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**Transportation Impact Study**

**RiverFront on the Anacostia  
Planned Unit Development**

**Washington, DC**

**April 30, 2012**



**GOROVE / SLADE**

**Transportation Planners and Engineers**

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## EXECUTIVE SUMMARY

The following report presents the findings of a Transportation Impact Study (TIS) performed for the RiverFront on the Anacostia PUD. Located in Ward 6 in near Southeast Washington, DC, south of Potomac Avenue SE between South Capitol Street and 1<sup>st</sup> Street SE, the proposed site plan consists of a mixed-use development (retail, residential, office, and hotel), with approximately 1.1 million square feet of overall development.

### Site Review

The PUD site is located within a high-quality transportation network, with excellent access to local and regional roadways, both rail and bus transit, quality bicycle connections and pedestrian accommodations.

Several District transportation initiatives to improve the transportation infrastructure are underway near the site. Of these, the improvements recommended in the South Capitol Street EIS will have the most impact. These improvements include a new Frederick Douglass Bridge, and a traffic oval at the current location of the intersection of Potomac Avenue and South Capitol Street.

In addition to these District initiatives, many new developments are planned near the site, throughout near SE/SW. The following report includes short descriptions of over 30 planned developments, which are taken into account within the roadway capacity analyses.

### Design Review

The RiverFront PUD consists of four buildings, each comprising a phase of the development, starting on the eastern edge of the site, and ending at the western edge. The western buildings cannot be constructed until the improvements from the South Capitol Street EIS are constructed. Phase 1, a residential building, is applying for consolidated approval. The other three phases are only applying for Stage 1 approval.

The transportation features of the site plans were designed to take advantage of the transportation network surrounding the site and conform to DDOT's general guidelines. In summary, the site plans include the following features:

- All vehicular access to the site will be located from Potomac Avenue. The PUD site design shows two full-access curb cuts on Potomac Avenue, which access the project's internal roadways.
  - Although both curb cuts are proposed to be full access, the western curb cut may need to be restricted to right-in/right-out only traffic in the future. The planned traffic oval at the intersection of Potomac Avenue and South Capitol Street will be constructed with a traffic island along Potomac Avenue. This island may extend past the western driveway, eliminating left turns into and out of RiverFront at that location.
  - Capacity analyses were performed for the western driveway with both a full-access and right-in/right-out only configuration. The results of the analysis show that after Phase 1 is complete, both configurations operate at acceptable levels. The long-term analysis containing full build-out of the PUD shows that the driveways operate acceptably when they are full access, but if the western driveway is limited to right-in/right-out delays may become unacceptable to traffic exiting the PUD. This recommends that the project proceed with both driveways operating as full access, and the capacity analyses be revisited during the Stage 2 applications for Phases 2 through 4.
- The four parking garages and four loading docks within the PUD are all accessed from the internal streets. Similarly, all pick-up and drop-off activity will take place on the internal streets.

- All pick-up and drop-off activity will take place on the internal streets
- All loading will take place on internal roadways and will not require any back-in maneuvers from Potomac Avenue.
- The amount of loading facilities contained within the PUD will be able to accommodate the expected truck activity.
- Each building/phase at the RiverFront PUD will have an underground parking garage
- The amount of parking provided will be sufficient without the unintended consequence of encouraging driving as a mode.
- At the PUD's ultimate build-out, the Anacostia Riverwalk Trail will be accommodated across the site, between Diamond Teague Park and the new South Capitol Street Bridge.
- The project will include short-term public bicycle spaces on streets, near building entrances, and public places.
- The project will also include secured long-term bicycle parking within the parking garages, and changing facilities for office and hotel employees in the last two phases.

Based on the DDOT expectations for TDM programs, the following is the proposed TDM requirements for the RiverFront PUD. The proposed TDM plan meets all expectations from the TDM Recommendations Matrix and DDOT's specific request for performance monitoring.

- During construction, the applicant will maintain or coordinate relocation of any existing bus stops at their expense. (There are currently no bus stops adjacent to the site)
- The site design complies with zoning requirements to provide bicycle parking/storage facilities.
- The development will unbundle all parking costs from the cost of lease or purchase. Parking costs will be set at no less than the charges of the lowest fee garage located within ¼ mile.
- The developer will post all TDM commitments on-line, publicize availability, and allow the public to see what commitments have been promised.
- The developer will identify a TDM Leader (for planning, construction, and operations), and provide DDOT/Zoning Enforcement with annual TDM Leader contact updates.
- The developer will provide website links to [CommuterConnections.com](http://CommuterConnections.com) and [goDCgo.com](http://goDCgo.com) on developer and property management websites.
- The developer will provide an on-site business center to residents with access to copier, fax, and internet services.
- The developer will provide a one-time membership fee subsidy in a car sharing program for each residential unit.
- Two years after Phase 1 is constructed, the developer will conduct a performance monitoring study of TDM measures. At minimum, this study will include a peak hour trip generation analysis and parking demand analysis of the Phase 1 parking garage.

### **Roadway Capacity Review**

In order to determine if the proposed PUD will have a negative impact on the transportation network, this report projects future conditions with and without development of the site and performs analyses of intersection delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the development will negatively impact the study area.



The vehicular analyses were performed for two time periods: (1) the year 2015 when Phase 1 opens, and (2) a long-term analysis of the year 2020 with complete build-out of all four phases of the PUD.

