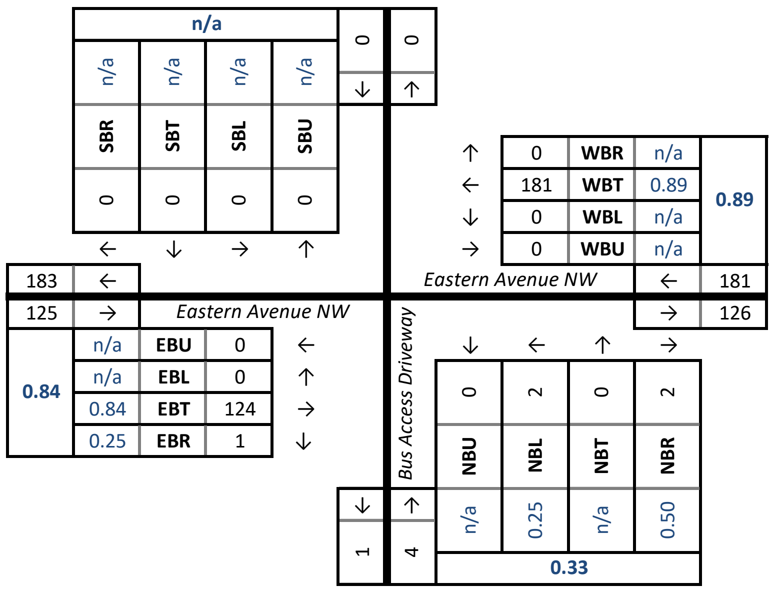
Intersection:	**1. /Bus Access Driveway & Eastern Avenue NW**																			
ALL VEHICLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Bus Access Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	0	0	0	0	0	0	15	0	1	0	2	0	1	3	0	0	8	2	0
06:45 AM to 07:00 AM	0	0	0	0	0	0	0	26	0	0	0	0	0	1	1	0	0	15	0	0
07:00 AM to 07:15 AM	0	0	0	0	0	0	0	28	0	0	0	0	0	2	2	0	0	16	0	0
07:15 AM to 07:30 AM	0	0	0	0	0	0	0	32	0	0	0	2	0	0	1	0	0	24	1	0
07:30 AM to 07:45 AM	0	0	0	0	0	0	0	43	0	0	0	0	0	1	2	0	0	24	0	0
07:45 AM to 08:00 AM	0	0	0	0	0	0	0	51	0	0	0	0	0	0	1	0	0	35	0	0
08:00 AM to 08:15 AM	0	0	0	0	0	0	0	44	0	0	0	2	0	1	1	0	0	28	1	1
08:15 AM to 08:30 AM	0	0	0	0	0	0	0	43	0	0	0	0	0	0	3	0	0	37	0	0
08:30 AM to 08:45 AM	0	0	0	0	0	0	0	28	0	0	0	2	0	0	4	0	0	24	0	0
08:45 AM to 09:00 AM	0	0	0	0	0	0	0	35	0	0	0	2	0	2	1	0	0	24	1	1
09:00 AM to 09:15 AM	0	0	0	0	0	0	0	34	0	0	0	2	0	0	4	0	0	15	1	0
09:15 AM to 09:30 AM	0	0	0	0	0	0	0	24	0	0	0	1	0	1	1	1	0	26	1	0
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0				0	181				0	4				7	125				1
07:30 AM to 08:30 AM	0	0	0	0		0	0	181	0		0	2	0	2		0	0	124	1	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.90**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	0.89	n/a	**0.89**	n/a	0.25	n/a	0.50	**0.33**	n/a	n/a	0.84	0.25	**0.84**

HEAVY VEHICLES (FHWA 4+) ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Bus Access Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	0	0		0	2	0	1		0	0	2	2	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	1		0	0	2	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	2	0		0	0	0	2		0	0	1	0	
07:15 AM to 07:30 AM	0	0	0	0		0	0	1	0		0	2	0	0		0	0	4	1	
07:30 AM to 07:45 AM	0	0	0	0		0	0	0	0		0	0	0	1		0	0	2	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
08:00 AM to 08:15 AM	0	0	0	0		0	0	2	0		0	2	0	1		0	0	0	1	
08:15 AM to 08:30 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
08:30 AM to 08:45 AM	0	0	0	0		0	0	1	0		0	1	0	0		0	0	1	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	1	0		0	2	0	2		0	0	1	1	
09:00 AM to 09:15 AM	0	0	0	0		0	0	2	0		0	1	0	0		0	0	1	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	2	0		0	0	0	1		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0					6					4					5				
07:30 AM to 08:30 AM	0	0	0	0		0	0	6	0		0	2	0	2		0	0	4	1	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	3.3%	0.0%	**3.3%**	0.0%	100.0%	0.0%	100.0%	**100.0%**	0.0%	0.0%	3.2%	100.0%	**4.0%**
INT. PEAK HR (HV ONLY)	0					3					8					12				
06:30 AM to 07:30 AM	0	0	0	0		0	0	3	0		0	4	0	4		0	0	9	3	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	3.0%	0.0%	**3.0%**	0.0%	100.0%	0.0%	100.0%	**100.0%**	0.0%	0.0%	14.3%	100.0%	**18.2%**

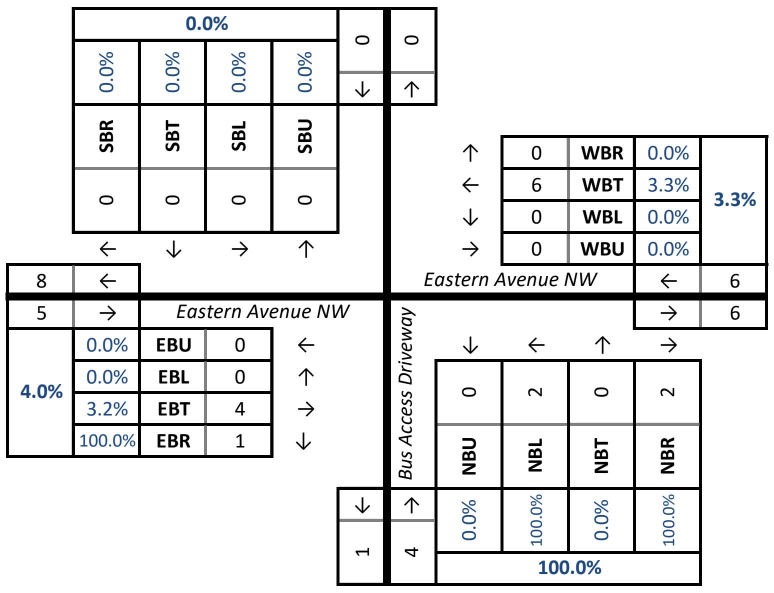
BICYCLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Bus Access Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	1	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:00 AM to 07:15 AM	0	0	0	0		0	1	0	0		0	0	0	0		0	0	1	0	
07:15 AM to 07:30 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
07:30 AM to 07:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
08:00 AM to 08:15 AM	0	0	0	0		0	1	1	0		0	2	0	0		0	0	0	0	
08:15 AM to 08:30 AM	0	0	0	0		0	1	1	0		0	0	0	0		0	0	2	0	
08:30 AM to 08:45 AM	0	0	0	0		0	1	0	0		0	0	0	0		0	0	0	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	1	
09:00 AM to 09:15 AM	0	0	0	0		0	1	0	0		0	0	0	0		0	0	0	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	0					5					2					4				
07:30 AM to 08:30 AM	0	0	0	0		0	2	3	0		0	2	0	0		0	0	4	0	
INT. PEAK HR (BIKES)	0					6					2					4				
07:45 AM to 08:45 AM	0	0	0	0		0	3	3	0		0	2	0	0		0	0	4	0	

DATA COLLECTION NOTES :

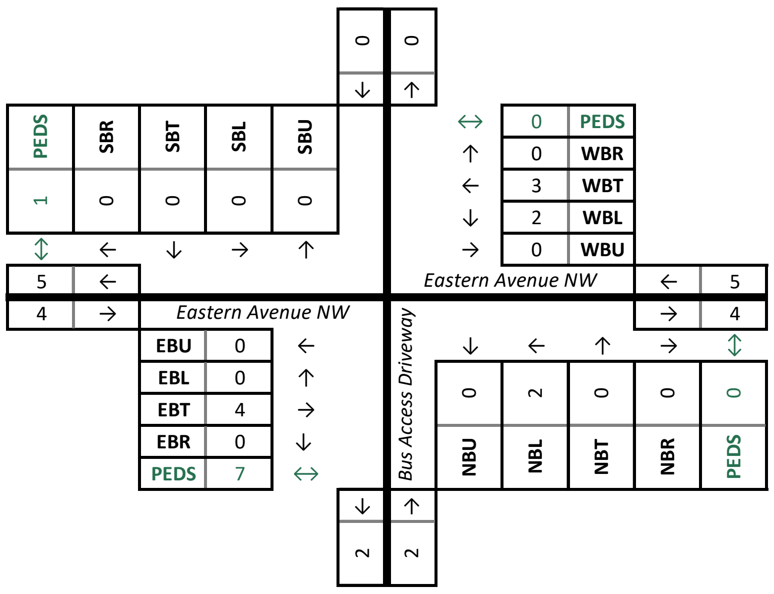
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:30 AM to 08:30 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection: 1. Cedar Avenue & /Eastern Avenue NW

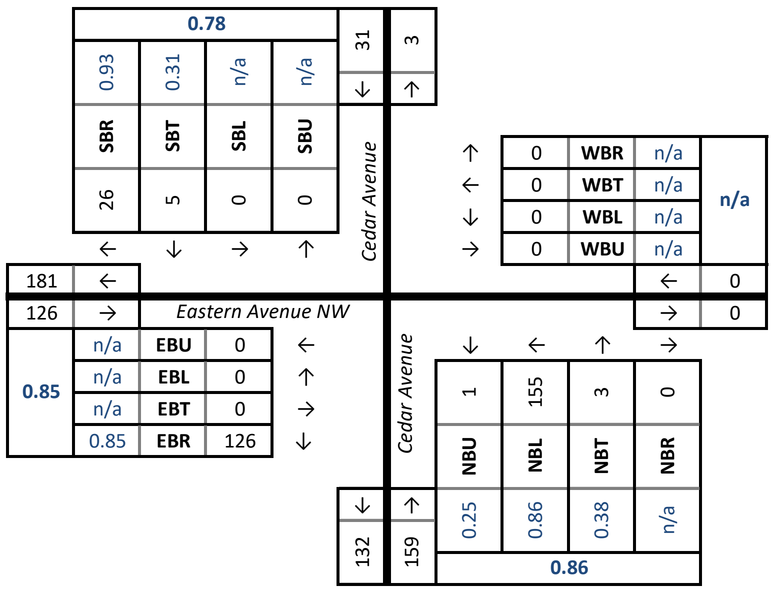
ALL VEHICLES *Direction:*	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Avenue**										**Cedar Avenue**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	0	2	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	9	2
06:45 AM to 07:00 AM	0	0	1	4	2	0	0	0	0	0	0	22	2	0	0	0	0	0	16	4
07:00 AM to 07:15 AM	0	0	0	3	0	0	0	0	0	0	0	25	0	0	0	0	0	0	18	3
07:15 AM to 07:30 AM	0	0	1	1	5	0	0	0	0	0	0	31	0	0	0	0	0	0	24	8
07:30 AM to 07:45 AM	0	0	4	6	1	0	0	0	0	0	0	37	1	0	0	0	0	0	25	5
07:45 AM to 08:00 AM	0	0	1	6	2	0	0	0	0	0	1	45	0	0	0	0	0	0	35	7
08:00 AM to 08:15 AM	0	0	0	7	4	0	0	0	0	0	0	37	0	0	0	0	0	0	29	6
08:15 AM to 08:30 AM	0	0	0	7	1	0	0	0	0	0	0	36	2	0	0	0	0	0	37	7
08:30 AM to 08:45 AM	0	0	2	6	3	0	0	0	0	0	0	22	3	0	0	0	0	0	24	8
08:45 AM to 09:00 AM	0	0	2	4	1	0	0	0	0	0	0	31	2	0	0	0	0	0	26	2
09:00 AM to 09:15 AM	0	0	2	4	1	0	0	0	0	0	0	30	1	0	0	0	0	0	15	4
09:15 AM to 09:30 AM	0	0	1	4	5	0	0	0	0	0	1	20	0	0	0	0	0	0	27	9
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	31				8	0				0	159				0	126				25
07:30 AM to 08:30 AM	0	0	5	26		0	0	0	0		1	155	3	0		0	0	0	126	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.90**	n/a	n/a	0.31	0.93	**0.78**	n/a	n/a	n/a	n/a	**n/a**	0.25	0.86	0.38	n/a	**0.86**	n/a	n/a	n/a	0.85	**0.85**

HEAVY VEHICLES (FHWA 4+) *Direction:*	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Avenue**										**Cedar Avenue**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	3	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	3	
07:00 AM to 07:15 AM	0	0	0	0		0	0	0	0		0	2	0	0		0	0	0	3	
07:15 AM to 07:30 AM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	4	
07:30 AM to 07:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	3	
07:45 AM to 08:00 AM	0	0	0	0		0	0	0	0		0	3	0	0		0	0	0	0	
08:00 AM to 08:15 AM	0	0	0	0		0	0	0	0		0	2	0	0		0	0	0	1	
08:15 AM to 08:30 AM	0	0	0	1		0	0	0	0		0	0	0	0		0	0	0	2	
08:30 AM to 08:45 AM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	1	
08:45 AM to 09:00 AM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	3	
09:00 AM to 09:15 AM	0	0	0	2		0	0	0	0		0	0	0	0		0	0	0	1	
09:15 AM to 09:30 AM	0	0	0	2		0	0	0	0		0	0	0	0		0	0	0	1	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	1					0					5					6				
07:30 AM to 08:30 AM	0	0	0	1		0	0	0	0		0	5	0	0		0	0	0	6	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	3.8%	**3.2%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	3.2%	0.0%	0.0%	**3.1%**	0.0%	0.0%	0.0%	4.8%	**4.8%**
INT. PEAK HR (HV ONLY)	0					0					3					13				
06:30 AM to 07:30 AM	0	0	0	0		0	0	0	0		0	3	0	0		0	0	0	13	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	3.2%	0.0%	0.0%	**3.2%**	0.0%	0.0%	0.0%	19.4%	**19.4%**

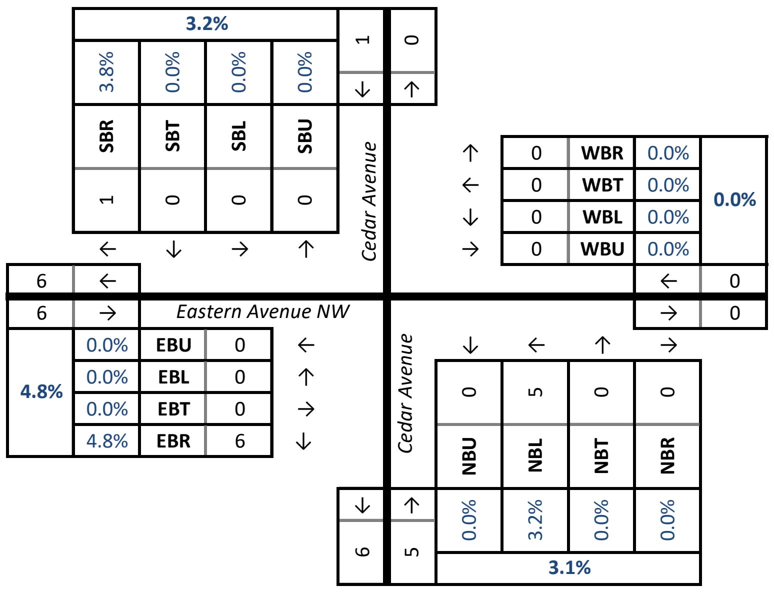
BICYCLES *Direction:*	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Avenue**										**Cedar Avenue**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	1	0		0	0	0	0		0	0	0	0		0	0	0	1	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:00 AM to 07:15 AM	0	0	0	1		0	0	0	0		0	1	0	0		0	0	0	2	
07:15 AM to 07:30 AM	0	0	1	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:30 AM to 07:45 AM	0	0	3	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	0	0		0	1	1	0		0	0	0	1	
08:00 AM to 08:15 AM	0	0	1	1		0	0	0	0		0	1	0	0		0	0	0	0	
08:15 AM to 08:30 AM	0	0	0	1		0	0	0	0		0	0	0	0		0	0	0	1	
08:30 AM to 08:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
08:45 AM to 09:00 AM	0	0	1	0		0	0	0	0		0	0	1	0		0	0	0	0	
09:00 AM to 09:15 AM	0	0	2	0		0	0	0	0		0	1	0	0		0	1	0	0	
09:15 AM to 09:30 AM	0	0	2	0		0	0	0	0		0	0	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	6					0					3					2				
07:30 AM to 08:30 AM	0	0	4	2		0	0	0	0		0	2	1	0		0	0	0	2	
INT. PEAK HR (BIKES)	5					0					3					3				
07:00 AM to 08:00 AM	0	0	4	1		0	0	0	0		0	2	1	0		0	0	0	3	

DATA COLLECTION NOTES :

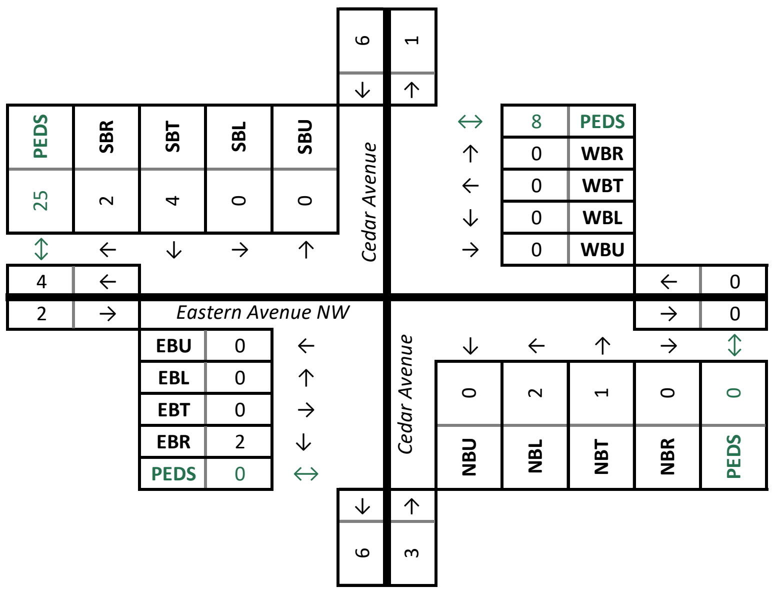
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:30 AM to 08:30 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection: 1. **Blair Road NW & Cedar Street NW**

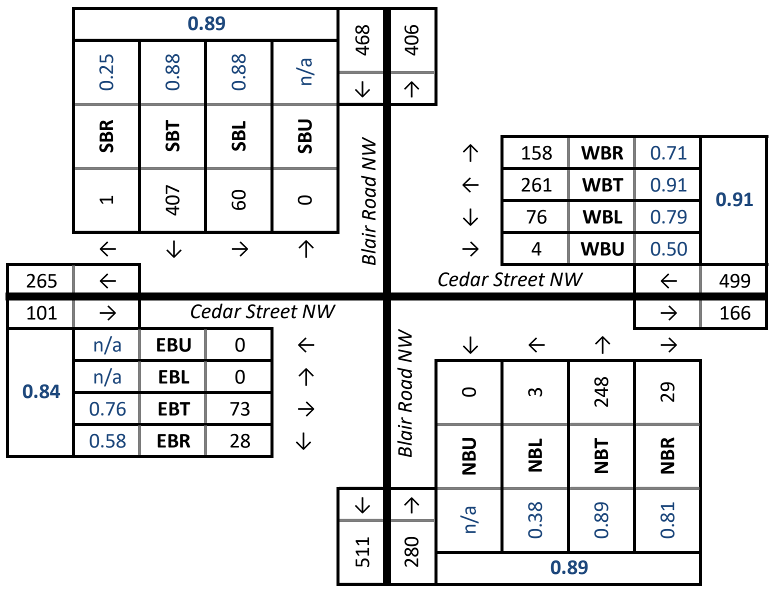
ALL VEHICLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Blair Road NW**					**Cedar Street NW**					**Blair Road NW**					**Cedar Street NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	12	65	0	3	0	6	20	27	3	0	0	37	8	2	0	0	8	5	1
06:45 AM to 07:00 AM	0	11	57	0	7	2	11	30	24	6	0	0	42	2	5	0	0	7	2	2
07:00 AM to 07:15 AM	0	19	73	0	11	0	12	27	37	7	0	0	50	5	2	0	1	12	3	0
07:15 AM to 07:30 AM	0	15	85	0	14	0	14	34	33	3	0	0	54	7	1	0	0	9	9	4
07:30 AM to 07:45 AM	0	12	108	0	30	1	17	63	56	12	0	2	70	7	3	0	0	24	6	3
07:45 AM to 08:00 AM	0	16	84	0	23	2	15	64	44	15	0	0	53	7	5	0	0	14	12	3
08:00 AM to 08:15 AM	0	17	100	0	15	0	20	62	32	34	0	1	58	9	6	0	0	15	4	3
08:15 AM to 08:30 AM	0	15	115	1	35	1	24	72	26	16	0	0	67	6	1	0	0	20	6	6
08:30 AM to 08:45 AM	0	27	77	1	28	2	26	52	40	33	0	0	55	11	0	0	0	23	10	3
08:45 AM to 09:00 AM	0	18	78	0	22	1	12	31	48	30	0	1	59	5	3	0	0	21	5	4
09:00 AM to 09:15 AM	0	13	70	0	19	2	8	21	27	35	0	1	61	7	1	0	0	14	6	7
09:15 AM to 09:30 AM	0	18	81	0	18	1	15	35	35	20	0	1	50	6	2	0	0	21	11	2
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	468				103	499				77	280				15	101				15
07:30 AM to 08:30 AM	0	60	407	1		4	76	261	158		0	3	248	29		0	0	73	28	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.92**	n/a	0.88	0.88	0.25	**0.89**	0.50	0.79	0.91	0.71	**0.91**	n/a	0.38	0.89	0.81	**0.89**	n/a	n/a	0.76	0.58	**0.84**

HEAVY VEHICLES (FHWA 4+) ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Blair Road NW**					**Cedar Street NW**					**Blair Road NW**					**Cedar Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	1	0		0	4	0	1		0	0	4	3		0	0	0	1	
06:45 AM to 07:00 AM	0	0	1	0		0	3	1	0		0	0	4	1		0	0	0	0	
07:00 AM to 07:15 AM	0	1	2	0		0	4	1	2		0	0	2	2		0	0	0	0	
07:15 AM to 07:30 AM	0	0	1	0		0	5	3	1		0	0	1	3		0	0	0	0	
07:30 AM to 07:45 AM	0	0	1	0		0	5	1	2		0	0	3	3		0	0	0	0	
07:45 AM to 08:00 AM	0	1	0	0		0	2	1	2		0	0	0	2		0	0	0	0	
08:00 AM to 08:15 AM	0	0	1	0		0	4	1	2		0	0	3	5		0	0	0	0	
08:15 AM to 08:30 AM	0	1	2	0		0	3	0	2		0	0	1	2		0	0	2	0	
08:30 AM to 08:45 AM	0	0	0	0		0	5	1	1		0	0	0	5		0	0	0	0	
08:45 AM to 09:00 AM	0	0	2	0		0	2	2	1		0	0	2	2		0	0	0	0	
09:00 AM to 09:15 AM	0	1	2	0		0	3	0	1		0	0	1	4		0	0	1	0	
09:15 AM to 09:30 AM	0	0	2	0		0	2	0	1		0	0	0	3		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	6					25					19					2				
07:30 AM to 08:30 AM	0	2	4	0		0	14	3	8		0	0	7	12		0	0	2	0	
Heavy Vehicle % (PHV):	0.0%	3.3%	1.0%	0.0%	**1.3%**	0.0%	18.4%	1.1%	5.1%	**5.0%**	0.0%	0.0%	2.8%	41.4%	**6.8%**	0.0%	0.0%	2.7%	0.0%	**2.0%**
INT. PEAK HR (HV ONLY)	6					28					19					0				
06:45 AM to 07:45 AM	0	1	5	0		0	17	6	5		0	0	10	9		0	0	0	0	
Heavy Vehicle % (PHV):	0.0%	1.8%	1.5%	0.0%	**1.6%**	0.0%	31.5%	3.9%	3.3%	**7.8%**	0.0%	0.0%	4.6%	42.9%	**7.9%**	0.0%	0.0%	0.0%	0.0%	**0.0%**

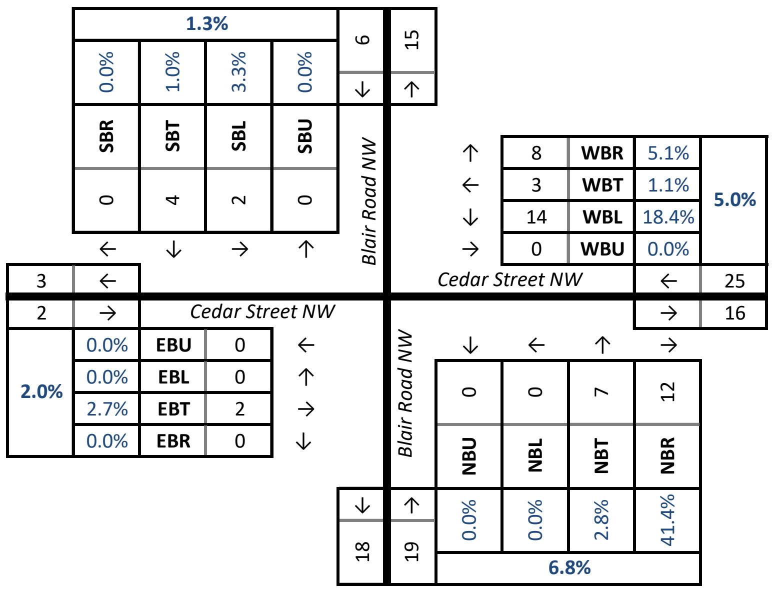
BICYCLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Blair Road NW**					**Cedar Street NW**					**Blair Road NW**					**Cedar Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	1	0	0		0	0	0	1		0	0	1	0	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:15 AM to 07:30 AM	0	0	1	0		0	1	2	0		0	0	0	0		0	0	1	0	
07:30 AM to 07:45 AM	0	0	1	0		0	0	1	0		0	0	0	1		0	0	0	0	
07:45 AM to 08:00 AM	0	0	1	0		0	1	1	0		0	0	0	0		0	0	1	0	
08:00 AM to 08:15 AM	0	0	1	1		0	1	1	0		0	0	0	0		0	0	0	0	
08:15 AM to 08:30 AM	0	0	1	0		0	1	2	1		0	0	0	1		0	0	2	0	
08:30 AM to 08:45 AM	0	0	0	0		0	0	0	0		0	0	0	1		0	0	1	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	0	0		0	0	0	2		0	0	1	1	
09:00 AM to 09:15 AM	0	0	0	0		0	1	0	0		0	0	0	0		0	0	1	0	
09:15 AM to 09:30 AM	0	0	0	0		0	0	1	1		0	0	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	5					9					2					3				
07:30 AM to 08:30 AM	0	0	4	1		0	3	5	1		0	0	0	2		0	0	3	0	
INT. PEAK HR (BIKES)	5					9					2					3				
07:30 AM to 08:30 AM	0	0	4	1		0	3	5	1		0	0	0	2		0	0	3	0	

DATA COLLECTION NOTES :

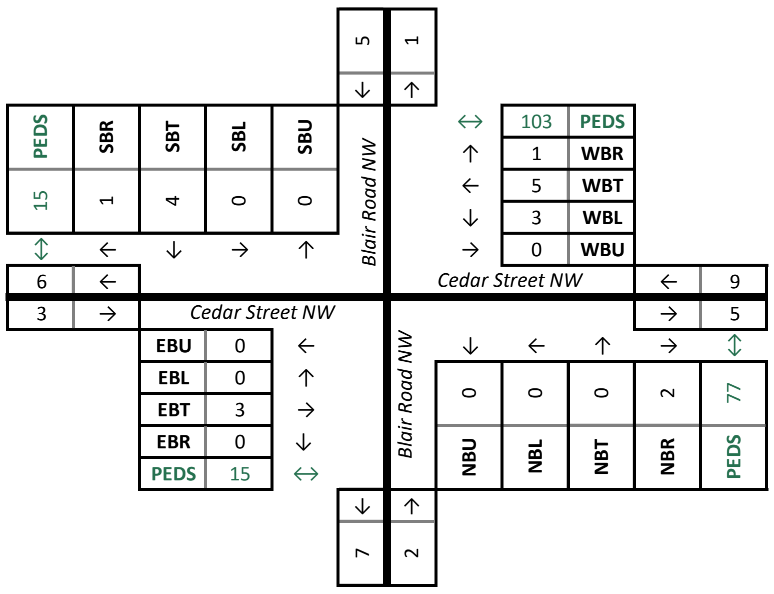
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:45 AM to 08:45 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection:	1. Takoma Station/ & Carroll Street NW/Cedar Street NW																			
ALL VEHICLES Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Takoma Station**					**Carroll Street NW**										**Cedar Street NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	4	0	3	40	0	0	56	9	0	0	0	0	0	0	0	3	22	0	2
06:45 AM to 07:00 AM	0	5	0	3	25	1	0	65	6	1	0	0	0	0	0	0	1	19	0	15
07:00 AM to 07:15 AM	0	1	0	4	29	1	0	73	5	0	0	0	0	0	0	1	2	31	0	10
07:15 AM to 07:30 AM	0	6	0	4	38	2	0	92	11	0	0	0	0	0	0	0	3	29	0	16
07:30 AM to 07:45 AM	0	5	0	4	24	0	0	115	4	0	0	0	0	0	0	2	3	28	0	17
07:45 AM to 08:00 AM	0	1	0	2	39	1	0	123	3	0	0	0	0	0	0	0	2	35	0	17
08:00 AM to 08:15 AM	0	4	0	4	38	2	0	107	4	0	0	0	0	0	0	1	3	37	0	27
08:15 AM to 08:30 AM	0	5	0	3	57	0	0	113	8	1	0	0	0	0	0	1	2	41	0	23
08:30 AM to 08:45 AM	0	4	0	3	42	0	0	119	5	1	0	0	0	0	0	1	5	57	0	15
08:45 AM to 09:00 AM	0	4	0	2	34	0	0	83	8	3	0	0	0	0	0	0	2	44	0	9
09:00 AM to 09:15 AM	0	3	0	1	7	1	0	26	1	1	0	0	0	0	0	0	2	20	0	4
09:15 AM to 09:30 AM	0	5	0	2	27	0	0	76	5	0	0	0	0	0	0	1	2	45	0	14
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	28				158	480				1	0				0	155				84
07:30 AM to 08:30 AM	0	15	0	13		3	0	458	19		0	0	0	0		4	10	141	0	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.96**	n/a	0.75	n/a	0.81	**0.78**	0.38	n/a	0.93	0.59	**0.94**	n/a	n/a	n/a	n/a	**n/a**	0.50	0.83	0.86	n/a	**0.88**

HEAVY VEHICLES (FHWA 4+) Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Takoma Station**					**Carroll Street NW**										**Cedar Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	3	0	2		0	0	2	9		0	0	0	0		0	2	1	0	
06:45 AM to 07:00 AM	0	5	0	3		0	0	2	6		0	0	0	0		0	1	0	0	
07:00 AM to 07:15 AM	0	1	0	4		0	0	4	5		0	0	0	0		0	2	1	0	
07:15 AM to 07:30 AM	0	6	0	4		0	0	3	11		0	0	0	0		0	3	0	0	
07:30 AM to 07:45 AM	0	5	0	4		0	0	3	4		0	0	0	0		0	3	0	0	
07:45 AM to 08:00 AM	0	1	0	2		0	0	4	3		0	0	0	0		0	2	1	0	
08:00 AM to 08:15 AM	0	4	0	4		0	0	3	4		0	0	0	0		0	3	1	0	
08:15 AM to 08:30 AM	0	5	0	3		0	0	3	7		0	0	0	0		0	2	1	0	
08:30 AM to 08:45 AM	0	4	0	3		0	0	3	3		0	0	0	0		1	5	0	0	
08:45 AM to 09:00 AM	0	4	0	2		0	0	3	8		0	0	0	0		0	2	0	0	
09:00 AM to 09:15 AM	0	3	0	2		0	0	1	1		0	0	0	0		0	2	1	0	
09:15 AM to 09:30 AM	0	5	0	2		0	0	1	5		0	0	0	0		0	2	0	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	28					31					0					13				
07:30 AM to 08:30 AM	0	15	0	13		0	0	13	18		0	0	0	0		0	10	3	0	
Heavy Vehicle % (PHV):	0.0%	100.0%	0.0%	100.0%	**100.0%**	0.0%	0.0%	2.8%	94.7%	**6.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	100.0%	2.1%	0.0%	**8.4%**
INT. PEAK HR (HV ONLY)	28					42					0					10				
06:30 AM to 07:30 AM	0	15	0	13		0	0	11	31		0	0	0	0		0	8	2	0	
Heavy Vehicle % (PHV):	0.0%	93.8%	0.0%	92.9%	**93.3%**	0.0%	0.0%	3.8%	100.0%	**13.1%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	88.9%	2.0%	0.0%	**9.0%**

BICYCLES Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Takoma Station**					**Carroll Street NW**										**Cedar Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	1		0	0	1	1		0	0	0	0		0	0	0	0	
06:45 AM to 07:00 AM	0	0	0	1		0	0	0	0		0	0	0	0		0	1	0	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:15 AM to 07:30 AM	0	1	0	1		0	0	1	0		0	0	0	0		0	0	0	0	
07:30 AM to 07:45 AM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
07:45 AM to 08:00 AM	0	0	0	1		0	0	0	0		0	0	0	0		0	0	1	0	
08:00 AM to 08:15 AM	0	0	0	1		0	0	1	0		0	0	0	0		0	1	0	0	
08:15 AM to 08:30 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	1	1	0	
08:30 AM to 08:45 AM	0	0	0	1		0	0	1	0		0	0	0	0		0	2	0	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	4	0	
09:00 AM to 09:15 AM	0	0	0	1		0	0	1	0		0	0	0	0		0	0	0	0	
09:15 AM to 09:30 AM	0	1	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
09:30 AM to 09:45 AM																				
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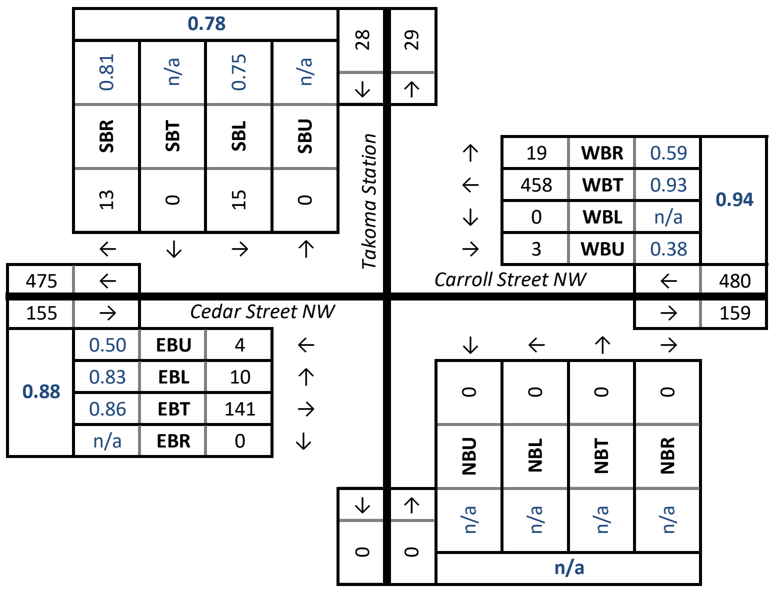
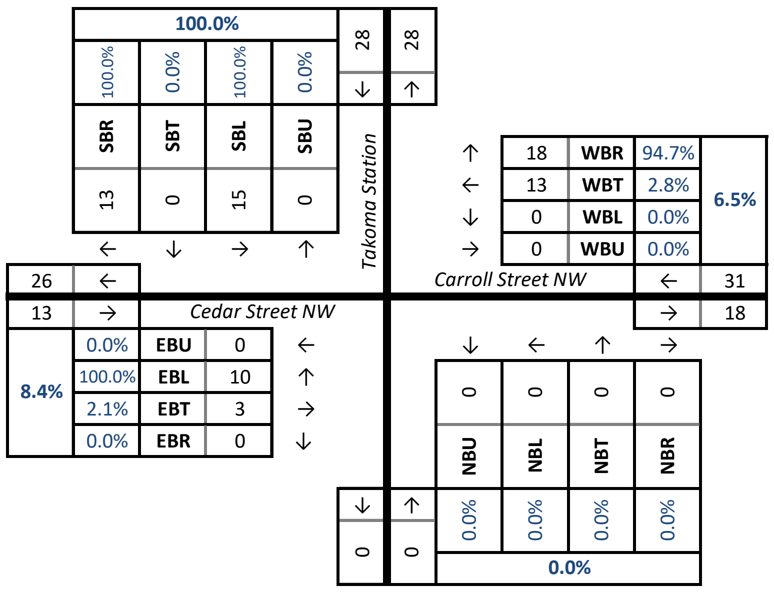
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	2					6					0					4				
07:30 AM to 08:30 AM	0	0	0	2		0	0	6	0		0	0	0	0		0	2	2	0	
INT. PEAK HR (BIKES)	2					4					0					9				
08:00 AM to 09:00 AM	0	0	0	2		0	0	4	0		0	0	0	0		0	4	5	0	

DATA COLLECTION NOTES :

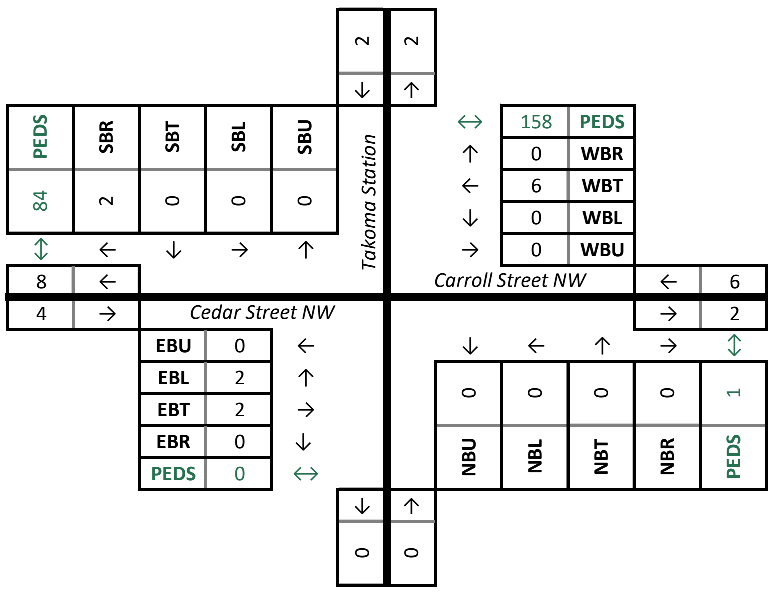
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 07:45 AM to 08:45 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection: **1. Cedar Street NW/ & Carroll Street NW**