The year 2015 analysis concluded that traffic conditions would be generally favorable within the study area, both with and without development of Phase 1 of the PUD. There are a few exceptions, although all of the locations in the study with unacceptable levels of delay occur in scenarios with and without the development of the PUD. Thus, these capacity issues will occur regardless of development of the PUD, and are as follows:

- The intersection of Potomac Avenue and South Capitol Street is projected to operate at a very unacceptable level of service. This intersection falls within the scope of the District's South Capitol Street EIS, and the preferred alternative developed for that study contains improvements to this intersection. This report defers to the conclusions from the EIS.
- The intersection of M Street and South Capitol Street is project to operate at poor levels of service. This intersection falls within the scope of the District's South Capitol Street EIS, and the preferred alternative developed for that study contains improvements to this intersection. This report defers to the conclusions from the EIS.
- The intersection of M Street and 5<sup>th</sup> Street experiences unacceptable delays for southbound 5<sup>th</sup> Street traffic during the afternoon peak hour. These delays are due to the addition of trips generated along M Street by background developments and are not generated by trips generated by Phase 1 of the RiverFront PUD. Phase 1 is expected to contribute less than 1% of the total traffic at this intersection. These delays could be alleviated through a traffic signal; however, based on a preliminary signal warrant this intersection does not warrant a traffic signal. DDOT is currently working on a Maine Avenue/M Street corridor study. This report recommends that this intersection and a potential traffic signal be considered within the corridor study.

The year 2020 analyses concluded that traffic conditions would be generally favorable within the study area, both with and without development of the entire RiverFront PUD, with the following exceptions:

- The new at-grade intersection of M Street and South Capitol Street and the new traffic oval at South Capitol Street and Potomac Avenue both show unacceptable levels of delay. Improvements from the South Capitol Street EIS were incorporated into the analysis of both intersections. Even with the improvements, the intersections are projected to operate at unacceptable levels of service. This is likely due to the difference in methodologies used in the traffic analyses performed for the EIS versus the methodologies used in this report. The EIS methodologies are more regionally focused and take into account changes in regional traffic patterns that the methodologies used in this report do not. This report uses methodologies that focus on providing quality analyses at local intersections and site driveways, which are not included in the EIS analysis. Thus, the EIS analysis can lead to recommendations and improvements that conflict with results from this study. Because that is the case here, this report defers to the EIS conclusions for these intersections.
- The intersection of M Street and 5<sup>th</sup> Street continues to operate with unacceptable delays for southbound 5<sup>th</sup> Street traffic during the afternoon peak hour. These delays are due to the addition of trips generated along M Street by background developments, and are not generated by trips generated by Phase 1 of the RiverFront PUD. These delays could be alleviated through a traffic signal; however, based on a preliminary signal warrant this intersection does not warrant a traffic signal. DDOT is currently working on a Maine Avenue/M Street corridor study. This report recommends that this intersection and a potential traffic signal be considered within the corridor study.

- Two intersections, M Street and 1<sup>st</sup> Street and M Street & 4<sup>th</sup> Street, show unacceptable levels of delay in the year 2020 conditions, both with and without the RiverFront PUD traffic. These delays are a result of how new traffic generated by the background developments makes the old signal timings along the M Street corridor obsolete. Regular updating of the signal timings would prevent these delays from occurring. Analysis with updated signal timings on M Street based on the existing timings and DDOT standards show these intersections operating at acceptable levels of service.

All of the locations in the study with unacceptable levels of delay occur in scenarios with and without the development of the PUD. Thus, these capacity issues will occur regardless of development of the PUD. Implementation of the preferred alternative from the South Capitol Street EIS will improve conditions along that corridor. Regular signal timing updates on the M Street corridor as new developments are constructed will prevent potential delays. Thus, the RiverFront PUD will not have an adverse impact on the surrounding transportation network.

#### **Impact to Non-Auto Modes Review**

In addition to the vehicular capacity analysis the following report examines transportation demand for all major modes of travel and includes trip generation projections for transit, bicycling and walking. A review of projected demand and the local services came to the following conclusions:

- The RiverFront PUD will not have a negative impact to local transit service. Based on findings presented in transit studies from WMATA and DDOT, both the Navy Yard Metrorail station and local bus services can accommodate the projected future ridership generated by the RiverFront PUD.
- Based on the trip generation estimates for walking, the quality of the routes near the project's location taking into account the streetscapes that will be redeveloped and improved, the RiverFront PUD will not have a negative impact to pedestrian facilities in the study area.
- Based on the trip generation estimates for bicycling, and the quality of the routes near the project's location, the RiverFront PUD will not have a negative impact to bicycle facilities in the study area.

## 1: INTRODUCTION & SITE REVIEW

This report presents the findings of a revised Transportation Impact Study (TIS) performed for the RiverFront on the Anacostia Consolidated PUD for Phase 1 of the development and the Stage 1 PUD for Phases 2-4 of development. The development is located in Ward 6 in near Southeast Washington, DC, south of Potomac Avenue SE between South Capitol Street and 1<sup>st</sup> Street SE. The proposed site plan consists of a mixed-use development (retail, residential, office, and hotel), with approximately 1.2 million square feet of overall development. The development program for the Phase 1 PUD consists of approximately 324 residential units and 12,520 square feet of street-level retail uses. Phases 2-4 consist of an additional 282 residential units, an additional 10,850 square feet of street-level retail uses, approximately 325,000 square feet of office uses, and a 400-room hotel.

The purpose of this report is to:

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

This report contains three sections as follows:

- **Introduction & Site Review**  
This section provides a summary of major transportation features near and adjacent to the RiverFront PUD site. This includes reviewing roadways, transit facilities, bicycle facilities, and future developments and District initiatives. This section contains information on the site to help establish a reference for the following sections.
- **Design Review**  
This section provides a summary of the internal transportation features of the RiverFront PUD. This section is meant to supplement the details provided in the site plan package contained in the PUD application and reviews such items as the general parking strategy of the site, bicycle accommodation, and transportation demand management (TDM).
- **Impacts Review**  
This section provides a review of the impacts development of the RiverFront PUD could have to each mode within the transportation network. For each mode, and where necessary, a list of recommendations and mitigation measures are compiled.

## 1.1 Site Location and Major Transportation Features

The RiverFront development is located in the near Southeast portion of Washington, DC, in Ward 6. The proposed development is located in an area of the District near several major private and public developments and roadway infrastructure projects, including the Yards at Southeast Federal Center, the Southwest Waterfront Development, the South Capitol Street infrastructure project, and the 11<sup>th</sup> Street Bridges project.

The project site, as shown in Figure 1, is bounded by Potomac Avenue SE to the north/northwest, the Anacostia River to the south/southeast, South Capitol Street to the west/southwest, and 1<sup>st</sup> Street SE to the east/northeast. The site is served by many regional roadways including Interstate 395 (I-395), Interstate 295 (I-295), and several interchanges and bridges. Arterials near the site include South Capitol Street and M Street. Major collector roadways include 1<sup>st</sup> Street and 8<sup>th</sup> Street. The site is also served by several public transportation sources, including Metrorail, Metrobus, and the DC Circulator bus system.

The project site also features a pedestrian network consisting of sidewalks and crosswalks along the local streets surrounding the project site and the new Anacostia Riverwalk trail, which will connect the site and other locations along the Anacostia River and Washington Channel waterfronts. In addition to pedestrian accommodations, the site is also served by the on- and off-street bicycle network, which consists of bike lanes and signed bicycle routes along local roadways.

## 1.2 Roadways

As stated previously, the site is accessible via arterials, collector, and local streets. Figure 2 shows the roadway network hierarchy for the roadways in the vicinity of the proposed development. The immediate study area of the proposed development has several key local access roads. These include the following:

- South Capitol Street

South Capitol Street is a six- to eight-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a principal arterial with an average daily traffic of 58,600 vehicles in the vicinity of the proposed development. Within the limits of the study area, South Capitol Street runs from the Frederick Douglas Memorial Bridge and Potomac Avenue to I Street and the I-395 freeway ramps. North of M Street, South Capitol Street functions as a grade-separated roadway, and on-street parking is prohibited. South of M Street, South Capitol Street has been reconfigured from a grade-separated facility to a boulevard. On-street parking is prohibited south of M Street as well.

- M Street

M Street is a six-lane east-west minor arterial that connects Maine Avenue SW to 11<sup>th</sup> Street SE. It has an average daily traffic volume of 19,200 vehicles in the vicinity of the proposed development. M Street has a six-lane cross-section with a median, which is converted into center turn lanes at several intersections. Limited parking is available along both sides of the street, but parking is generally prohibited at these locations during peak hours.

- Potomac Avenue

Potomac Avenue is a four-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a collector roadway in the vicinity of the proposed development. Within the limits of the study area, Potomac Avenue connects 1<sup>st</sup> Street SW to 1<sup>st</sup> Street SE and borders the northern edge of the site. On-street parking is permitted on Potomac Avenue at all times on a portion of the roadway. Bike lanes also provided on both sides of the roadway.