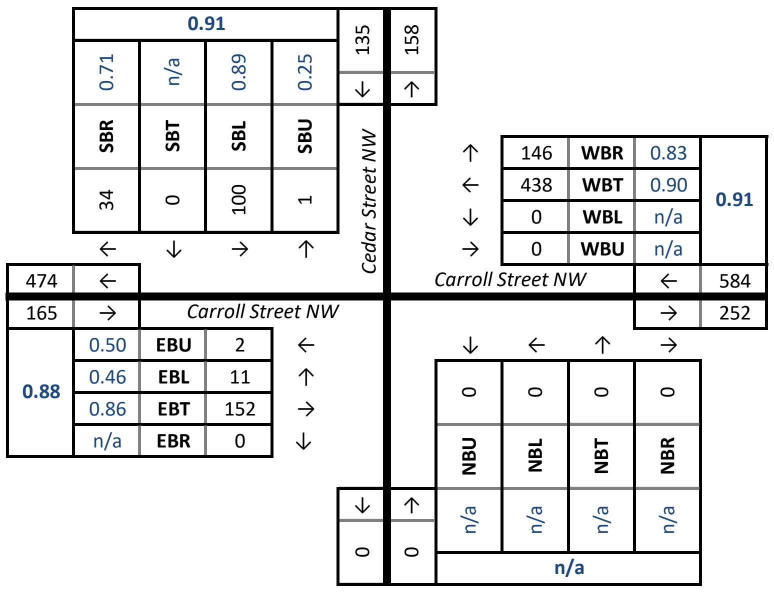
ALL VEHICLES	***Direction:***	Southbound					Westbound					Northbound					Eastbound				
	Roadway:	**Cedar Street NW**					**Carroll Street NW**										**Carroll Street NW**				
	Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM	to 06:45 AM	0	8	0	6	6	0	0	57	14	1	0	0	0	0	0	1	5	23	0	0
06:45 AM	to 07:00 AM	0	11	0	5	18	0	0	68	21	9	0	0	0	0	0	1	3	20	0	0
07:00 AM	to 07:15 AM	0	13	0	5	15	0	0	69	24	2	0	0	0	0	0	0	3	28	0	1
07:15 AM	to 07:30 AM	0	15	0	7	9	0	0	93	31	1	0	0	0	0	0	0	2	30	0	0
07:30 AM	to 07:45 AM	0	24	0	12	14	0	0	106	39	4	0	0	0	0	0	0	3	34	0	1
07:45 AM	to 08:00 AM	0	25	0	6	37	0	0	116	44	4	0	0	0	0	0	0	6	34	0	0
08:00 AM	to 08:15 AM	1	28	0	8	12	0	0	95	28	3	0	0	0	0	0	1	2	44	0	4
08:15 AM	to 08:30 AM	0	23	0	8	26	0	0	121	35	1	0	0	0	0	0	1	0	40	0	0
08:30 AM	to 08:45 AM	0	19	0	7	36	0	0	108	21	1	0	0	0	0	0	2	4	59	0	2
08:45 AM	to 09:00 AM	0	23	0	5	22	0	0	88	33	0	0	0	0	0	0	0	2	46	0	0
09:00 AM	to 09:15 AM	0	20	0	0	16	0	0	59	26	3	0	0	0	0	0	2	1	33	0	0
09:15 AM	to 09:30 AM	0	21	0	8	22	0	0	77	20	3	0	0	0	0	0	2	3	45	0	2
09:30 AM	to 09:45 AM																				
09:45 AM	to 10:00 AM																				
10:00 AM	to 10:15 AM																				
10:15 AM	to 10:30 AM																				
10:30 AM	to 10:45 AM																				
10:45 AM	to 11:00 AM																				
11:00 AM	to 11:15 AM																				
11:15 AM	to 11:30 AM																				
SYSTEM PEAK HR (VEH.)		135				89	584				12	0				0	165				5
07:30 AM	to 08:30 AM	1	100	0	34		0	0	438	146		0	0	0	0		2	11	152	0	
Peak Hour	Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF)	**0.96**	0.25	0.89	n/a	0.71	**0.91**	n/a	n/a	0.90	0.83	**0.91**	n/a	n/a	n/a	n/a	**n/a**	0.50	0.46	0.86	n/a	**0.88**

HEAVY VEHICLES (FHWA 4+)	***Direction:***	Southbound					Westbound					Northbound					Eastbound				
	Roadway:	**Cedar Street NW**					**Carroll Street NW**										**Carroll Street NW**				
	Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM	to 06:45 AM	0	1	0	3		0	0	8	1		0	0	0	0		0	0	4	0	
06:45 AM	to 07:00 AM	0	2	0	2		0	0	6	2		0	0	0	0		0	0	5	0	
07:00 AM	to 07:15 AM	0	1	0	1		0	0	6	2		0	0	0	0		0	0	2	0	
07:15 AM	to 07:30 AM	0	0	0	3		0	0	10	0		0	0	0	0		0	0	4	0	
07:30 AM	to 07:45 AM	0	0	0	3		0	0	5	1		0	0	0	0		0	0	7	0	
07:45 AM	to 08:00 AM	0	0	0	0		0	0	8	3		0	0	0	0		0	0	1	0	
08:00 AM	to 08:15 AM	1	1	0	1		0	0	7	0		0	0	0	0		0	1	3	0	
08:15 AM	to 08:30 AM	0	0	0	2		0	0	8	0		0	0	0	0		0	0	5	0	
08:30 AM	to 08:45 AM	0	1	0	0		0	0	7	0		0	0	0	0		0	0	3	0	
08:45 AM	to 09:00 AM	0	1	0	3		0	0	7	0		0	0	0	0		0	0	5	0	
09:00 AM	to 09:15 AM	0	0	0	0		0	0	4	0		0	0	0	0		0	0	6	0	
09:15 AM	to 09:30 AM	0	0	0	1		0	0	5	0		0	0	0	0		0	0	5	0	
09:30 AM	to 09:45 AM																				
09:45 AM	to 10:00 AM																				
10:00 AM	to 10:15 AM																				
10:15 AM	to 10:30 AM																				
10:30 AM	to 10:45 AM																				
10:45 AM	to 11:00 AM																				
11:00 AM	to 11:15 AM																				
11:15 AM	to 11:30 AM																				
SYSTEM PEAK HR (VEH.)		8					32					0					17				
07:30 AM	to 08:30 AM	1	1	0	6		0	0	28	4		0	0	0	0		0	1	16	0	
Heavy Vehicle % (PHV):		100.0%	1.0%	0.0%	17.6%	**5.9%**	0.0%	0.0%	6.4%	2.7%	**5.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	9.1%	10.5%	0.0%	**10.3%**
INT. PEAK HR (HV ONLY)		13					35					0					15				
06:30 AM	to 07:30 AM	0	4	0	9		0	0	30	5		0	0	0	0		0	0	15	0	
Heavy Vehicle % (PHV):		0.0%	8.5%	0.0%	39.1%	**18.6%**	0.0%	0.0%	10.5%	5.6%	**9.3%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	14.9%	0.0%	**12.9%**

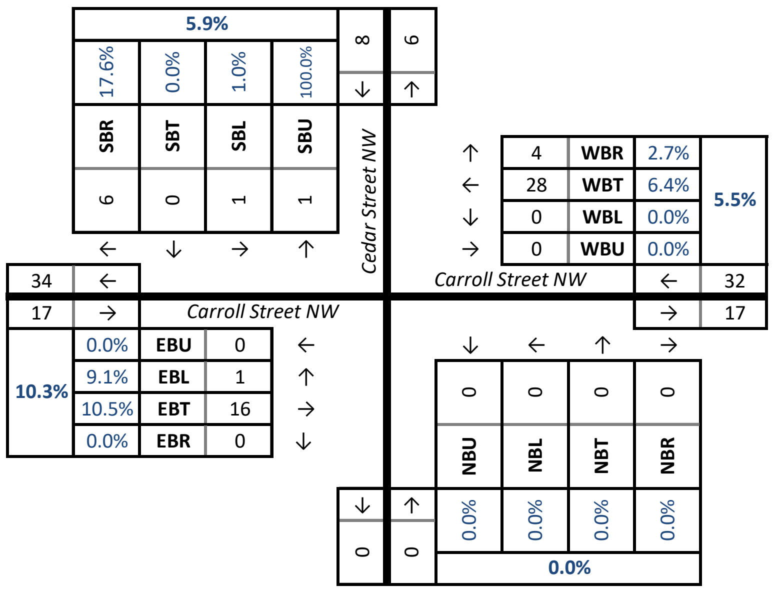
BICYCLES	***Direction:***	Southbound					Westbound					Northbound					Eastbound				
	Roadway:	**Cedar Street NW**					**Carroll Street NW**										**Carroll Street NW**				
	Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM	to 06:45 AM	0	1	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
06:45 AM	to 07:00 AM	0	1	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:00 AM	to 07:15 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:15 AM	to 07:30 AM	0	0	0	1		0	0	2	0		0	0	0	0		0	0	0	0	
07:30 AM	to 07:45 AM	0	0	0	2		0	0	0	0		0	0	0	0		0	0	0	0	
07:45 AM	to 08:00 AM	0	0	0	0		0	0	0	1		0	0	0	0		0	0	1	0	
08:00 AM	to 08:15 AM	0	0	0	0		0	0	1	1		0	0	0	0		0	0	0	0	
08:15 AM	to 08:30 AM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	1	0	
08:30 AM	to 08:45 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
08:45 AM	to 09:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	3	0	
09:00 AM	to 09:15 AM	0	0	0	0		0	0	1	1		0	0	0	0		0	0	0	0	
09:15 AM	to 09:30 AM	0	0	0	2		0	0	2	0		0	0	0	0		0	0	0	0	
09:30 AM	to 09:45 AM																				
09:45 AM	to 10:00 AM																				
10:00 AM	to 10:15 AM																				
10:15 AM	to 10:30 AM																				
10:30 AM	to 10:45 AM																				
10:45 AM	to 11:00 AM																				
11:00 AM	to 11:15 AM																				
11:15 AM	to 11:30 AM																				
SYSTEM PEAK HR (VEH.)		2					5					0					2				
07:30 AM	to 08:30 AM	0	0	0	2		0	0	3	2		0	0	0	0		0	0	2	0	
INT. PEAK HR (BIKES)		2					5					0					3				
08:30 AM	to 09:30 AM	0	0	0	2		0	0	4	1		0	0	0	0		0	0	3	0	

DATA COLLECTION NOTES :

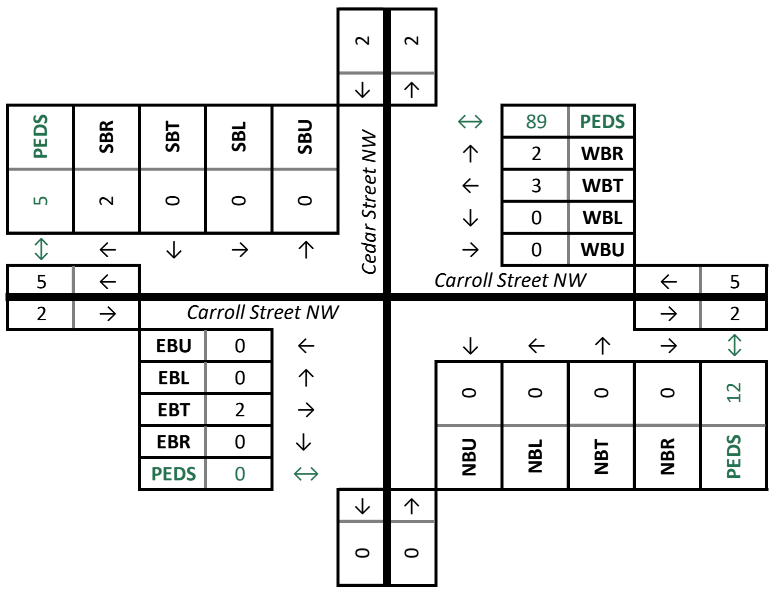
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



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Project # : 2592-015
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Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 06:30 AM to 09:30 AM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 08:00 AM to 09:00 AM
System Peak Hour (all vehicles): 07:30 AM to 08:30 AM
User-Defined Peak Hour: 07:30 AM to 08:30 AM

Intersection: 1. **Maple Street NW & Carroll Street NW**

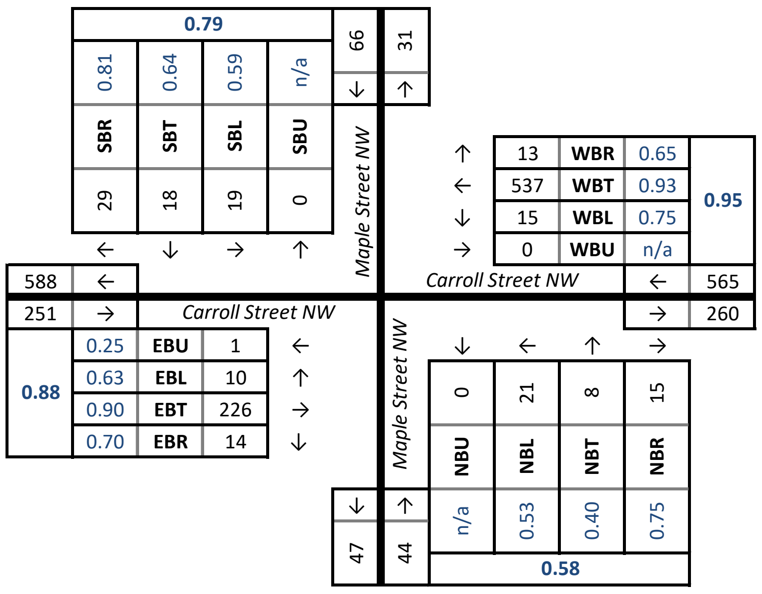
ALL VEHICLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Maple Street NW**					**Carroll Street NW**					**Maple Street NW**					**Carroll Street NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
06:30 AM to 06:45 AM	0	0	5	2	3	0	7	68	0	0	0	1	0	0	3	0	2	23	2	0
06:45 AM to 07:00 AM	0	2	4	6	11	0	2	74	3	1	0	4	1	5	5	0	3	27	5	6
07:00 AM to 07:15 AM	0	1	4	6	8	0	5	91	1	1	0	3	1	1	1	0	0	32	1	2
07:15 AM to 07:30 AM	0	3	2	13	6	0	5	83	0	0	0	8	0	2	4	0	1	43	1	4
07:30 AM to 07:45 AM	0	5	5	9	8	0	5	133	0	3	0	2	1	2	2	1	3	45	3	6
07:45 AM to 08:00 AM	0	5	2	3	14	0	1	144	3	4	0	7	1	4	3	0	2	56	5	3
08:00 AM to 08:15 AM	0	1	7	8	7	0	5	125	5	1	0	2	1	5	5	0	1	62	2	2
08:15 AM to 08:30 AM	0	8	4	9	19	0	4	135	5	2	0	10	5	4	2	0	4	63	4	8
08:30 AM to 08:45 AM	0	2	7	5	17	0	7	100	4	3	0	16	6	5	5	0	2	68	2	3
08:45 AM to 09:00 AM	0	6	8	4	12	0	3	117	9	7	0	8	7	3	1	0	2	69	2	12
09:00 AM to 09:15 AM	0	3	2	8	10	0	4	69	6	3	0	7	7	7	5	0	5	47	3	1
09:15 AM to 09:30 AM	0	9	1	4	8	0	3	84	4	0	0	9	3	3	3	0	0	63	3	5
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	66				48	565				10	44				12	251				19
07:30 AM to 08:30 AM	0	19	18	29		0	15	537	13		0	21	8	15		1	10	226	14	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.91**	n/a	0.59	0.64	0.81	**0.79**	n/a	0.75	0.93	0.65	**0.95**	n/a	0.53	0.40	0.75	**0.58**	0.25	0.63	0.90	0.70	**0.88**

HEAVY VEHICLES (FHWA 4+) ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Maple Street NW**					**Carroll Street NW**					**Maple Street NW**					**Carroll Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	6	0		0	0	0	0		0	0	7	0	
06:45 AM to 07:00 AM	0	0	0	1		0	1	5	0		0	0	0	0		0	1	4	0	
07:00 AM to 07:15 AM	0	0	0	0		0	0	10	0		0	1	0	0		0	0	4	0	
07:15 AM to 07:30 AM	0	0	0	1		0	0	7	0		0	0	0	0		0	0	3	0	
07:30 AM to 07:45 AM	0	0	0	1		0	1	4	0		0	0	0	0		0	1	5	0	
07:45 AM to 08:00 AM	0	0	0	0		0	0	9	0		0	1	0	0		0	0	3	0	
08:00 AM to 08:15 AM	0	0	0	0		0	0	6	0		0	0	0	0		0	0	5	0	
08:15 AM to 08:30 AM	0	1	0	1		0	1	6	0		0	0	0	1		0	1	4	0	
08:30 AM to 08:45 AM	0	0	0	0		0	1	4	0		0	1	0	0		0	0	4	0	
08:45 AM to 09:00 AM	0	0	0	0		0	0	5	0		0	0	0	0		0	0	6	0	
09:00 AM to 09:15 AM	0	0	0	2		0	1	4	0		0	0	0	0		0	2	5	1	
09:15 AM to 09:30 AM	0	1	0	0		0	0	5	0		0	0	0	0		0	0	5	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	3					27					2					19				
07:30 AM to 08:30 AM	0	1	0	2		0	2	25	0		0	1	0	1		0	2	17	0	
Heavy Vehicle % (PHV):	0.0%	5.3%	0.0%	6.9%	**4.5%**	0.0%	13.3%	4.7%	0.0%	**4.8%**	0.0%	4.8%	0.0%	6.7%	**4.5%**	0.0%	20.0%	7.5%	0.0%	**7.6%**
INT. PEAK HR (HV ONLY)	2					29					1					19				
06:30 AM to 07:30 AM	0	0	0	2		0	1	28	0		0	1	0	0		0	1	18	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	7.4%	**4.2%**	0.0%	5.3%	8.9%	0.0%	**8.6%**	0.0%	6.3%	0.0%	0.0%	**3.8%**	0.0%	16.7%	14.4%	0.0%	**13.6%**

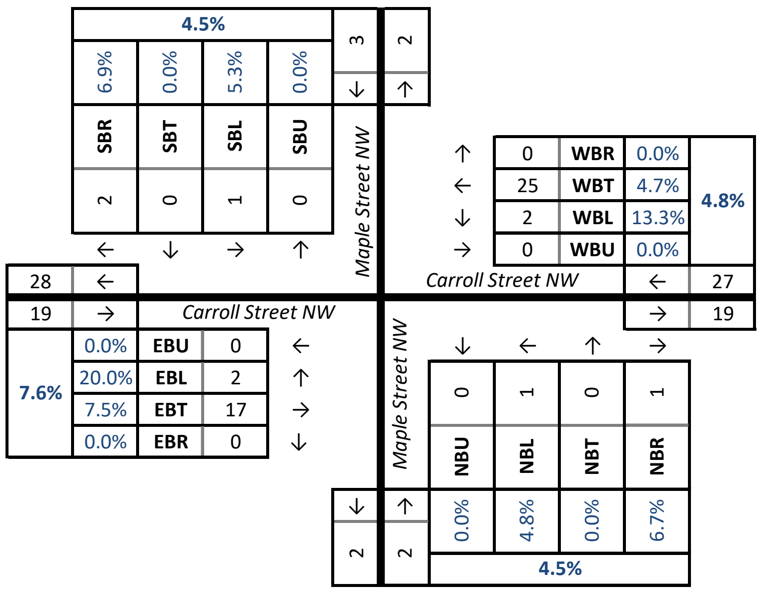
BICYCLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Maple Street NW**					**Carroll Street NW**					**Maple Street NW**					**Carroll Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
06:30 AM to 06:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
06:45 AM to 07:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:00 AM to 07:15 AM	0	0	1	0		0	0	0	0		0	0	0	0		0	0	1	0	
07:15 AM to 07:30 AM	0	0	0	1		0	0	1	0		0	0	0	0		0	0	0	0	
07:30 AM to 07:45 AM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
07:45 AM to 08:00 AM	0	0	2	0		0	0	0	0		0	1	1	0		0	0	1	0	
08:00 AM to 08:15 AM	0	0	1	1		0	0	1	0		0	0	0	0		0	0	0	0	
08:15 AM to 08:30 AM	0	1	2	0		0	0	1	0		0	0	1	1		0	0	1	0	
08:30 AM to 08:45 AM	0	0	3	1		0	0	0	0		0	0	1	0		0	0	0	0	
08:45 AM to 09:00 AM	0	0	1	1		0	0	0	0		0	0	1	0		0	0	3	0	
09:00 AM to 09:15 AM	0	0	1	0		0	0	1	0		0	0	0	0		0	0	0	0	
09:15 AM to 09:30 AM	0	0	2	0		0	1	3	0		0	0	0	0		0	0	1	0	
09:30 AM to 09:45 AM																				
09:45 AM to 10:00 AM																				
10:00 AM to 10:15 AM																				
10:15 AM to 10:30 AM																				
10:30 AM to 10:45 AM																				
10:45 AM to 11:00 AM																				
11:00 AM to 11:15 AM																				
11:15 AM to 11:30 AM																				
SYSTEM PEAK HR (VEH.)	7					3					4					2				
07:30 AM to 08:30 AM	0	1	5	1		0	0	3	0		0	1	2	1		0	0	2	0	
INT. PEAK HR (BIKES)	11					2					4					4				
08:00 AM to 09:00 AM	0	1	7	3		0	0	2	0		0	0	3	1		0	0	4	0	

DATA COLLECTION NOTES :

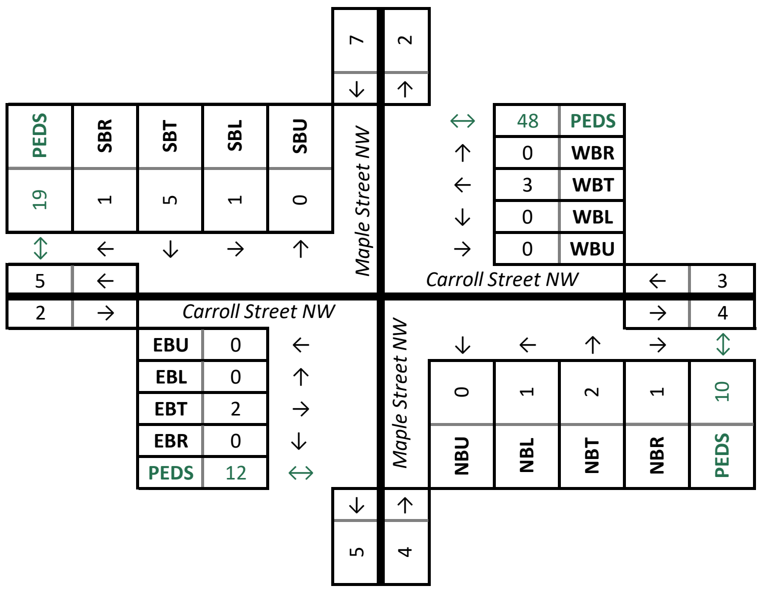
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

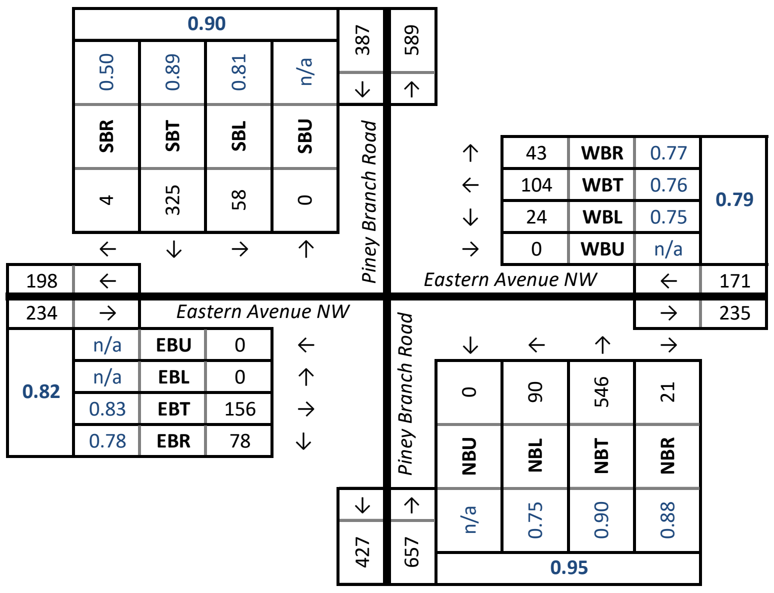
Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 05:00 PM to 06:00 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

Intersection: 1. **Piney Branch Road & Eastern Avenue NW**

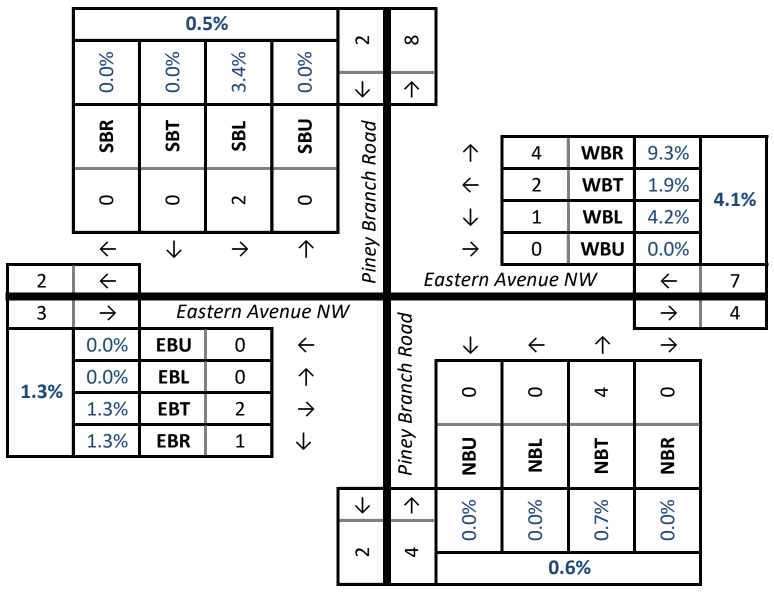
ALL VEHICLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Piney Branch Road**					**Eastern Avenue NW**					**Piney Branch Road**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	15	60	0	0	0	2	24	8	0	0	23	153	6	1	0	0	49	9	1
04:15 PM to 04:30 PM	0	14	71	1	4	0	9	18	8	0	0	40	123	8	1	0	2	46	19	0
04:30 PM to 04:45 PM	0	8	83	0	1	0	5	29	12	0	0	30	119	4	4	0	0	33	17	0
04:45 PM to 05:00 PM	0	10	91	0	2	0	4	27	13	1	0	20	117	6	4	0	0	43	25	0
05:00 PM to 05:15 PM	0	18	89	1	2	0	6	34	14	0	0	25	142	4	3	0	0	37	18	1
05:15 PM to 05:30 PM	0	18	69	2	7	0	6	19	8	0	0	15	151	5	1	0	0	47	24	3
05:30 PM to 05:45 PM	0	12	76	1	4	0	8	24	8	0	0	30	136	6	6	0	0	29	11	0
05:45 PM to 06:00 PM	1	16	103	0	3	0	5	26	14	0	1	20	144	2	5	0	0	27	13	2
06:00 PM to 06:15 PM	0	10	76	0	4	0	6	33	16	1	0	10	127	6	3	0	2	38	24	1
06:15 PM to 06:30 PM	0	12	75	1	6	0	3	16	6	0	0	14	129	10	4	0	0	32	19	3
06:30 PM to 06:45 PM	0	12	85	1	4	0	4	15	9	1	0	9	145	5	4	0	1	32	18	4
06:45 PM to 07:00 PM	0	11	90	0	4	0	6	24	14	1	0	19	139	4	6	0	1	34	12	2
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	387				15	171				1	657				14	234				4
04:45 PM to 05:45 PM	0	58	325	4		0	24	104	43		0	90	546	21		0	0	156	78	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.93**	n/a	0.81	0.89	0.50	**0.90**	n/a	0.75	0.76	0.77	**0.79**	n/a	0.75	0.90	0.88	**0.95**	n/a	n/a	0.83	0.78	**0.82**

VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



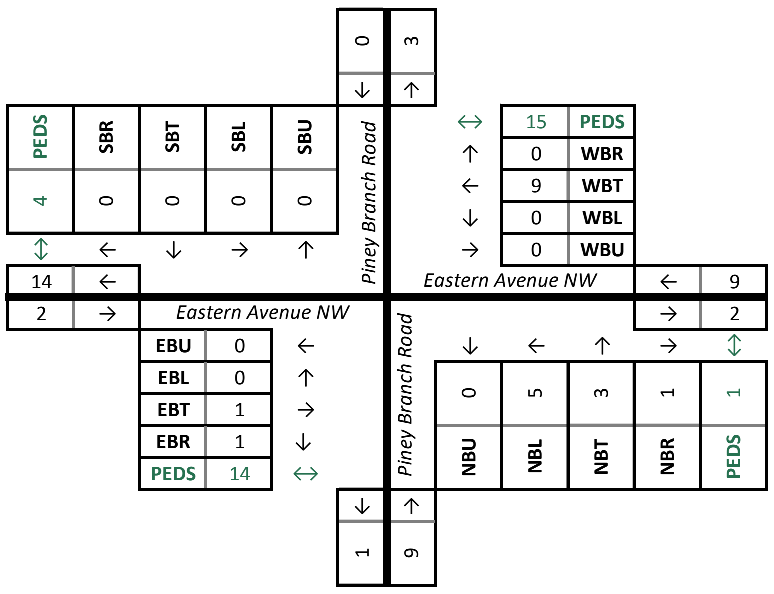
HEAVY VEHICLES (FHWA 4+) ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Piney Branch Road**					**Eastern Avenue NW**					**Piney Branch Road**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	0	0		0	0	3	0		0	0	1	0	
04:15 PM to 04:30 PM	0	1	1	0		0	0	1	2		0	0	2	1		0	1	1	0	
04:30 PM to 04:45 PM	0	0	1	0		0	0	1	0		0	0	0	0		0	0	0	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	0	1		0	0	1	0		0	0	0	1	
05:00 PM to 05:15 PM	0	1	0	0		0	0	0	2		0	0	1	0		0	0	1	0	
05:15 PM to 05:30 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	1	0	
05:30 PM to 05:45 PM	0	1	0	0		0	1	1	1		0	0	2	0		0	0	0	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	0	1		0	0	3	0		0	0	1	0	
06:00 PM to 06:15 PM	0	1	0	0		0	0	1	2		0	0	2	1		0	0	0	0	
06:15 PM to 06:30 PM	0	1	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
06:30 PM to 06:45 PM	0	1	0	0		0	0	2	0		0	0	1	0		0	0	1	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	1	2		0	0	1	0		0	0	0	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	2					7					4					3				
04:45 PM to 05:45 PM	0	2	0	0		0	1	2	4		0	0	4	0		0	0	2	1	
Heavy Vehicle % (PHV):	0.0%	3.4%	0.0%	0.0%	**0.5%**	0.0%	4.2%	1.9%	9.3%	**4.1%**	0.0%	0.0%	0.7%	0.0%	**0.6%**	0.0%	0.0%	1.3%	1.3%	**1.3%**
INT. PEAK HR (HV ONLY)	4					7					5					4				
04:15 PM to 05:15 PM	0	2	2	0		0	0	2	5		0	0	4	1		0	1	2	1	
Heavy Vehicle % (PHV):	0.0%	4.0%	0.6%	0.0%	**1.0%**	0.0%	0.0%	1.9%	10.6%	**3.9%**	0.0%	0.0%	0.8%	4.5%	**0.8%**	0.0%	50.0%	1.3%	1.3%	**1.7%**

HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



BICYCLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Piney Branch Road**					**Eastern Avenue NW**					**Piney Branch Road**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	1	0		0	1	2	0		0	0	0	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	2	0		0	2	0	0		0	0	0	1	
04:30 PM to 04:45 PM	0	0	0	0		0	0	0	1		0	2	0	1		0	0	2	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	4	0		0	0	1	0		0	0	1	1	
05:00 PM to 05:15 PM	0	0	0	0		0	0	0	0		0	2	0	0		0	0	0	0	
05:15 PM to 05:30 PM	0	0	0	0		0	0	3	0		0	2	1	0		0	0	0	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	2	0		0	1	1	1		0	0	0	0	
05:45 PM to 06:00 PM	0	0	1	0		0	0	1	0		0	3	0	0		0	0	1	1	
06:00 PM to 06:15 PM	0	0	1	0		0	0	1	0		0	1	1	0		0	0	1	0	
06:15 PM to 06:30 PM	0	0	0	0		0	1	3	0		0	1	2	1		0	0	2	1	
06:30 PM to 06:45 PM	0	0	0	0		0	0	2	0		0	0	0	1		0	0	0	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	2	0		0	0	0	2		0	0	1	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	0					9					9					2				
04:45 PM to 05:45 PM	0	0	0	0		0	0	9	0		0	5	3	1		0	0	1	1	
INT. PEAK HR (BIKES)	2					8					12					6				
05:30 PM to 06:30 PM	0	0	2	0		0	1	7	0		0	6	4	2		0	0	4	2	

PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



DATA COLLECTION NOTES :

Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:45 PM to 05:45 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

Intersection: 1. **Holly Avenue/Apartments Entrance & Eastern Avenue NW**

ALL VEHICLES

Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Holly Avenue**					**Eastern Avenue NW**					**Apartments Entrance**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	2	0	3	0	0	0	34	1	0	0	0	0	1	1	0	5	68	0	2
04:15 PM to 04:30 PM	0	0	0	3	2	0	0	31	0	2	0	0	0	0	2	0	5	61	0	1
04:30 PM to 04:45 PM	0	0	0	7	0	0	1	37	0	3	0	0	0	1	5	0	5	41	0	0
04:45 PM to 05:00 PM	0	1	0	4	3	0	0	41	2	2	0	0	0	0	6	0	6	55	0	0
05:00 PM to 05:15 PM	0	2	0	6	1	0	0	55	2	1	0	0	0	0	2	0	5	44	0	0
05:15 PM to 05:30 PM	0	0	0	6	6	0	0	20	1	3	0	0	0	0	9	0	8	67	1	0
05:30 PM to 05:45 PM	0	1	0	5	0	0	0	41	1	1	0	1	0	0	6	0	4	39	1	0
05:45 PM to 06:00 PM	0	2	0	4	2	0	0	40	2	6	0	1	0	0	8	0	5	44	0	0
06:00 PM to 06:15 PM	0	1	0	3	3	0	0	47	3	1	0	0	0	0	6	0	5	45	0	0
06:15 PM to 06:30 PM	0	1	0	2	2	0	0	21	0	0	0	0	0	0	6	0	16	42	0	3
06:30 PM to 06:45 PM	0	2	0	2	1	0	0	30	2	1	0	1	0	0	4	0	5	43	0	0
06:45 PM to 07:00 PM	0	0	0	4	0	0	0	34	1	1	0	0	0	0	2	0	4	46	0	0
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	25				10	163				7	1				23	230				0
04:45 PM to 05:45 PM	0	4	0	21		0	0	157	6		0	1	0	0		0	23	205	2	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.92**	n/a	0.50	n/a	0.88	**0.78**	n/a	n/a	0.71	0.75	**0.71**	n/a	0.25	n/a	n/a	**0.25**	n/a	0.72	0.76	0.50	**0.76**

HEAVY VEHICLES (FHWA 4+)

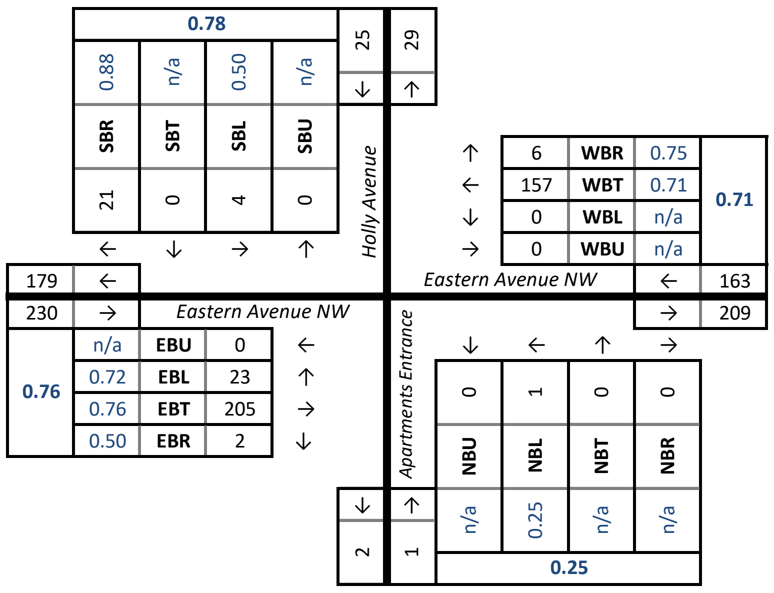
Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Holly Avenue**					**Eastern Avenue NW**					**Apartments Entrance**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	3	0		0	0	0	0		0	1	2	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	0	0	
05:00 PM to 05:15 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
05:15 PM to 05:30 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
05:30 PM to 05:45 PM	0	0	0	1		0	0	4	0		0	0	0	0		0	0	1	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
06:00 PM to 06:15 PM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	2	0	
06:15 PM to 06:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
06:30 PM to 06:45 PM	0	1	0	0		0	0	3	0		0	0	0	0		0	0	2	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	1					8					0					3				
04:45 PM to 05:45 PM	0	0	0	1		0	0	8	0		0	0	0	0		0	0	3	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	4.8%	**4.0%**	0.0%	0.0%	5.1%	0.0%	**4.9%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	1.5%	0.0%	**1.3%**
INT. PEAK HR (HV ONLY)	1					8					0					5				
05:15 PM to 06:15 PM	0	0	0	1		0	0	8	0		0	0	0	0		0	0	5	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	5.6%	**4.5%**	0.0%	0.0%	5.4%	0.0%	**5.2%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	2.6%	0.0%	**2.3%**

BICYCLES

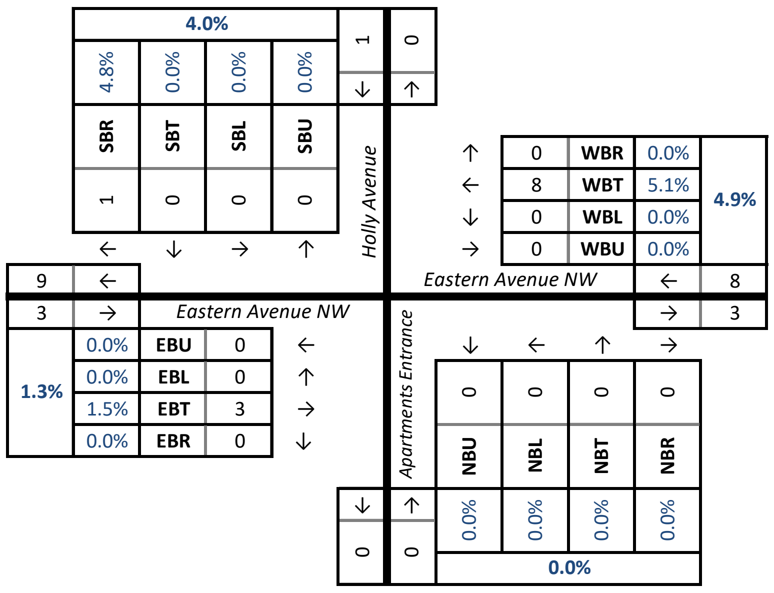
Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Holly Avenue**					**Eastern Avenue NW**					**Apartments Entrance**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	1	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	4	0		0	0	0	0		0	1	0	0	
05:00 PM to 05:15 PM	0	0	0	2		0	0	0	0		0	0	0	0		0	0	1	0	
05:15 PM to 05:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	1	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	1	0	
06:00 PM to 06:15 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
06:15 PM to 06:30 PM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	3	0	
06:30 PM to 06:45 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	1	1	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	2					5					0					3				
04:45 PM to 05:45 PM	0	0	0	2		0	0	5	0		0	0	0	0		0	1	2	0	
INT. PEAK HR (BIKES)	0					8					0					2				
04:00 PM to 05:00 PM	0	0	0	0		0	0	8	0		0	0	0	0		0	1	1	0	