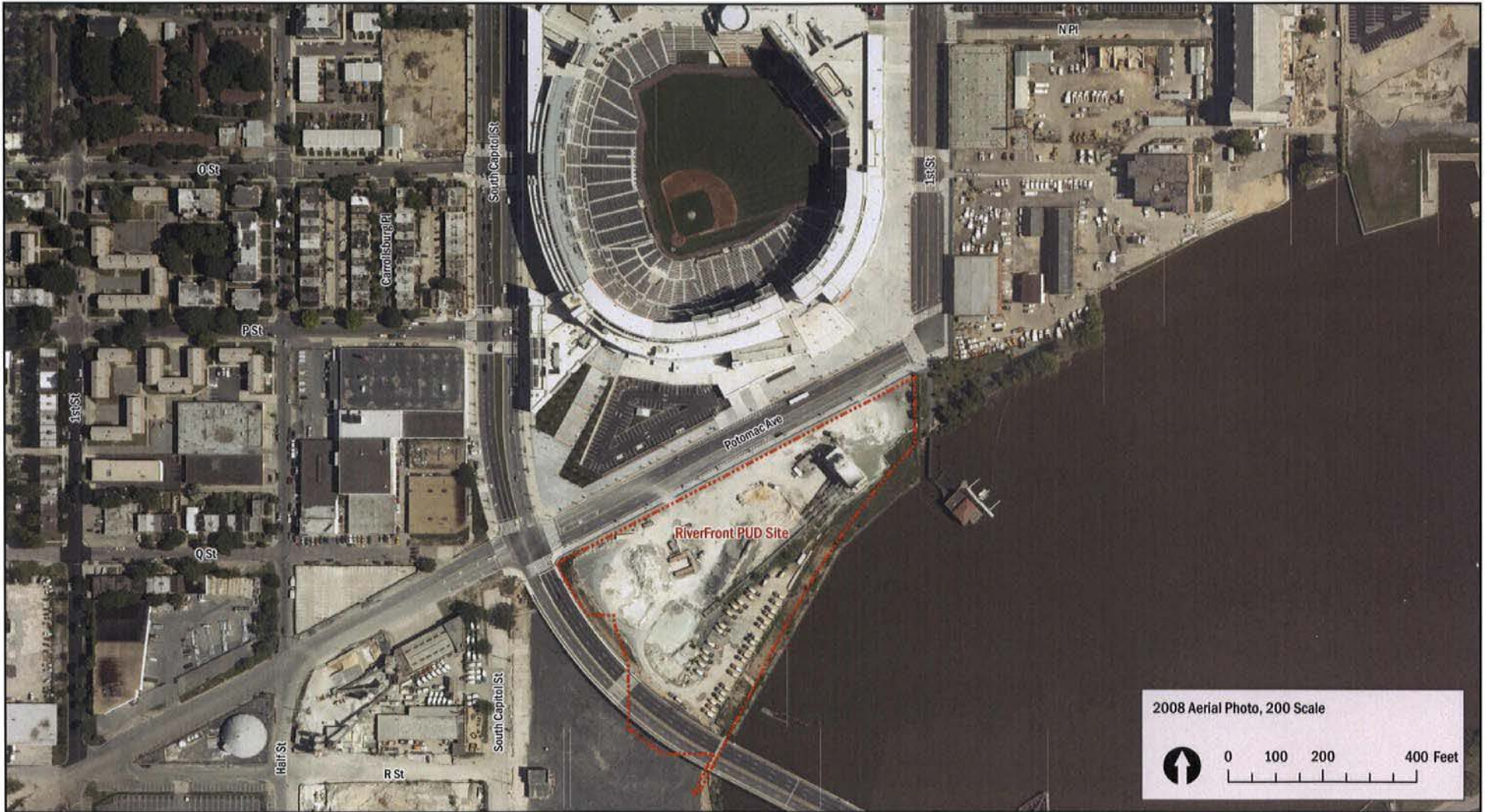


Figure 1: Site Location - Aerial

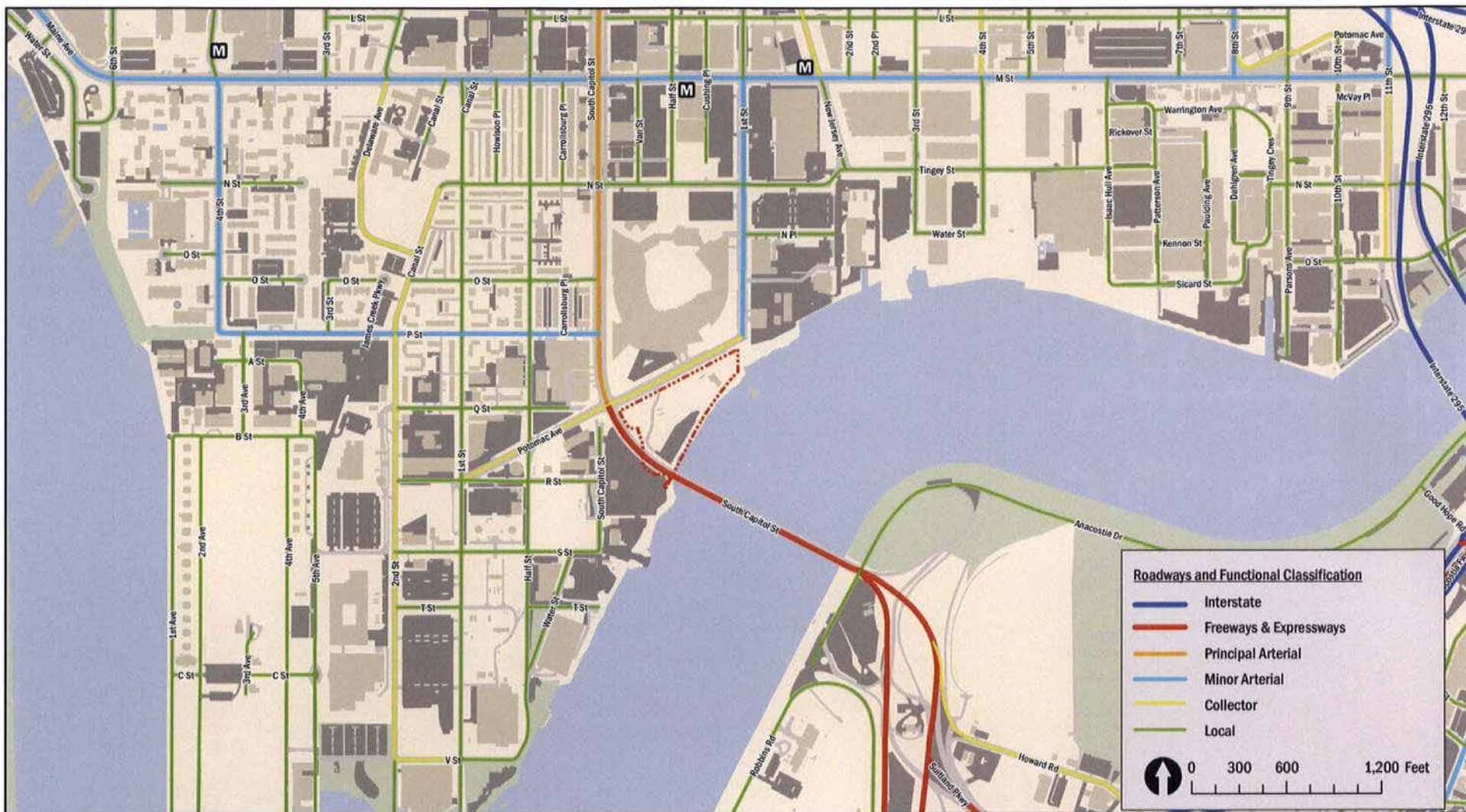


Figure 2: Roadway Functional Classification

- *I (Eye) Street*

DDOT classifies I (Eye) Street as a minor arterial with average daily traffic volumes of 4,600 vehicles per day. I (Eye) Street has a four-lane cross-section and operates east-west between 7<sup>th</sup> Street SW to New Jersey Avenue SE. Restricted residential parking and limited public parking line both sides of the roadway.
- *N Street/Tingey Street*

N Street is a two-lane roadway that runs east-west in the vicinity of the site. DDOT classifies it as a local roadway in the vicinity of the proposed development. Within the limits of the study area, N Street runs from South Capitol Street to the Washington Navy Yard. West of New Jersey Avenue, the roadway is named “N Street.” Within the limits of The Yards, east of New Jersey Avenue, the roadway is named “Tingey Street”. On-street parking is permitted on N Street during off-peak periods.
- *1<sup>st</sup> Street*

First Street is a four-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway in the vicinity of the proposed development. Within the limits of the study area, 1<sup>st</sup> Street intersects M Street north of the proposed development and connects to Potomac Avenue east of the site. On-street parking is permitted on 1<sup>st</sup> Street at all times on the eastern side of the roadway. Bike lanes also provided on both sides of the roadway.
- *New Jersey Avenue*

New Jersey Avenue is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway with an average daily traffic of 3,000 vehicles in the vicinity of the proposed development. Within the limits of the study area, New Jersey Avenue intersects M Street northeast of the proposed development. South of M Street, on-street parking is permitted on New Jersey Avenue at all times on the eastern side of the roadway; on-street parking is also permitted at all times on both sides of New Jersey Avenue north of M Street.
- *3<sup>rd</sup> Street*