DATA COLLECTION NOTES :

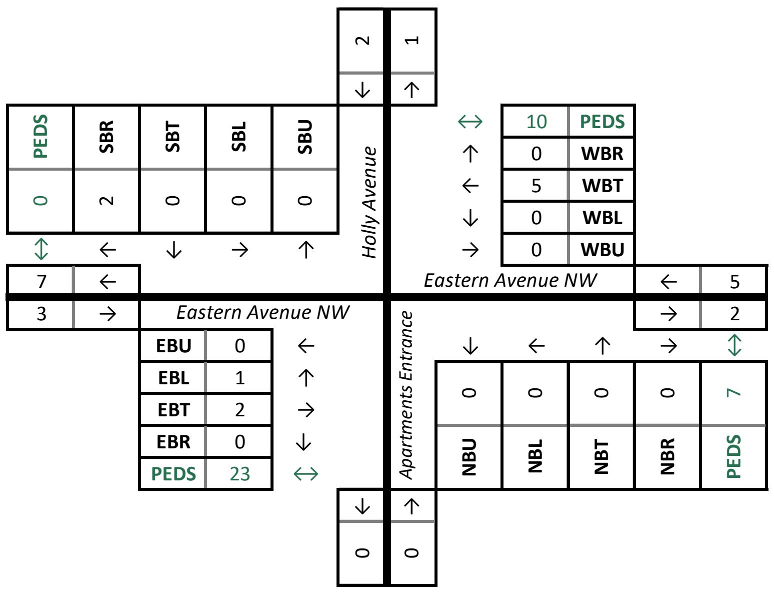
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:45 PM to 05:45 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

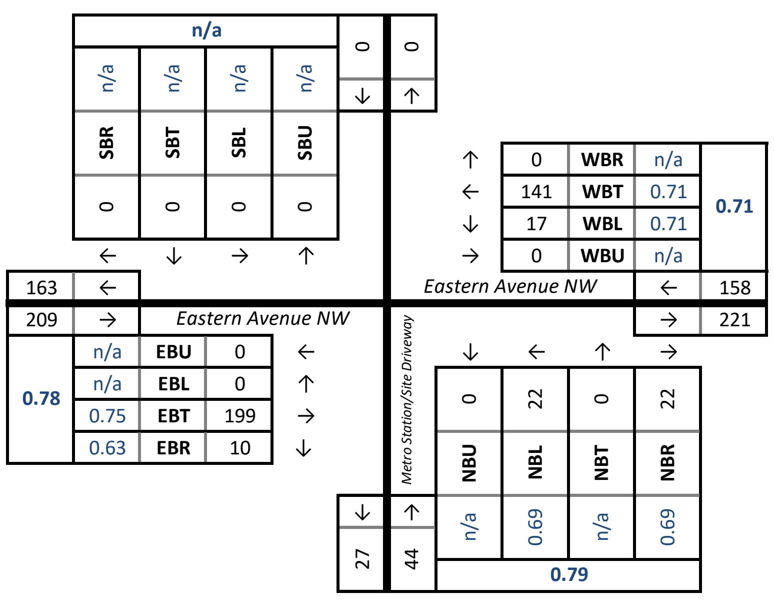
Intersection:	1. /Metro Station/Site Driveway & Eastern Avenue NW																			
ALL VEHICLES Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Metro Station/Site Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	0	0	0	0	0	2	28	0	0	0	7	0	5	1	0	0	64	7	0
04:15 PM to 04:30 PM	0	0	0	0	0	0	1	25	0	1	0	6	0	3	4	0	0	54	7	2
04:30 PM to 04:45 PM	0	0	0	0	0	0	4	29	0	0	0	9	0	9	5	0	0	38	4	0
04:45 PM to 05:00 PM	0	0	0	0	0	0	1	35	0	0	0	8	0	6	4	0	0	52	4	0
05:00 PM to 05:15 PM	0	0	0	0	0	0	6	50	0	0	0	7	0	6	2	0	0	42	4	2
05:15 PM to 05:30 PM	0	0	0	0	0	0	4	18	0	0	0	3	0	2	4	0	0	66	1	1
05:30 PM to 05:45 PM	0	0	0	0	0	0	6	38	0	0	0	4	0	8	4	0	0	39	1	0
05:45 PM to 06:00 PM	0	0	0	0	0	0	3	35	0	0	0	7	0	1	6	0	0	41	5	1
06:00 PM to 06:15 PM	0	0	0	0	0	0	3	44	0	2	0	6	0	5	2	1	0	45	0	2
06:15 PM to 06:30 PM	0	0	0	0	0	0	2	20	0	0	0	1	0	1	2	0	0	42	1	0
06:30 PM to 06:45 PM	0	0	0	0	0	0	2	27	0	0	0	5	0	6	2	0	0	41	4	1
06:45 PM to 07:00 PM	0	0	0	0	0	0	2	32	0	0	0	3	0	1	2	0	0	45	1	0
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	0				0	158				0	44				14	209				3
04:45 PM to 05:45 PM	0	0	0	0		0	17	141	0		0	22	0	22		0	0	199	10	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.89**	n/a	n/a	n/a	n/a	**n/a**	n/a	0.71	0.71	n/a	**0.71**	n/a	0.69	n/a	0.69	**0.79**	n/a	n/a	0.75	0.63	**0.78**

HEAVY VEHICLES (FHWA 4+) Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Metro Station/Site Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	2	0		0	1	0	0		0	0	2	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	0	0	
05:00 PM to 05:15 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
05:15 PM to 05:30 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	4	0		0	0	0	0		0	0	1	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
06:00 PM to 06:15 PM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	2	0	
06:15 PM to 06:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
06:30 PM to 06:45 PM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	3	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	0	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	0					8					0					3				
04:45 PM to 05:45 PM	0	0	0	0		0	0	8	0		0	0	0	0		0	0	3	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	5.7%	0.0%	**5.1%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	1.5%	0.0%	**1.4%**
INT. PEAK HR (HV ONLY)	0					8					0					5				
05:15 PM to 06:15 PM	0	0	0	0		0	0	8	0		0	0	0	0		0	0	5	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	5.9%	0.0%	**5.3%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	2.6%	0.0%	**2.5%**

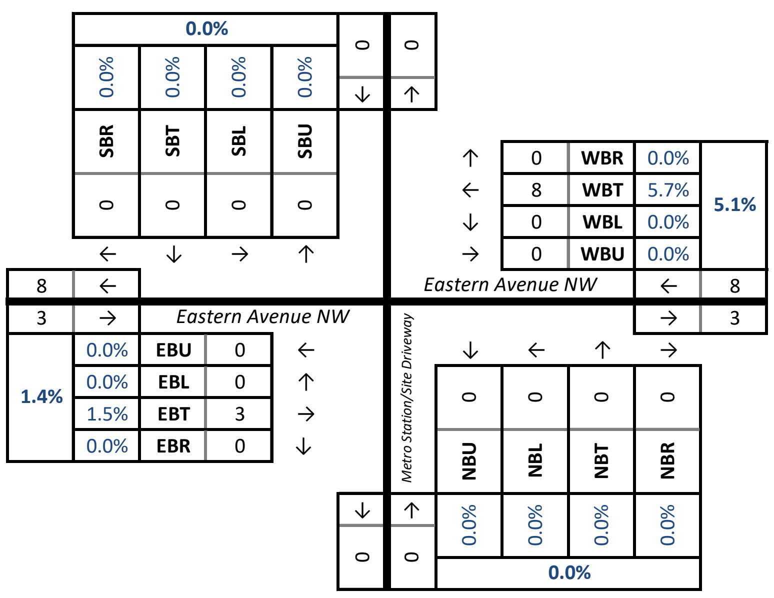
BICYCLES Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Metro Station/Site Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	2	0		0	0	0	0		0	0	0	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	1	0		0	3	0	0		0	0	2	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
05:00 PM to 05:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
05:15 PM to 05:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
06:00 PM to 06:15 PM	0	0	0	0		0	0	2	0		0	1	0	0		0	0	2	0	
06:15 PM to 06:30 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
06:30 PM to 06:45 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	1	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	0					1					0					3				
04:45 PM to 05:45 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	3	0	
INT. PEAK HR (BIKES)	0					4					1					6				
05:45 PM to 06:45 PM	0	0	0	0		0	0	4	0		0	1	0	0		0	0	6	0	

DATA COLLECTION NOTES :

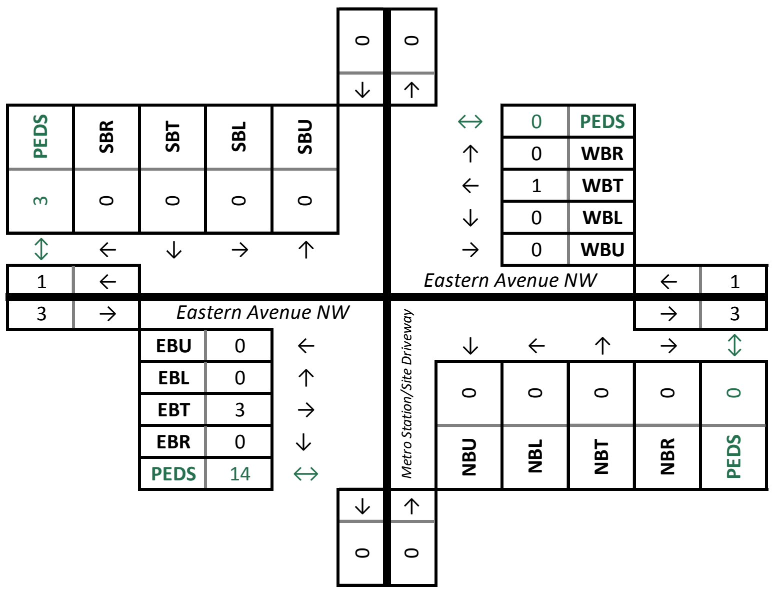
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:45 PM to 05:45 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

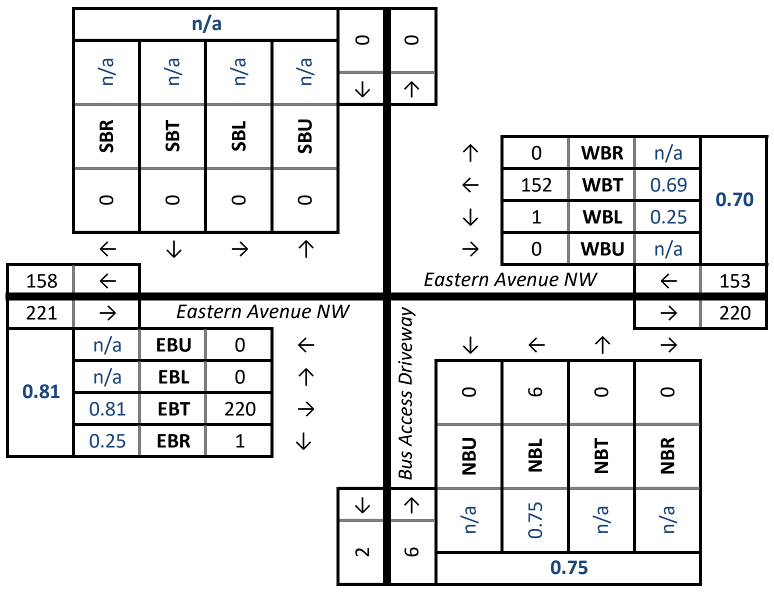
Intersection:	1. /Bus Access Driveway & Eastern Avenue NW																			
ALL VEHICLES Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Bus Access Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	0	0	0	0	0	0	30	0	0	0	0	0	0	1	0	0	68	1	0
04:15 PM to 04:30 PM	0	0	0	0	0	0	0	24	0	0	0	2	0	0	1	0	0	56	1	1
04:30 PM to 04:45 PM	0	0	0	0	0	1	0	32	0	1	0	1	0	0	5	0	0	47	0	0
04:45 PM to 05:00 PM	0	0	0	0	0	0	1	34	0	0	0	2	0	0	1	0	0	58	0	0
05:00 PM to 05:15 PM	0	0	0	0	0	0	0	55	0	0	0	1	0	0	2	0	0	47	1	0
05:15 PM to 05:30 PM	0	0	0	0	0	0	0	21	0	0	0	1	0	0	1	0	0	68	0	0
05:30 PM to 05:45 PM	0	0	0	0	0	0	0	42	0	0	0	2	0	0	3	0	0	47	0	1
05:45 PM to 06:00 PM	0	0	0	0	0	0	0	37	0	0	0	1	0	0	6	0	0	41	1	0
06:00 PM to 06:15 PM	0	0	0	0	0	0	0	45	0	0	0	2	0	2	2	0	0	49	1	0
06:15 PM to 06:30 PM	0	0	0	0	0	1	0	22	0	0	0	0	0	0	1	0	0	43	0	1
06:30 PM to 06:45 PM	0	0	0	0	0	0	0	26	0	1	0	3	0	0	4	0	0	45	2	0
06:45 PM to 07:00 PM	0	0	0	0	0	0	0	31	0	0	0	3	0	0	0	0	0	46	0	0
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	0				0	153				0	6				7	221				1
04:45 PM to 05:45 PM	0	0	0	0		0	1	152	0		0	6	0	0		0	0	220	1	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.91**	n/a	n/a	n/a	n/a	**n/a**	n/a	0.25	0.69	n/a	**0.70**	n/a	0.75	n/a	n/a	**0.75**	n/a	n/a	0.81	0.25	**0.81**

HEAVY VEHICLES (FHWA 4+) Direction:	Southbound					Westbound					Northbound					Eastbound				
Roadway:						**Eastern Avenue NW**					**Bus Access Driveway**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	2	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	0	0		0	2	0	0		0	0	1	1	
04:30 PM to 04:45 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	0	
04:45 PM to 05:00 PM	0	0	0	0		0	1	0	0		0	2	0	0		0	0	0	0	
05:00 PM to 05:15 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	1	1	
05:15 PM to 05:30 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	2	0		0	2	0	0		0	0	1	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	1	1	
06:00 PM to 06:15 PM	0	0	0	0		0	0	0	0		0	2	0	2		0	0	1	1	
06:15 PM to 06:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
06:30 PM to 06:45 PM	0	0	0	0		0	0	0	0		0	3	0	0		0	0	2	1	
06:45 PM to 07:00 PM	0	0	0	0		0	0	0	0		0	3	0	0		0	0	0	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	0					3					6					3				
04:45 PM to 05:45 PM	0	0	0	0		0	1	2	0		0	6	0	0		0	0	2	1	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	100.0%	1.3%	0.0%	**2.0%**	0.0%	100.0%	0.0%	0.0%	**100.0%**	0.0%	0.0%	0.9%	100.0%	**1.4%**
INT. PEAK HR (HV ONLY)	0					2					8					5				
05:15 PM to 06:15 PM	0	0	0	0		0	0	2	0		0	6	0	2		0	0	3	2	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	1.4%	0.0%	**1.4%**	0.0%	100.0%	0.0%	100.0%	**100.0%**	0.0%	0.0%	1.5%	100.0%	**2.4%**

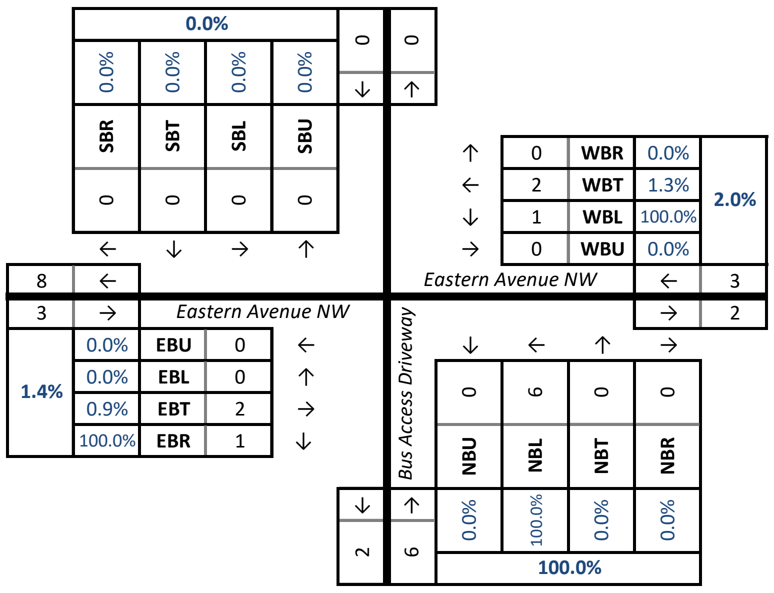
BICYCLES Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:					**Eastern Avenue NW**				**Bus Access Driveway**				**Eastern Avenue NW**			
Movement:	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right
04:00 PM to 04:15 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
04:15 PM to 04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM to 04:45 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0
04:45 PM to 05:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
05:00 PM to 05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
05:15 PM to 05:30 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2	0
05:30 PM to 05:45 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
05:45 PM to 06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:00 PM to 06:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
06:15 PM to 06:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
06:30 PM to 06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:45 PM to 07:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
07:00 PM to 07:15 PM																
07:15 PM to 07:30 PM																
07:30 PM to 07:45 PM																
07:45 PM to 08:00 PM																
08:00 PM to 08:15 PM																
08:15 PM to 08:30 PM																
08:30 PM to 08:45 PM																
08:45 PM to 09:00 PM																
SYSTEM PEAK HR (VEH.)	0				4				1				4			
04:45 PM to 05:45 PM	0	0	0	0	0	0	4	0	0	0	0	1	0	0	4	0
INT. PEAK HR (BIKES)	0				4				1				6			
05:15 PM to 06:15 PM	0	0	0	0	0	0	4	0	0	0	0	1	0	0	3	3

DATA COLLECTION NOTES :

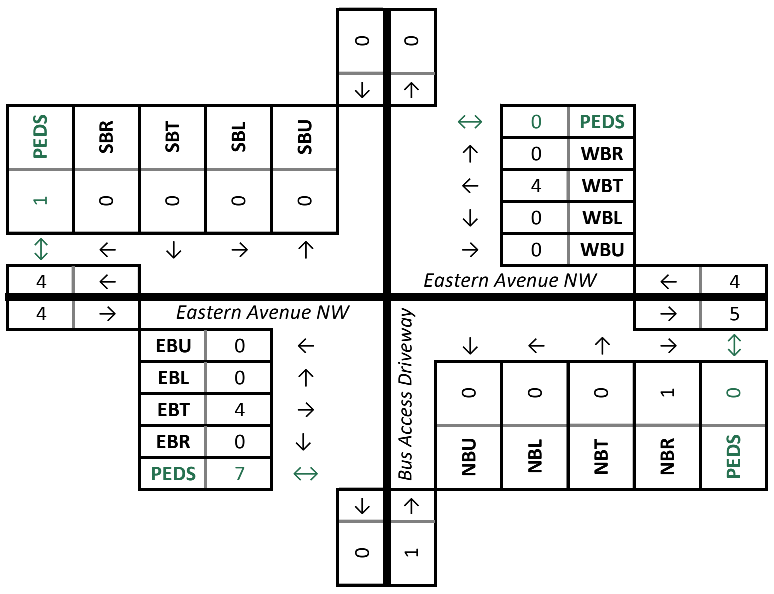
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:45 PM to 05:45 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

Intersection: 1. Cedar Avenue & /Eastern Avenue NW

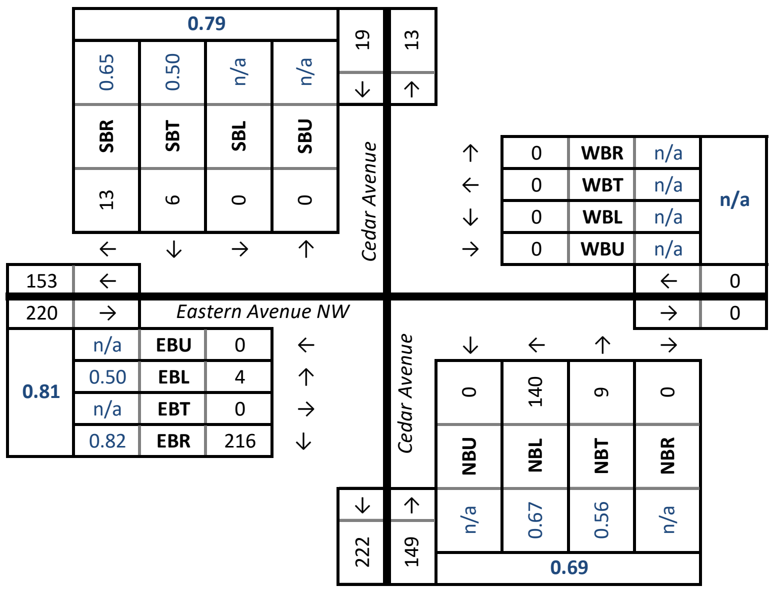
ALL VEHICLES	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Avenue**										**Cedar Avenue**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	0	0	2	1	0	0	0	0	0	0	28	5	0	0	0	2	0	66	1
04:15 PM to 04:30 PM	0	0	1	0	1	0	0	0	0	0	0	24	2	0	0	0	0	0	56	6
04:30 PM to 04:45 PM	0	0	1	2	1	0	0	0	0	0	0	31	3	0	0	0	3	0	45	8
04:45 PM to 05:00 PM	0	0	3	2	5	0	0	0	0	0	0	33	1	0	0	0	0	0	58	4
05:00 PM to 05:15 PM	0	0	1	3	1	0	0	0	0	0	0	52	2	0	0	0	0	0	47	9
05:15 PM to 05:30 PM	0	0	1	5	4	0	0	0	0	0	0	16	4	0	0	0	2	0	66	4
05:30 PM to 05:45 PM	0	0	1	3	6	0	0	0	0	0	0	39	2	0	0	0	2	0	45	8
05:45 PM to 06:00 PM	0	0	1	4	3	0	0	0	0	0	0	33	6	0	0	0	1	0	40	8
06:00 PM to 06:15 PM	0	0	0	3	4	0	0	0	0	0	1	42	5	0	0	0	0	0	51	7
06:15 PM to 06:30 PM	0	0	4	1	3	0	0	0	0	0	0	22	3	0	0	0	0	0	44	7
06:30 PM to 06:45 PM	0	0	0	2	2	0	0	0	0	0	0	24	1	0	0	0	1	0	44	4
06:45 PM to 07:00 PM	0	0	1	1	1	0	0	0	0	0	0	30	1	0	0	0	1	0	45	6
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	19				16	0				0	149				0	220				25
04:45 PM to 05:45 PM	0	0	6	13		0	0	0	0		0	140	9	0		0	4	0	216	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.92**	n/a	n/a	0.50	0.65	**0.79**	n/a	n/a	n/a	n/a	**n/a**	n/a	0.67	0.56	n/a	**0.69**	n/a	0.50	n/a	0.82	**0.81**

HEAVY VEHICLES (FHWA 4+)	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Avenue**										**Cedar Avenue**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	2	
04:15 PM to 04:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	1	
04:30 PM to 04:45 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	0	
05:00 PM to 05:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	1	
05:15 PM to 05:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	0	0		0	2	0	0		0	1	0	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	1	0	0	
06:00 PM to 06:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	3	
06:15 PM to 06:30 PM	0	0	0	0		0	0	0	0		0	0	1	0		0	0	0	0	
06:30 PM to 06:45 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	1	0	1	
06:45 PM to 07:00 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	0					0					3					2				
04:45 PM to 05:45 PM	0	0	0	0		0	0	0	0		0	3	0	0		0	1	0	1	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	2.1%	0.0%	0.0%	**2.0%**	0.0%	25.0%	0.0%	0.5%	**0.9%**
INT. PEAK HR (HV ONLY)	0					0					3					5				
05:30 PM to 06:30 PM	0	0	0	0		0	0	0	0		0	2	1	0		0	2	0	3	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	1.5%	6.3%	0.0%	**2.0%**	0.0%	66.7%	0.0%	1.7%	**2.7%**

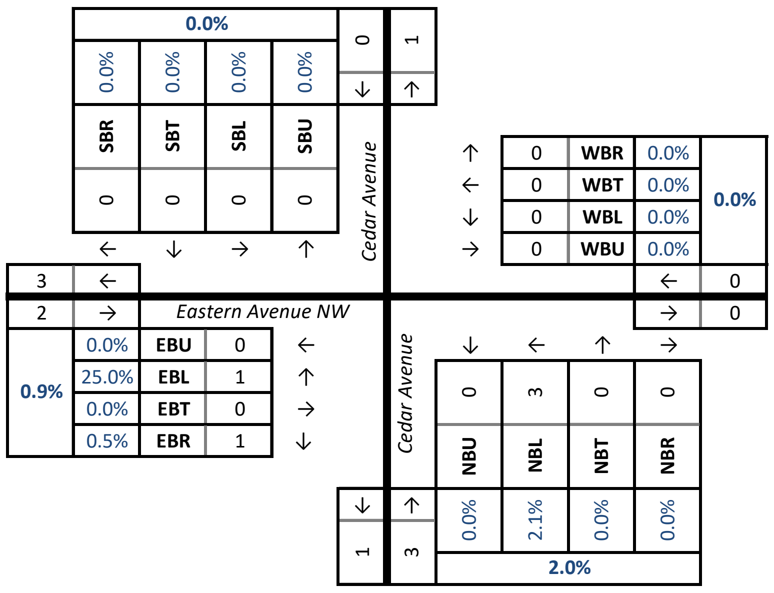
BICYCLES	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Avenue**										**Cedar Avenue**					**Eastern Avenue NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	1	1		0	0	0	0		0	2	6	0		0	0	0	0	
04:15 PM to 04:30 PM	0	0	1	0		0	0	0	0		0	0	1	0		0	0	0	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	0	0		0	1	1	0		0	1	0	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	0	0		0	0	1	0		0	0	0	0	
05:00 PM to 05:15 PM	0	0	1	0		0	0	0	0		0	0	0	0		0	0	0	1	
05:15 PM to 05:30 PM	0	0	2	0		0	0	0	0		0	0	0	0		0	1	0	1	
05:30 PM to 05:45 PM	0	0	1	0		0	0	0	0		0	1	1	0		0	0	0	1	
05:45 PM to 06:00 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	0	
06:00 PM to 06:15 PM	0	0	1	0		0	0	0	0		0	0	0	0		0	0	0	0	
06:15 PM to 06:30 PM	0	0	0	0		0	0	0	0		0	3	0	0		0	1	0	1	
06:30 PM to 06:45 PM	0	0	0	0		0	0	0	0		0	0	1	0		0	1	0	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	0	0		0	1	0	0		0	0	0	1	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	4					0					3					4				
04:45 PM to 05:45 PM	0	0	4	0		0	0	0	0		0	1	2	0		0	1	0	3	
INT. PEAK HR (BIKES)	3					0					12					1				
04:00 PM to 05:00 PM	0	0	2	1		0	0	0	0		0	3	9	0		0	1	0	0	

DATA COLLECTION NOTES :

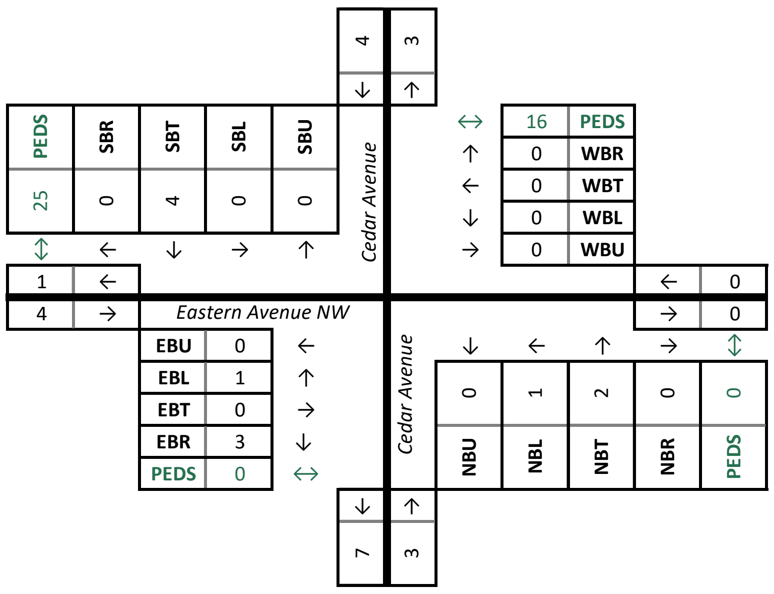
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:45 PM to 05:45 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

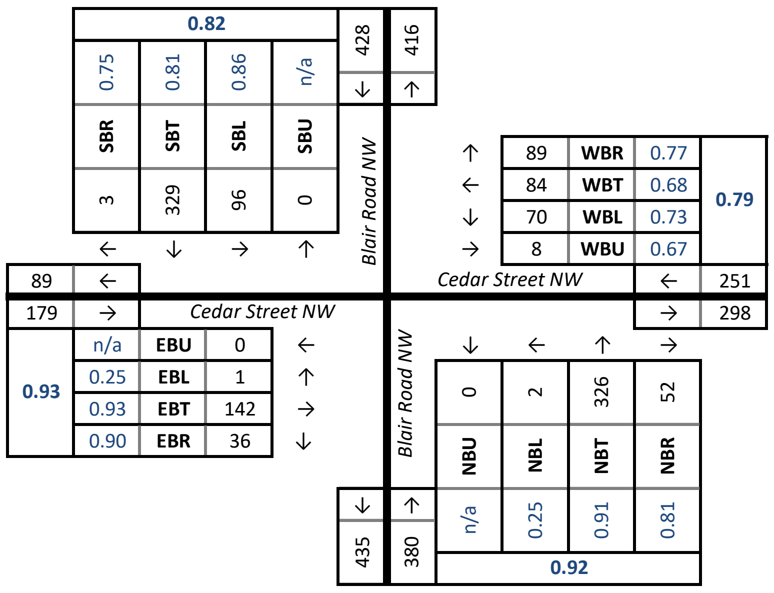
Intersection: 1. Blair Road NW & Cedar Street NW

ALL VEHICLES	Direction:	Southbound					Westbound					Northbound					Eastbound				
	Roadway:	Blair Road NW					Cedar Street NW					Blair Road NW					Cedar Street NW				
	Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM	to 04:15 PM	0	32	55	1	41	4	16	20	22	36	0	1	70	9	41	0	0	38	10	18
04:15 PM	to 04:30 PM	0	24	81	0	22	2	12	13	12	21	0	2	89	9	21	0	1	21	9	3
04:30 PM	to 04:45 PM	0	27	74	0	15	3	13	20	22	23	0	0	78	13	22	0	0	32	5	4
04:45 PM	to 05:00 PM	0	25	79	0	19	2	24	31	22	13	0	0	90	13	12	0	1	31	8	9
05:00 PM	to 05:15 PM	0	18	80	1	29	2	18	17	21	28	0	0	78	11	13	0	0	36	9	11
05:15 PM	to 05:30 PM	0	28	102	1	17	3	16	16	17	19	0	0	84	12	12	0	0	38	10	8
05:30 PM	to 05:45 PM	0	25	68	1	24	1	12	20	29	23	0	2	74	16	7	0	0	37	9	4
05:45 PM	to 06:00 PM	0	22	78	0	29	1	9	17	24	38	0	1	69	14	9	0	0	28	2	5
06:00 PM	to 06:15 PM	0	28	72	0	24	2	10	19	25	20	0	1	83	12	5	0	0	26	4	9
06:15 PM	to 06:30 PM	0	23	86	0	20	1	17	20	27	26	0	0	71	15	7	0	0	20	9	4
06:30 PM	to 06:45 PM	0	27	77	0	13	5	11	12	18	24	0	1	76	6	4	0	0	21	5	5
06:45 PM	to 07:00 PM	0	13	95	3	14	3	15	17	25	19	0	0	69	9	12	0	0	23	9	12
07:00 PM	to 07:15 PM																				
07:15 PM	to 07:30 PM																				
07:30 PM	to 07:45 PM																				
07:45 PM	to 08:00 PM																				
08:00 PM	to 08:15 PM																				
08:15 PM	to 08:30 PM																				
08:30 PM	to 08:45 PM																				
08:45 PM	to 09:00 PM																				
SYSTEM PEAK HR (VEH.)		428				89	251				83	380				44	179				32
04:45 PM	to 05:45 PM	0	96	329	3		8	70	84	89		0	2	326	52		0	1	142	36	
Peak Hour	Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF)	**0.95**	n/a	0.86	0.81	0.75	**0.82**	0.67	0.73	0.68	0.77	**0.79**	n/a	0.25	0.91	0.81	**0.92**	n/a	0.25	0.93	0.90	**0.93**

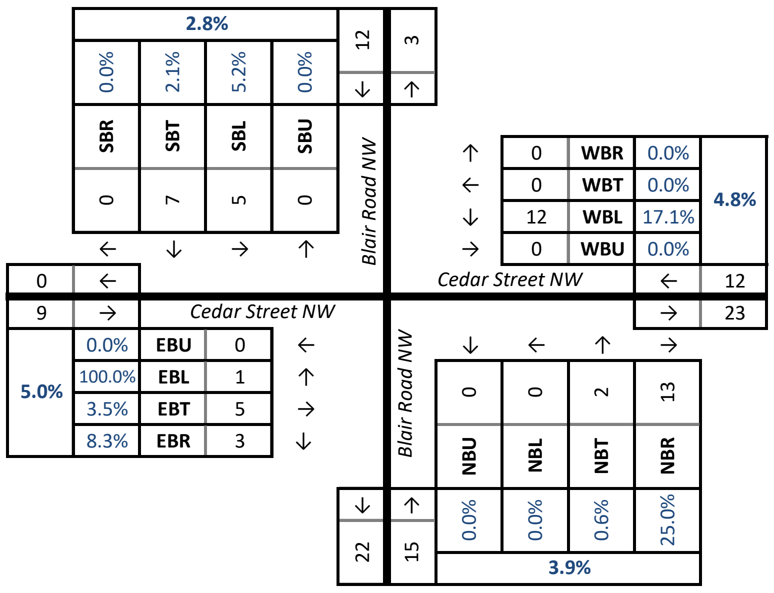
HEAVY VEHICLES (FHWA 4+)	Direction:	Southbound					Westbound					Northbound					Eastbound				
	Roadway:	Blair Road NW					Cedar Street NW					Blair Road NW					Cedar Street NW				
	Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM	to 04:15 PM	0	1	1	0		0	4	1	0		0	0	1	2		0	0	1	1	
04:15 PM	to 04:30 PM	0	1	2	0		0	2	0	0		0	0	0	2		0	0	0	1	
04:30 PM	to 04:45 PM	0	0	0	0		0	3	1	0		0	0	1	3		0	0	0	1	
04:45 PM	to 05:00 PM	0	3	2	0		0	2	0	0		0	0	1	4		0	1	2	0	
05:00 PM	to 05:15 PM	0	0	1	0		0	5	0	0		0	0	0	4		0	0	0	2	
05:15 PM	to 05:30 PM	0	2	3	0		0	3	0	0		0	0	1	1		0	0	1	1	
05:30 PM	to 05:45 PM	0	0	1	0		0	2	0	0		0	0	0	4		0	0	2	0	
05:45 PM	to 06:00 PM	0	1	1	0		0	3	0	1		0	0	1	2		0	0	0	0	
06:00 PM	to 06:15 PM	0	0	1	0		0	1	0	0		0	0	3	3		0	0	0	0	
06:15 PM	to 06:30 PM	0	0	1	0		0	2	0	0		0	0	0	5		0	0	1	0	
06:30 PM	to 06:45 PM	0	0	0	0		0	0	0	0		0	0	0	3		0	0	1	0	
06:45 PM	to 07:00 PM	0	0	1	0		0	3	0	0		0	0	0	2		0	0	1	0	
07:00 PM	to 07:15 PM																				
07:15 PM	to 07:30 PM																				
07:30 PM	to 07:45 PM																				
07:45 PM	to 08:00 PM																				
08:00 PM	to 08:15 PM																				
08:15 PM	to 08:30 PM																				
08:30 PM	to 08:45 PM																				
08:45 PM	to 09:00 PM																				
SYSTEM PEAK HR (VEH.)		12					12					15					9				
04:45 PM	to 05:45 PM	0	5	7	0		0	12	0	0		0	0	2	13		0	1	5	3	
	Heavy Vehicle % (PHV):	0.0%	5.2%	2.1%	0.0%	**2.8%**	0.0%	17.1%	0.0%	0.0%	**4.8%**	0.0%	0.0%	0.6%	25.0%	**3.9%**	0.0%	100.0%	3.5%	8.3%	**5.0%**
INT. PEAK HR (HV ONLY)		11					14					15					8				
04:30 PM	to 05:30 PM	0	5	6	0		0	13	1	0		0	0	3	12		0	1	3	4	
	Heavy Vehicle % (PHV):	0.0%	5.1%	1.8%	0.0%	**2.5%**	0.0%	18.3%	1.2%	0.0%	**5.7%**	0.0%	0.0%	0.9%	24.5%	**4.0%**	0.0%	100.0%	2.2%	12.5%	**4.7%**

BICYCLES	Direction:	Southbound					Westbound					Northbound					Eastbound				
	Roadway:	Blair Road NW					Cedar Street NW					Blair Road NW					Cedar Street NW				
	Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM	to 04:15 PM	0	1	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
04:15 PM	to 04:30 PM	0	0	0	0		0	1	0	0		0	0	1	0		0	0	1	0	
04:30 PM	to 04:45 PM	0	0	0	0		0	1	0	0		0	0	0	1		0	0	1	0	
04:45 PM	to 05:00 PM	0	0	0	0		0	0	1	0		0	0	1	0		0	0	0	0	
05:00 PM	to 05:15 PM	0	1	1	0		0	1	3	0		0	0	0	0		0	0	0	0	
05:15 PM	to 05:30 PM	0	1	0	1		0	2	1	0		0	0	0	0		0	0	1	0	
05:30 PM	to 05:45 PM	0	0	1	0		0	0	0	0		0	0	0	0		0	0	2	0	
05:45 PM	to 06:00 PM	0	0	0	0		0	1	0	0		0	0	1	1		0	0	2	0	
06:00 PM	to 06:15 PM	0	1	0	0		0	1	1	0		0	2	2	0		0	0	1	0	
06:15 PM	to 06:30 PM	0	0	0	0		0	1	0	1		0	0	0	0		0	0	0	0	
06:30 PM	to 06:45 PM	0	1	1	0		0	0	1	0		0	0	0	0		0	0	2	0	
06:45 PM	to 07:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
07:00 PM	to 07:15 PM																				
07:15 PM	to 07:30 PM																				
07:30 PM	to 07:45 PM																				
07:45 PM	to 08:00 PM																				
08:00 PM	to 08:15 PM																				
08:15 PM	to 08:30 PM																				
08:30 PM	to 08:45 PM																				
08:45 PM	to 09:00 PM																				
SYSTEM PEAK HR (VEH.)		5					8					1					3				
04:45 PM	to 05:45 PM	0	2	2	1		0	3	5	0		0	0	1	0		0	0	3	0	
INT. PEAK HR (BIKES)		4					6					6					6				
05:15 PM	to 06:15 PM	0	2	1	1		0	4	2	0		0	2	3	1		0	0	6	0	