Third Street is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway with an average daily traffic of 3,000 vehicles in the vicinity of the proposed development. Within the limits of the study area, 3<sup>rd</sup> Street intersects M Street northeast of the proposed development. The portion of 3<sup>rd</sup> Street between Tingey Street and M Street is closed to through-traffic due to security at the USDOT headquarters. Vehicles may not travel southbound on 3<sup>rd</sup> Street at M Street. At Tingey Street, vehicles accessing the USDOT may enter through security gates to on-site parking facilities. South of Tingey Street, 3<sup>rd</sup> Street continues through Washington Navy Yard. North of M Street, on-street parking is permitted on 3<sup>rd</sup> Street at all times on both sides of the roadway; on-street parking is also prohibited at all times on both sides of 3<sup>rd</sup> Street south of Tingey Street.
- *4<sup>th</sup> Street*

Fourth Street is a two- to four-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a collector roadway with an average daily traffic of 2,500 vehicles in the vicinity of the proposed development. Within the limits of the study area, 4<sup>th</sup> Street intersects M Street northeast of the proposed development. North of M Street, 4<sup>th</sup> Street is a two-lane one-way southbound roadway. On-street parking is provided on the western side of 4<sup>th</sup> Street at all times; on the eastern side of 4<sup>th</sup> Street, on-street parking is provided at all times except the afternoon peak period, reducing the roadway to a one-lane cross-section. South of M Street, 4<sup>th</sup> Street is a four-lane two-way roadway. On-street parking is provided at all times except morning peak period on the western side

and afternoon peak period on the eastern side of the roadway, reducing the roadway to a 3-lane cross-section during peak periods and a two-lane cross-section during off-peak periods.

- 5<sup>th</sup> Street

Fifth Street is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway in the vicinity of the proposed development. Within the limits of the study area, 5<sup>th</sup> Street intersects M Street at the northeast corner of the proposed development. On-street parking is permitted on 5<sup>th</sup> Street at all times on both sides of the roadway.

- 8<sup>th</sup> Street

Eighth Street is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a minor arterial with an average daily traffic of 11,000 vehicles in the vicinity of the proposed development. Within the limits of the study area, 8<sup>th</sup> Street intersects M Street east of the proposed development. The portion of 8<sup>th</sup> Street south of M Street is closed to through-traffic due to security at the Washington Navy Yard. Vehicles may not travel southbound on 8<sup>th</sup> Street at M Street. South of M Street, 8<sup>th</sup> Street operates within Washington Navy Yard. North of M Street, on-street parking is permitted on 8<sup>th</sup> Street at all times on the western side of the roadway; on the eastern side of the roadway, on-street back-in angled parking is provided at all times.

Two major infrastructure projects are located near the proposed development: the 11<sup>th</sup> Street Bridges Improvement Project and the South Capitol Street Improvement Project. The majority of the future roadway changes outlined by these projects will not affect the roadway network immediately surrounding the project site. However, both projects will improve access to the proposed development by reducing congestion on the roadway network and providing additional mobility in the study area.

### 1.3 Car-Sharing

Car-sharing is provided in DC and the vicinity of the study area by Zipcar. Zipcar is a private company that allows registered users to reserve cars for a minimum of 30 minutes or for longer periods (up to several days) and provides individual access to a variety automobiles for trips made easier by car. Table 1 lists the car-sharing locations in the study area and the number of vehicles available.

**Table 1: Carshare Location and Vehicles**

Carshare Location	Number of Vehicles
1 <sup>st</sup> & N Streets SE (Lot H/I at The Yards)	2 vehicles
3 <sup>rd</sup> & N Streets SE (Lot L at The Yards)	2 vehicles
<b>Total Number of Carshare Vehicles in Study Area</b>	<b>4 vehicles</b>

### 1.4 Transit

The study area is served by heavy rail, commuter bus, DC Circulator bus, and local bus service. Combined, these transit services provide local, city wide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 3 identifies the major transit routes, stations, and stops in the study area.