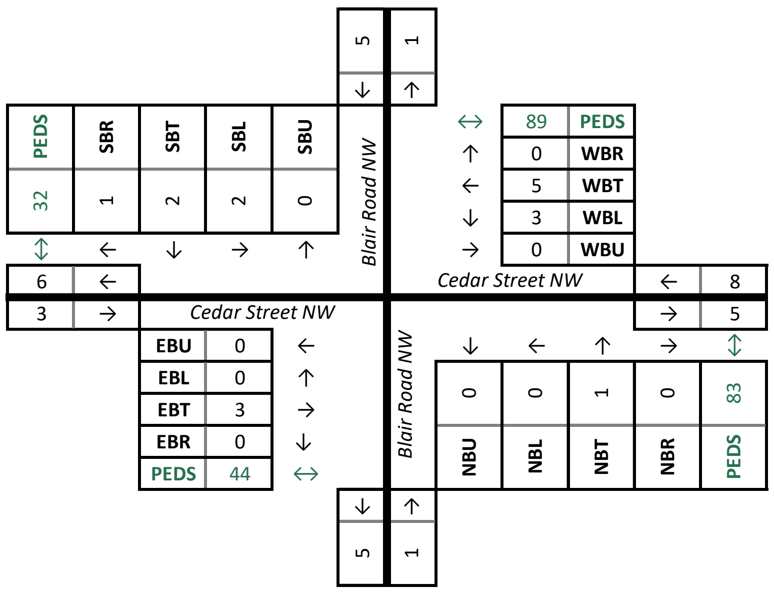
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



DATA COLLECTION NOTES :

Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:45 PM to 05:45 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

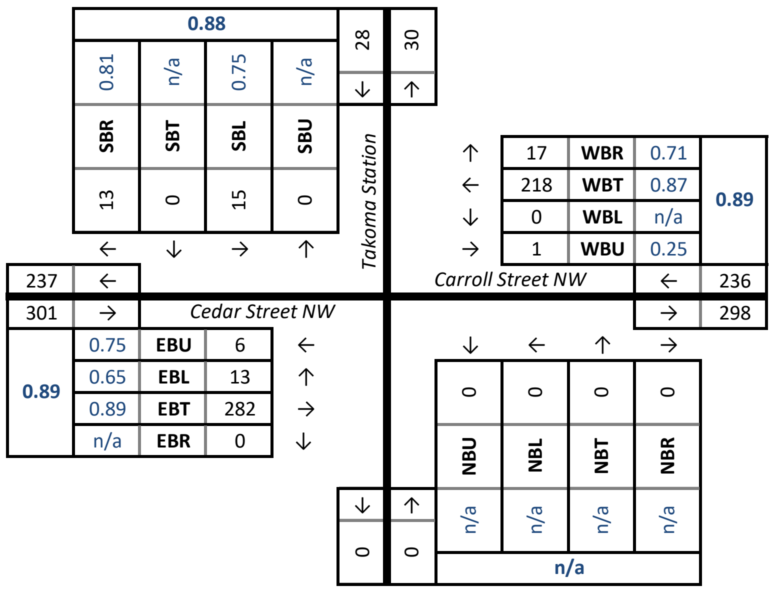
Intersection:	1. Takoma Station/ & Carroll Street NW/Cedar Street NW																			
ALL VEHICLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Takoma Station**					**Carroll Street NW**										**Cedar Street NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	4	0	4	39	2	0	56	4	0	0	0	0	0	0	0	1	77	0	23
04:15 PM to 04:30 PM	0	4	0	2	44	0	0	36	7	0	0	0	0	0	0	2	2	57	0	23
04:30 PM to 04:45 PM	0	5	0	3	31	0	0	62	5	0	0	0	0	0	0	3	2	78	0	25
04:45 PM to 05:00 PM	0	4	0	3	33	0	0	61	3	1	0	0	0	0	0	1	5	60	0	14
05:00 PM to 05:15 PM	0	3	0	4	37	1	0	51	5	1	0	0	0	0	0	1	3	67	0	30
05:15 PM to 05:30 PM	0	3	0	3	35	0	0	43	6	0	0	0	0	0	0	2	1	76	0	15
05:30 PM to 05:45 PM	0	5	0	3	55	0	0	63	3	1	0	0	0	0	0	2	4	79	0	14
05:45 PM to 06:00 PM	0	4	0	2	36	0	0	42	6	2	0	0	0	0	0	1	2	60	0	27
06:00 PM to 06:15 PM	0	5	0	1	42	1	0	55	7	0	0	0	0	0	0	2	4	58	0	12
06:15 PM to 06:30 PM	0	6	0	2	30	0	0	58	3	0	0	0	0	0	0	2	3	54	0	8
06:30 PM to 06:45 PM	0	5	0	3	29	0	0	53	6	0	0	0	0	0	0	0	3	53	0	13
06:45 PM to 07:00 PM	0	3	0	1	34	0	0	38	4	0	0	0	0	0	0	1	3	45	0	7
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	28				160	236				3	0				0	301				73
04:45 PM to 05:45 PM	0	15	0	13		1	0	218	17		0	0	0	0		6	13	282	0	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.89**	n/a	0.75	n/a	0.81	**0.88**	0.25	n/a	0.87	0.71	**0.89**	n/a	n/a	n/a	n/a	**n/a**	0.75	0.65	0.89	n/a	**0.89**

HEAVY VEHICLES (FHWA 4+) ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Takoma Station**					**Carroll Street NW**										**Cedar Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	4	0	3		0	0	1	4		0	0	0	0		0	1	1	0	
04:15 PM to 04:30 PM	0	4	0	2		0	0	0	7		0	0	0	0		0	2	1	0	
04:30 PM to 04:45 PM	0	5	0	3		0	0	1	5		0	0	0	0		1	2	2	0	
04:45 PM to 05:00 PM	0	4	0	3		0	0	0	3		0	0	0	0		0	5	3	0	
05:00 PM to 05:15 PM	0	3	0	4		0	0	0	5		0	0	0	0		0	3	2	0	
05:15 PM to 05:30 PM	0	3	0	3		0	0	0	5		0	0	0	0		0	1	1	0	
05:30 PM to 05:45 PM	0	4	0	3		0	0	1	3		0	0	0	0		0	4	2	0	
05:45 PM to 06:00 PM	0	4	0	2		0	0	0	6		0	0	0	0		0	2	1	0	
06:00 PM to 06:15 PM	0	5	0	1		0	0	0	7		0	0	0	0		0	4	0	0	
06:15 PM to 06:30 PM	0	6	0	2		0	0	0	3		0	0	0	0		0	3	2	0	
06:30 PM to 06:45 PM	0	5	0	2		0	0	0	6		0	0	0	0		0	3	1	0	
06:45 PM to 07:00 PM	0	3	0	1		0	0	0	3		0	0	0	0		0	3	1	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	27					17					0					21				
04:45 PM to 05:45 PM	0	14	0	13		0	0	1	16		0	0	0	0		0	13	8	0	
Heavy Vehicle % (PHV):	0.0%	93.3%	0.0%	100.0%	**96.4%**	0.0%	0.0%	0.5%	94.1%	**7.2%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	100.0%	2.8%	0.0%	**7.0%**
INT. PEAK HR (HV ONLY)	28					21					0					21				
04:15 PM to 05:15 PM	0	16	0	12		0	0	1	20		0	0	0	0		1	12	8	0	
Heavy Vehicle % (PHV):	0.0%	100.0%	0.0%	100.0%	**100.0%**	0.0%	0.0%	0.5%	100.0%	**9.1%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	14.3%	100.0%	3.1%	0.0%	**7.5%**

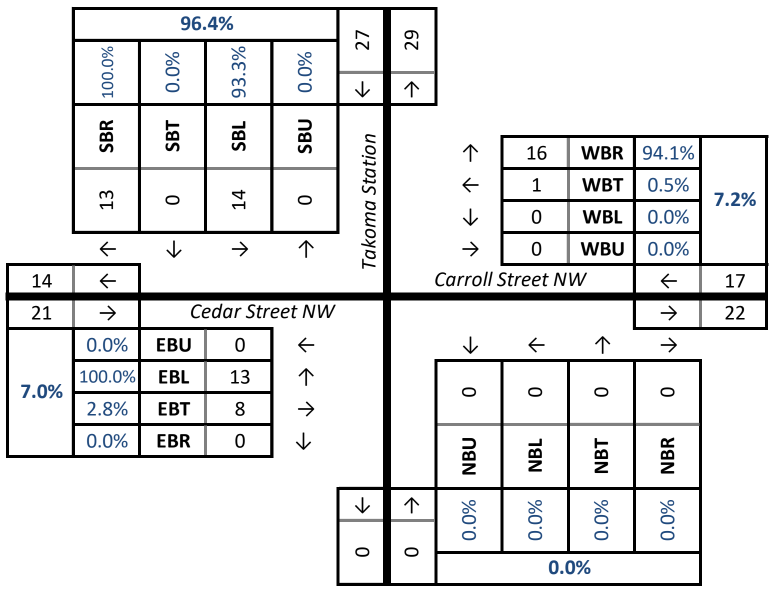
BICYCLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Takoma Station**					**Carroll Street NW**										**Cedar Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	2	2	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	1	1		0	0	0	0		0	1	0	0	
04:30 PM to 04:45 PM	0	0	0	2		0	0	1	0		0	0	0	0		0	1	0	0	
04:45 PM to 05:00 PM	0	1	0	2		0	0	2	0		0	0	0	0		0	0	0	0	
05:00 PM to 05:15 PM	0	0	0	0		0	0	5	0		0	0	0	0		0	0	0	0	
05:15 PM to 05:30 PM	0	0	0	3		0	0	1	0		0	0	0	0		0	2	2	0	
05:30 PM to 05:45 PM	0	1	0	0		0	0	1	0		0	0	0	0		0	1	4	0	
05:45 PM to 06:00 PM	0	0	0	1		0	0	2	0		0	0	0	0		0	1	0	0	
06:00 PM to 06:15 PM	0	2	0	1		0	0	2	0		0	0	0	0		0	0	5	0	
06:15 PM to 06:30 PM	0	1	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
06:30 PM to 06:45 PM	0	0	0	1		0	0	0	0		0	0	0	0		0	0	4	0	
06:45 PM to 07:00 PM	0	0	0	1		0	0	2	0		0	0	0	0		0	0	2	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	7					9					0					9				
04:45 PM to 05:45 PM	0	2	0	5		0	0	9	0		0	0	0	0		0	3	6	0	
INT. PEAK HR (BIKES)	8					6					0					15				
05:15 PM to 06:15 PM	0	3	0	5		0	0	6	0		0	0	0	0		0	4	11	0	

DATA COLLECTION NOTES :

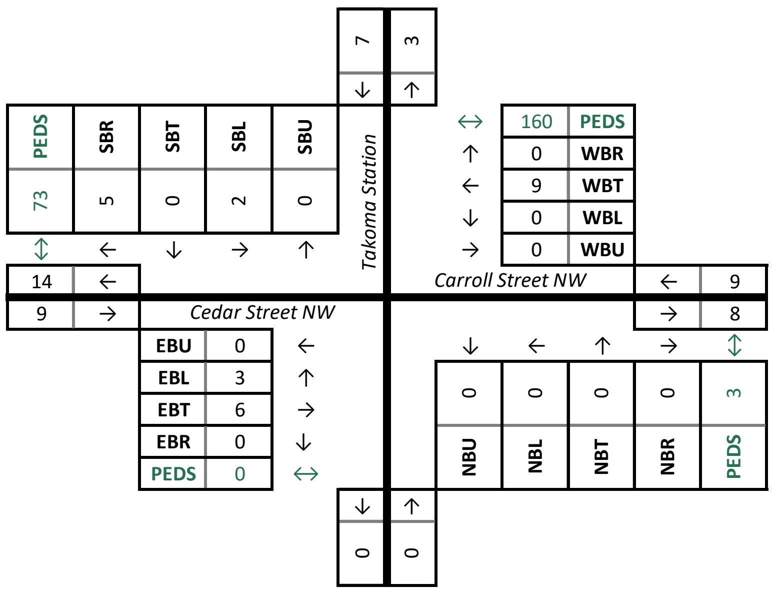
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developm
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:45 PM to 05:45 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

Intersection: 1. Cedar Street NW/ & Carroll Street NW

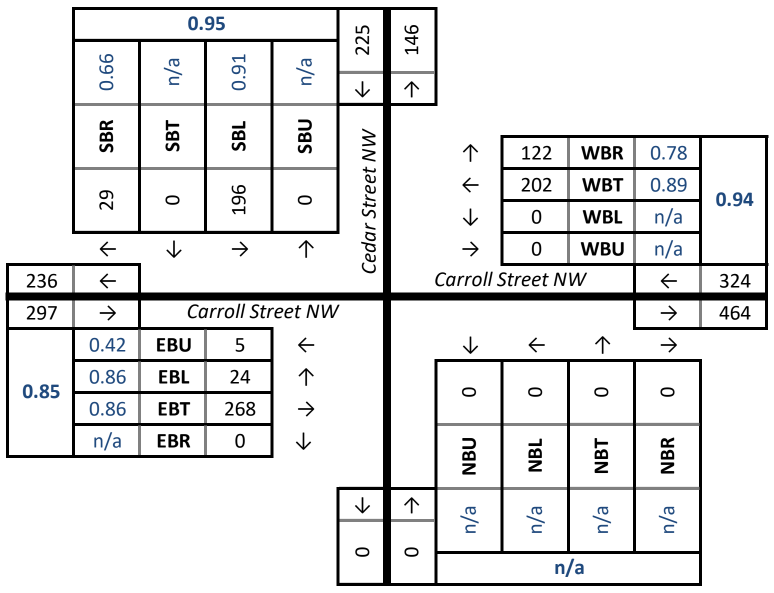
ALL VEHICLES	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Street NW**					**Carroll Street NW**										**Carroll Street NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	57	0	8	28	0	0	53	27	15	0	0	0	0	0	2	5	84	0	6
04:15 PM to 04:30 PM	0	47	0	5	31	0	0	37	21	7	0	0	0	0	0	0	3	57	0	0
04:30 PM to 04:45 PM	0	45	0	4	32	0	0	55	27	11	0	0	0	0	0	1	9	69	0	0
04:45 PM to 05:00 PM	0	46	0	9	27	0	0	57	29	4	0	0	0	0	0	1	7	55	0	1
05:00 PM to 05:15 PM	0	43	0	11	32	0	0	41	39	4	0	0	0	0	0	0	6	58	0	0
05:15 PM to 05:30 PM	0	54	0	3	21	0	0	54	24	2	0	0	0	0	0	1	5	77	0	2
05:30 PM to 05:45 PM	0	53	0	6	39	0	0	50	30	8	0	0	0	0	0	3	6	78	0	1
05:45 PM to 06:00 PM	0	27	0	1	27	0	0	52	34	3	0	0	0	0	0	0	9	62	0	0
06:00 PM to 06:15 PM	0	46	0	9	33	0	0	50	35	2	0	0	0	0	0	0	5	57	0	2
06:15 PM to 06:30 PM	0	35	0	9	21	0	0	55	26	2	0	0	0	0	0	1	4	59	0	0
06:30 PM to 06:45 PM	0	41	0	7	36	0	0	43	25	4	0	0	0	0	0	0	1	53	0	1
06:45 PM to 07:00 PM	0	37	0	0	23	0	0	49	36	2	0	0	0	0	0	1	3	49	0	3
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	225				119	324				18	0				0	297				4
04:45 PM to 05:45 PM	0	196	0	29		0	0	202	122		0	0	0	0		5	24	268	0	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.94**	n/a	0.91	n/a	0.66	**0.95**	n/a	n/a	0.89	0.78	**0.94**	n/a	n/a	n/a	n/a	**n/a**	0.42	0.86	0.86	n/a	**0.85**

HEAVY VEHICLES (FHWA 4+)	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Street NW**					**Carroll Street NW**										**Carroll Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	1	0	1		0	0	4	0		0	0	0	0		0	0	5	0	
04:15 PM to 04:30 PM	0	0	0	1		0	0	6	0		0	0	0	0		0	0	5	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	6	0		0	0	0	0		0	0	6	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	3	1		0	0	0	0		0	0	8	0	
05:00 PM to 05:15 PM	0	0	0	1		0	0	3	0		0	0	0	0		0	0	3	0	
05:15 PM to 05:30 PM	0	0	0	0		0	0	6	0		0	0	0	0		0	0	7	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	4	1		0	0	0	0		0	1	4	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	3	0		0	0	0	0		0	0	6	0	
06:00 PM to 06:15 PM	0	0	0	2		0	0	6	0		0	0	0	0		0	0	4	0	
06:15 PM to 06:30 PM	0	0	0	0		0	0	3	1		0	0	0	0		0	0	9	0	
06:30 PM to 06:45 PM	0	0	0	2		0	0	4	0		0	0	0	0		0	0	5	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	4	0		0	0	0	0		0	0	5	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	1					18					0					23				
04:45 PM to 05:45 PM	0	0	0	1		0	0	16	2		0	0	0	0		0	1	22	0	
Heavy Vehicle % (PHV):	0.0%	0.0%	0.0%	3.4%	**0.4%**	0.0%	0.0%	7.9%	1.6%	**5.6%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	4.2%	8.2%	0.0%	**7.7%**
INT. PEAK HR (HV ONLY)	3					20					0					24				
04:00 PM to 05:00 PM	0	1	0	2		0	0	19	1		0	0	0	0		0	0	24	0	
Heavy Vehicle % (PHV):	0.0%	0.5%	0.0%	7.7%	**1.4%**	0.0%	0.0%	9.4%	1.0%	**6.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	9.1%	0.0%	**8.2%**

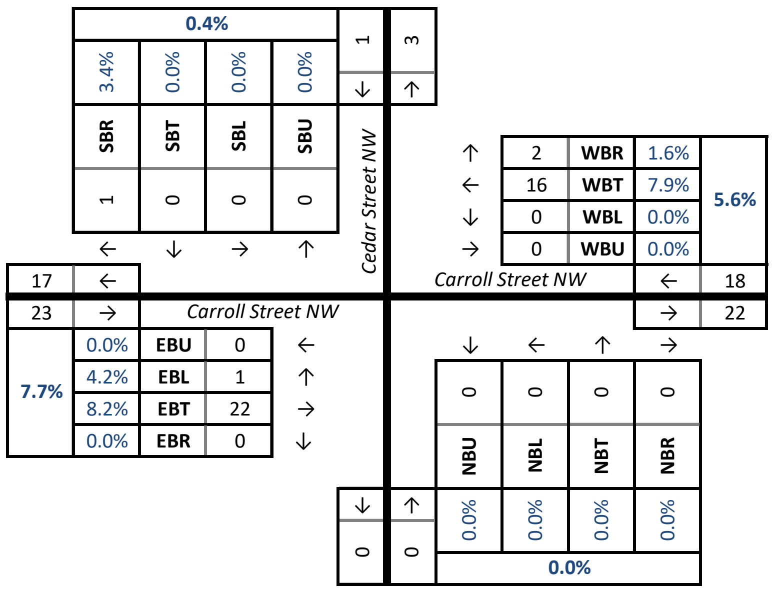
BICYCLES	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Cedar Street NW**					**Carroll Street NW**										**Carroll Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	1		0	0	0	2		0	0	0	0		0	2	1	0	
04:15 PM to 04:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	1	0	
04:45 PM to 05:00 PM	0	0	0	0		0	0	2	2		0	0	0	0		0	0	1	0	
05:00 PM to 05:15 PM	0	3	0	0		0	0	2	0		0	0	0	0		0	0	2	0	
05:15 PM to 05:30 PM	0	0	0	1		0	0	0	0		0	0	0	0		0	0	2	0	
05:30 PM to 05:45 PM	0	1	0	0		0	0	1	1		0	0	0	0		0	1	3	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	0	0	
06:00 PM to 06:15 PM	0	1	0	0		0	0	2	1		0	0	0	0		0	1	4	0	
06:15 PM to 06:30 PM	0	1	0	0		0	0	1	0		0	0	0	0		0	0	2	0	
06:30 PM to 06:45 PM	0	0	0	0		0	0	1	0		0	0	0	0		0	0	3	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	2	1		0	0	0	0		0	1	1	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	5					8					0					9				
04:45 PM to 05:45 PM	0	4	0	1		0	0	5	3		0	0	0	0		0	1	8	0	
INT. PEAK HR (BIKES)	5					8					0					9				
04:45 PM to 05:45 PM	0	4	0	1		0	0	5	3		0	0	0	0		0	1	8	0	

DATA COLLECTION NOTES :

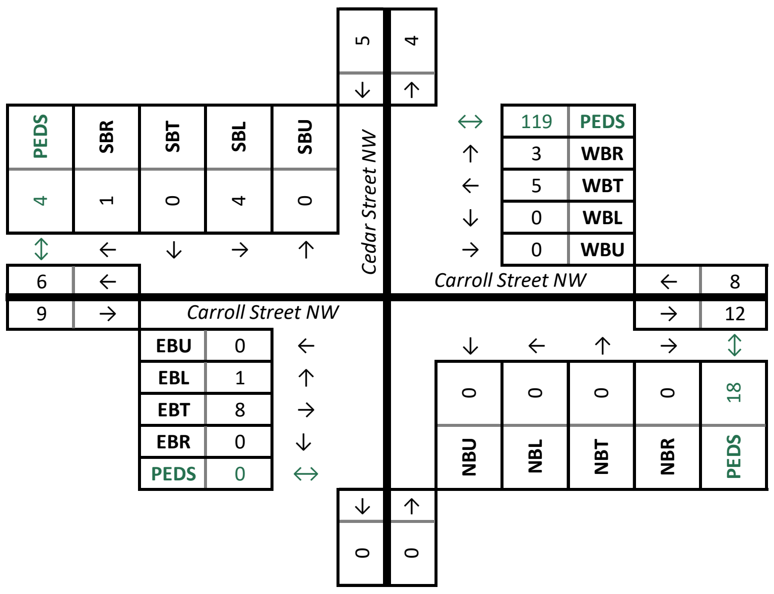
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



Gorove/Slade Associates - Multimodal Turning Movement Count Report

Project Name : Takoma Metro Multifamily Developn
Project # : 2592-015
Location Washington DC
Data Source: Gorove/Slade Associates, Inc.

Analysis Period: STUDY_PERIOD 04:00 PM to 07:00 PM
Date of Counts: Thursday, May 19, 2022
Weather: Partly Cloudy

Volumes Displayed as: 2. System Peak (vehicle)
Intersection Peak Hour (all vehicles): 04:00 PM to 05:00 PM
System Peak Hour (all vehicles): 04:45 PM to 05:45 PM
User-Defined Peak Hour: 05:00 PM to 06:00 PM

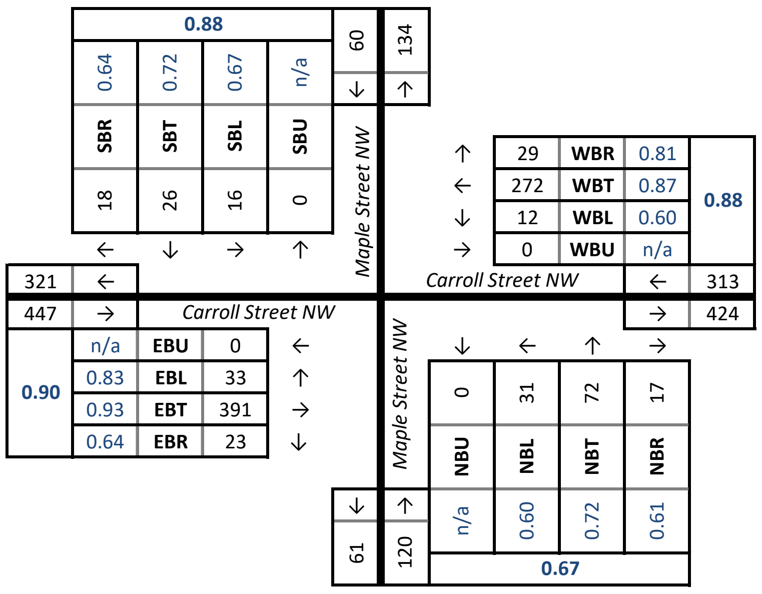
Intersection: **1. Maple Street NW & Carroll Street NW**

ALL VEHICLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Maple Street NW**					**Carroll Street NW**					**Maple Street NW**					**Carroll Street NW**				
Movement:	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds	U	Left	Thru	Right	Peds
04:00 PM to 04:15 PM	0	6	5	8	12	0	1	66	7	12	0	8	17	9	5	0	3	132	4	5
04:15 PM to 04:30 PM	0	5	4	3	17	0	1	47	4	3	0	7	16	6	12	0	8	106	2	5
04:30 PM to 04:45 PM	0	2	6	6	29	0	4	78	10	4	0	7	23	9	9	0	6	93	10	6
04:45 PM to 05:00 PM	0	2	9	3	30	0	5	78	6	8	0	5	16	2	16	0	9	95	5	8
05:00 PM to 05:15 PM	0	5	5	7	27	0	1	71	8	12	0	13	25	7	24	0	4	90	3	23
05:15 PM to 05:30 PM	0	6	6	5	19	0	3	54	9	7	0	6	16	5	15	0	10	105	9	7
05:30 PM to 05:45 PM	0	3	6	3	18	0	3	69	6	10	0	7	15	3	16	0	10	101	6	14
05:45 PM to 06:00 PM	0	7	4	3	53	0	2	71	9	15	0	9	14	7	14	0	4	102	6	19
06:00 PM to 06:15 PM	0	5	7	6	42	0	5	74	9	8	0	9	18	5	16	0	7	83	5	9
06:15 PM to 06:30 PM	0	5	7	5	20	0	2	66	9	9	0	9	11	8	17	0	8	79	8	12
06:30 PM to 06:45 PM	0	4	5	4	42	0	3	62	8	8	0	8	12	7	10	0	6	86	5	15
06:45 PM to 07:00 PM	0	0	9	7	37	0	4	62	3	7	0	5	11	7	6	0	3	86	1	14
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	60				94	313				37	120				71	447				52
04:45 PM to 05:45 PM	0	16	26	18		0	12	272	29		0	31	72	17		0	33	391	23	
Peak Hour Overall	U	Left	Thru	Right	**SB**	U	Left	Thru	Right	**WB**	U	Left	Thru	Right	**NB**	U	Left	Thru	Right	**EB**
Factor (PHF) **0.98**	n/a	0.67	0.72	0.64	**0.88**	n/a	0.60	0.87	0.81	**0.88**	n/a	0.60	0.72	0.61	**0.67**	n/a	0.83	0.93	0.64	**0.90**

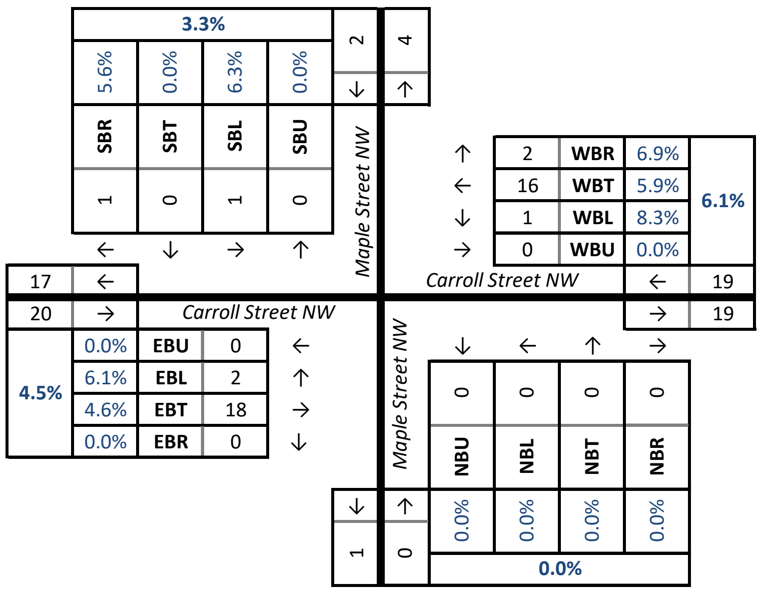
HEAVY VEHICLES (FHWA 4+) ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Maple Street NW**					**Carroll Street NW**					**Maple Street NW**					**Carroll Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	5	0		0	0	0	0		0	0	5	0	
04:15 PM to 04:30 PM	0	1	1	1		0	0	5	0		0	0	0	0		0	0	5	0	
04:30 PM to 04:45 PM	0	0	0	1		0	0	5	0		0	0	0	0		0	1	5	0	
04:45 PM to 05:00 PM	0	0	0	0		0	1	4	0		0	0	0	0		0	1	7	0	
05:00 PM to 05:15 PM	0	0	0	0		0	0	5	1		0	0	0	0		0	0	3	0	
05:15 PM to 05:30 PM	0	1	0	1		0	0	3	1		0	0	0	0		0	0	4	0	
05:30 PM to 05:45 PM	0	0	0	0		0	0	4	0		0	0	0	0		0	1	4	0	
05:45 PM to 06:00 PM	0	0	0	0		0	0	5	0		0	0	0	0		0	0	6	0	
06:00 PM to 06:15 PM	0	0	0	1		0	0	5	0		0	0	0	0		0	0	4	0	
06:15 PM to 06:30 PM	0	0	0	0		0	0	3	0		0	0	0	0		0	1	8	0	
06:30 PM to 06:45 PM	0	0	0	0		0	0	5	0		0	0	0	0		0	0	4	0	
06:45 PM to 07:00 PM	0	0	0	0		0	0	4	0		0	0	0	0		0	0	6	1	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	2					19					0					20				
04:45 PM to 05:45 PM	0	1	0	1		0	1	16	2		0	0	0	0		0	2	18	0	
Heavy Vehicle % (PHV):	0.0%	6.3%	0.0%	5.6%	**3.3%**	0.0%	8.3%	5.9%	6.9%	**6.1%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	6.1%	4.6%	0.0%	**4.5%**
INT. PEAK HR (HV ONLY)	4					20					0					24				
04:00 PM to 05:00 PM	0	1	1	2		0	1	19	0		0	0	0	0		0	2	22	0	
Heavy Vehicle % (PHV):	0.0%	6.7%	4.2%	10.0%	**6.8%**	0.0%	9.1%	7.1%	0.0%	**6.5%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	7.7%	5.2%	0.0%	**5.1%**

BICYCLES ***Direction:***	Southbound					Westbound					Northbound					Eastbound				
Roadway:	**Maple Street NW**					**Carroll Street NW**					**Maple Street NW**					**Carroll Street NW**				
Movement:	U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right		U	Left	Thru	Right	
04:00 PM to 04:15 PM	0	0	0	0		0	0	1	0		0	0	0	1		0	0	1	0	
04:15 PM to 04:30 PM	0	0	1	0		0	0	0	0		0	0	1	0		0	0	0	0	
04:30 PM to 04:45 PM	0	0	0	0		0	0	0	0		0	0	1	0		0	0	0	0	
04:45 PM to 05:00 PM	0	0	0	2		0	1	2	0		0	0	0	0		0	0	1	0	
05:00 PM to 05:15 PM	0	0	1	0		0	0	1	1		0	1	0	0		0	1	3	0	
05:15 PM to 05:30 PM	0	0	1	0		0	0	0	0		0	1	0	0		0	0	3	0	
05:30 PM to 05:45 PM	0	0	1	1		0	0	1	0		0	0	5	0		0	4	0	1	
05:45 PM to 06:00 PM	0	0	5	0		0	0	1	0		0	0	1	0		0	1	0	0	
06:00 PM to 06:15 PM	0	0	0	1		0	0	1	0		0	0	2	1		0	1	3	0	
06:15 PM to 06:30 PM	0	1	1	0		0	1	1	1		0	1	2	0		0	0	1	1	
06:30 PM to 06:45 PM	0	0	0	0		0	0	1	0		0	0	1	0		0	1	2	0	
06:45 PM to 07:00 PM	0	0	0	1		0	0	1	0		0	0	3	0		0	0	2	0	
07:00 PM to 07:15 PM																				
07:15 PM to 07:30 PM																				
07:30 PM to 07:45 PM																				
07:45 PM to 08:00 PM																				
08:00 PM to 08:15 PM																				
08:15 PM to 08:30 PM																				
08:30 PM to 08:45 PM																				
08:45 PM to 09:00 PM																				
SYSTEM PEAK HR (VEH.)	6					6					7					13				
04:45 PM to 05:45 PM	0	0	3	3		0	1	4	1		0	2	5	0		0	5	7	1	
INT. PEAK HR (BIKES)	10					6					12					12				
05:30 PM to 06:30 PM	0	1	7	2		0	1	4	1		0	1	10	1		0	6	4	2	

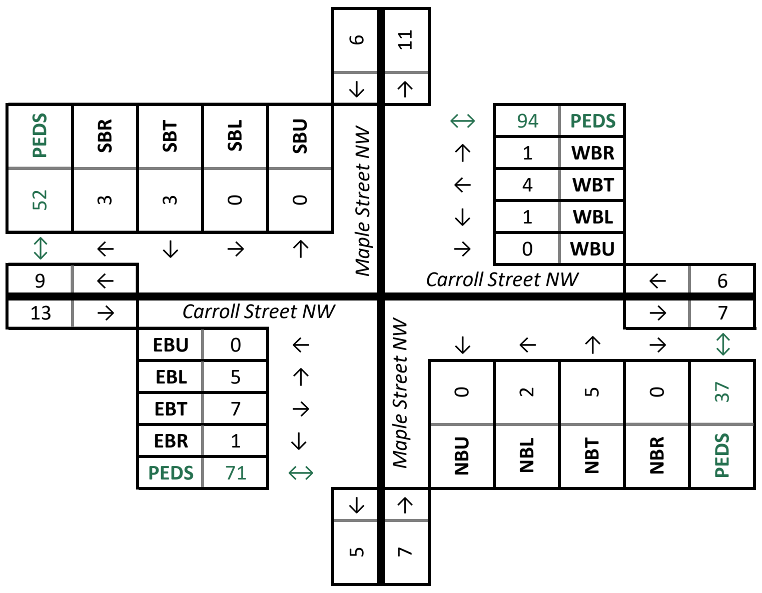
VEHICLE PEAK HOUR VOLS AND PHF: System Peak (vehicle)



HEAVY VEH PEAK HOUR VOLS AND PHV: System Peak (vehicle)



PED AND BIKE PEAK HOUR VOLUMES: System Peak (vehicle)



DATA COLLECTION NOTES :

E. Background Development Trip Generation Information

Excerpt from Children's National at Walter Reed CTR
(ZC Case No. 19-24, Exhibit No. 18A)

TRIP GENERATION

This chapter outlines the Project's transportation demand. It summarizes the projected trip generation of the Project by mode, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10th Edition. This methodology was supplemented to account for the urban nature of the Project (the *Trip Generation Manual* provides data for non-urban, low transit use Sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

Trip generation for the R&D, institutional, clinical office, and laboratory space was calculated based on ITE land use 760, Research and Development Center. Trip generation for the residential component of the CNRIC development was calculated based on ITE land use 221, Multifamily Housing (Mid-Rise). Trip generation for the outpatient/ambulatory clinic space component of the CNRIC development was calculated based on ITE land use 630, clinic. While the conference space component of the CNRIC development that is analyzed in this report is anticipated to be support space to the CNRIC Phase I auditorium, as a conservative measure trip generation for the conference space was calculated using Zoning Regulation parking guidelines for entertainment, assembly and performing arts uses which require two (2) parking spaces for every 1,000 square feet and supplemented with the directional split of ITE land use 444, movie theater.

Trips were split into different modes using assumptions derived from census data for the residents that currently live near the Site, WMATA ridership survey data, and projected developments surrounding the study area. A summary of the mode split assumptions is provided in Table 3, and a summary of the multimodal trip generation for the Project, based on ITE, is provided in Table 4 for both peak hours. Detailed calculations are included in the Technical Attachments.

Table 3: CNRIC Mode Split Assumptions

Land Use	Mode			
	Drive	Transit	Bike	Walk
Residential	45%	45%	1%	9%
Non-Residential (Clinical Office, R&D Visitors, etc.)	55%	35%	5%	5%
Event	60%	35%	1%	4%

The Project is expected to generate new trips on the surrounding transportation network across all modes. The AM peak hour trip generation is projected to include 316 vehicles/hour, 246 transit riders/hour, 32 bicycle trips/hour, and 36 walking trips/hour. The PM peak hour trip generation is projected to include 331 vehicles/hour, 258 transit riders/hour, 33 bicycle trips/hour, and 37 walking trips/hour.

Table 4: ITE Multi-Modal Trip Generation Summary

Mode	AM Peak Hour			PM Peak Hour			Weekday
	In	Out	Total	In	Out	Total	Total
Auto	242 veh/hr	74 veh/hr	316 veh/hr	87 veh/hr	244 veh/hr	331 veh/hr	5817 veh
Transit	186 ppl/hr	60 ppl/hr	246 ppl/hr	73 ppl/hr	185 ppl/hr	258 ppl/hr	4433 ppl
Bike	24 ppl/hr	8 ppl/hr	32 ppl/hr	7 ppl/hr	26 ppl/hr	33 ppl/hr	610 ppl
Walk	27 ppl/hr	9 ppl/hr	36 ppl/hr	10 ppl/hr	27 ppl/hr	37 ppl/hr	640 ppl

Excerpt from Children's National at Walter Reed CTR
(ZC Case No. 19-24, Exhibit No. 18A)

Figure 20: Site Trip Distribution with DoS FMC Access

GOROVE / SLADE

1140 Connecticut Avenue NW
Suite 600
Washington, DC 20036
202.296.8625

TECHNICAL MEMORANDUM

To: Samson Cheng 	Square 134

From: Vinay Varadarajan, PE
Katie Wagner, PE, PTOE
Erwin N. Andres

Date: March 13, 2020

Subject: 218 Cedar Street, NW Redevelopment Loading Management Plan

INTRODUCTION

This memorandum presents a Loading Management Plan for the proposed redevelopment at 218 Cedar Street, NW in Washington, DC. An existing convenience store with surface parking lot is slated for redevelopment as a mixed-use property. Loading for the proposed redevelopment is located at the northern portion of the property, accessible from Cedar Street. The loading spaces include one (1) 30-foot loading berth.