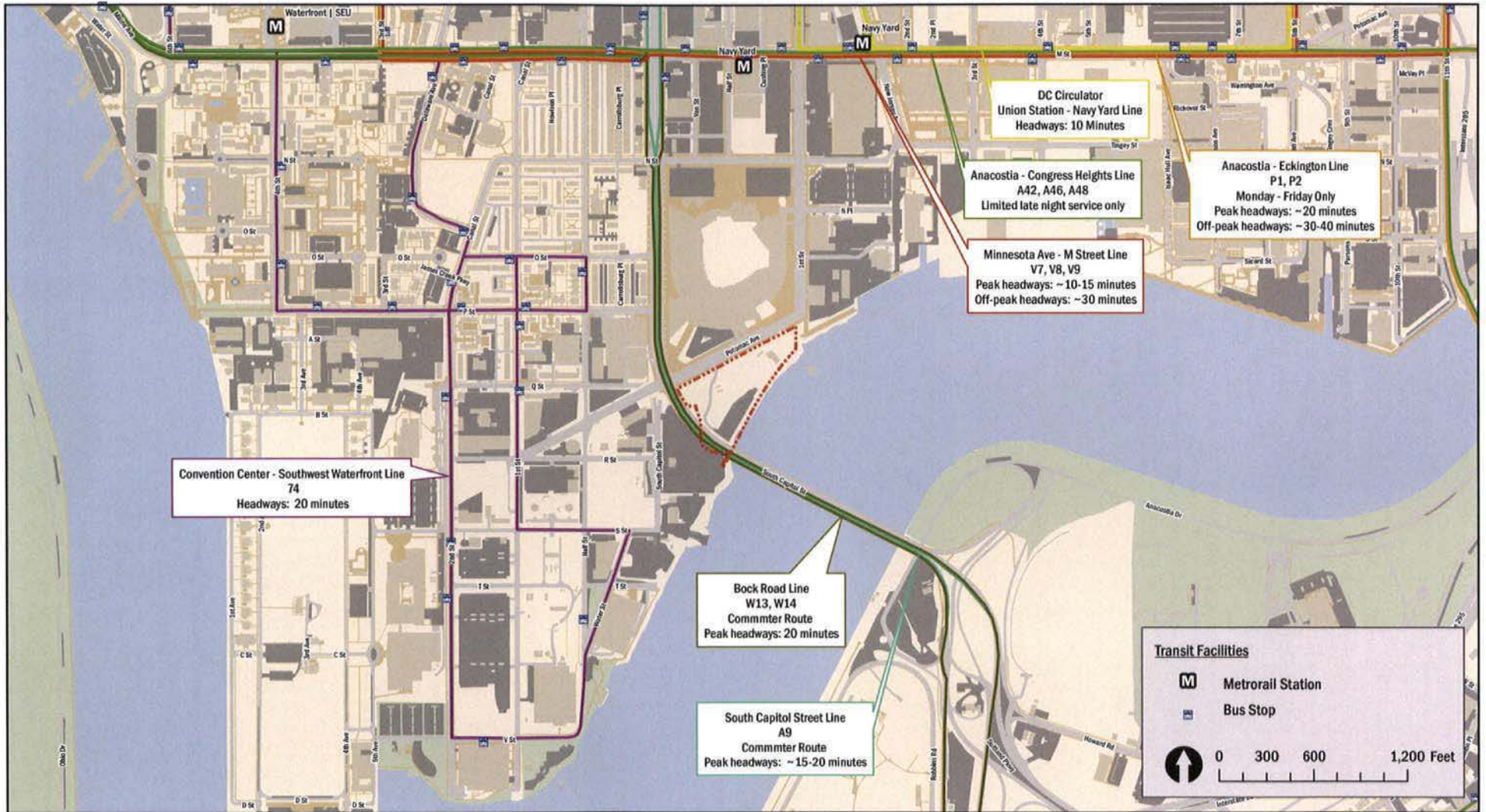


Figure 3: Existing Transit Routes, Stations, and Stops

The Metrobus and Metrorail systems provide public transportation access to the RiverFront development site. The nearest Metrorail station is Navy Yard, located approximately 0.5 miles from the proposed development at the intersection of 1<sup>st</sup> Street and M Street. An additional portal is provided at the intersection of New Jersey Avenue and M Street. The green line serves the Navy Yard station running approximately every 6 minutes during the morning and afternoon peak periods and every 15 to 20 minutes during the weekday off-peak periods and on weekends.

Metrobus service is accessible to the site, with stops adjacent to the site on M Street and near the site on other surrounding roadways. The majority of the Metrobus lines that serve the site converge at the Navy Yard Metrorail station. These routes connect the site with several destinations throughout downtown DC and the surrounding areas. The DC Circulator bus is also accessible to the site, with stops provided near the intersection of 4<sup>th</sup> Street and M Street. Table 2 shows a summary of the bus route information for the lines that serve the site, including service hours and the headways. Figure 3 shows the existing rail and bus service.

**Table 2: Bus Route Information**

Route Number	Route Name	Service Hours	Headway
74	Convention Center-Southwest Waterfront Line	5:00 am – 1:00 am	15-20 min
A9	South Capitol Street Line	Weekdays 6:00 – 9:30 am, 3:00 – 7:00 pm	15-20 min
A42, 46, 48	Anacostia-Congress Heights Line	Late night extension of A2, 6, 8 line Weekdays: 12:00 am – 6:00 am Weekends: 12:00 am – 8:00 am	30 min
P1, 2	Anacostia-Eckington Line	Primarily provides northbound service Weekdays 6:30 AM – 12:00 AM Weekends 8:30 AM – 2:30 AM	20-40 min for each route
V7, 8, 9	Minnesota Ave-M Street Line	4:30 am – 1:30 am	30 min
P17, 19	Oxon Hill-Fort Washington Line	Monday – Saturday NB: 5:00 am – 10:00 am Monday – Saturday SB: 3:00 pm – 8:00 pm	20-30 min for each route
W13	Bock Road Line	Monday – Saturday NB: 5:00 am – 9:00 am Monday – Saturday SB: 3:30 pm – 8:00 pm	20-30 min
DC Circulator	Union Station-Navy Yard	Winter Hours (October 1 – March 31) Weekdays: 6:00 am – 7:00 pm Summer Hours (April 1 – September 30) Weekdays: 6:00 am – 9:00 pm Saturdays: 7:00 am – 9:00 pm Extended service on Nationals game days	10 min

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

The streetcar system element of the plan includes three routes that travel near the project site. The streetcar system will consist of modern low-floor vehicles that operate on surface tracks embedded in the roadways, which will mostly operate

in travel lanes that are shared with automobiles. Stops will generally be located every ¼- to ½-mile along the routes. The future planned routes serving the study area will connect the site to several areas in the District including Buzzard Point, Congress Heights, Woodley Park, Adams Morgan, and Washington Circle.

The Metro Express limited-stop bus service element of the plan includes one route that travel near the project site. The network of new limited-stop bus service (“Metro Express”) will consist of high-frequency bus services using specially marked vehicles, operated by WMATA, which will supplement the four existing Metro Express routes that operate along Georgia Avenue, 16<sup>th</sup> Street, Wisconsin Avenue, and Pennsylvania Avenue. Stops will generally be located every ¼- to ½-mile along the routes. The Metro Express bus services will also include traffic signal priority and real-time Next Bus arrival displays. The future planned corridor near the site travels along the 11<sup>th</sup> Street Bridges, M Street, and 8<sup>th</sup> Street.