PROJECT DESCRIPTION

The subject property is located at 218 Cedar Street in the Takoma neighborhood of Northwest, DC. The Applicant is redeveloping the existing convenience store and surface lot into a mixed-use building featuring 36 condominium units and approximately 9,182 square feet of ground-floor retail. The property is located on a rectangular parcel and is bordered by residential properties to the north, a mixed-use development at 255 Carroll Street to the east, Cedar Street to the west, and Carroll Street to the south, as seen in Figure 1. Existing vehicular access to the property surface lot is from three (3) curb cuts: one (1) on Carroll Street and two (2) on Cedar Street. The redevelopment plans call for the existing curb cut on Carroll Street to be removed, with all vehicular access taking place from the two (2) 24-foot curb cuts on Cedar Street. Adjacent to the loading area will be the entrance to the parking garage, which is access controlled and will feature 10 parking spaces, with seven (7) spaces managed through an electronic lift system.

ZONING REQUIREMENTS

Per DC Zoning requirements, a retail development between 5,000 and 20,000 square feet GFA is required to provide one (1) loading berth. The residential portion of the development is exempt from providing loading. A loading area has been created for the proposed development to include one (1) 30-foot loading berths along the northern portion of the property, meeting zoning requirements. As shown in the attached turning maneuvers, the 30-foot trucks may use Cedar Street to reach the loading berth. The loading area has been designed such that vehicles are able to access the loading area using back-in and back-out maneuvers.

F. Vehicular Capacity Analysis Worksheets – 2022 Existing Conditions

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	112	121	175	30	38	193	11	35	554	1
v/c Ratio	0.24	0.32	0.40	0.08	0.13	0.29	0.02	0.06	0.57	0.00
Control Delay	32.7	34.7	36.0	30.2	16.4	17.2	15.4	11.0	18.4	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	34.7	36.0	30.2	16.4	17.2	15.4	11.0	18.4	10.0
Queue Length 50th (ft)	65	72	107	16	12	59	3	11	253	0
Queue Length 95th (ft)	113	126	174	40	m24	m85	m9	25	358	3
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	474	379	442	399	296	660	561	624	978	784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.32	0.40	0.08	0.13	0.29	0.02	0.06	0.57	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	2	101	111	43	118	28	35	178	10	32	510	1
Future Volume (vph)	2	101	111	43	118	28	35	178	10	32	510	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.94	1.00	1.00	1.00	1.00	1.00	0.94
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1544	1232		1592	1297	1543	1651	1403	1593	1677	1345
Flt Permitted		1.00	1.00		0.89	1.00	0.46	1.00	1.00	0.53	1.00	1.00
Satd. Flow (perm)		1539	1232		1435	1297	742	1651	1403	889	1677	1345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	110	121	47	128	30	38	193	11	35	554	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	112	121	0	175	30	38	193	11	35	554	1
Confl. Peds. (#/hr)	13		15	15		13	7					7
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		35.0	35.0		35.0	35.0	46.0	46.0	46.0	68.0	68.0	68.0
Effective Green, g (s)		37.0	37.0		37.0	37.0	48.0	48.0	48.0	70.0	70.0	70.0
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.40	0.40	0.40	0.58	0.58	0.58
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		474	379		442	399	296	660	561	624	978	784
v/s Ratio Prot								0.12		0.01	c0.33	
v/s Ratio Perm		0.07	0.10		c0.12	0.02	0.05		0.01	0.02		0.00
v/c Ratio		0.24	0.32		0.40	0.08	0.13	0.29	0.02	0.06	0.57	0.00
Uniform Delay, d1		31.0	31.8		32.7	29.4	22.8	24.5	21.8	11.0	15.6	10.4
Progression Factor		1.00	1.00		1.00	1.00	0.66	0.65	0.70	1.00	1.00	1.00
Incremental Delay, d2		1.2	2.2		2.6	0.4	0.8	1.0	0.1	0.2	2.4	0.0
Delay (s)		32.1	34.0		35.3	29.8	15.9	16.9	15.2	11.1	17.9	10.4
Level of Service		C	C		D	C	B	B	B	B	B	B
Approach Delay (s)		33.1			34.5			16.7			17.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
12/05/2022

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	14	134	172	4	2	13
Future Volume (vph)	14	134	172	4	2	13
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	149	191	4	2	14

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	165	195	16
Volume Left (vph)	16	0	2
Volume Right (vph)	0	4	14
Hadj (s)	0.09	0.07	-0.50
Departure Headway (s)	4.2	4.2	4.2
Degree Utilization, x	0.19	0.23	0.02
Capacity (veh/h)	841	852	788
Control Delay (s)	8.2	8.4	7.3
Approach Delay (s)	8.2	8.4	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	8.3		
Level of Service	A		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Kiss and Ride & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	120	16	22	161	15	6
Future Volume (Veh/h)	120	16	22	161	15	6
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	17	24	175	16	7
Pedestrians	1				10	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			157		372	148
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			157		372	148
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	99
cM capacity (veh/h)			1399		616	896

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	147	199	23
Volume Left	0	24	16
Volume Right	17	0	7
cSH	1700	1399	681
Volume to Capacity	0.09	0.02	0.03
Queue Length 95th (ft)	0	1	3
Control Delay (s)	0.0	1.0	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	1.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	⇆	
Traffic Volume (veh/h)	124	1	1	181	2	2
Future Volume (Veh/h)	124	1	1	181	2	2
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	138	1	1	201	2	2
Pedestrians	1				7	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			146		350	146
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			146		350	146
tC, single (s)			4.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	4.2
p0 queue free %			100		100	100
cM capacity (veh/h)			1422		487	693

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	139	202	4
Volume Left	0	1	2
Volume Right	1	0	2
cSH	1700	1422	572
Volume to Capacity	0.08	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	11.3
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	126	156	3	0	31
Future Volume (vph)	0	126	156	3	0	31
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	140	173	3	0	34

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	140	173	3	34
Volume Left (vph)	0	173	0	0
Volume Right (vph)	140	0	0	34
Hadj (s)	-0.52	0.55	0.05	-0.55
Departure Headway (s)	3.9	5.3	4.8	3.2
Degree Utilization, x	0.15	0.26	0.00	0.03
Capacity (veh/h)	886	655	717	1121
Control Delay (s)	7.6	9.0	6.7	6.3
Approach Delay (s)	7.6	8.9		6.3
Approach LOS	A	A		A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
7: Blair Rd & Cedar St

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	109	87	284	172	273	32	508
v/c Ratio	0.41	0.27	0.61	0.55	0.62	0.07	0.76
Control Delay	47.6	24.1	31.6	15.0	4.8	0.2	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.3	3.7	0.1
Total Delay	47.6	24.1	31.6	15.0	5.1	3.9	32.1
Queue Length 50th (ft)	74	46	176	40	0	0	212
Queue Length 95th (ft)	131	m87	279	112	0	m0	370
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	266	328	462	311	439	464	670
Starvation Cap Reductn	0	0	0	0	17	379	0
Spillback Cap Reductn	0	0	0	0	0	0	5
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.27	0.61	0.55	0.65	0.38	0.76

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development

12/05/2022

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	73	28	80	261	158	0	251	29	60	407	1
Future Volume (vph)	0	73	28	80	261	158	0	251	29	60	407	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.98		1.00	1.00	0.45		1.00	0.86		1.00	
Flpb, ped/bikes		1.00		0.97	1.00	1.00		1.00	1.00		1.00	
Frt		0.96		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1389		1424	1543	592		1424	1037		1641	
Flt Permitted		1.00		0.68	1.00	1.00		1.00	1.00		0.92	
Satd. Flow (perm)		1389		1020	1543	592		1424	1037		1523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	79	30	87	284	172	0	273	32	65	442	1
RTOR Reduction (vph)	0	0	0	0	0	120	0	0	22	0	0	0
Lane Group Flow (vph)	0	109	0	87	284	52	0	273	10	0	508	0
Confl. Peds. (#/hr)	103		15	15		103	15		77	77		15
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	1%	1%	1%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		21.0		34.0	34.0	34.0		35.0	35.0		44.0	
Effective Green, g (s)		23.0		36.0	36.0	36.0		37.0	37.0		48.0	
Actuated g/C Ratio		0.19		0.30	0.30	0.30		0.31	0.31		0.40	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		266		329	462	177		439	319		620	
v/s Ratio Prot		0.08		0.02	c0.18			0.19			c0.08	
v/s Ratio Perm				0.06		0.09			0.01		c0.25	
v/c Ratio		0.41		0.26	0.61	0.29		0.62	0.03		0.82	
Uniform Delay, d1		42.5		32.3	36.0	32.2		35.5	29.0		32.1	
Progression Factor		0.99		0.68	0.71	2.33		0.00	1.00		0.90	
Incremental Delay, d2		4.6		1.8	5.5	3.8		4.6	0.1		9.8	
Delay (s)		46.8		23.6	31.0	78.9		4.8	29.1		38.8	
Level of Service		D		C	C	E		A	C		D	
Approach Delay (s)		46.8			45.0			7.3			38.8	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	560	311
v/c Ratio	0.46	0.70
Control Delay	1.9	48.1
Queue Delay	1.3	0.0
Total Delay	3.2	48.1
Queue Length 50th (ft)	0	215
Queue Length 95th (ft)	0	322
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1207	445
Starvation Cap Reductn	425	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.72	0.70

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/05/2022

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↳			↑
Traffic Volume (vph)	0	0	463	52	0	280
Future Volume (vph)	0	0	463	52	0	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.99			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1505			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1505			1574
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.90
Adj. Flow (vph)	0	0	503	57	0	311
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	556	0	0	311
Confl. Peds. (#/hr)		77				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			32.0
Effective Green, g (s)			94.0			34.0
Actuated g/C Ratio			0.78			0.28
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1178			445
v/s Ratio Prot			c0.37			c0.20
v/s Ratio Perm						
v/c Ratio			0.47			0.70
Uniform Delay, d1			4.5			38.4
Progression Factor			0.25			1.00
Incremental Delay, d2			1.0			8.8
Delay (s)			2.1			47.2
Level of Service			A			D
Approach Delay (s)	0.0		2.1			47.2
Approach LOS	A		A			D

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
12/05/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	10	145	461	19	15	13
Future Volume (Veh/h)	10	145	461	19	15	13
Sign Control		Free	Free		Stop	
Grade		6%	4%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	151	480	20	16	14
Pedestrians		84	1		158	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		7	0		13	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		312	206			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	658				820	732
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	497				690	585
tC, single (s)	4.2				7.4	7.2
tC, 2 stage (s)						
tF (s)	2.3				4.4	4.2
p0 queue free %	99				92	94
cM capacity (veh/h)	756				211	249

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	161	500	30
Volume Left	10	0	16
Volume Right	0	20	14
cSH	756	1700	227
Volume to Capacity	0.01	0.29	0.13
Queue Length 95th (ft)	1	0	11
Control Delay (s)	0.7	0.0	23.3
Lane LOS	A		C
Approach Delay (s)	0.7	0.0	23.3
Approach LOS			C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/05/2022

	→	←	↖	↘
Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	172	456	152	140
v/c Ratio	0.19	0.49	0.27	0.65
Control Delay	2.0	6.2	4.6	62.7
Queue Delay	0.0	0.8	0.0	0.0
Total Delay	2.0	7.0	4.6	62.7
Queue Length 50th (ft)	18	94	19	103
Queue Length 95th (ft)	m21	130	m32	#185
Internal Link Dist (ft)	126	337		365
Turn Bay Length (ft)			125	
Base Capacity (vph)	907	925	566	215
Starvation Cap Reductn	0	214	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.19	0.64	0.27	0.65

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/05/2022

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑	↱	↰↱	
Traffic Volume (vph)	13	152	438	146	101	34
Future Volume (vph)	13	152	438	146	101	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.78	0.99	
Flpb, ped/bikes		0.99	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.97	
Flt Protected		1.00	1.00	1.00	0.96	
Satd. Flow (prot)		1255	1521	932	1358	
Flt Permitted		0.97	1.00	1.00	0.96	
Satd. Flow (perm)		1218	1521	932	1358	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	14	158	456	152	105	35
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	172	456	152	140	0
Confl. Peds. (#/hr)	89			89	12	5
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	10%	10%	6%	6%	6%	6%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		87.0	71.0	71.0	17.0	
Effective Green, g (s)		89.0	73.0	73.0	19.0	
Actuated g/C Ratio		0.74	0.61	0.61	0.16	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		907	925	566	215	
v/s Ratio Prot		c0.02	c0.30		c0.10	
v/s Ratio Perm		0.12		0.16		
v/c Ratio		0.19	0.49	0.27	0.65	
Uniform Delay, d1		4.7	13.1	11.0	47.4	
Progression Factor		0.33	0.36	0.33	1.00	
Incremental Delay, d2		0.4	1.4	0.9	14.3	
Delay (s)		2.0	6.1	4.5	61.7	
Level of Service		A	A	A	E	
Approach Delay (s)		2.0	5.7		61.7	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

Takoma Metro Multifamily Development
12/05/2022

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	275	620	48	73
v/c Ratio	0.28	0.68	0.19	0.27
Control Delay	6.8	10.9	31.3	29.1
Queue Delay	0.7	2.1	0.0	0.0
Total Delay	7.4	13.0	31.3	29.1
Queue Length 50th (ft)	58	233	21	29
Queue Length 95th (ft)	83	349	56	73
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	977	906	255	266
Starvation Cap Reductn	410	158	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.49	0.83	0.19	0.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development

12/05/2022

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	11	226	14	15	537	13	21	8	15	19	18	29
Future Volume (vph)	11	226	14	15	537	13	21	8	15	19	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.94	
Flpb, ped/bikes		1.00			1.00			0.97			0.99	
Frt		0.99			1.00			0.95			0.94	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1467			1338			1374			1302	
Flt Permitted		0.97			0.99			0.86			0.92	
Satd. Flow (perm)		1427			1326			1214			1214	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	12	248	15	16	590	14	23	9	16	21	20	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	13	0	0	23	0
Lane Group Flow (vph)	0	273	0	0	619	0	0	35	0	0	50	0
Confl. Peds. (#/hr)	48		12	12		48	19		10	10		19
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	8%	8%	8%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		975			906			242			242	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.47			0.03			c0.04	
v/c Ratio		0.28			0.68			0.15			0.21	
Uniform Delay, d1		7.4			11.3			39.6			40.0	
Progression Factor		0.81			0.64			1.00			1.00	
Incremental Delay, d2		0.7			3.3			1.3			1.9	
Delay (s)		6.7			10.5			40.8			42.0	
Level of Service		A			B			D			D	
Approach Delay (s)		6.7			10.5			40.8			42.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development

12/05/2022

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	169	84	138	46	97	587	23	62	349	4
v/c Ratio	0.49	0.30	0.42	0.16	0.20	0.66	0.03	0.15	0.31	0.00
Control Delay	46.0	42.3	44.3	39.3	8.1	9.5	8.1	7.8	9.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	42.3	44.3	39.3	8.1	9.5	8.1	7.8	9.2	6.8
Queue Length 50th (ft)	115	54	92	29	12	77	3	15	104	1
Queue Length 95th (ft)	186	103	156	63	m21	m128	m5	31	151	5
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	347	277	332	289	487	894	741	416	1140	929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.30	0.42	0.16	0.20	0.66	0.03	0.15	0.31	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	1	156	78	24	104	43	90	546	21	58	325	4
Future Volume (vph)	1	156	78	24	104	43	90	546	21	58	325	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.93	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1546	1233		1605	1288	1549	1651	1368	1624	1710	1394
Flt Permitted		1.00	1.00		0.91	1.00	0.55	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)		1544	1233		1479	1288	900	1651	1368	465	1710	1394
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1	168	84	26	112	46	97	587	23	62	349	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	169	84	0	138	46	97	587	23	62	349	4
Confl. Peds. (#/hr)	15		14	14		15	4		1	1		4
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	1%	1%	1%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		25.0	25.0		25.0	25.0	63.0	63.0	63.0	78.0	78.0	78.0
Effective Green, g (s)		27.0	27.0		27.0	27.0	65.0	65.0	65.0	80.0	80.0	80.0
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.54	0.54	0.54	0.67	0.67	0.67
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		347	277		332	289	487	894	741	416	1140	929
v/s Ratio Prot								c0.36		0.01	c0.20	
v/s Ratio Perm		c0.11	0.07		0.09	0.04	0.11		0.02	0.09		0.00
v/c Ratio		0.49	0.30		0.42	0.16	0.20	0.66	0.03	0.15	0.31	0.00
Uniform Delay, d1		40.5	38.7		39.8	37.4	14.1	19.6	12.8	10.1	8.4	6.7
Progression Factor		1.00	1.00		1.00	1.00	0.52	0.38	0.62	1.00	1.00	1.00
Incremental Delay, d2		4.8	2.8		3.8	1.2	0.4	1.8	0.0	0.8	0.7	0.0
Delay (s)		45.3	41.5		43.6	38.6	7.8	9.3	8.0	10.9	9.1	6.7
Level of Service		D	D		D	D	A	A	A	B	A	A
Approach Delay (s)		44.0			42.3			9.1			9.3	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
12/05/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		⅄	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	23	205	157	6	4	21
Future Volume (vph)	23	205	157	6	4	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	223	171	7	4	23

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	248	178	27
Volume Left (vph)	25	0	4
Volume Right (vph)	0	7	23
Hadj (s)	0.04	0.06	-0.41
Departure Headway (s)	4.2	4.3	4.4
Degree Utilization, x	0.29	0.21	0.03
Capacity (veh/h)	848	829	742
Control Delay (s)	8.9	8.4	7.6
Approach Delay (s)	8.9	8.4	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.6		
Level of Service	A		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Kiss and Ride & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	199	10	17	141	22	22
Future Volume (Veh/h)	199	10	17	141	22	22
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	224	11	19	158	25	25
Pedestrians	3				14	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			249		442	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			249		442	244
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	97
cM capacity (veh/h)			1284		560	791

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	235	177	50
Volume Left	0	19	25
Volume Right	11	0	25
cSH	1700	1284	656
Volume to Capacity	0.14	0.01	0.08
Queue Length 95th (ft)	0	1	6
Control Delay (s)	0.0	1.0	10.9
Lane LOS		A	B
Approach Delay (s)	0.0	1.0	10.9
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	220	1	1	152	6	1
Future Volume (Veh/h)	220	1	1	152	6	1
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	242	1	1	167	7	1
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			243		412	242
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			243		412	242
tC, single (s)			4.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	4.2
p0 queue free %			100		98	100
cM capacity (veh/h)			1323		445	606

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	243	168	8
Volume Left	0	1	7
Volume Right	1	0	1
cSH	1700	1323	461
Volume to Capacity	0.14	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.1	13.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	13.0
Approach LOS			B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	22.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
12/05/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	220	140	9	0	19
Future Volume (vph)	0	220	140	9	0	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	239	152	10	0	21

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	239	152	10	21
Volume Left (vph)	0	152	0	0
Volume Right (vph)	239	0	0	21
Hadj (s)	-0.58	0.53	0.03	-0.60
Departure Headway (s)	3.8	5.5	5.0	3.2
Degree Utilization, x	0.25	0.23	0.01	0.02
Capacity (veh/h)	917	626	684	1121
Control Delay (s)	8.0	9.0	6.9	6.3
Approach Delay (s)	8.0	8.9		6.3
Approach LOS	A	A		A

Intersection Summary			
Delay	8.3		
Level of Service	A		
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
7: Blair Rd & Cedar St

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	189	82	88	94	345	55	450
v/c Ratio	0.84	0.35	0.21	0.31	0.64	0.10	0.81
Control Delay	76.8	21.5	15.2	5.7	3.7	0.2	31.6
Queue Delay	0.0	0.0	0.0	0.0	1.2	4.8	0.1
Total Delay	76.8	21.5	15.2	5.7	4.9	5.1	31.7
Queue Length 50th (ft)	120	42	46	23	0	0	200
Queue Length 95th (ft)	#260	m71	m75	m54	m2	m0	m264
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	224	236	424	307	537	528	553
Starvation Cap Reductn	0	0	0	0	65	419	0
Spillback Cap Reductn	0	0	0	0	0	0	2
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.35	0.21	0.31	0.73	0.50	0.82

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
12/05/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑	↱		↑	↱		↰↑↱	
Traffic Volume (vph)	0	143	36	78	84	89	0	328	52	96	329	3
Future Volume (vph)	0	143	36	78	84	89	0	328	52	96	329	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.97		1.00	1.00	0.47		1.00	0.87		1.00	
Flpb, ped/bikes		1.00		0.96	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1344		1400	1543	615		1465	1081		1597	
Flt Permitted		1.00		0.50	1.00	1.00		1.00	1.00		0.71	
Satd. Flow (perm)		1344		734	1543	615		1465	1081		1150	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	151	38	82	88	94	0	345	55	101	346	3
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	35	0	0	0
Lane Group Flow (vph)	0	189	0	82	88	26	0	345	20	0	450	0
Confl. Peds. (#/hr)	89		44	44		89	32		83	83		32
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		18.0		31.0	31.0	31.0		42.0	42.0		47.0	
Effective Green, g (s)		20.0		33.0	33.0	33.0		44.0	44.0		51.0	
Actuated g/C Ratio		0.17		0.28	0.28	0.28		0.37	0.37		0.42	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		224		240	424	169		537	396		514	
v/s Ratio Prot		c0.14		c0.02	0.06			0.24			c0.05	
v/s Ratio Perm				0.07		0.04			0.02		c0.32	
v/c Ratio		0.84		0.34	0.21	0.15		0.64	0.05		0.88	
Uniform Delay, d1		48.5		39.2	33.4	32.9		31.5	24.5		31.6	
Progression Factor		0.95		0.47	0.42	1.00		0.01	1.00		0.92	
Incremental Delay, d2		29.5		3.7	1.1	1.8		3.5	0.1		10.0	
Delay (s)		75.7		22.3	15.0	34.8		3.7	24.7		39.0	
Level of Service		E		C	B	C		A	C		D	
Approach Delay (s)		75.7			24.3			6.6			39.0	
Approach LOS		E			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/05/2022

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	492	422
v/c Ratio	0.41	0.79
Control Delay	2.0	47.5
Queue Delay	2.4	0.0
Total Delay	4.4	47.5
Queue Length 50th (ft)	27	292
Queue Length 95th (ft)	m28	#434
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1208	537
Starvation Cap Reductn	566	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.77	0.79

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis — Takoma Metro Multifamily Development

8: 4th St & Blair Rd

12/05/2022

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	399	44	0	380
Future Volume (vph)	0	0	399	44	0	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.99			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1506			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1506			1574
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	443	49	0	422
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	488	0	0	422
Confl. Peds. (#/hr)		83				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			39.0
Effective Green, g (s)			94.0			41.0
Actuated g/C Ratio			0.78			0.34
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1179			537
v/s Ratio Prot			c0.32			c0.27
v/s Ratio Perm						
v/c Ratio			0.41			0.79
Uniform Delay, d1			4.2			35.5
Progression Factor			0.37			1.00
Incremental Delay, d2			0.8			11.0
Delay (s)			2.3			46.6
Level of Service			A			D
Approach Delay (s)	0.0		2.3			46.6
Approach LOS	A		A			D

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
12/05/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	13	288	219	17	15	13
Future Volume (Veh/h)	13	288	219	17	15	13
Sign Control		Free	Free		Stop	
Grade		6%	4%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	15	324	246	19	17	15
Pedestrians		73	3		160	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	0		13	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		312	206			
pX, platoon unblocked	0.91				0.95	0.91
vC, conflicting volume	425				772	488
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	322				559	391
tC, single (s)	4.2				7.4	7.2
tC, 2 stage (s)						
tF (s)	2.3				4.4	4.2
p0 queue free %	98				94	96
cM capacity (veh/h)	957				292	367

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	339	265	32
Volume Left	15	0	17
Volume Right	0	19	15
cSH	957	1700	323
Volume to Capacity	0.02	0.16	0.10
Queue Length 95th (ft)	1	0	8
Control Delay (s)	0.6	0.0	17.4
Lane LOS	A		C
Approach Delay (s)	0.6	0.0	17.4
Approach LOS			C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

	→	←	↖	↘
Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	316	215	130	240
v/c Ratio	0.41	0.35	0.38	0.60
Control Delay	12.6	13.4	15.4	45.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.6	13.4	15.4	45.0
Queue Length 50th (ft)	115	55	36	161
Queue Length 95th (ft)	m157	95	79	251
Internal Link Dist (ft)	126	337		365
Turn Bay Length (ft)			125	
Base Capacity (vph)	777	621	345	402
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.35	0.38	0.60

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
Takoma Metro Multifamily Development
10: Cedar St & Carroll St
12/05/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑	↱	↰↱	
Traffic Volume (vph)	29	268	202	122	196	29
Future Volume (vph)	29	268	202	122	196	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.71	0.99	
Flpb, ped/bikes		0.98	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.98	
Flt Protected		1.00	1.00	1.00	0.96	
Satd. Flow (prot)		1263	1521	847	1465	
Flt Permitted		0.97	1.00	1.00	0.96	
Satd. Flow (perm)		1228	1521	847	1465	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	31	285	215	130	209	31
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	316	215	130	240	0
Confl. Peds. (#/hr)	119			119	18	4
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	8%	8%	6%	6%	0%	0%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		73.0	47.0	47.0	31.0	
Effective Green, g (s)		75.0	49.0	49.0	33.0	
Actuated g/C Ratio		0.62	0.41	0.41	0.28	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		773	621	345	402	
v/s Ratio Prot		c0.07	0.14		c0.16	
v/s Ratio Perm		c0.18		0.15		
v/c Ratio		0.41	0.35	0.38	0.60	
Uniform Delay, d1		11.3	24.5	24.8	37.7	
Progression Factor		0.97	0.48	0.48	1.00	
Incremental Delay, d2		1.3	1.5	3.0	6.4	
Delay (s)		12.3	13.2	15.0	44.1	
Level of Service		B	B	B	D	
Approach Delay (s)		12.3	13.8		44.1	
Approach LOS		B	B		D	

Intersection Summary

HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	456	320	122	61
v/c Ratio	0.48	0.38	0.44	0.24
Control Delay	8.1	17.5	45.9	33.8
Queue Delay	0.8	11.8	0.0	0.0
Total Delay	8.8	29.2	45.9	33.8
Queue Length 50th (ft)	164	190	79	29
Queue Length 95th (ft)	221	m175	142	70
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	956	843	275	254
Starvation Cap Reductn	233	492	0	0
Spillback Cap Reductn	78	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.91	0.44	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development

12/05/2022

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	33	391	23	12	272	29	31	72	17	16	26	18
Future Volume (vph)	33	391	23	12	272	29	31	72	17	16	26	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.95			0.97			0.92	
Flpb, ped/bikes		0.98			0.99			0.95			0.97	
Frt		0.99			0.99			0.98			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1454			1251			1463			1300	
Flt Permitted		0.96			0.98			0.91			0.92	
Satd. Flow (perm)		1397			1230			1354			1206	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	34	399	23	12	278	30	32	73	17	16	27	18
RTOR Reduction (vph)	0	2	0	0	3	0	0	5	0	0	13	0
Lane Group Flow (vph)	0	454	0	0	317	0	0	117	0	0	48	0
Confl. Peds. (#/hr)	94		71	71		94	52		37	37		52
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	5%	5%	5%	6%	6%	6%	0%	0%	0%	3%	3%	3%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		954			840			270			241	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.26			c0.09			0.04	
v/c Ratio		0.48			0.38			0.43			0.20	
Uniform Delay, d1		8.9			8.1			42.1			40.0	
Progression Factor		0.72			2.14			1.00			1.00	
Incremental Delay, d2		1.5			0.1			5.0			1.9	
Delay (s)		7.9			17.5			47.1			41.9	
Level of Service		A			B			D			D	
Approach Delay (s)		7.9			17.5			47.1			41.9	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

G. Vehicular Capacity Analysis Worksheets – 2027 Background Interim Conditions

Queues
1: Piney Branch Rd & Eastern Ave

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	124	121	176	34	38	211	11	39	576	1
v/c Ratio	0.26	0.32	0.40	0.09	0.13	0.32	0.02	0.06	0.59	0.00
Control Delay	33.1	34.7	36.1	30.4	16.4	17.4	15.4	11.0	19.0	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	34.7	36.1	30.4	16.4	17.4	15.4	11.0	19.0	10.0
Queue Length 50th (ft)	72	72	107	19	12	65	3	12	268	0
Queue Length 95th (ft)	124	126	175	44	m24	m93	m9	28	379	3
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	474	379	441	399	291	660	561	610	978	784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.32	0.40	0.09	0.13	0.32	0.02	0.06	0.59	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↖	↑	↱	↖	↑	↱
Traffic Volume (vph)	2	112	111	43	119	31	35	194	10	36	530	1
Future Volume (vph)	2	112	111	43	119	31	35	194	10	36	530	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.94	1.00	1.00	1.00	1.00	1.00	0.94
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1545	1232		1592	1297	1544	1651	1403	1593	1677	1345
Flt Permitted		1.00	1.00		0.89	1.00	0.45	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)		1540	1232		1431	1297	727	1651	1403	857	1677	1345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	122	121	47	129	34	38	211	11	39	576	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	124	121	0	176	34	38	211	11	39	576	1
Confl. Peds. (#/hr)	13		15	15		13	7					7
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		35.0	35.0		35.0	35.0	46.0	46.0	46.0	68.0	68.0	68.0
Effective Green, g (s)		37.0	37.0		37.0	37.0	48.0	48.0	48.0	70.0	70.0	70.0
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.40	0.40	0.40	0.58	0.58	0.58
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		474	379		441	399	290	660	561	610	978	784
v/s Ratio Prot								0.13		0.01	c0.34	
v/s Ratio Perm		0.08	0.10		c0.12	0.03	0.05		0.01	0.03		0.00
v/c Ratio		0.26	0.32		0.40	0.09	0.13	0.32	0.02	0.06	0.59	0.00
Uniform Delay, d1		31.2	31.8		32.7	29.5	22.8	24.8	21.8	11.1	15.9	10.4
Progression Factor		1.00	1.00		1.00	1.00	0.66	0.64	0.70	1.00	1.00	1.00
Incremental Delay, d2		1.3	2.2		2.7	0.4	0.9	1.2	0.1	0.2	2.6	0.0
Delay (s)		32.6	34.0		35.4	29.9	15.9	17.1	15.2	11.3	18.5	10.4
Level of Service		C	C		D	C	B	B	B	B	B	B
Approach Delay (s)		33.3			34.5			16.9			18.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
12/14/2022

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑↱		↰↱	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	14	152	176	4	2	13
Future Volume (vph)	14	152	176	4	2	13
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	169	196	4	2	14

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	185	200	16
Volume Left (vph)	16	0	2
Volume Right (vph)	0	4	14
Hadj (s)	0.09	0.07	-0.50
Departure Headway (s)	4.2	4.2	4.2
Degree Utilization, x	0.22	0.23	0.02
Capacity (veh/h)	840	848	775
Control Delay (s)	8.4	8.5	7.3
Approach Delay (s)	8.4	8.5	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	8.4		
Level of Service	A		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Kiss and Ride & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	136	16	22	165	15	6
Future Volume (Veh/h)	136	16	22	165	15	6
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	148	17	24	179	16	7
Pedestrians	1				10	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			175		394	166
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			175		394	166
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	99
cM capacity (veh/h)			1378		598	876

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	165	203	23
Volume Left	0	24	16
Volume Right	17	0	7
cSH	1700	1378	662
Volume to Capacity	0.10	0.02	0.03
Queue Length 95th (ft)	0	1	3
Control Delay (s)	0.0	1.0	10.6
Lane LOS		A	B
Approach Delay (s)	0.0	1.0	10.6
Approach LOS			B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	141	1	1	185	2	2
Future Volume (Veh/h)	141	1	1	185	2	2
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	157	1	1	206	2	2
Pedestrians	1				7	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			165		374	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			165		374	164
tC, single (s)			4.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	4.2
p0 queue free %			100		100	100
cM capacity (veh/h)			1399		469	674

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	158	207	4
Volume Left	0	1	2
Volume Right	1	0	2
cSH	1700	1399	553
Volume to Capacity	0.09	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	11.6
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	143	160	3	0	31
Future Volume (vph)	0	143	160	3	0	31
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	159	178	3	0	34

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	159	178	3	34
Volume Left (vph)	0	178	0	0
Volume Right (vph)	159	0	0	34
Hadj (s)	-0.52	0.55	0.05	-0.55
Departure Headway (s)	3.9	5.4	4.9	3.2
Degree Utilization, x	0.17	0.27	0.00	0.03
Capacity (veh/h)	883	648	710	1121
Control Delay (s)	7.7	9.1	6.7	6.3
Approach Delay (s)	7.7	9.1		6.3
Approach LOS	A	A		A

Intersection Summary			
Delay	8.2		
Level of Service	A		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

Queues

7: Blair Rd & Cedar St

Takoma Metro Multifamily Development

12/14/2022

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	110	87	286	173	274	32	521
v/c Ratio	0.41	0.27	0.62	0.56	0.62	0.07	0.78
Control Delay	47.8	24.4	31.9	15.0	4.8	0.2	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.3	3.8	0.1
Total Delay	47.8	24.4	31.9	15.0	5.1	4.0	33.5
Queue Length 50th (ft)	75	46	178	40	0	0	257
Queue Length 95th (ft)	132	m87	m279	m112	0	m0	402
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	266	327	462	311	439	464	666
Starvation Cap Reductn	0	0	0	0	17	380	0
Spillback Cap Reductn	0	0	0	0	0	0	6
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.27	0.62	0.56	0.65	0.38	0.79

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
Takoma Metro Multifamily Development

7: Blair Rd & Cedar St

12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	74	28	80	263	159	0	252	29	62	417	1
Future Volume (vph)	0	74	28	80	263	159	0	252	29	62	417	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.98		1.00	1.00	0.45		1.00	0.86		1.00	
Flpb, ped/bikes		1.00		0.97	1.00	1.00		1.00	1.00		1.00	
Frt		0.96		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1389		1424	1543	592		1424	1037		1641	
Flt Permitted		1.00		0.68	1.00	1.00		1.00	1.00		0.91	
Satd. Flow (perm)		1389		1018	1543	592		1424	1037		1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	80	30	87	286	173	0	274	32	67	453	1
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	22	0	0	0
Lane Group Flow (vph)	0	110	0	87	286	52	0	274	10	0	521	0
Confl. Peds. (#/hr)	103		15	15		103	15		77	77		15
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	1%	1%	1%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		21.0		34.0	34.0	34.0		35.0	35.0		44.0	
Effective Green, g (s)		23.0		36.0	36.0	36.0		37.0	37.0		48.0	
Actuated g/C Ratio		0.19		0.30	0.30	0.30		0.31	0.31		0.40	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		266		329	462	177		439	319		615	
v/s Ratio Prot		0.08		0.02	c0.19			0.19			c0.08	
v/s Ratio Perm				0.06		0.09			0.01		c0.26	
v/c Ratio		0.41		0.26	0.62	0.29		0.62	0.03		0.85	
Uniform Delay, d1		42.6		32.4	36.1	32.2		35.5	29.0		32.7	
Progression Factor		0.99		0.68	0.71	2.26		0.00	1.00		0.90	
Incremental Delay, d2		4.6		1.8	5.6	3.8		4.7	0.1		11.5	
Delay (s)		47.0		23.9	31.3	76.7		4.8	29.1		41.0	
Level of Service		D		C	C	E		A	C		D	
Approach Delay (s)		47.0			44.5			7.3			41.0	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	35.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/14/2022

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	573	312
v/c Ratio	0.47	0.70
Control Delay	2.0	48.2
Queue Delay	1.5	0.0
Total Delay	3.4	48.2
Queue Length 50th (ft)	0	216
Queue Length 95th (ft)	0	323
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1208	445
Starvation Cap Reductn	428	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.73	0.70

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/14/2022

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	475	52	0	281
Future Volume (vph)	0	0	475	52	0	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.99			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1506			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1506			1574
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.90
Adj. Flow (vph)	0	0	516	57	0	312
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	569	0	0	312
Confl. Peds. (#/hr)		77				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			32.0
Effective Green, g (s)			94.0			34.0
Actuated g/C Ratio			0.78			0.28
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1179			445
v/s Ratio Prot			c0.38			c0.20
v/s Ratio Perm						
v/c Ratio			0.48			0.70
Uniform Delay, d1			4.5			38.5
Progression Factor			0.26			1.00
Incremental Delay, d2			1.0			8.9
Delay (s)			2.2			47.4
Level of Service			A			D
Approach Delay (s)	0.0		2.2			47.4
Approach LOS	A		A			D

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		↲↳	
Traffic Volume (veh/h)	10	149	465	19	15	13
Future Volume (Veh/h)	10	149	465	19	15	13
Sign Control		Free	Free		Stop	
Grade		6%	4%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	155	484	20	16	14
Pedestrians		84	1		158	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		7	0		13	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		312	206			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	662				828	736
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	499				698	588
tC, single (s)	4.2				7.4	7.2
tC, 2 stage (s)						
tF (s)	2.3				4.4	4.2
p0 queue free %	99				92	94
cM capacity (veh/h)	752				208	247

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	165	504	30
Volume Left	10	0	16
Volume Right	0	20	14
cSH	752	1700	225
Volume to Capacity	0.01	0.30	0.13
Queue Length 95th (ft)	1	0	11
Control Delay (s)	0.7	0.0	23.5
Lane LOS	A		C
Approach Delay (s)	0.7	0.0	23.5
Approach LOS			C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
10: Cedar St & Carroll St

Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	176	459	155	162
v/c Ratio	0.19	0.50	0.27	0.75
Control Delay	2.0	6.2	4.7	70.6
Queue Delay	0.0	0.8	0.0	0.0
Total Delay	2.0	7.1	4.7	70.6
Queue Length 50th (ft)	18	93	19	121
Queue Length 95th (ft)	m21	132	m33	#228
Internal Link Dist (ft)	126	337		365
Turn Bay Length (ft)			125	
Base Capacity (vph)	905	925	566	215
Starvation Cap Reductn	0	216	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.19	0.65	0.27	0.75

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑	↱	↰↱	
Traffic Volume (vph)	14	155	441	149	116	39
Future Volume (vph)	14	155	441	149	116	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.78	0.99	
Flpb, ped/bikes		0.99	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.97	
Flt Protected		1.00	1.00	1.00	0.96	
Satd. Flow (prot)		1254	1521	932	1358	
Flt Permitted		0.96	1.00	1.00	0.96	
Satd. Flow (perm)		1214	1521	932	1358	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	15	161	459	155	121	41
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	176	459	155	162	0
Confl. Peds. (#/hr)	89			89	12	5
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	10%	10%	6%	6%	6%	6%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		87.0	71.0	71.0	17.0	
Effective Green, g (s)		89.0	73.0	73.0	19.0	
Actuated g/C Ratio		0.74	0.61	0.61	0.16	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		904	925	566	215	
v/s Ratio Prot		c0.02	c0.30		c0.12	
v/s Ratio Perm		0.12		0.17		
v/c Ratio		0.19	0.50	0.27	0.75	
Uniform Delay, d1		4.7	13.2	11.0	48.3	
Progression Factor		0.33	0.35	0.33	1.00	
Incremental Delay, d2		0.4	1.4	0.9	21.4	
Delay (s)		2.0	6.1	4.6	69.7	
Level of Service		A	A	A	E	
Approach Delay (s)		2.0	5.7		69.7	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Maple St & Carroll St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	283	627	49	73
v/c Ratio	0.29	0.69	0.19	0.27
Control Delay	6.3	11.2	31.5	29.1
Queue Delay	0.7	2.1	0.0	0.0
Total Delay	7.1	13.3	31.5	29.1
Queue Length 50th (ft)	56	236	21	29
Queue Length 95th (ft)	m78	355	57	73
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	977	906	254	266
Starvation Cap Reductn	412	154	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.83	0.19	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	11	232	15	15	543	13	22	8	15	19	18	29
Future Volume (vph)	11	232	15	15	543	13	22	8	15	19	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.94	
Flpb, ped/bikes		1.00			1.00			0.97			0.99	
Frt		0.99			1.00			0.96			0.94	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1466			1339			1374			1302	
Flt Permitted		0.97			0.99			0.86			0.92	
Satd. Flow (perm)		1428			1326			1209			1214	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	12	255	16	16	597	14	24	9	16	21	20	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	13	0	0	23	0
Lane Group Flow (vph)	0	281	0	0	626	0	0	36	0	0	50	0
Confl. Peds. (#/hr)	48		12	12		48	19		10	10		19
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	8%	8%	8%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		975			906			241			242	
v/s Ratio Prot												
v/s Ratio Perm		0.20			c0.47			0.03			c0.04	
v/c Ratio		0.29			0.69			0.15			0.21	
Uniform Delay, d1		7.5			11.4			39.6			40.0	
Progression Factor		0.75			0.64			1.00			1.00	
Incremental Delay, d2		0.7			3.4			1.3			1.9	
Delay (s)		6.3			10.7			40.9			42.0	
Level of Service		A			B			D			D	
Approach Delay (s)		6.3			10.7			40.9			42.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	170	84	150	60	97	618	23	76	372	4
v/c Ratio	0.49	0.30	0.45	0.21	0.20	0.69	0.03	0.19	0.33	0.00
Control Delay	46.1	42.3	45.1	40.1	8.4	10.5	8.3	8.2	9.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	42.3	45.1	40.1	8.4	10.5	8.3	8.2	9.5	6.8
Queue Length 50th (ft)	115	54	101	38	13	87	3	19	113	1
Queue Length 95th (ft)	187	103	168	78	m22	m141	m5	36	163	5
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	347	277	335	289	477	894	741	395	1140	929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.30	0.45	0.21	0.20	0.69	0.03	0.19	0.33	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	1	157	78	24	115	56	90	575	21	71	346	4
Future Volume (vph)	1	157	78	24	115	56	90	575	21	71	346	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.93	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1546	1233		1606	1288	1549	1651	1368	1624	1710	1394
Flt Permitted		1.00	1.00		0.92	1.00	0.54	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)		1544	1233		1490	1288	881	1651	1368	429	1710	1394
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1	169	84	26	124	60	97	618	23	76	372	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	170	84	0	150	60	97	618	23	76	372	4
Confl. Peds. (#/hr)	15		14	14		15	4		1	1		4
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	1%	1%	1%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		25.0	25.0		25.0	25.0	63.0	63.0	63.0	78.0	78.0	78.0
Effective Green, g (s)		27.0	27.0		27.0	27.0	65.0	65.0	65.0	80.0	80.0	80.0
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.54	0.54	0.54	0.67	0.67	0.67
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		347	277		335	289	477	894	741	395	1140	929
v/s Ratio Prot								c0.37		0.02	c0.22	
v/s Ratio Perm		c0.11	0.07		0.10	0.05	0.11		0.02	0.11		0.00
v/c Ratio		0.49	0.30		0.45	0.21	0.20	0.69	0.03	0.19	0.33	0.00
Uniform Delay, d1		40.5	38.7		40.1	37.8	14.2	20.1	12.8	10.8	8.5	6.7
Progression Factor		1.00	1.00		1.00	1.00	0.54	0.39	0.63	1.00	1.00	1.00
Incremental Delay, d2		4.9	2.8		4.3	1.6	0.5	2.3	0.0	1.1	0.8	0.0
Delay (s)		45.4	41.5		44.4	39.4	8.2	10.2	8.2	11.9	9.3	6.7
Level of Service		D	D		D	D	A	B	A	B	A	A
Approach Delay (s)		44.1			42.9			9.8			9.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		⋎	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	23	219	186	6	4	21
Future Volume (vph)	23	219	186	6	4	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	238	202	7	4	23

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	263	209	27
Volume Left (vph)	25	0	4
Volume Right (vph)	0	7	23
Hadj (s)	0.04	0.06	-0.41
Departure Headway (s)	4.2	4.3	4.5
Degree Utilization, x	0.31	0.25	0.03
Capacity (veh/h)	841	816	721
Control Delay (s)	9.1	8.7	7.7
Approach Delay (s)	9.1	8.7	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Kiss and Ride & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	213	10	17	169	22	22
Future Volume (Veh/h)	213	10	17	169	22	22
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	239	11	19	190	25	25
Pedestrians	3				14	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			264		490	258
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			264		490	258
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	97
cM capacity (veh/h)			1268		526	776

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	250	209	50
Volume Left	0	19	25
Volume Right	11	0	25
cSH	1700	1268	627
Volume to Capacity	0.15	0.01	0.08
Queue Length 95th (ft)	0	1	6
Control Delay (s)	0.0	0.8	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	11.2
Approach LOS			B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	234	1	1	181	6	1
Future Volume (Veh/h)	234	1	1	181	6	1
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	257	1	1	199	7	1
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			258		460	258
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			258		460	258
tC, single (s)			4.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	4.2
p0 queue free %			100		98	100
cM capacity (veh/h)			1307		415	593

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	258	200	8
Volume Left	0	1	7
Volume Right	1	0	1
cSH	1700	1307	431
Volume to Capacity	0.15	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	13.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	13.5
Approach LOS			B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	23.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	234	168	9	0	19
Future Volume (vph)	0	234	168	9	0	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	254	183	10	0	21

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	254	183	10	21
Volume Left (vph)	0	183	0	0
Volume Right (vph)	254	0	0	21
Hadj (s)	-0.58	0.53	0.03	-0.60
Departure Headway (s)	3.9	5.6	5.1	3.2
Degree Utilization, x	0.27	0.28	0.01	0.02
Capacity (veh/h)	892	622	678	1121
Control Delay (s)	8.3	9.6	6.9	6.3
Approach Delay (s)	8.3	9.4		6.3
Approach LOS	A	A		A

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
12/14/2022

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	192	82	89	98	347	55	456
v/c Ratio	0.86	0.35	0.21	0.32	0.65	0.10	0.84
Control Delay	78.6	21.3	14.8	5.9	3.7	0.2	33.5
Queue Delay	0.0	0.0	0.0	0.0	1.3	4.8	0.1
Total Delay	78.6	21.3	14.8	5.9	5.0	5.1	33.6
Queue Length 50th (ft)	122	42	46	24	0	0	208
Queue Length 95th (ft)	#264	m69	m73	m39	m2	m0	m268
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	224	234	424	307	537	528	544
Starvation Cap Reductn	0	0	0	0	65	419	0
Spillback Cap Reductn	0	0	0	0	0	0	1
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.35	0.21	0.32	0.74	0.50	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	146	36	78	85	93	0	330	52	100	331	3
Future Volume (vph)	0	146	36	78	85	93	0	330	52	100	331	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.97		1.00	1.00	0.47		1.00	0.87		1.00	
Flpb, ped/bikes		1.00		0.96	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1346		1402	1543	615		1465	1081		1597	
Flt Permitted		1.00		0.49	1.00	1.00		1.00	1.00		0.70	
Satd. Flow (perm)		1346		725	1543	615		1465	1081		1129	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	154	38	82	89	98	0	347	55	105	348	3
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	35	0	0	0
Lane Group Flow (vph)	0	192	0	82	89	27	0	347	20	0	456	0
Confl. Peds. (#/hr)	89		44	44		89	32		83	83		32
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		18.0		31.0	31.0	31.0		42.0	42.0		47.0	
Effective Green, g (s)		20.0		33.0	33.0	33.0		44.0	44.0		51.0	
Actuated g/C Ratio		0.17		0.28	0.28	0.28		0.37	0.37		0.42	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		224		238	424	169		537	396		507	
v/s Ratio Prot		c0.14		c0.02	0.06			0.24			c0.05	
v/s Ratio Perm				0.07		0.04			0.02		c0.33	
v/c Ratio		0.86		0.34	0.21	0.16		0.65	0.05		0.90	
Uniform Delay, d1		48.6		39.4	33.5	33.0		31.5	24.5		32.1	
Progression Factor		0.95		0.47	0.40	1.00		0.01	1.00		0.93	
Incremental Delay, d2		31.3		3.8	1.1	1.9		3.5	0.1		12.0	
Delay (s)		77.6		22.1	14.6	34.9		3.7	24.7		42.0	
Level of Service		E		C	B	C		A	C		D	
Approach Delay (s)		77.6			24.3			6.6			42.0	
Approach LOS		E			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/14/2022

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	495	424
v/c Ratio	0.41	0.79
Control Delay	2.0	47.8
Queue Delay	2.6	0.0
Total Delay	4.7	47.8
Queue Length 50th (ft)	27	294
Queue Length 95th (ft)	m28	#452
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1208	537
Starvation Cap Reductn	574	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.78	0.79

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	401	44	0	382
Future Volume (vph)	0	0	401	44	0	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.99			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1506			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1506			1574
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	446	49	0	424
RTOR Reduction (vph)	0	0	3	0	0	0
Lane Group Flow (vph)	0	0	492	0	0	424
Confl. Peds. (#/hr)		83				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			39.0
Effective Green, g (s)			94.0			41.0
Actuated g/C Ratio			0.78			0.34
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1179			537
v/s Ratio Prot			c0.33			c0.27
v/s Ratio Perm						
v/c Ratio			0.42			0.79
Uniform Delay, d1			4.2			35.6
Progression Factor			0.37			1.00
Incremental Delay, d2			0.7			11.2
Delay (s)			2.3			46.9
Level of Service			A			D
Approach Delay (s)	0.0		2.3			46.9
Approach LOS	A		A			D

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		↰↱	
Traffic Volume (veh/h)	13	295	225	17	15	13
Future Volume (Veh/h)	13	295	225	17	15	13
Sign Control		Free	Free		Stop	
Grade		6%	4%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	15	331	253	19	17	15
Pedestrians		73	3		160	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	0		13	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		312	206			
pX, platoon unblocked	0.91				0.95	0.91
vC, conflicting volume	432				786	496
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326				564	396
tC, single (s)	4.2				7.4	7.2
tC, 2 stage (s)						
tF (s)	2.3				4.4	4.2
p0 queue free %	98				94	96
cM capacity (veh/h)	951				290	363

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	346	272	32
Volume Left	15	0	17
Volume Right	0	19	15
cSH	951	1700	320
Volume to Capacity	0.02	0.16	0.10
Queue Length 95th (ft)	1	0	8
Control Delay (s)	0.5	0.0	17.5
Lane LOS	A		C
Approach Delay (s)	0.5	0.0	17.5
Approach LOS			C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	323	220	141	253
v/c Ratio	0.42	0.35	0.41	0.63
Control Delay	12.7	13.5	16.2	46.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.7	13.5	16.2	46.3
Queue Length 50th (ft)	119	58	43	172
Queue Length 95th (ft)	m159	101	93	265
Internal Link Dist (ft)	126	337		365
Turn Bay Length (ft)			125	
Base Capacity (vph)	775	621	345	402
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.42	0.35	0.41	0.63

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑	↱	↲↳	
Traffic Volume (vph)	31	273	207	133	208	30
Future Volume (vph)	31	273	207	133	208	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.71	0.99	
Flpb, ped/bikes		0.98	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.98	
Flt Protected		0.99	1.00	1.00	0.96	
Satd. Flow (prot)		1262	1521	847	1465	
Flt Permitted		0.96	1.00	1.00	0.96	
Satd. Flow (perm)		1224	1521	847	1465	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	290	220	141	221	32
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	323	220	141	253	0
Confl. Peds. (#/hr)	119			119	18	4
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	8%	8%	6%	6%	0%	0%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		73.0	47.0	47.0	31.0	
Effective Green, g (s)		75.0	49.0	49.0	33.0	
Actuated g/C Ratio		0.62	0.41	0.41	0.28	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		771	621	345	402	
v/s Ratio Prot		c0.08	0.14		c0.17	
v/s Ratio Perm		c0.18		0.17		
v/c Ratio		0.42	0.35	0.41	0.63	
Uniform Delay, d1		11.4	24.6	25.2	38.1	
Progression Factor		0.96	0.48	0.49	1.00	
Incremental Delay, d2		1.3	1.5	3.4	7.3	
Delay (s)		12.3	13.2	15.7	45.4	
Level of Service		B	B	B	D	
Approach Delay (s)		12.3	14.2		45.4	
Approach LOS		B	B		D	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	474	331	127	61
v/c Ratio	0.50	0.39	0.47	0.24
Control Delay	8.2	17.8	46.9	33.8
Queue Delay	0.8	13.9	0.0	0.0
Total Delay	9.0	31.7	46.9	33.8
Queue Length 50th (ft)	173	197	83	29
Queue Length 95th (ft)	235	m182	148	70
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	952	845	270	254
Starvation Cap Reductn	222	490	0	0
Spillback Cap Reductn	11	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.65	0.93	0.47	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	33	403	28	12	283	29	36	72	17	16	26	18
Future Volume (vph)	33	403	28	12	283	29	36	72	17	16	26	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.95			0.97			0.92	
Flpb, ped/bikes		0.98			1.00			0.94			0.97	
Frt		0.99			0.99			0.98			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1446			1255			1455			1301	
Flt Permitted		0.96			0.98			0.90			0.91	
Satd. Flow (perm)		1391			1233			1330			1206	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	34	411	29	12	289	30	37	73	17	16	27	18
RTOR Reduction (vph)	0	2	0	0	3	0	0	5	0	0	13	0
Lane Group Flow (vph)	0	472	0	0	328	0	0	122	0	0	48	0
Confl. Peds. (#/hr)	94		71	71		94	52		37	37		52
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	5%	5%	5%	6%	6%	6%	0%	0%	0%	3%	3%	3%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		950			842			266			241	
v/s Ratio Prot												
v/s Ratio Perm		c0.34			0.27			c0.09			0.04	
v/c Ratio		0.50			0.39			0.46			0.20	
Uniform Delay, d1		9.1			8.2			42.3			40.0	
Progression Factor		0.71			2.15			1.00			1.00	
Incremental Delay, d2		1.6			0.1			5.6			1.9	
Delay (s)		8.1			17.8			47.9			41.9	
Level of Service		A			B			D			D	
Approach Delay (s)		8.1			17.8			47.9			41.9	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H. Vehicular Capacity Analysis Worksheets – 2027 Background Conditions

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	121	194	122	38	211	11	125	576	1
v/c Ratio	0.26	0.32	0.46	0.31	0.13	0.32	0.02	0.20	0.59	0.00
Control Delay	33.1	34.7	37.6	34.3	16.4	17.4	15.4	12.2	19.0	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	34.7	37.6	34.3	16.4	17.4	15.4	12.2	19.0	10.0
Queue Length 50th (ft)	73	72	121	72	12	65	3	41	268	0
Queue Length 95th (ft)	125	126	194	126	m24	m92	m9	71	379	3
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	474	379	426	399	291	660	561	610	978	784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.32	0.46	0.31	0.13	0.32	0.02	0.20	0.59	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	2	113	111	57	121	112	35	194	10	115	530	1
Future Volume (vph)	2	113	111	57	121	112	35	194	10	115	530	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.94	1.00	1.00	1.00	1.00	1.00	0.94
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1545	1232		1585	1297	1544	1651	1403	1593	1677	1345
Flt Permitted		1.00	1.00		0.86	1.00	0.45	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)		1540	1232		1382	1297	727	1651	1403	857	1677	1345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	123	121	62	132	122	38	211	11	125	576	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	121	0	194	122	38	211	11	125	576	1
Confl. Peds. (#/hr)	13		15	15		13	7					7
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		35.0	35.0		35.0	35.0	46.0	46.0	46.0	68.0	68.0	68.0
Effective Green, g (s)		37.0	37.0		37.0	37.0	48.0	48.0	48.0	70.0	70.0	70.0
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.40	0.40	0.40	0.58	0.58	0.58
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		474	379		426	399	290	660	561	610	978	784
v/s Ratio Prot								0.13		0.03	c0.34	
v/s Ratio Perm		0.08	0.10		c0.14	0.09	0.05		0.01	0.09		0.00
v/c Ratio		0.26	0.32		0.46	0.31	0.13	0.32	0.02	0.20	0.59	0.00
Uniform Delay, d1		31.2	31.8		33.4	31.7	22.8	24.8	21.8	11.7	15.9	10.4
Progression Factor		1.00	1.00		1.00	1.00	0.66	0.64	0.70	1.00	1.00	1.00
Incremental Delay, d2		1.4	2.2		3.5	2.0	0.9	1.2	0.1	0.8	2.6	0.0
Delay (s)		32.6	34.0		36.9	33.7	15.9	17.1	15.2	12.5	18.5	10.4
Level of Service		C	C		D	C	B	B	B	B	B	B
Approach Delay (s)		33.3			35.6			16.9			17.4	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

Takoma Metro Multifamily Development

2: Eastern Ave & Holly Ave

12/14/2022

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		↔	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	14	232	273	18	2	13
Future Volume (vph)	14	232	273	18	2	13
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	258	303	20	2	14

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	274	323	16
Volume Left (vph)	16	0	2
Volume Right (vph)	0	20	14
Hadj (s)	0.08	0.05	-0.50
Departure Headway (s)	4.3	4.3	4.7
Degree Utilization, x	0.33	0.38	0.02
Capacity (veh/h)	815	825	677
Control Delay (s)	9.5	9.9	7.8
Approach Delay (s)	9.5	9.9	7.8
Approach LOS	A	A	A

Intersection Summary			
Delay	9.6		
Level of Service	A		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Relocated Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	214	2	6	170	106	35
Future Volume (Veh/h)	214	2	6	170	106	35
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	233	2	7	185	115	38
Pedestrians	1				10	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			245		444	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			245		444	244
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		80	95
cM capacity (veh/h)			1299		567	793

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	235	192	153
Volume Left	0	7	115
Volume Right	2	0	38
cSH	1700	1299	610
Volume to Capacity	0.14	0.01	0.25
Queue Length 95th (ft)	0	0	25
Control Delay (s)	0.0	0.3	12.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	12.9
Approach LOS			B

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	256	165	3	0	31
Future Volume (vph)	0	256	165	3	0	31
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	284	183	3	0	34

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	284	183	3	34
Volume Left (vph)	0	183	0	0
Volume Right (vph)	284	0	0	34
Hadj (s)	-0.52	0.55	0.05	-0.55
Departure Headway (s)	3.9	5.7	5.2	3.2
Degree Utilization, x	0.31	0.29	0.00	0.03
Capacity (veh/h)	880	610	664	1121
Control Delay (s)	8.7	9.7	7.0	6.3
Approach Delay (s)	8.7	9.7		6.3
Approach LOS	A	A		A

Intersection Summary			
Delay	8.9		
Level of Service	A		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Cedar St & Site Dwy

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰↑	↱	
Traffic Volume (veh/h)	0	0	0	168	256	6
Future Volume (Veh/h)	0	0	0	168	256	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	187	284	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				227		
pX, platoon unblocked						
vC, conflicting volume	381	288	291			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	381	288	291			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	594	709	1268			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	0	62	125	291
Volume Left	0	0	0	0
Volume Right	0	0	0	7
cSH	1700	1268	1700	1700
Volume to Capacity	0.00	0.00	0.07	0.17
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	17.2%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
12/14/2022

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	126	137	286	173	274	80	521
v/c Ratio	0.47	0.43	0.62	0.56	0.62	0.17	0.78
Control Delay	49.5	28.1	29.4	8.4	3.9	0.4	33.5
Queue Delay	0.0	0.0	5.0	2.3	2.0	5.1	0.1
Total Delay	49.5	28.1	34.4	10.7	6.0	5.6	33.6
Queue Length 50th (ft)	86	40	110	2	0	0	257
Queue Length 95th (ft)	146	m86	m237	m35	m2	m0	401
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	268	316	462	311	439	464	666
Starvation Cap Reductn	0	0	116	58	69	327	0
Spillback Cap Reductn	0	0	0	0	0	0	5
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.43	0.83	0.68	0.74	0.58	0.79

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	88	28	126	263	159	0	252	74	62	417	1
Future Volume (vph)	0	88	28	126	263	159	0	252	74	62	417	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.98		1.00	1.00	0.45		1.00	0.86		1.00	
Flpb, ped/bikes		1.00		0.97	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1400		1428	1543	592		1424	1037		1641	
Flt Permitted		1.00		0.65	1.00	1.00		1.00	1.00		0.91	
Satd. Flow (perm)		1400		971	1543	592		1424	1037		1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	96	30	137	286	173	0	274	80	67	453	1
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	55	0	0	0
Lane Group Flow (vph)	0	126	0	137	286	52	0	274	25	0	521	0
Confl. Peds. (#/hr)	103		15	15		103	15		77	77		15
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	1%	1%	1%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		21.0		34.0	34.0	34.0		35.0	35.0		44.0	
Effective Green, g (s)		23.0		36.0	36.0	36.0		37.0	37.0		48.0	
Actuated g/C Ratio		0.19		0.30	0.30	0.30		0.31	0.31		0.40	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		268		317	462	177		439	319		615	
v/s Ratio Prot		0.09		0.03	c0.19			0.19			c0.08	
v/s Ratio Perm				0.10		0.09			0.02		c0.26	
v/c Ratio		0.47		0.43	0.62	0.29		0.62	0.08		0.85	
Uniform Delay, d1		43.1		35.0	36.1	32.2		35.5	29.4		32.7	
Progression Factor		0.99		0.70	0.67	0.80		0.01	1.00		0.91	
Incremental Delay, d2		5.8		3.2	4.6	3.2		3.7	0.3		11.5	
Delay (s)		48.6		27.8	28.9	28.8		3.9	29.7		41.2	
Level of Service		D		C	C	C		A	C		D	
Approach Delay (s)		48.6			28.6			9.8			41.2	
Approach LOS		D			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/14/2022

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	622	362
v/c Ratio	0.52	0.81
Control Delay	2.0	55.9
Queue Delay	1.0	0.0
Total Delay	3.0	55.9
Queue Length 50th (ft)	0	261
Queue Length 95th (ft)	0	#414
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1206	445
Starvation Cap Reductn	330	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.71	0.81

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/14/2022

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	510	63	0	326
Future Volume (vph)	0	0	510	63	0	326
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.99			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1503			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1503			1574
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.90
Adj. Flow (vph)	0	0	554	68	0	362
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	618	0	0	362
Confl. Peds. (#/hr)		77				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			32.0
Effective Green, g (s)			94.0			34.0
Actuated g/C Ratio			0.78			0.28
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1177			445
v/s Ratio Prot			c0.41			c0.23
v/s Ratio Perm						
v/c Ratio			0.53			0.81
Uniform Delay, d1			4.8			40.0
Progression Factor			0.22			1.00
Incremental Delay, d2			1.2			15.0
Delay (s)			2.2			55.0
Level of Service			A			E
Approach Delay (s)	0.0		2.2			55.0
Approach LOS	A		A			E

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Cedar St & Metro Station Dwy

Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	216	629	30
v/c Ratio	0.24	0.74	0.27
Control Delay	9.2	31.9	38.6
Queue Delay	0.7	52.3	0.0
Total Delay	9.9	84.3	38.6
Queue Length 50th (ft)	63	455	13
Queue Length 95th (ft)	m102	m504	44
Internal Link Dist (ft)	232	126	98
Turn Bay Length (ft)			
Base Capacity (vph)	893	851	112
Starvation Cap Reductn	415	309	0
Spillback Cap Reductn	0	37	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.45	1.16	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

9: Cedar St & Metro Station Dwy

12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		↔	
Traffic Volume (vph)	59	149	500	104	18	11
Future Volume (vph)	59	149	500	104	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		6%	4%		0%	
Total Lost time (s)		3.0	4.0		3.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	0.91		0.83	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.98		0.95	
Flt Protected		0.99	1.00		0.97	
Satd. Flow (prot)		1514	1389		652	
Flt Permitted		0.75	1.00		0.97	
Satd. Flow (perm)		1157	1389		652	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	61	155	521	108	19	11
RTOR Reduction (vph)	0	0	6	0	9	0
Lane Group Flow (vph)	0	216	623	0	21	0
Confl. Peds. (#/hr)	158			158	1	84
Heavy Vehicles (%)	8%	8%	7%	7%	100%	100%
Turn Type	pm+pt	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)		87.0	71.0		17.0	
Effective Green, g (s)		89.0	73.0		19.0	
Actuated g/C Ratio		0.74	0.61		0.16	
Clearance Time (s)		5.0	6.0		5.0	
Lane Grp Cap (vph)		893	844		103	
v/s Ratio Prot		c0.02	c0.45		c0.03	
v/s Ratio Perm		0.16				
v/c Ratio		0.24	0.74		0.20	
Uniform Delay, d1		4.9	16.7		43.9	
Progression Factor		1.69	1.64		1.00	
Incremental Delay, d2		0.6	3.9		4.4	
Delay (s)		8.8	31.2		48.3	
Level of Service		A	C		D	
Approach Delay (s)		8.8	31.2		48.3	
Approach LOS		A	C		D	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	195	486	155	279
v/c Ratio	0.22	0.53	0.27	1.36
Control Delay	2.0	6.3	4.5	229.6
Queue Delay	1.7	0.9	0.0	0.0
Total Delay	3.7	7.2	4.5	229.6
Queue Length 50th (ft)	18	98	18	~284
Queue Length 95th (ft)	19	135	m29	#456
Internal Link Dist (ft)	126	337		147
Turn Bay Length (ft)			125	
Base Capacity (vph)	890	925	566	205
Starvation Cap Reductn	537	210	0	0
Spillback Cap Reductn	0	170	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	0.68	0.27	1.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑	↱	↲↳	
Traffic Volume (vph)	19	168	467	149	116	152
Future Volume (vph)	19	168	467	149	116	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.78	0.97	
Flpb, ped/bikes		0.99	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.92	
Flt Protected		0.99	1.00	1.00	0.98	
Satd. Flow (prot)		1253	1521	932	1299	
Flt Permitted		0.95	1.00	1.00	0.98	
Satd. Flow (perm)		1193	1521	932	1299	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	20	175	486	155	121	158
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	195	486	155	279	0
Confl. Peds. (#/hr)	89			89	12	5
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	10%	10%	6%	6%	6%	6%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		87.0	71.0	71.0	17.0	
Effective Green, g (s)		89.0	73.0	73.0	19.0	
Actuated g/C Ratio		0.74	0.61	0.61	0.16	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		890	925	566	205	
v/s Ratio Prot		c0.02	c0.32		c0.21	
v/s Ratio Perm		0.14		0.17		
v/c Ratio		0.22	0.53	0.27	1.36	
Uniform Delay, d1		4.8	13.5	11.0	50.5	
Progression Factor		0.29	0.34	0.31	1.00	
Incremental Delay, d2		0.6	1.5	0.9	190.6	
Delay (s)		1.9	6.1	4.3	241.1	
Level of Service		A	A	A	F	
Approach Delay (s)		1.9	5.7		241.1	
Approach LOS		A	A		F	

Intersection Summary			
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	297	655	49	73
v/c Ratio	0.30	0.72	0.19	0.27
Control Delay	6.3	12.4	31.5	29.1
Queue Delay	0.7	2.4	0.0	0.0
Total Delay	7.0	14.8	31.5	29.1
Queue Length 50th (ft)	51	253	21	29
Queue Length 95th (ft)	m72	377	57	73
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	980	906	254	266
Starvation Cap Reductn	400	140	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.51	0.86	0.19	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	11	245	15	15	569	13	22	8	15	19	18	29
Future Volume (vph)	11	245	15	15	569	13	22	8	15	19	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.94	
Flpb, ped/bikes		1.00			1.00			0.97			0.99	
Frt		0.99			1.00			0.96			0.94	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1471			1339			1374			1302	
Flt Permitted		0.97			0.99			0.86			0.92	
Satd. Flow (perm)		1432			1327			1209			1214	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	12	269	16	16	625	14	24	9	16	21	20	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	13	0	0	23	0
Lane Group Flow (vph)	0	295	0	0	654	0	0	36	0	0	50	0
Confl. Peds. (#/hr)	48		12	12		48	19		10	10		19
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	8%	8%	8%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		978			906			241			242	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.49			0.03			c0.04	
v/c Ratio		0.30			0.72			0.15			0.21	
Uniform Delay, d1		7.6			11.9			39.6			40.0	
Progression Factor		0.75			0.65			1.00			1.00	
Incremental Delay, d2		0.6			4.1			1.3			1.9	
Delay (s)		6.3			11.8			40.9			42.0	
Level of Service		A			B			D			D	
Approach Delay (s)		6.3			11.8			40.9			42.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	171	84	154	78	97	618	23	92	372	4
v/c Ratio	0.49	0.30	0.46	0.27	0.20	0.69	0.03	0.23	0.33	0.00
Control Delay	46.2	42.3	45.5	41.4	8.4	10.4	8.2	8.5	9.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	42.3	45.5	41.4	8.4	10.4	8.2	8.5	9.5	6.8
Queue Length 50th (ft)	116	54	104	50	13	87	3	23	113	1
Queue Length 95th (ft)	189	103	172	97	m22	m141	m5	42	163	5
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	347	277	333	289	477	894	741	395	1140	929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.30	0.46	0.27	0.20	0.69	0.03	0.23	0.33	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	1	158	78	26	117	73	90	575	21	86	346	4
Future Volume (vph)	1	158	78	26	117	73	90	575	21	86	346	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.93	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1546	1233		1605	1288	1549	1651	1368	1624	1710	1394
Flt Permitted		1.00	1.00		0.91	1.00	0.54	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)		1544	1233		1481	1288	881	1651	1368	429	1710	1394
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1	170	84	28	126	78	97	618	23	92	372	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	171	84	0	154	78	97	618	23	92	372	4
Confl. Peds. (#/hr)	15		14	14		15	4		1	1		4
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	1%	1%	1%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		25.0	25.0		25.0	25.0	63.0	63.0	63.0	78.0	78.0	78.0
Effective Green, g (s)		27.0	27.0		27.0	27.0	65.0	65.0	65.0	80.0	80.0	80.0
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.54	0.54	0.54	0.67	0.67	0.67
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		347	277		333	289	477	894	741	395	1140	929
v/s Ratio Prot								c0.37		0.02	c0.22	
v/s Ratio Perm		c0.11	0.07		0.10	0.06	0.11		0.02	0.13		0.00
v/c Ratio		0.49	0.30		0.46	0.27	0.20	0.69	0.03	0.23	0.33	0.00
Uniform Delay, d1		40.5	38.7		40.2	38.4	14.2	20.1	12.8	11.0	8.5	6.7
Progression Factor		1.00	1.00		1.00	1.00	0.54	0.39	0.63	1.00	1.00	1.00
Incremental Delay, d2		4.9	2.8		4.6	2.3	0.5	2.3	0.0	1.4	0.8	0.0
Delay (s)		45.5	41.5		44.8	40.7	8.2	10.2	8.1	12.4	9.3	6.7
Level of Service		D	D		D	D	A	B	A	B	A	A
Approach Delay (s)		44.2			43.4			9.8			9.9	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c   Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	23	235	207	8	4	21
Future Volume (vph)	23	235	207	8	4	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	255	225	9	4	23

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	280	234	27
Volume Left (vph)	25	0	4
Volume Right (vph)	0	9	23
Hadj (s)	0.03	0.06	-0.41
Departure Headway (s)	4.2	4.3	4.6
Degree Utilization, x	0.33	0.28	0.03
Capacity (veh/h)	835	813	703
Control Delay (s)	9.3	9.0	7.8
Approach Delay (s)	9.3	9.0	7.8
Approach LOS	A	A	A

Intersection Summary			
Delay	9.1		
Level of Service	A		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Relocated Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Volume (veh/h)	227	2	6	174	18	6
Future Volume (Veh/h)	227	2	6	174	18	6
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	255	2	7	196	20	7
Pedestrians	3				14	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			271		483	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			271		483	270
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	99
cM capacity (veh/h)			1260		535	765

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	257	203	27
Volume Left	0	7	20
Volume Right	2	0	7
cSH	1700	1260	581
Volume to Capacity	0.15	0.01	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.3	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	11.5
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	254	173	9	0	19
Future Volume (vph)	0	254	173	9	0	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	276	188	10	0	21

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	276	188	10	21
Volume Left (vph)	0	188	0	0
Volume Right (vph)	276	0	0	21
Hadj (s)	-0.58	0.53	0.03	-0.60
Departure Headway (s)	3.9	5.6	5.1	3.2
Degree Utilization, x	0.30	0.29	0.01	0.02
Capacity (veh/h)	888	615	670	1121
Control Delay (s)	8.5	9.7	7.0	6.3
Approach Delay (s)	8.5	9.6		6.3
Approach LOS	A	A		A

Intersection Summary			
Delay	8.9		
Level of Service	A		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Cedar St & Site Dwy

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰↑	↱	
Traffic Volume (veh/h)	0	0	0	185	254	0
Future Volume (Veh/h)	0	0	0	185	254	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	206	282	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				229		
pX, platoon unblocked						
vC, conflicting volume	385	282	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	385	282	282			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	591	715	1277			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	0	69	137	282
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1277	1700	1700
Volume to Capacity	0.00	0.00	0.08	0.17
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	16.7%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development

12/14/2022

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	194	100	89	98	347	72	456
v/c Ratio	0.87	0.43	0.21	0.32	0.65	0.14	0.84
Control Delay	80.0	61.6	54.1	13.0	3.4	0.3	33.5
Queue Delay	2.0	0.0	0.0	0.0	1.8	5.2	0.1
Total Delay	82.0	61.6	54.1	13.0	5.3	5.5	33.6
Queue Length 50th (ft)	124	58	51	28	0	0	208
Queue Length 95th (ft)	#267	111	101	64	m2	m0	m268
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	224	233	424	307	537	528	544
Starvation Cap Reductn	0	0	0	0	81	401	0
Spillback Cap Reductn	5	0	0	0	0	6	1
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.43	0.21	0.32	0.76	0.57	0.84

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑	↱		↑	↱		↰↑↱	
Traffic Volume (vph)	0	148	36	95	85	93	0	330	68	100	331	3
Future Volume (vph)	0	148	36	95	85	93	0	330	68	100	331	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.97		1.00	1.00	0.47		1.00	0.87		1.00	
Flpb, ped/bikes		1.00		0.96	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1346		1403	1543	615		1465	1081		1597	
Flt Permitted		1.00		0.49	1.00	1.00		1.00	1.00		0.70	
Satd. Flow (perm)		1346		719	1543	615		1465	1081		1129	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	156	38	100	89	98	0	347	72	105	348	3
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	46	0	0	0
Lane Group Flow (vph)	0	194	0	100	89	27	0	347	26	0	456	0
Confl. Peds. (#/hr)	89		44	44		89	32		83	83		32
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		18.0		31.0	31.0	31.0		42.0	42.0		47.0	
Effective Green, g (s)		20.0		33.0	33.0	33.0		44.0	44.0		51.0	
Actuated g/C Ratio		0.17		0.28	0.28	0.28		0.37	0.37		0.42	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		224		237	424	169		537	396		507	
v/s Ratio Prot		c0.14		c0.02	0.06			0.24			c0.05	
v/s Ratio Perm				0.09		0.04			0.02		c0.33	
v/c Ratio		0.87		0.42	0.21	0.16		0.65	0.07		0.90	
Uniform Delay, d1		48.7		40.4	33.5	33.0		31.5	24.7		32.1	
Progression Factor		0.95		1.46	1.56	1.00		0.01	1.00		0.93	
Incremental Delay, d2		32.6		5.0	1.0	1.8		3.2	0.2		12.0	
Delay (s)		78.9		63.9	53.2	34.8		3.4	24.8		42.0	
Level of Service		E		E	D	C		A	C		D	
Approach Delay (s)		78.9			50.7			7.1			42.0	
Approach LOS		E			D			A			D	

Intersection Summary

HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/14/2022

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	513	442
v/c Ratio	0.43	0.82
Control Delay	2.0	50.5
Queue Delay	2.3	0.0
Total Delay	4.3	50.5
Queue Length 50th (ft)	26	312
Queue Length 95th (ft)	m27	#482
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1204	537
Starvation Cap Reductn	537	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.77	0.82

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
12/14/2022

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	407	55	0	398
Future Volume (vph)	0	0	407	55	0	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.98			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1501			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1501			1574
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	452	61	0	442
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	509	0	0	442
Confl. Peds. (#/hr)		83				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			39.0
Effective Green, g (s)			94.0			41.0
Actuated g/C Ratio			0.78			0.34
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1175			537
v/s Ratio Prot			c0.34			c0.28
v/s Ratio Perm						
v/c Ratio			0.43			0.82
Uniform Delay, d1			4.3			36.2
Progression Factor			0.34			1.00
Incremental Delay, d2			0.8			13.4
Delay (s)			2.3			49.5
Level of Service			A			D
Approach Delay (s)	0.0		2.3			49.5
Approach LOS	A		A			D

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
12/14/2022

	→	←	↘
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	351	290	32
v/c Ratio	0.37	0.48	0.16
Control Delay	10.4	41.7	25.9
Queue Delay	3.2	67.7	0.1
Total Delay	13.6	109.4	26.1
Queue Length 50th (ft)	137	230	12
Queue Length 95th (ft)	m208	317	39
Internal Link Dist (ft)	232	126	98
Turn Bay Length (ft)			
Base Capacity (vph)	948	598	195
Starvation Cap Reductn	485	432	0
Spillback Cap Reductn	37	0	20
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.76	1.75	0.18

Intersection Summary

m   Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
	↗	→	←	↖	↘	↙
Lane Configurations		↰	↱		Y	
Traffic Volume (vph)	18	295	231	27	18	11
Future Volume (vph)	18	295	231	27	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		6%	4%		0%	
Total Lost time (s)		3.0	4.0		3.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	0.94		0.85	
Flpb, ped/bikes		0.99	1.00		1.00	
Frt		1.00	0.99		0.95	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		1525	1458		680	
Flt Permitted		0.98	1.00		0.97	
Satd. Flow (perm)		1504	1458		680	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	20	331	260	30	20	12
RTOR Reduction (vph)	0	0	4	0	9	0
Lane Group Flow (vph)	0	351	286	0	23	0
Confl. Peds. (#/hr)	160			160	3	73
Heavy Vehicles (%)	7%	7%	7%	7%	96%	96%
Turn Type	pm+pt	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)		73.0	47.0		31.0	
Effective Green, g (s)		75.0	49.0		33.0	
Actuated g/C Ratio		0.62	0.41		0.28	
Clearance Time (s)		5.0	6.0		5.0	
Lane Grp Cap (vph)		943	595		187	
v/s Ratio Prot		c0.07	c0.20		c0.03	
v/s Ratio Perm		0.16				
v/c Ratio		0.37	0.48		0.12	
Uniform Delay, d1		11.0	26.1		32.7	
Progression Factor		0.85	1.49		1.00	
Incremental Delay, d2		0.8	2.6		1.4	
Delay (s)		10.1	41.6		34.0	
Level of Service		B	D		C	
Approach Delay (s)		10.1	41.6		34.0	
Approach LOS		B	D		C	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	342	234	141	274
v/c Ratio	0.44	0.38	0.41	0.69
Control Delay	13.1	13.6	15.8	49.1
Queue Delay	5.6	72.9	0.0	0.0
Total Delay	18.6	86.5	15.8	49.1
Queue Length 50th (ft)	117	63	41	190
Queue Length 95th (ft)	152	106	87	291
Internal Link Dist (ft)	126	337		149
Turn Bay Length (ft)			125	
Base Capacity (vph)	770	621	345	399
Starvation Cap Reductn	360	0	0	0
Spillback Cap Reductn	0	493	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.83	1.83	0.41	0.69