### **1.5 Bicycle Facilities**

Within the study area, bicyclists have access to multi-use trails, on-street bike lanes, signed bike routes, and local and residential streets that facilitate cycling. The site is directly served by multi-use trails, signed bicycle routes, and local streets that accommodate cycling. The bicycle network generally provides good conditions for local trips and there are several routes for trips between the study area and Northern Virginia, Northwest Washington DC, and destinations south of the Anacostia River.

For cyclists, the most attractive routes are those that have good cycling conditions and provide direct routing between origins and destinations. Conditions in the study area that contribute to good cycling conditions includes minimal changes in topography, multi-use trails that separate bicycle traffic from vehicle traffic, on-street bicycle lanes that designate bicycle rights-of-way, multiple Capital Bikeshare stations, local and collector streets with low traffic volumes and speeds, sidewalks that permit bicycle traffic and provide routing through barriers, and bicycle parking.

Within the existing study area, cycling conditions are good and provide attractive conditions for commuters and recreational riders alike. The existing conditions provide a good environment for cycling include low traffic volumes and speeds, wide travel lanes, the Anacostia Riverwalk Trail, two Capital Bikeshare stations, and ample bicycle parking. Bike lanes are provided along Potomac Avenue in front of the site and along 1<sup>st</sup> Street and 4<sup>th</sup> Street. A direct connection to the Anacostia Riverwalk Trail is provided along Potomac Avenue at South Capitol Street to access the Frederick Douglass Bridge across the Anacostia River. A second connection to the Trail is provided along Potomac Avenue at Diamond Teague Park to travel along the Anacostia River and through The Yards Park. On weekdays, the Trail is open south of the Navy Yard to provide connection to the Trail further east and across the 11<sup>th</sup> Street Bridge. A portion of the Trail to connect to Diamond Teague Park and travel along the Anacostia River and 2<sup>nd</sup> Street SW is proposed. In addition to bike lanes and the off-street trail, on-street signed bicycle routes are provided along P Street SW west of the site and along I (Eye) and K Streets north of the site.

This portion of the District has several major roads with high traffic volumes and speeds, man-made and natural barriers, and a lack of existing bicycle facilities. Generally, poor cycling conditions in the study area result when bicycle routes use or cross streets with high traffic volumes and speeds, barriers that increase the distance between origins and destinations or block access, intersection geometries that create conflicting bicycle, vehicle and pedestrian desire lines, freeway access ramps, and gaps in the bicycle network. These conditions reduce the attractiveness of cycling in the study area and may discourage people from using bicycles. There are some routes with barriers to cycling along them and entire roadway corridors that have poor cycling conditions that reduce the overall quality of cycling conditions and limit the number of routes that directly link the site with destinations throughout the District and region. Figure 4 illustrates bicycle facilities in

the study area. In the study area, the greatest barrier to cycling is South Capitol Street, which is difficult to cross due to high traffic volumes.

Some bicycle parking was observed in the study area though most cyclists typically use street signs, parking meters, or similar objects to secure their bicycles. This indicates that there is demand for additional bicycle parking facilities in the study area.

As shown in the *DC Bicycle Master Plan* from April 2005, DDOT’s proposed bicycle infrastructure for the roadways in the vicinity of the proposed development includes several multi-use trails, on-street bike lanes, and signed bicycle routes. The facilities will significantly improve bicycling conditions in the study area and may lead to higher rates of cycling. They also link the site with major residential and commercial destinations in near Southeast, DC and beyond. The proposed extension of the bike lanes along 4<sup>th</sup> and 5<sup>th</sup> Streets, as well as the proposed N and O Street bike lanes will help improve bicycle connectivity in the study area. Figure 4 illustrates the planned and proposed bicycle facilities in the study area.

The newly formed Capital Bikeshare was launched in late September 2010 to replace the DC SmartBike program. This program has placed 110 bicycle-share stations across Washington, DC and Arlington, VA with approximately 1,100 bicycles provided. In the vicinity of the proposed development, Capital Bikeshare stations have been placed along 1<sup>st</sup> Street at N Street and along M Street at New Jersey Avenue<sup>1</sup>, as shown in Table 3. In conjunction with the improvements proposed in the *Bicycle Master Plan*, the Capital Bikeshare program will increase accessibility of bicycles to the proposed development. Bikeshare makes bicycling an attractive and convenient option. Capital Bikeshare has plans to expand the system and potential new station locations and expanded locations have been identified. There is not an official timeline for when potential stations will be installed. The DDOT map of “Capital Bikeshare Proposed and Expanded Locations” shows a proposed additional location along N Street near 3<sup>rd</sup> Street.

**Table 3: Bikeshare Location and Docking Stations**

Bikeshare Location	Number of Docking Stations
1 <sup>st</sup> Street & N Street SE	18 docking stations
M Street & New Jersey Avenue SE	17 docking stations
<b>Total Number of Bikeshare Docking Stations Study Area</b>	<b>35 docking stations</b>

## 1.6 Pedestrian Facilities

Overall, the pedestrian facilities within the study area provide a good walking environment. Pedestrian access to the site is provided along Potomac Avenue. Sidewalks, crosswalks, and curb ramps with detectable warnings are provided at most intersections in the study area. Pedestrian activity within the study area occurs along transit access routes, in the vicinity of transit stops, at commercial nodes along M Street, and, to a lesser extent, between residential neighborhoods and transit and commercial nodes. Nearly all streets in the study area have adequate sidewalks, planted buffers between sidewalks and the curb, and on-street parking that provides an additional buffer between pedestrians and vehicular traffic.

The bus stops located along M Street serve bus routes that provide local and commuter service between the study area and destinations downtown and in the surrounding area. Pedestrians access these bus stops along the local pedestrian network at the site and within the residential and commercial neighborhoods located adjacent to the site. There is some pedestrian activity between transit stops and residential areas throughout the day.