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑	↱	↰↱	
Traffic Volume (vph)	36	286	220	133	208	50
Future Volume (vph)	36	286	220	133	208	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.71	0.99	
Flpb, ped/bikes		0.98	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.97	
Flt Protected		0.99	1.00	1.00	0.96	
Satd. Flow (prot)		1261	1521	847	1452	
Flt Permitted		0.96	1.00	1.00	0.96	
Satd. Flow (perm)		1214	1521	847	1452	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	38	304	234	141	221	53
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	342	234	141	274	0
Confl. Peds. (#/hr)	119			119	18	4
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	8%	8%	6%	6%	0%	0%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		73.0	47.0	47.0	31.0	
Effective Green, g (s)		75.0	49.0	49.0	33.0	
Actuated g/C Ratio		0.62	0.41	0.41	0.28	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		767	621	345	399	
v/s Ratio Prot		c0.08	0.15		c0.19	
v/s Ratio Perm		c0.20		0.17		
v/c Ratio		0.45	0.38	0.41	0.69	
Uniform Delay, d1		11.7	24.8	25.2	38.9	
Progression Factor		0.93	0.47	0.48	1.00	
Incremental Delay, d2		1.8	1.6	3.3	9.3	
Delay (s)		12.6	13.4	15.4	48.2	
Level of Service		B	B	B	D	
Approach Delay (s)		12.6	14.1		48.2	
Approach LOS		B	B		D	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	487	344	127	61
v/c Ratio	0.51	0.41	0.47	0.24
Control Delay	15.4	18.2	46.9	33.8
Queue Delay	0.8	17.3	0.0	0.0
Total Delay	16.2	35.5	46.9	33.8
Queue Length 50th (ft)	232	206	83	29
Queue Length 95th (ft)	108	m189	148	70
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	954	847	270	254
Starvation Cap Reductn	208	488	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.65	0.96	0.47	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
12/14/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	33	416	28	12	296	29	36	72	17	16	26	18
Future Volume (vph)	33	416	28	12	296	29	36	72	17	16	26	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.96			0.97			0.92	
Flpb, ped/bikes		0.98			1.00			0.94			0.97	
Frt		0.99			0.99			0.98			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1450			1258			1455			1301	
Flt Permitted		0.96			0.98			0.90			0.91	
Satd. Flow (perm)		1394			1237			1330			1206	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	34	424	29	12	302	30	37	73	17	16	27	18
RTOR Reduction (vph)	0	2	0	0	3	0	0	5	0	0	13	0
Lane Group Flow (vph)	0	485	0	0	341	0	0	122	0	0	48	0
Confl. Peds. (#/hr)	94		71	71		94	52		37	37		52
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	5%	5%	5%	6%	6%	6%	0%	0%	0%	3%	3%	3%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		952			845			266			241	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.28			c0.09			0.04	
v/c Ratio		0.51			0.40			0.46			0.20	
Uniform Delay, d1		9.2			8.3			42.3			40.0	
Progression Factor		1.45			2.16			1.00			1.00	
Incremental Delay, d2		1.7			0.1			5.6			1.9	
Delay (s)		15.1			18.1			47.9			41.9	
Level of Service		B			B			D			D	
Approach Delay (s)		15.1			18.1			47.9			41.9	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

I. Vehicular Capacity Analysis Worksheets – 2027 Total Future Conditions

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	121	194	165	38	211	11	145	576	1
v/c Ratio	0.26	0.32	0.46	0.41	0.13	0.32	0.02	0.24	0.59	0.00
Control Delay	33.1	34.7	37.6	36.8	16.4	17.4	15.4	12.6	19.0	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	34.7	37.6	36.8	16.4	17.4	15.4	12.6	19.0	10.0
Queue Length 50th (ft)	73	72	121	101	12	65	3	49	268	0
Queue Length 95th (ft)	125	126	194	168	m24	m92	m9	81	379	3
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	474	379	426	399	291	660	561	610	978	784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.32	0.46	0.41	0.13	0.32	0.02	0.24	0.59	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis — Takoma Metro Multifamily Development

1: Piney Branch Rd & Eastern Ave

04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	2	113	111	57	121	152	35	194	10	133	530	1
Future Volume (vph)	2	113	111	57	121	152	35	194	10	133	530	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.94	1.00	1.00	1.00	1.00	1.00	0.94
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1545	1232		1585	1297	1544	1651	1403	1593	1677	1345
Flt Permitted		1.00	1.00		0.86	1.00	0.45	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)		1540	1232		1382	1297	727	1651	1403	857	1677	1345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	123	121	62	132	165	38	211	11	145	576	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	121	0	194	165	38	211	11	145	576	1
Confl. Peds. (#/hr)	13		15	15		13	7					7
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		35.0	35.0		35.0	35.0	46.0	46.0	46.0	68.0	68.0	68.0
Effective Green, g (s)		37.0	37.0		37.0	37.0	48.0	48.0	48.0	70.0	70.0	70.0
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.40	0.40	0.40	0.58	0.58	0.58
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		474	379		426	399	290	660	561	610	978	784
v/s Ratio Prot								0.13		0.04	c0.34	
v/s Ratio Perm		0.08	0.10		c0.14	0.13	0.05		0.01	0.10		0.00
v/c Ratio		0.26	0.32		0.46	0.41	0.13	0.32	0.02	0.24	0.59	0.00
Uniform Delay, d1		31.2	31.8		33.4	32.9	22.8	24.8	21.8	11.9	15.9	10.4
Progression Factor		1.00	1.00		1.00	1.00	0.66	0.64	0.70	1.00	1.00	1.00
Incremental Delay, d2		1.4	2.2		3.5	3.1	0.9	1.2	0.1	0.9	2.6	0.0
Delay (s)		32.6	34.0		36.9	36.0	15.9	17.1	15.2	12.8	18.5	10.4
Level of Service		C	C		D	D	B	B	B	B	B	B
Approach Delay (s)		33.3			36.5			16.9			17.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c   Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
04/12/2023

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑↱		↰↱	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	14	250	313	18	2	13
Future Volume (vph)	14	250	313	18	2	13
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	278	348	20	2	14

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	294	368	16
Volume Left (vph)	16	0	2
Volume Right (vph)	0	20	14
Hadj (s)	0.08	0.05	-0.50
Departure Headway (s)	4.4	4.3	4.8
Degree Utilization, x	0.36	0.44	0.02
Capacity (veh/h)	806	821	643
Control Delay (s)	9.8	10.6	7.9
Approach Delay (s)	9.8	10.6	7.9
Approach LOS	A	B	A

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

3: Relocated Metro Station Dwy & Eastern Ave

04/12/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↰↑	↰↱	
Traffic Volume (veh/h)	225	9	6	191	125	39
Future Volume (Veh/h)	225	9	6	191	125	39
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	245	10	7	208	136	42
Pedestrians	1				10	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			265		483	260
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			265		483	260
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	95
cM capacity (veh/h)			1277		538	777

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	255	215	178
Volume Left	0	7	136
Volume Right	10	0	42
cSH	1700	1277	580
Volume to Capacity	0.15	0.01	0.31
Queue Length 95th (ft)	0	0	32
Control Delay (s)	0.0	0.3	13.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	13.9
Approach LOS			B

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	271	186	3	0	31
Future Volume (vph)	0	271	186	3	0	31
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	301	207	3	0	34

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	301	207	3	34
Volume Left (vph)	0	207	0	0
Volume Right (vph)	301	0	0	34
Hadj (s)	-0.52	0.55	0.05	-0.55
Departure Headway (s)	4.0	5.7	5.2	3.2
Degree Utilization, x	0.33	0.33	0.00	0.03
Capacity (veh/h)	862	605	658	1121
Control Delay (s)	9.0	10.3	7.0	6.3
Approach Delay (s)	9.0	10.2		6.3
Approach LOS	A	B		A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Cedar St & Site Dwy

Takoma Metro Multifamily Development
04/12/2023

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰↑	↱	
Traffic Volume (veh/h)	21	38	15	168	260	11
Future Volume (Veh/h)	21	38	15	168	260	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	42	17	187	289	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				227		
pX, platoon unblocked						
vC, conflicting volume	422	295	301			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422	295	301			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	94	99			
cM capacity (veh/h)	552	701	1257			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	65	79	125	301
Volume Left	23	17	0	0
Volume Right	42	0	0	12
cSH	640	1257	1700	1700
Volume to Capacity	0.10	0.01	0.07	0.18
Queue Length 95th (ft)	8	1	0	0
Control Delay (s)	11.3	1.8	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.3	0.7		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		

7: Blair Rd & Cedar St

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	129	163	296	173	274	90	521
v/c Ratio	0.48	0.52	0.64	0.56	0.62	0.19	0.78
Control Delay	49.7	31.5	31.5	8.6	3.7	0.5	33.5
Queue Delay	0.0	0.3	6.3	2.4	2.5	5.5	0.1
Total Delay	49.7	31.9	37.8	11.0	6.2	6.0	33.6
Queue Length 50th (ft)	89	55	125	3	0	0	257
Queue Length 95th (ft)	150	m105	m238	m25	m2	m0	401
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	268	314	462	311	439	464	666
Starvation Cap Reductn	0	16	117	59	78	318	0
Spillback Cap Reductn	0	0	0	0	0	0	5
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.55	0.86	0.69	0.76	0.62	0.79

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	91	28	150	272	159	0	252	83	62	417	1
Future Volume (vph)	0	91	28	150	272	159	0	252	83	62	417	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.98		1.00	1.00	0.45		1.00	0.86		1.00	
Flpb, ped/bikes		1.00		0.98	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1402		1429	1543	592		1424	1037		1641	
Flt Permitted		1.00		0.64	1.00	1.00		1.00	1.00		0.91	
Satd. Flow (perm)		1402		962	1543	592		1424	1037		1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	99	30	163	296	173	0	274	90	67	453	1
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	62	0	0	0
Lane Group Flow (vph)	0	129	0	163	296	52	0	274	28	0	521	0
Confl. Peds. (#/hr)	103		15	15		103	15		77	77		15
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	1%	1%	1%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		21.0		34.0	34.0	34.0		35.0	35.0		44.0	
Effective Green, g (s)		23.0		36.0	36.0	36.0		37.0	37.0		48.0	
Actuated g/C Ratio		0.19		0.30	0.30	0.30		0.31	0.31		0.40	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		268		315	462	177		439	319		615	
v/s Ratio Prot		0.09		0.03	c0.19			0.19			c0.08	
v/s Ratio Perm				0.12		0.09			0.03		c0.26	
v/c Ratio		0.48		0.52	0.64	0.29		0.62	0.09		0.85	
Uniform Delay, d1		43.2		36.3	36.4	32.2		35.5	29.5		32.7	
Progression Factor		0.99		0.74	0.72	0.93		0.01	1.00		0.91	
Incremental Delay, d2		6.0		4.3	4.8	3.0		3.5	0.3		11.5	
Delay (s)		48.9		31.1	30.9	33.0		3.7	29.8		41.2	
Level of Service		D		C	C	C		A	C		D	
Approach Delay (s)		48.9			31.5			10.2			41.2	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
04/12/2023

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	648	372
v/c Ratio	0.54	0.84
Control Delay	2.1	58.0
Queue Delay	0.9	0.0
Total Delay	3.0	58.0
Queue Length 50th (ft)	0	271
Queue Length 95th (ft)	0	#432
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1207	445
Starvation Cap Reductn	294	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.71	0.84

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
04/12/2023

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	534	63	0	335
Future Volume (vph)	0	0	534	63	0	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.99			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1504			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1504			1574
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.90
Adj. Flow (vph)	0	0	580	68	0	372
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	644	0	0	372
Confl. Peds. (#/hr)		77				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			32.0
Effective Green, g (s)			94.0			34.0
Actuated g/C Ratio			0.78			0.28
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1178			445
v/s Ratio Prot			c0.43			c0.24
v/s Ratio Perm						
v/c Ratio			0.55			0.84
Uniform Delay, d1			4.9			40.4
Progression Factor			0.20			1.00
Incremental Delay, d2			1.3			16.8
Delay (s)			2.3			57.2
Level of Service			A			E
Approach Delay (s)	0.0		2.3			57.2
Approach LOS	A		A			E

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Cedar St & Metro Station Dwy

	→	←	↳
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	229	663	30
v/c Ratio	0.26	0.77	0.27
Control Delay	9.7	33.2	38.6
Queue Delay	0.8	51.9	0.0
Total Delay	10.5	85.1	38.6
Queue Length 50th (ft)	69	471	13
Queue Length 95th (ft)	m110	m494	44
Internal Link Dist (ft)	232	126	98
Turn Bay Length (ft)			
Base Capacity (vph)	876	856	112
Starvation Cap Reductn	393	309	0
Spillback Cap Reductn	0	47	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.47	1.21	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑↱		↰↱	
Traffic Volume (vph)	59	161	533	104	18	11
Future Volume (vph)	59	161	533	104	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		6%	4%		0%	
Total Lost time (s)		3.0	4.0		3.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	0.91		0.83	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.98		0.95	
Flt Protected		0.99	1.00		0.97	
Satd. Flow (prot)		1516	1398		652	
Flt Permitted		0.73	1.00		0.97	
Satd. Flow (perm)		1129	1398		652	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	61	168	555	108	19	11
RTOR Reduction (vph)	0	0	6	0	9	0
Lane Group Flow (vph)	0	229	657	0	21	0
Confl. Peds. (#/hr)	158			158	1	84
Heavy Vehicles (%)	8%	8%	7%	7%	100%	100%
Turn Type	pm+pt	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)		87.0	71.0		17.0	
Effective Green, g (s)		89.0	73.0		19.0	
Actuated g/C Ratio		0.74	0.61		0.16	
Clearance Time (s)		5.0	6.0		5.0	
Lane Grp Cap (vph)		876	850		103	
v/s Ratio Prot		c0.03	c0.47		c0.03	
v/s Ratio Perm		0.17				
v/c Ratio		0.26	0.77		0.20	
Uniform Delay, d1		5.0	17.4		43.9	
Progression Factor		1.75	1.64		1.00	
Incremental Delay, d2		0.7	3.7		4.4	
Delay (s)		9.3	32.2		48.3	
Level of Service		A	C		D	
Approach Delay (s)		9.3	32.2		48.3	
Approach LOS		A	C		D	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	207	486	158	323
v/c Ratio	0.24	0.53	0.28	1.58
Control Delay	1.9	6.2	4.5	318.7
Queue Delay	1.7	1.0	0.0	0.0
Total Delay	3.7	7.1	4.5	318.7
Queue Length 50th (ft)	15	97	19	~356
Queue Length 95th (ft)	19	135	m29	#540
Internal Link Dist (ft)	126	337		147
Turn Bay Length (ft)			125	
Base Capacity (vph)	854	925	566	204
Starvation Cap Reductn	490	212	0	0
Spillback Cap Reductn	0	191	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.68	0.28	1.58

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑	↱	⅄	
Traffic Volume (vph)	31	168	467	152	125	185
Future Volume (vph)	31	168	467	152	125	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.78	0.97	
Flpb, ped/bikes		0.99	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.92	
Flt Protected		0.99	1.00	1.00	0.98	
Satd. Flow (prot)		1246	1521	932	1293	
Flt Permitted		0.91	1.00	1.00	0.98	
Satd. Flow (perm)		1137	1521	932	1293	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	175	486	158	130	193
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	207	486	158	323	0
Confl. Peds. (#/hr)	89			89	12	5
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	10%	10%	6%	6%	6%	6%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		87.0	71.0	71.0	17.0	
Effective Green, g (s)		89.0	73.0	73.0	19.0	
Actuated g/C Ratio		0.74	0.61	0.61	0.16	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		854	925	566	204	
v/s Ratio Prot		c0.02	c0.32		c0.25	
v/s Ratio Perm		0.16		0.17		
v/c Ratio		0.24	0.53	0.28	1.58	
Uniform Delay, d1		4.9	13.5	11.1	50.5	
Progression Factor		0.25	0.33	0.31	1.00	
Incremental Delay, d2		0.7	1.5	0.9	284.6	
Delay (s)		1.9	6.0	4.3	335.1	
Level of Service		A	A	A	F	
Approach Delay (s)		1.9	5.6		335.1	
Approach LOS		A	A		F	

Intersection Summary			
HCM 2000 Control Delay	95.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	307	659	49	73
v/c Ratio	0.31	0.73	0.19	0.27
Control Delay	6.4	12.5	31.5	29.1
Queue Delay	0.8	2.4	0.0	0.0
Total Delay	7.2	15.0	31.5	29.1
Queue Length 50th (ft)	51	255	21	29
Queue Length 95th (ft)	m73	379	57	73
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	980	906	254	266
Starvation Cap Reductn	400	138	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.53	0.86	0.19	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	11	254	15	15	572	13	22	8	15	19	18	29
Future Volume (vph)	11	254	15	15	572	13	22	8	15	19	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.94	
Flpb, ped/bikes		1.00			1.00			0.97			0.99	
Frt		0.99			1.00			0.96			0.94	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1472			1340			1374			1302	
Flt Permitted		0.97			0.99			0.86			0.92	
Satd. Flow (perm)		1434			1327			1209			1214	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	12	279	16	16	629	14	24	9	16	21	20	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	13	0	0	23	0
Lane Group Flow (vph)	0	305	0	0	658	0	0	36	0	0	50	0
Confl. Peds. (#/hr)	48		12	12		48	19		10	10		19
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	8%	8%	8%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		979			906			241			242	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.50			0.03			c0.04	
v/c Ratio		0.31			0.73			0.15			0.21	
Uniform Delay, d1		7.6			12.0			39.6			40.0	
Progression Factor		0.77			0.66			1.00			1.00	
Incremental Delay, d2		0.5			4.2			1.3			1.9	
Delay (s)		6.4			12.0			40.9			42.0	
Level of Service		A			B			D			D	
Approach Delay (s)		6.4			12.0			40.9			42.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	171	84	154	112	97	618	23	137	372	4
v/c Ratio	0.49	0.30	0.46	0.39	0.20	0.69	0.03	0.35	0.33	0.00
Control Delay	46.2	42.3	45.5	44.2	8.5	10.5	8.2	9.8	9.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	42.3	45.5	44.2	8.5	10.5	8.2	9.8	9.5	6.8
Queue Length 50th (ft)	116	54	104	74	13	87	3	35	113	1
Queue Length 95th (ft)	189	103	172	131	m22	m141	m5	60	163	5
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	347	277	333	289	477	894	741	395	1140	929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.30	0.46	0.39	0.20	0.69	0.03	0.35	0.33	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	1	158	78	26	117	104	90	575	21	127	346	4
Future Volume (vph)	1	158	78	26	117	104	90	575	21	127	346	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.93	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1546	1233		1605	1288	1549	1651	1368	1624	1710	1394
Flt Permitted		1.00	1.00		0.91	1.00	0.54	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)		1544	1233		1481	1288	881	1651	1368	429	1710	1394
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1	170	84	28	126	112	97	618	23	137	372	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	171	84	0	154	112	97	618	23	137	372	4
Confl. Peds. (#/hr)	15		14	14		15	4		1	1		4
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	1%	1%	1%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		25.0	25.0		25.0	25.0	63.0	63.0	63.0	78.0	78.0	78.0
Effective Green, g (s)		27.0	27.0		27.0	27.0	65.0	65.0	65.0	80.0	80.0	80.0
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.54	0.54	0.54	0.67	0.67	0.67
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		347	277		333	289	477	894	741	395	1140	929
v/s Ratio Prot								c0.37		0.03	c0.22	
v/s Ratio Perm		c0.11	0.07		0.10	0.09	0.11		0.02	0.20		0.00
v/c Ratio		0.49	0.30		0.46	0.39	0.20	0.69	0.03	0.35	0.33	0.00
Uniform Delay, d1		40.5	38.7		40.2	39.5	14.2	20.1	12.8	11.5	8.5	6.7
Progression Factor		1.00	1.00		1.00	1.00	0.54	0.39	0.63	1.00	1.00	1.00
Incremental Delay, d2		4.9	2.8		4.6	3.9	0.5	2.3	0.0	2.4	0.8	0.0
Delay (s)		45.5	41.5		44.8	43.4	8.2	10.2	8.1	13.9	9.3	6.7
Level of Service		D	D		D	D	A	B	A	B	A	A
Approach Delay (s)		44.2			44.2			9.9			10.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		⋎	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	23	276	238	8	4	21
Future Volume (vph)	23	276	238	8	4	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	300	259	9	4	23

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	325	268	27
Volume Left (vph)	25	0	4
Volume Right (vph)	0	9	23
Hadj (s)	0.03	0.06	-0.41
Departure Headway (s)	4.3	4.4	4.8
Degree Utilization, x	0.39	0.32	0.04
Capacity (veh/h)	828	804	668
Control Delay (s)	9.9	9.4	7.9
Approach Delay (s)	9.9	9.4	7.9
Approach LOS	A	A	A

Intersection Summary			
Delay	9.6		
Level of Service	A		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Relocated Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

	→	↴	↲	←	↰	↱
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	253	17	6	196	27	8
Future Volume (Veh/h)	253	17	6	196	27	8
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	284	19	7	220	30	9
Pedestrians	3				14	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			317		544	308
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			317		544	308
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		94	99
cM capacity (veh/h)			1212		493	729

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	303	227	39
Volume Left	0	7	30
Volume Right	19	0	9
cSH	1700	1212	533
Volume to Capacity	0.18	0.01	0.07
Queue Length 95th (ft)	0	0	6
Control Delay (s)	0.0	0.3	12.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	12.3
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	282	195	9	0	19
Future Volume (vph)	0	282	195	9	0	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	307	212	10	0	21

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	307	212	10	21
Volume Left (vph)	0	212	0	0
Volume Right (vph)	307	0	0	21
Hadj (s)	-0.58	0.53	0.03	-0.60
Departure Headway (s)	4.0	5.7	5.2	3.2
Degree Utilization, x	0.34	0.34	0.01	0.02
Capacity (veh/h)	870	607	660	1121
Control Delay (s)	9.0	10.3	7.1	6.3
Approach Delay (s)	9.0	10.2		6.3
Approach LOS	A	B		A

Intersection Summary			
Delay	9.4		
Level of Service	A		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Cedar St & Site Dwy

Takoma Metro Multifamily Development
04/12/2023

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰↑	↱	
Traffic Volume (veh/h)	22	25	37	185	256	26
Future Volume (Veh/h)	22	25	37	185	256	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	24	28	41	206	284	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				229		
pX, platoon unblocked						
vC, conflicting volume	484	298	313			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	298	313			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	96	97			
cM capacity (veh/h)	495	698	1244			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	52	110	137	313
Volume Left	24	41	0	0
Volume Right	28	0	0	29
cSH	587	1244	1700	1700
Volume to Capacity	0.09	0.03	0.08	0.18
Queue Length 95th (ft)	7	3	0	0
Control Delay (s)	11.7	3.2	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.7	1.4		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
04/12/2023

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	202	116	96	98	347	94	456
v/c Ratio	0.90	0.51	0.23	0.32	0.65	0.18	0.84
Control Delay	84.9	65.7	55.4	13.2	3.0	0.3	33.5
Queue Delay	6.0	0.0	0.0	0.0	2.9	5.9	0.1
Total Delay	90.9	65.7	55.4	13.2	5.9	6.2	33.6
Queue Length 50th (ft)	129	69	57	27	0	0	208
Queue Length 95th (ft)	#282	126	110	63	m2	m0	m268
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	225	228	424	307	537	528	544
Starvation Cap Reductn	0	0	0	0	103	380	0
Spillback Cap Reductn	10	0	0	0	0	7	1
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.51	0.23	0.32	0.80	0.64	0.84

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	156	36	110	91	93	0	330	89	100	331	3
Future Volume (vph)	0	156	36	110	91	93	0	330	89	100	331	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.97		1.00	1.00	0.47		1.00	0.87		1.00	
Flpb, ped/bikes		1.00		0.96	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1350		1407	1543	615		1465	1081		1597	
Flt Permitted		1.00		0.47	1.00	1.00		1.00	1.00		0.70	
Satd. Flow (perm)		1350		696	1543	615		1465	1081		1129	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	164	38	116	96	98	0	347	94	105	348	3
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	60	0	0	0
Lane Group Flow (vph)	0	202	0	116	96	27	0	347	34	0	456	0
Confl. Peds. (#/hr)	89		44	44		89	32		83	83		32
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		18.0		31.0	31.0	31.0		42.0	42.0		47.0	
Effective Green, g (s)		20.0		33.0	33.0	33.0		44.0	44.0		51.0	
Actuated g/C Ratio		0.17		0.28	0.28	0.28		0.37	0.37		0.42	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		225		232	424	169		537	396		507	
v/s Ratio Prot		c0.15		c0.03	0.06			0.24			c0.05	
v/s Ratio Perm				0.11		0.04			0.03		c0.33	
v/c Ratio		0.90		0.50	0.23	0.16		0.65	0.09		0.90	
Uniform Delay, d1		49.0		41.7	33.6	33.0		31.5	24.9		32.1	
Progression Factor		0.95		1.46	1.59	1.00		0.01	1.00		0.93	
Incremental Delay, d2		37.4		6.7	1.1	1.8		2.8	0.2		12.0	
Delay (s)		83.9		67.7	54.5	34.8		3.0	25.1		42.0	
Level of Service		F		E	D	C		A	C		D	
Approach Delay (s)		83.9			53.2			7.7			42.0	
Approach LOS		F			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
04/12/2023

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	530	466
v/c Ratio	0.44	0.87
Control Delay	2.0	55.0
Queue Delay	2.1	0.0
Total Delay	4.1	55.0
Queue Length 50th (ft)	26	336
Queue Length 95th (ft)	m27	#524
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1204	537
Starvation Cap Reductn	509	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.76	0.87

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
04/12/2023

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	422	55	0	419
Future Volume (vph)	0	0	422	55	0	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.98			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1502			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1502			1574
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	469	61	0	466
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	526	0	0	466
Confl. Peds. (#/hr)		83				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			39.0
Effective Green, g (s)			94.0			41.0
Actuated g/C Ratio			0.78			0.34
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1176			537
v/s Ratio Prot			c0.35			c0.30
v/s Ratio Perm						
v/c Ratio			0.45			0.87
Uniform Delay, d1			4.3			37.0
Progression Factor			0.33			1.00
Incremental Delay, d2			0.8			17.1
Delay (s)			2.2			54.1
Level of Service			A			D
Approach Delay (s)	0.0		2.2			54.1
Approach LOS	A		A			D

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
04/12/2023

	→	←	↘
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	384	313	32
v/c Ratio	0.40	0.52	0.16
Control Delay	10.9	44.3	25.9
Queue Delay	3.4	67.1	0.2
Total Delay	14.3	111.4	26.2
Queue Length 50th (ft)	165	247	12
Queue Length 95th (ft)	m220	m333	39
Internal Link Dist (ft)	232	126	98
Turn Bay Length (ft)			
Base Capacity (vph)	949	601	195
Starvation Cap Reductn	458	431	0
Spillback Cap Reductn	65	0	31
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.78	1.84	0.20

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (vph)	18	324	252	27	18	11
Future Volume (vph)	18	324	252	27	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		6%	4%		0%	
Total Lost time (s)		3.0	4.0		3.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	0.95		0.85	
Flpb, ped/bikes		0.99	1.00		1.00	
Frt		1.00	0.99		0.95	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		1529	1466		680	
Flt Permitted		0.98	1.00		0.97	
Satd. Flow (perm)		1509	1466		680	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	20	364	283	30	20	12
RTOR Reduction (vph)	0	0	3	0	9	0
Lane Group Flow (vph)	0	384	310	0	23	0
Confl. Peds. (#/hr)	160			160	3	73
Heavy Vehicles (%)	7%	7%	7%	7%	96%	96%
Turn Type	pm+pt	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)		73.0	47.0		31.0	
Effective Green, g (s)		75.0	49.0		33.0	
Actuated g/C Ratio		0.62	0.41		0.28	
Clearance Time (s)		5.0	6.0		5.0	
Lane Grp Cap (vph)		946	598		187	
v/s Ratio Prot		c0.07	c0.21		c0.03	
v/s Ratio Perm		0.18				
v/c Ratio		0.41	0.52		0.12	
Uniform Delay, d1		11.3	26.6		32.7	
Progression Factor		0.85	1.54		1.00	
Incremental Delay, d2		1.0	2.9		1.4	
Delay (s)		10.6	44.0		34.0	
Level of Service		B	D		C	
Approach Delay (s)		10.6	44.0		34.0	
Approach LOS		B	D		C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

	→	←	↖	↘
Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	373	234	150	304
v/c Ratio	0.51	0.38	0.43	0.77
Control Delay	14.5	13.5	16.4	54.3
Queue Delay	6.2	67.5	0.0	0.0
Total Delay	20.7	81.0	16.4	54.3
Queue Length 50th (ft)	133	62	45	217
Queue Length 95th (ft)	173	105	97	#350
Internal Link Dist (ft)	126	337		149
Turn Bay Length (ft)			125	
Base Capacity (vph)	737	621	345	396
Starvation Cap Reductn	304	0	0	0
Spillback Cap Reductn	0	450	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.86	1.37	0.43	0.77

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

	↗	→	←	↖	↘	↙
Movement	**EBL**	**EBT**	**WBT**	**WBR**	**SBL**	**SBR**
Lane Configurations		↰	↑	↱	↰↱	
Traffic Volume (vph)	65	286	220	141	214	71
Future Volume (vph)	65	286	220	141	214	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.71	0.99	
Flpb, ped/bikes		0.97	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.97	
Flt Protected		0.99	1.00	1.00	0.96	
Satd. Flow (prot)		1244	1521	847	1442	
Flt Permitted		0.91	1.00	1.00	0.96	
Satd. Flow (perm)		1142	1521	847	1442	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	304	234	150	228	76
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	373	234	150	304	0
Confl. Peds. (#/hr)	119			119	18	4
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	8%	8%	6%	6%	0%	0%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		73.0	47.0	47.0	31.0	
Effective Green, g (s)		75.0	49.0	49.0	33.0	
Actuated g/C Ratio		0.62	0.41	0.41	0.28	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		732	621	345	396	
v/s Ratio Prot		c0.09	0.15		c0.21	
v/s Ratio Perm		c0.22		0.18		
v/c Ratio		0.51	0.38	0.43	0.77	
Uniform Delay, d1		12.4	24.8	25.5	40.0	
Progression Factor		0.93	0.47	0.48	1.00	
Incremental Delay, d2		2.4	1.6	3.7	13.3	
Delay (s)		13.9	13.3	15.9	53.3	
Level of Service		B	B	B	D	
Approach Delay (s)		13.9	14.3		53.3	
Approach LOS		B	B		D	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	494	352	127	61
v/c Ratio	0.52	0.42	0.47	0.24
Control Delay	15.8	18.4	46.9	33.8
Queue Delay	0.9	20.2	0.0	0.0
Total Delay	16.6	38.6	46.9	33.8
Queue Length 50th (ft)	245	211	83	29
Queue Length 95th (ft)	112	m194	148	70
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	955	848	270	254
Starvation Cap Reductn	216	487	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	0.98	0.47	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	33	422	28	12	304	29	36	72	17	16	26	18
Future Volume (vph)	33	422	28	12	304	29	36	72	17	16	26	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.96			0.97			0.92	
Flpb, ped/bikes		0.98			1.00			0.94			0.97	
Frt		0.99			0.99			0.98			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1451			1260			1455			1301	
Flt Permitted		0.96			0.98			0.90			0.91	
Satd. Flow (perm)		1395			1239			1330			1206	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	34	431	29	12	310	30	37	73	17	16	27	18
RTOR Reduction (vph)	0	2	0	0	3	0	0	5	0	0	13	0
Lane Group Flow (vph)	0	492	0	0	349	0	0	122	0	0	48	0
Confl. Peds. (#/hr)	94		71	71		94	52		37	37		52
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	5%	5%	5%	6%	6%	6%	0%	0%	0%	3%	3%	3%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		953			846			266			241	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.28			c0.09			0.04	
v/c Ratio		0.52			0.41			0.46			0.20	
Uniform Delay, d1		9.3			8.4			42.3			40.0	
Progression Factor		1.49			2.17			1.00			1.00	
Incremental Delay, d2		1.6			0.1			5.6			1.9	
Delay (s)		15.4			18.3			47.9			41.9	
Level of Service		B			B			D			D	
Approach Delay (s)		15.4			18.3			47.9			41.9	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

J. Vehicular Capacity Analysis Worksheets – 2027 Total Future Conditions with Mitigations

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	121	194	165	38	211	11	145	576	1
v/c Ratio	0.26	0.32	0.46	0.41	0.13	0.32	0.02	0.24	0.59	0.00
Control Delay	33.1	34.7	37.6	36.8	16.4	17.4	15.4	12.6	19.0	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	34.7	37.6	36.8	16.4	17.4	15.4	12.6	19.0	10.0
Queue Length 50th (ft)	73	72	121	101	12	65	3	49	268	0
Queue Length 95th (ft)	125	126	194	168	m24	m93	m9	81	379	3
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	474	379	426	399	291	660	561	610	978	784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.32	0.46	0.41	0.13	0.32	0.02	0.24	0.59	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	2	113	111	57	121	152	35	194	10	133	530	1
Future Volume (vph)	2	113	111	57	121	152	35	194	10	133	530	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.94	1.00	1.00	1.00	1.00	1.00	0.94
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1545	1232		1585	1297	1544	1651	1403	1593	1677	1345
Flt Permitted		1.00	1.00		0.86	1.00	0.45	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)		1540	1232		1382	1297	727	1651	1403	857	1677	1345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	123	121	62	132	165	38	211	11	145	576	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	121	0	194	165	38	211	11	145	576	1
Confl. Peds. (#/hr)	13		15	15		13	7					7
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		35.0	35.0		35.0	35.0	46.0	46.0	46.0	68.0	68.0	68.0
Effective Green, g (s)		37.0	37.0		37.0	37.0	48.0	48.0	48.0	70.0	70.0	70.0
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.40	0.40	0.40	0.58	0.58	0.58
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		474	379		426	399	290	660	561	610	978	784
v/s Ratio Prot								0.13		0.04	c0.34	
v/s Ratio Perm		0.08	0.10		c0.14	0.13	0.05		0.01	0.10		0.00
v/c Ratio		0.26	0.32		0.46	0.41	0.13	0.32	0.02	0.24	0.59	0.00
Uniform Delay, d1		31.2	31.8		33.4	32.9	22.8	24.8	21.8	11.9	15.9	10.4
Progression Factor		1.00	1.00		1.00	1.00	0.66	0.64	0.70	1.00	1.00	1.00
Incremental Delay, d2		1.4	2.2		3.5	3.1	0.9	1.2	0.1	0.9	2.6	0.0
Delay (s)		32.6	34.0		36.9	36.0	15.9	17.1	15.2	12.8	18.5	10.4
Level of Service		C	C		D	D	B	B	B	B	B	B
Approach Delay (s)		33.3			36.5			16.9			17.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑↱		↲↳	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	14	250	313	18	2	13
Future Volume (vph)	14	250	313	18	2	13
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	278	348	20	2	14

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	294	368	16
Volume Left (vph)	16	0	2
Volume Right (vph)	0	20	14
Hadj (s)	0.08	0.05	-0.50
Departure Headway (s)	4.4	4.3	4.8
Degree Utilization, x	0.36	0.44	0.02
Capacity (veh/h)	806	821	643
Control Delay (s)	9.8	10.6	7.9
Approach Delay (s)	9.8	10.6	7.9
Approach LOS	A	B	A

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Relocated Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	225	9	6	191	125	39
Future Volume (Veh/h)	225	9	6	191	125	39
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	245	10	7	208	136	42
Pedestrians	1				10	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			265		483	260
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			265		483	260
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	95
cM capacity (veh/h)			1277		538	777

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	255	215	178
Volume Left	0	7	136
Volume Right	10	0	42
cSH	1700	1277	580
Volume to Capacity	0.15	0.01	0.31
Queue Length 95th (ft)	0	0	32
Control Delay (s)	0.0	0.3	13.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	13.9
Approach LOS			B

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
04/12/2023

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	271	186	3	0	31
Future Volume (vph)	0	271	186	3	0	31
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	301	207	3	0	34

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	301	207	3	34
Volume Left (vph)	0	207	0	0
Volume Right (vph)	301	0	0	34
Hadj (s)	-0.52	0.55	0.05	-0.55
Departure Headway (s)	4.0	5.7	5.2	3.2
Degree Utilization, x	0.33	0.33	0.00	0.03
Capacity (veh/h)	862	605	658	1121
Control Delay (s)	9.0	10.3	7.0	6.3
Approach Delay (s)	9.0	10.2		6.3
Approach LOS	A	B		A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Cedar St & Site Dwy

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰↑	↱	
Traffic Volume (veh/h)	21	38	15	168	260	11
Future Volume (Veh/h)	21	38	15	168	260	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	42	17	187	289	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				227		
pX, platoon unblocked						
vC, conflicting volume	422	295	301			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422	295	301			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	94	99			
cM capacity (veh/h)	552	701	1257			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	65	79	125	301
Volume Left	23	17	0	0
Volume Right	42	0	0	12
cSH	640	1257	1700	1700
Volume to Capacity	0.10	0.01	0.07	0.18
Queue Length 95th (ft)	8	1	0	0
Control Delay (s)	11.3	1.8	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.3	0.7		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		

Queues

7: Blair Rd & Cedar St

Takoma Metro Multifamily Development

04/12/2023

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	129	163	296	173	274	90	521
v/c Ratio	0.48	0.52	0.64	0.56	0.62	0.19	0.78
Control Delay	49.7	33.4	33.8	8.6	3.7	0.5	33.5
Queue Delay	0.0	0.3	6.3	2.4	2.5	5.5	0.1
Total Delay	49.7	33.8	40.1	11.0	6.2	6.0	33.6
Queue Length 50th (ft)	89	54	124	0	0	0	257
Queue Length 95th (ft)	150	m105	m239	m36	m2	m0	401
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	268	314	462	311	439	464	666
Starvation Cap Reductn	0	16	117	59	78	318	0
Spillback Cap Reductn	0	0	0	0	0	0	5
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.55	0.86	0.69	0.76	0.62	0.79

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
04/12/2023

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	91	28	150	272	159	0	252	83	62	417	1
Future Volume (vph)	0	91	28	150	272	159	0	252	83	62	417	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.98		1.00	1.00	0.45		1.00	0.86		1.00	
Flpb, ped/bikes		1.00		0.98	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1402		1429	1543	592		1424	1037		1641	
Flt Permitted		1.00		0.64	1.00	1.00		1.00	1.00		0.91	
Satd. Flow (perm)		1402		962	1543	592		1424	1037		1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	99	30	163	296	173	0	274	90	67	453	1
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	62	0	0	0
Lane Group Flow (vph)	0	129	0	163	296	52	0	274	28	0	521	0
Confl. Peds. (#/hr)	103		15	15		103	15		77	77		15
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	1%	1%	1%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		21.0		34.0	34.0	34.0		35.0	35.0		44.0	
Effective Green, g (s)		23.0		36.0	36.0	36.0		37.0	37.0		48.0	
Actuated g/C Ratio		0.19		0.30	0.30	0.30		0.31	0.31		0.40	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		268		315	462	177		439	319		615	
v/s Ratio Prot		0.09		0.03	c0.19			0.19			c0.08	
v/s Ratio Perm				0.12		0.09			0.03		c0.26	
v/c Ratio		0.48		0.52	0.64	0.29		0.62	0.09		0.85	
Uniform Delay, d1		43.2		36.3	36.4	32.2		35.5	29.5		32.7	
Progression Factor		0.99		0.79	0.78	0.92		0.01	1.00		0.91	
Incremental Delay, d2		6.0		4.3	4.8	3.0		3.5	0.3		11.5	
Delay (s)		48.9		33.0	33.1	32.8		3.7	29.8		41.2	
Level of Service		D		C	C	C		A	C		D	
Approach Delay (s)		48.9			33.0			10.2			41.2	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	648	372
v/c Ratio	0.54	0.84
Control Delay	2.1	58.0
Queue Delay	0.9	0.0
Total Delay	3.0	58.0
Queue Length 50th (ft)	0	271
Queue Length 95th (ft)	0	#432
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1207	445
Starvation Cap Reductn	294	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.71	0.84

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
04/12/2023

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	534	63	0	335
Future Volume (vph)	0	0	534	63	0	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.99			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1504			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1504			1574
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.90
Adj. Flow (vph)	0	0	580	68	0	372
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	644	0	0	372
Confl. Peds. (#/hr)		77				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			32.0
Effective Green, g (s)			94.0			34.0
Actuated g/C Ratio			0.78			0.28
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1178			445
v/s Ratio Prot			c0.43			c0.24
v/s Ratio Perm						
v/c Ratio			0.55			0.84
Uniform Delay, d1			4.9			40.4
Progression Factor			0.20			1.00
Incremental Delay, d2			1.3			16.8
Delay (s)			2.3			57.2
Level of Service			A			E
Approach Delay (s)	0.0		2.3			57.2
Approach LOS	A		A			E

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Cedar St & Metro Station Dwy

Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	229	663	30
v/c Ratio	0.26	0.77	0.27
Control Delay	9.7	24.8	38.6
Queue Delay	0.8	52.4	0.0
Total Delay	10.5	77.1	38.6
Queue Length 50th (ft)	69	350	13
Queue Length 95th (ft)	m110	531	44
Internal Link Dist (ft)	232	126	98
Turn Bay Length (ft)			
Base Capacity (vph)	876	856	112
Starvation Cap Reductn	393	338	0
Spillback Cap Reductn	0	47	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.47	1.28	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
04/12/2023

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		↙↘	
Traffic Volume (vph)	59	161	533	104	18	11
Future Volume (vph)	59	161	533	104	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		6%	4%		0%	
Total Lost time (s)		3.0	4.0		3.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	0.91		0.83	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.98		0.95	
Flt Protected		0.99	1.00		0.97	
Satd. Flow (prot)		1516	1398		652	
Flt Permitted		0.73	1.00		0.97	
Satd. Flow (perm)		1129	1398		652	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	61	168	555	108	19	11
RTOR Reduction (vph)	0	0	6	0	9	0
Lane Group Flow (vph)	0	229	657	0	21	0
Confl. Peds. (#/hr)	158			158	1	84
Heavy Vehicles (%)	8%	8%	7%	7%	100%	100%
Turn Type	pm+pt	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)		87.0	71.0		17.0	
Effective Green, g (s)		89.0	73.0		19.0	
Actuated g/C Ratio		0.74	0.61		0.16	
Clearance Time (s)		5.0	6.0		5.0	
Lane Grp Cap (vph)		876	850		103	
v/s Ratio Prot		c0.03	c0.47		c0.03	
v/s Ratio Perm		0.17				
v/c Ratio		0.26	0.77		0.20	
Uniform Delay, d1		5.0	17.4		43.9	
Progression Factor		1.75	1.00		1.00	
Incremental Delay, d2		0.7	6.8		4.4	
Delay (s)		9.3	24.1		48.3	
Level of Service		A	C		D	
Approach Delay (s)		9.3	24.1		48.3	
Approach LOS		A	C		D	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
10: Cedar St & Carroll St

	→	←	↖	↘
Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	207	486	158	323
v/c Ratio	0.29	0.64	0.32	1.02
Control Delay	9.1	21.4	15.6	91.6
Queue Delay	3.1	2.2	0.0	0.0
Total Delay	12.3	23.5	15.6	91.6
Queue Length 50th (ft)	48	194	51	~190
Queue Length 95th (ft)	84	303	95	#359
Internal Link Dist (ft)	126	337		147
Turn Bay Length (ft)			125	
Base Capacity (vph)	722	760	497	317
Starvation Cap Reductn	412	153	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	0.80	0.32	1.02

Intersection Summary

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

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

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↑	↱	↰↱	
Traffic Volume (vph)	31	168	467	152	125	185
Future Volume (vph)	31	168	467	152	125	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.83	0.98	
Flpb, ped/bikes		0.99	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.92	
Flt Protected		0.99	1.00	1.00	0.98	
Satd. Flow (prot)		1249	1521	994	1298	
Flt Permitted		0.91	1.00	1.00	0.98	
Satd. Flow (perm)		1147	1521	994	1298	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	175	486	158	130	193
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	207	486	158	323	0
Confl. Peds. (#/hr)	89			89	12	5
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	10%	10%	6%	6%	6%	6%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		54.0	43.0	43.0	20.0	
Effective Green, g (s)		56.0	45.0	45.0	22.0	
Actuated g/C Ratio		0.62	0.50	0.50	0.24	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		721	760	497	317	
v/s Ratio Prot		c0.02	c0.32		c0.25	
v/s Ratio Perm		0.16		0.16		
v/c Ratio		0.29	0.64	0.32	1.02	
Uniform Delay, d1		7.8	16.5	13.4	34.0	
Progression Factor		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	4.1	1.7	55.5	
Delay (s)		8.8	20.6	15.1	89.5	
Level of Service		A	C	B	F	
Approach Delay (s)		8.8	19.3		89.5	
Approach LOS		A	B		F	

Intersection Summary

HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
11: Maple St & Carroll St

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	307	659	49	73
v/c Ratio	0.31	0.73	0.19	0.27
Control Delay	8.5	12.5	31.5	29.1
Queue Delay	1.1	2.4	0.0	0.0
Total Delay	9.6	15.0	31.5	29.1
Queue Length 50th (ft)	85	255	21	29
Queue Length 95th (ft)	130	379	57	73
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	980	906	254	266
Starvation Cap Reductn	446	138	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.86	0.19	0.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
04/12/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	11	254	15	15	572	13	22	8	15	19	18	29
Future Volume (vph)	11	254	15	15	572	13	22	8	15	19	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.94	
Flpb, ped/bikes		1.00			1.00			0.97			0.99	
Frt		0.99			1.00			0.96			0.94	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1472			1340			1374			1302	
Flt Permitted		0.97			0.99			0.86			0.92	
Satd. Flow (perm)		1434			1327			1209			1214	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	12	279	16	16	629	14	24	9	16	21	20	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	13	0	0	23	0
Lane Group Flow (vph)	0	305	0	0	658	0	0	36	0	0	50	0
Confl. Peds. (#/hr)	48		12	12		48	19		10	10		19
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	8%	8%	8%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		979			906			241			242	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.50			0.03			c0.04	
v/c Ratio		0.31			0.73			0.15			0.21	
Uniform Delay, d1		7.6			12.0			39.6			40.0	
Progression Factor		1.00			0.66			1.00			1.00	
Incremental Delay, d2		0.8			4.2			1.3			1.9	
Delay (s)		8.5			12.0			40.9			42.0	
Level of Service		A			B			D			D	
Approach Delay (s)		8.5			12.0			40.9			42.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
04/24/2023

	→	↘	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	171	84	154	112	97	618	23	137	372	4
v/c Ratio	0.49	0.30	0.46	0.39	0.20	0.69	0.03	0.35	0.33	0.00
Control Delay	46.2	42.3	45.5	44.2	8.4	10.4	8.2	9.8	9.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	42.3	45.5	44.2	8.4	10.4	8.2	9.8	9.5	6.8
Queue Length 50th (ft)	116	54	104	74	13	87	3	35	113	1
Queue Length 95th (ft)	189	103	172	131	m22	m141	m5	60	163	5
Internal Link Dist (ft)	325		429			793			351	
Turn Bay Length (ft)		25		25	120		420	70		70
Base Capacity (vph)	347	277	333	289	477	894	741	395	1140	929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.30	0.46	0.39	0.20	0.69	0.03	0.35	0.33	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Piney Branch Rd & Eastern Ave

Takoma Metro Multifamily Development
04/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	1	158	78	26	117	104	90	575	21	127	346	4
Future Volume (vph)	1	158	78	26	117	104	90	575	21	127	346	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			5%			-2%	
Total Lost time (s)		6.0	6.0		6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.94		1.00	0.93	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1546	1233		1605	1288	1549	1651	1368	1624	1710	1394
Flt Permitted		1.00	1.00		0.91	1.00	0.54	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)		1544	1233		1481	1288	881	1651	1368	429	1710	1394
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1	170	84	28	126	112	97	618	23	137	372	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	171	84	0	154	112	97	618	23	137	372	4
Confl. Peds. (#/hr)	15		14	14		15	4		1	1		4
Confl. Bikes (#/hr)			4									3
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	1%	1%	1%
Parking (#/hr)	0	0	0									
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8		8	4		4	6		6	2		2
Actuated Green, G (s)		25.0	25.0		25.0	25.0	63.0	63.0	63.0	78.0	78.0	78.0
Effective Green, g (s)		27.0	27.0		27.0	27.0	65.0	65.0	65.0	80.0	80.0	80.0
Actuated g/C Ratio		0.22	0.22		0.22	0.22	0.54	0.54	0.54	0.67	0.67	0.67
Clearance Time (s)		8.0	8.0		8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)		347	277		333	289	477	894	741	395	1140	929
v/s Ratio Prot								c0.37		0.03	c0.22	
v/s Ratio Perm		c0.11	0.07		0.10	0.09	0.11		0.02	0.20		0.00
v/c Ratio		0.49	0.30		0.46	0.39	0.20	0.69	0.03	0.35	0.33	0.00
Uniform Delay, d1		40.5	38.7		40.2	39.5	14.2	20.1	12.8	11.5	8.5	6.7
Progression Factor		1.00	1.00		1.00	1.00	0.54	0.39	0.63	1.00	1.00	1.00
Incremental Delay, d2		4.9	2.8		4.6	3.9	0.5	2.3	0.0	2.4	0.8	0.0
Delay (s)		45.5	41.5		44.8	43.4	8.2	10.2	8.1	13.9	9.3	6.7
Level of Service		D	D		D	D	A	B	A	B	A	A
Approach Delay (s)		44.2			44.2			9.8			10.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Eastern Ave & Holly Ave

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		⋎	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	23	276	238	8	4	21
Future Volume (vph)	23	276	238	8	4	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	300	259	9	4	23

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	325	268	27
Volume Left (vph)	25	0	4
Volume Right (vph)	0	9	23
Hadj (s)	0.03	0.06	-0.41
Departure Headway (s)	4.3	4.4	4.8
Degree Utilization, x	0.39	0.32	0.04
Capacity (veh/h)	828	804	668
Control Delay (s)	9.9	9.4	7.9
Approach Delay (s)	9.9	9.4	7.9
Approach LOS	A	A	A

Intersection Summary			
Delay	9.6		
Level of Service	A		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Relocated Metro Station Dwy & Eastern Ave

Takoma Metro Multifamily Development
04/24/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	253	17	6	196	27	8
Future Volume (Veh/h)	253	17	6	196	27	8
Sign Control	Free			Free	Stop	
Grade	0%			2%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	284	19	7	220	30	9
Pedestrians	3				14	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			317		544	308
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			317		544	308
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		94	99
cM capacity (veh/h)			1212		493	729

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	303	227	39
Volume Left	0	7	30
Volume Right	19	0	9
cSH	1700	1212	533
Volume to Capacity	0.18	0.01	0.07
Queue Length 95th (ft)	0	0	6
Control Delay (s)	0.0	0.3	12.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	12.3
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Cedar St/Cedar Ave & Eastern Ave

Takoma Metro Multifamily Development
04/24/2023

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱	↰	↑		↱
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	0	282	195	9	0	19
Future Volume (vph)	0	282	195	9	0	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	307	212	10	0	21

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	307	212	10	21
Volume Left (vph)	0	212	0	0
Volume Right (vph)	307	0	0	21
Hadj (s)	-0.58	0.53	0.03	-0.60
Departure Headway (s)	4.0	5.7	5.2	3.2
Degree Utilization, x	0.34	0.34	0.01	0.02
Capacity (veh/h)	870	607	660	1121
Control Delay (s)	9.0	10.3	7.1	6.3
Approach Delay (s)	9.0	10.2		6.3
Approach LOS	A	B		A

Intersection Summary			
Delay	9.4		
Level of Service	A		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Cedar St & Site Dwy

Takoma Metro Multifamily Development
04/24/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰↑	↱	
Traffic Volume (veh/h)	22	25	37	185	256	26
Future Volume (Veh/h)	22	25	37	185	256	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	24	28	41	206	284	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				229		
pX, platoon unblocked						
vC, conflicting volume	484	298	313			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	298	313			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	96	97			
cM capacity (veh/h)	495	698	1244			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	52	110	137	313
Volume Left	24	41	0	0
Volume Right	28	0	0	29
cSH	587	1244	1700	1700
Volume to Capacity	0.09	0.03	0.08	0.18
Queue Length 95th (ft)	7	3	0	0
Control Delay (s)	11.7	3.2	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.7	1.4		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

	→	↙	←	↖	↑	↗	↓
Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	202	116	96	98	347	94	456
v/c Ratio	0.82	0.48	0.21	0.31	0.65	0.18	0.89
Control Delay	70.3	62.7	53.8	13.1	3.0	0.3	41.3
Queue Delay	1.6	0.0	0.0	0.0	2.9	5.9	0.1
Total Delay	71.9	62.7	53.8	13.1	5.9	6.2	41.4
Queue Length 50th (ft)	128	69	57	27	0	0	228
Queue Length 95th (ft)	#263	126	109	63	m2	m0	m283
Internal Link Dist (ft)	452		232		39		909
Turn Bay Length (ft)		220		180			
Base Capacity (vph)	247	244	450	314	537	528	513
Starvation Cap Reductn	0	0	0	0	103	380	0
Spillback Cap Reductn	7	0	0	0	0	6	1
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.48	0.21	0.31	0.80	0.64	0.89

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Blair Rd & Cedar St

Takoma Metro Multifamily Development
04/24/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑	↱		↑	↱		✥	
Traffic Volume (vph)	0	156	36	110	91	93	0	330	89	100	331	3
Future Volume (vph)	0	156	36	110	91	93	0	330	89	100	331	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	11	11	11
Grade (%)		-2%			4%			2%			-2%	
Total Lost time (s)		6.0		5.0	5.0	5.0		8.0	8.0		4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Frpb, ped/bikes		0.97		1.00	1.00	0.47		1.00	0.87		1.00	
Flpb, ped/bikes		1.00		0.96	1.00	1.00		1.00	1.00		1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00	1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1350		1404	1543	615		1465	1081		1597	
Flt Permitted		1.00		0.49	1.00	1.00		1.00	1.00		0.69	
Satd. Flow (perm)		1350		720	1543	615		1465	1081		1118	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	164	38	116	96	98	0	347	94	105	348	3
RTOR Reduction (vph)	0	0	0	0	0	69	0	0	60	0	0	0
Lane Group Flow (vph)	0	202	0	116	96	29	0	347	34	0	456	0
Confl. Peds. (#/hr)	89		44	44		89	32		83	83		32
Confl. Bikes (#/hr)			4			4			1			1
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Parking (#/hr)	0	0	0				0	0	0			
Turn Type		NA		pm+pt	NA	Perm		NA	Perm	D.P+P	NA	
Protected Phases		6		5	2			11		3	3 11	
Permitted Phases				2		2			11	11		
Actuated Green, G (s)		20.0		33.0	33.0	33.0		42.0	42.0		45.0	
Effective Green, g (s)		22.0		35.0	35.0	35.0		44.0	44.0		49.0	
Actuated g/C Ratio		0.18		0.29	0.29	0.29		0.37	0.37		0.41	
Clearance Time (s)		8.0		7.0	7.0	7.0		10.0	10.0			
Lane Grp Cap (vph)		247		249	450	179		537	396		476	
v/s Ratio Prot		c0.15		c0.03	0.06			0.24			c0.04	
v/s Ratio Perm				0.11		0.05			0.03		c0.35	
v/c Ratio		0.82		0.47	0.21	0.16		0.65	0.09		0.96	
Uniform Delay, d1		47.1		39.7	32.1	31.6		31.5	24.9		34.5	
Progression Factor		0.95		1.50	1.62	1.00		0.01	1.00		0.99	
Incremental Delay, d2		24.4		5.5	1.0	1.7		2.8	0.2		20.1	
Delay (s)		69.3		65.0	52.9	33.3		3.0	25.1		54.2	
Level of Service		E		E	D	C		A	C		D	
Approach Delay (s)		69.3			51.2			7.7			54.2	
Approach LOS		E			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
04/24/2023

	↘	↖
Lane Group	SET	NWT
Lane Group Flow (vph)	530	466
v/c Ratio	0.44	0.87
Control Delay	2.1	55.0
Queue Delay	2.4	0.0
Total Delay	4.5	55.0
Queue Length 50th (ft)	26	336
Queue Length 95th (ft)	m28	#524
Internal Link Dist (ft)	39	263
Turn Bay Length (ft)		
Base Capacity (vph)	1204	537
Starvation Cap Reductn	525	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.78	0.87

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: 4th St & Blair Rd

Takoma Metro Multifamily Development
04/24/2023

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations			↱			↑
Traffic Volume (vph)	0	0	422	55	0	419
Future Volume (vph)	0	0	422	55	0	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	2%		2%			2%
Total Lost time (s)			5.0			11.0
Lane Util. Factor			1.00			1.00
Frpb, ped/bikes			1.00			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.98			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1502			1574
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1502			1574
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	469	61	0	466
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	526	0	0	466
Confl. Peds. (#/hr)		83				
Confl. Bikes (#/hr)		1		2		
Heavy Vehicles (%)	0%	0%	7%	7%	4%	4%
Turn Type			NA			NA
Protected Phases			2 3 13			7
Permitted Phases						
Actuated Green, G (s)			96.0			39.0
Effective Green, g (s)			94.0			41.0
Actuated g/C Ratio			0.78			0.34
Clearance Time (s)						13.0
Lane Grp Cap (vph)			1176			537
v/s Ratio Prot			c0.35			c0.30
v/s Ratio Perm						
v/c Ratio			0.45			0.87
Uniform Delay, d1			4.3			37.0
Progression Factor			0.36			1.00
Incremental Delay, d2			0.8			17.1
Delay (s)			2.4			54.1
Level of Service			A			D
Approach Delay (s)	0.0		2.4			54.1
Approach LOS	A		A			D

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	35.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
04/24/2023

	→	←	↘
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	384	313	32
v/c Ratio	0.40	0.52	0.16
Control Delay	10.4	44.3	25.9
Queue Delay	3.3	67.1	0.2
Total Delay	13.8	111.4	26.2
Queue Length 50th (ft)	144	247	12
Queue Length 95th (ft)	m218	m333	39
Internal Link Dist (ft)	232	126	98
Turn Bay Length (ft)			
Base Capacity (vph)	949	601	195
Starvation Cap Reductn	456	431	0
Spillback Cap Reductn	94	0	31
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.78	1.84	0.20

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Cedar St & Metro Station Dwy

Takoma Metro Multifamily Development
04/24/2023

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰↑	↑↱		↰↱	
Traffic Volume (vph)	18	324	252	27	18	11
Future Volume (vph)	18	324	252	27	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		6%	4%		0%	
Total Lost time (s)		3.0	4.0		3.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	0.95		0.85	
Flpb, ped/bikes		0.99	1.00		1.00	
Frt		1.00	0.99		0.95	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		1529	1466		680	
Flt Permitted		0.98	1.00		0.97	
Satd. Flow (perm)		1509	1466		680	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	20	364	283	30	20	12
RTOR Reduction (vph)	0	0	3	0	9	0
Lane Group Flow (vph)	0	384	310	0	23	0
Confl. Peds. (#/hr)	160			160	3	73
Heavy Vehicles (%)	7%	7%	7%	7%	96%	96%
Turn Type	pm+pt	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)		73.0	47.0		31.0	
Effective Green, g (s)		75.0	49.0		33.0	
Actuated g/C Ratio		0.62	0.41		0.28	
Clearance Time (s)		5.0	6.0		5.0	
Lane Grp Cap (vph)		946	598		187	
v/s Ratio Prot		c0.07	c0.21		c0.03	
v/s Ratio Perm		0.18				
v/c Ratio		0.41	0.52		0.12	
Uniform Delay, d1		11.3	26.6		32.7	
Progression Factor		0.81	1.54		1.00	
Incremental Delay, d2		1.0	2.9		1.4	
Delay (s)		10.2	44.0		34.0	
Level of Service		B	D		C	
Approach Delay (s)		10.2	44.0		34.0	
Approach LOS		B	D		C	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	→	←	↖	↘
Lane Group	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	373	234	150	304
v/c Ratio	0.51	0.38	0.43	0.77
Control Delay	15.2	13.5	16.4	54.3
Queue Delay	6.2	67.5	0.0	0.0
Total Delay	21.4	81.0	16.4	54.3
Queue Length 50th (ft)	143	62	45	217
Queue Length 95th (ft)	182	105	97	#350
Internal Link Dist (ft)	126	337		149
Turn Bay Length (ft)			125	
Base Capacity (vph)	737	621	345	396
Starvation Cap Reductn	304	0	0	0
Spillback Cap Reductn	0	450	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.86	1.37	0.43	0.77

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
10: Cedar St & Carroll St

Takoma Metro Multifamily Development

04/24/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖↑	↑	↱	↖↗	
Traffic Volume (vph)	65	286	220	141	214	71
Future Volume (vph)	65	286	220	141	214	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	8	10	10
Grade (%)		6%	-2%		4%	
Total Lost time (s)		3.0	4.0	4.0	3.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	0.71	0.99	
Flpb, ped/bikes		0.97	1.00	1.00	1.00	
Frt		1.00	1.00	0.85	0.97	
Flt Protected		0.99	1.00	1.00	0.96	
Satd. Flow (prot)		1244	1521	847	1442	
Flt Permitted		0.91	1.00	1.00	0.96	
Satd. Flow (perm)		1142	1521	847	1442	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	304	234	150	228	76
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	373	234	150	304	0
Confl. Peds. (#/hr)	119			119	18	4
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	8%	8%	6%	6%	0%	0%
Parking (#/hr)	0	0				
Turn Type	pm+pt	NA	NA	Perm	Prot	
Protected Phases	5	2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)		73.0	47.0	47.0	31.0	
Effective Green, g (s)		75.0	49.0	49.0	33.0	
Actuated g/C Ratio		0.62	0.41	0.41	0.28	
Clearance Time (s)		5.0	6.0	6.0	5.0	
Lane Grp Cap (vph)		732	621	345	396	
v/s Ratio Prot		c0.09	0.15		c0.21	
v/s Ratio Perm		c0.22		0.18		
v/c Ratio		0.51	0.38	0.43	0.77	
Uniform Delay, d1		12.4	24.8	25.5	40.0	
Progression Factor		0.98	0.47	0.48	1.00	
Incremental Delay, d2		2.4	1.6	3.7	13.3	
Delay (s)		14.5	13.3	15.9	53.3	
Level of Service		B	B	B	D	
Approach Delay (s)		14.5	14.3		53.3	
Approach LOS		B	B		D	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
11: Maple St & Carroll St

Takoma Metro Multifamily Development
04/24/2023

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	494	352	127	61
v/c Ratio	0.52	0.42	0.47	0.24
Control Delay	15.1	18.4	46.9	33.8
Queue Delay	0.9	20.2	0.0	0.0
Total Delay	16.0	38.6	46.9	33.8
Queue Length 50th (ft)	239	211	83	29
Queue Length 95th (ft)	106	m194	148	70
Internal Link Dist (ft)	337	218	497	725
Turn Bay Length (ft)				
Base Capacity (vph)	955	848	270	254
Starvation Cap Reductn	216	487	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	0.98	0.47	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
11: Maple St & Carroll St

Takoma Metro Multifamily Development
04/24/2023

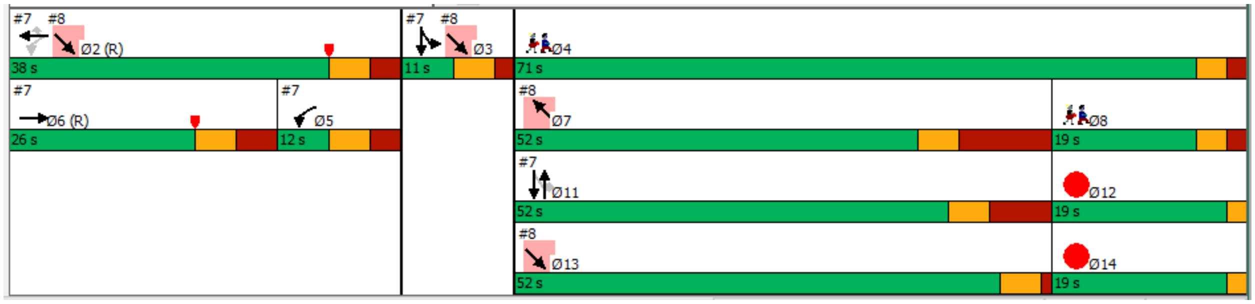
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	33	422	28	12	304	29	36	72	17	16	26	18
Future Volume (vph)	33	422	28	12	304	29	36	72	17	16	26	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	10	10	10
Grade (%)		-2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.96			0.97			0.92	
Flpb, ped/bikes		0.98			1.00			0.94			0.97	
Frt		0.99			0.99			0.98			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1451			1260			1455			1301	
Flt Permitted		0.96			0.98			0.90			0.91	
Satd. Flow (perm)		1395			1239			1330			1206	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	34	431	29	12	310	30	37	73	17	16	27	18
RTOR Reduction (vph)	0	2	0	0	3	0	0	5	0	0	13	0
Lane Group Flow (vph)	0	492	0	0	349	0	0	122	0	0	48	0
Confl. Peds. (#/hr)	94		71	71		94	52		37	37		52
Confl. Bikes (#/hr)						7			2			13
Heavy Vehicles (%)	5%	5%	5%	6%	6%	6%	0%	0%	0%	3%	3%	3%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		80.0			80.0			22.0			22.0	
Effective Green, g (s)		82.0			82.0			24.0			24.0	
Actuated g/C Ratio		0.68			0.68			0.20			0.20	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		953			846			266			241	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.28			c0.09			0.04	
v/c Ratio		0.52			0.41			0.46			0.20	
Uniform Delay, d1		9.3			8.4			42.3			40.0	
Progression Factor		1.42			2.17			1.00			1.00	
Incremental Delay, d2		1.6			0.1			5.6			1.9	
Delay (s)		14.8			18.3			47.9			41.9	
Level of Service		B			B			D			D	
Approach Delay (s)		14.8			18.3			47.9			41.9	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

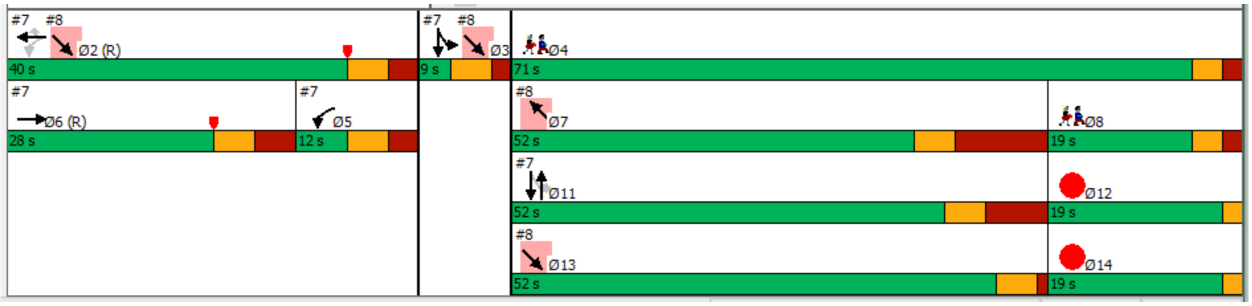
K. Potential Signal Timing Adjustments

Potential Signal Timing Adjustment at Blair Street and Cedar Street NW (PM)

Existing Signal Timing (PM)

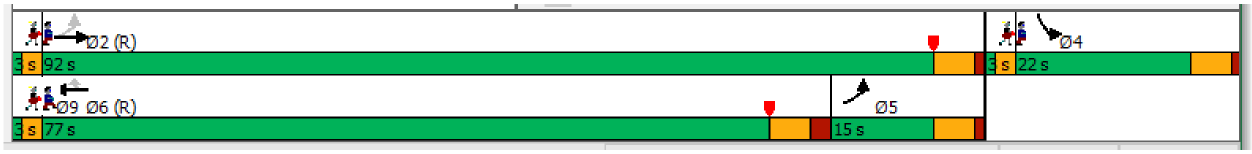


Potential Signal Timing (PM)

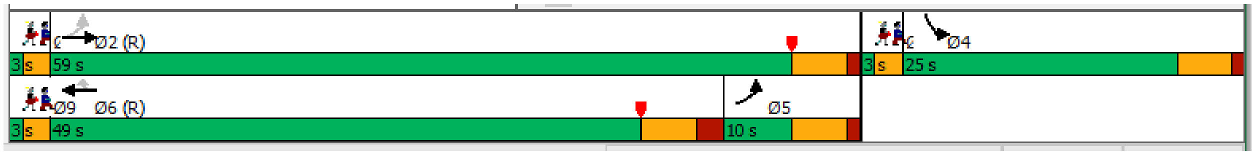


Potential Signal Timing Adjustment at Cedar Street and Carroll Street NW (AM)

Existing Signal Timing (AM)



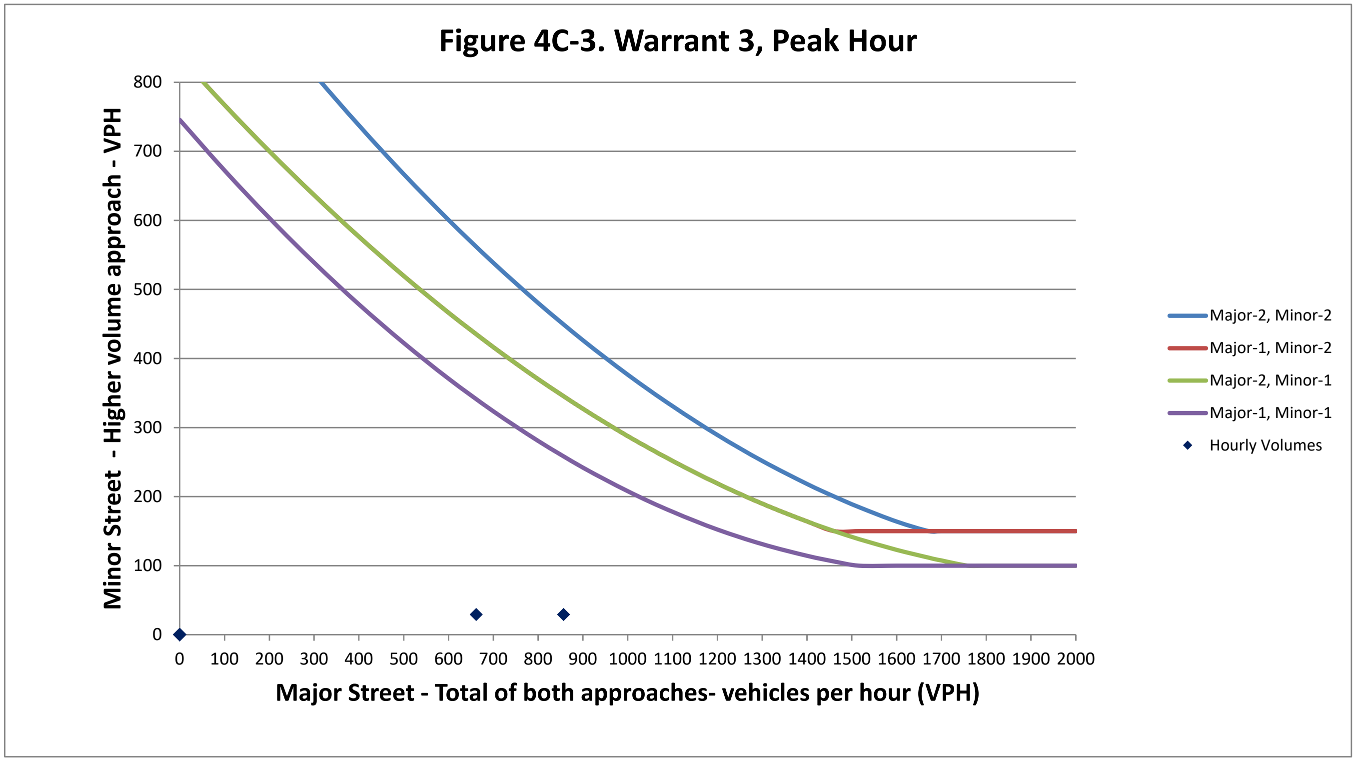
Potential Signal Timing (AM)



L. MUTCD Signal Warrants

Peak Hour

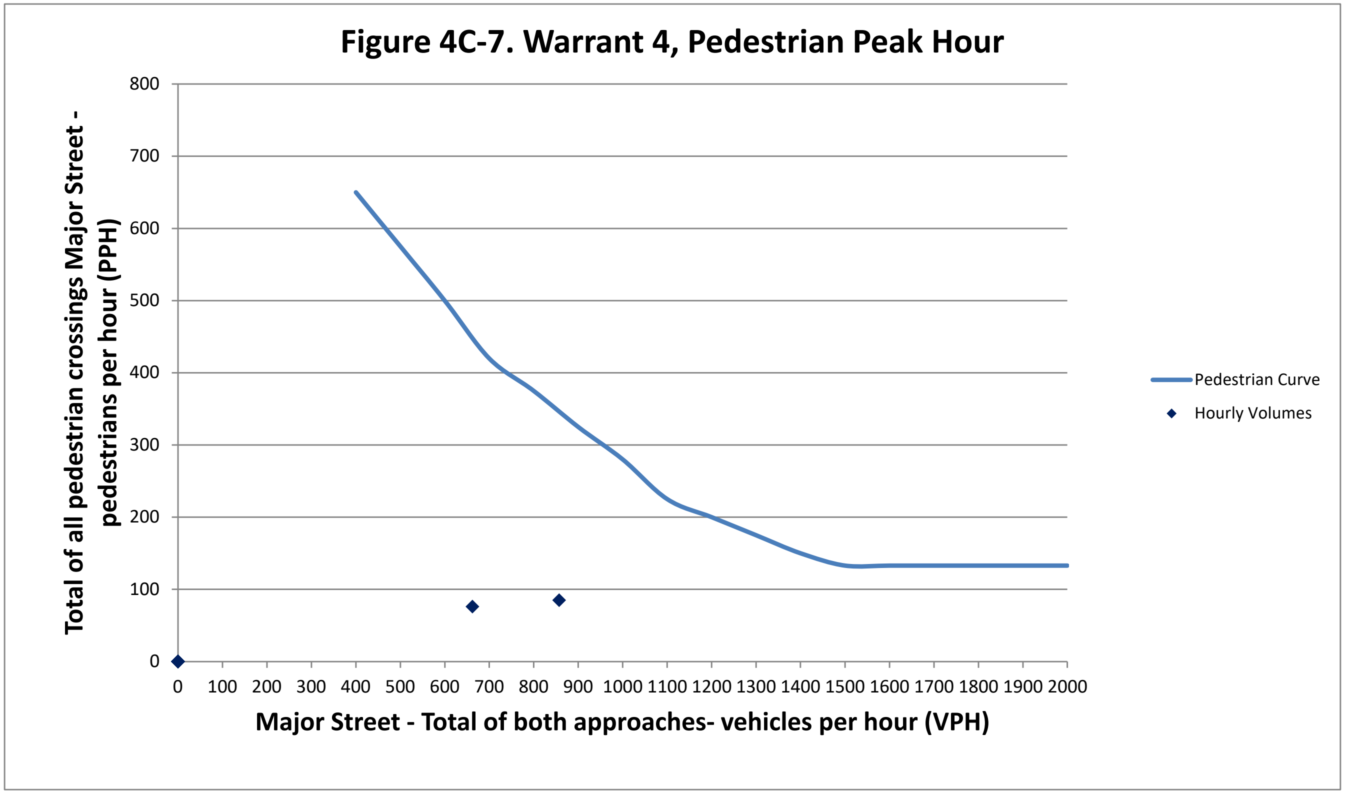
Input		
Time	Major Street Volume	Minor Street Volume
12:30 - 1:30	0	0
1:30 - 2:30	0	0
2:30 - 3:30	0	0
3:30 - 4:30	0	0
4:30 - 5:30	0	0
5:30 - 6:30	0	0
6:30 - 7:30	0	0
7:30 - 8:30	857	29
8:30 - 9:30	0	0
9:30 - 10:30	0	0
10:30 - 11:30	0	0
11:30 - 12:30	0	0
12:45 - 1:45	0	0
1:45 - 2:45	0	0
2:45 - 3:45	0	0
3:45 - 4:45	0	0
4:45 - 5:45	662	29
5:45 - 6:45	0	0
6:45 - 7:45	0	0
7:45 - 8:45	0	0
8:45 - 9:45	0	0
9:45 - 10:45	0	0
10:45 - 11:45	0	0
10:45 - 11:45	0	0
11:45 - 12:45	0	0



Standard: The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

Peak Hour Pedestrian Volume

	Input	
	Major Street Volume	Pedestrian Volume
12:30 - 1:30	0	0
1:30 - 2:30	0	0
2:30 - 3:30	0	0
3:30 - 4:30	0	0
4:30 - 5:30	0	0
5:30 - 6:30	0	0
6:30 - 7:30	0	0
7:30 - 8:30	857	85
8:30 - 9:30	0	0
9:30 - 10:30	0	0
10:30 - 11:30	0	0
11:30 - 12:30	0	0
12:45 - 1:45	0	0
1:45 - 2:45	0	0
2:45 - 3:45	0	0
3:45 - 4:45	0	0
4:45 - 5:45	662	76
5:45 - 6:45	0	0
6:45 - 7:45	0	0
7:45 - 8:45	0	0
8:45 - 9:45	0	0
9:45 - 10:45	0	0
10:45 - 11:45	0	0
10:45 - 11:45	0	0
11:45 - 12:45	0	0



Standard: For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.