<sup>1</sup> Capital Bikeshare: [www.capitalbikeshare.com](http://www.capitalbikeshare.com)

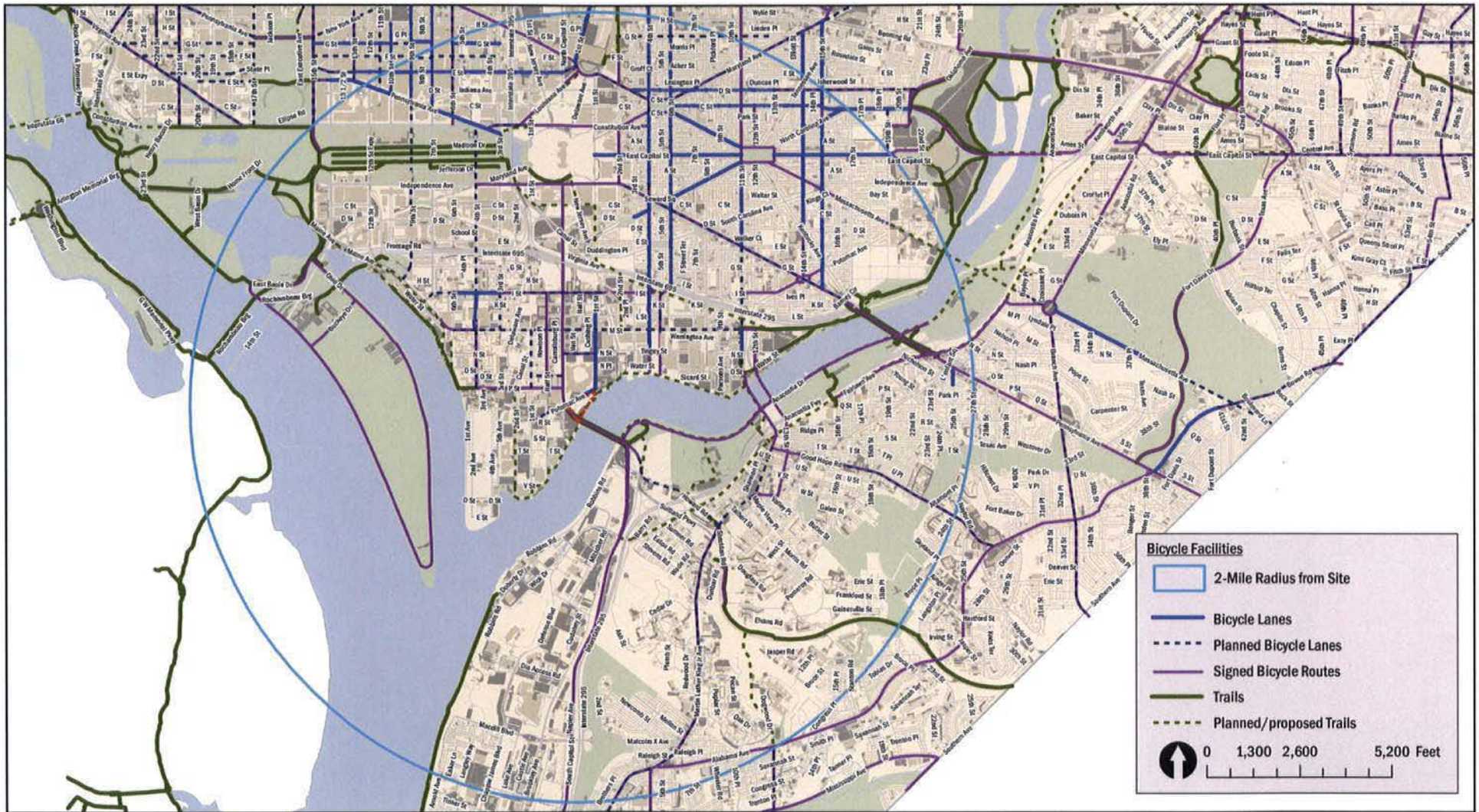


Figure 4: Existing and Planned Bicycle Facilities

There are some barriers and areas of concern within the study area that negatively impact the quality and attractiveness of walking, including walking distances between the site and some major destinations, manmade and natural barriers that increase walking distances, and roadway conditions that reduce the quality of walking conditions, including narrow sidewalks along several streets, lengthy freeway underpasses, and lengthy crossings at some intersections. Walking distances between the site and major transit and commercial destinations in the area, such as Half Street and M Street, will not have a significant impact on the pedestrian activity because access routes generally provide good walking conditions and walking is a convenient and quick option as compared to other modes.

## **1.7 Future Projects & Developments**

### **1.7.1 District Initiatives**

Both the 11<sup>th</sup> Street Bridges project and the South Capitol Street Improvement project are currently underway in the vicinity of the project site. These projects are summarized below.

#### **11<sup>th</sup> Street Bridges Project**

The purpose of the 11<sup>th</sup> Street Bridges project is to reduce congestion and improve mobility across the Anacostia River on the 11<sup>th</sup> Street Bridges (11<sup>th</sup> Street Bridge and Officer Welsh Bridge) and on the local streets in the vicinity of the project. Additionally, the project will increase the safety of vehicular, pedestrian, and bicycle traffic in the Anacostia area; correct design deficiencies in the existing infrastructure; and upgrade evacuation routes for security movements into and out of the nation's capital and military installations.

The Phase I Alternative Design includes complete construction of three new river crossings and two new Anacostia Freeway interchanges on the east and west sides of the Anacostia River. The proposed improvements will no longer require traffic to use the neighborhood streets (Martin Luther King, Jr. Avenue, Good Hope Road, and Minnesota Avenue) to access the 11<sup>th</sup> Street Bridges because there will be a direct connection for trips between the Southeast/Southwest Freeway (I-395) and the Anacostia Freeway (I-295) from the north and a seamless connection to I-295 northbound at the southern end of the 11<sup>th</sup> Street Bridges complex where none exists today. In addition to the vehicular improvements, a 14-foot shared-use path will be provided on the downstream side (southwest) of the 11<sup>th</sup> Street Bridge from O Street to Good Hope Road. No sidewalk will be provided on the upstream side of the bridge due to safety concerns for pedestrians. Direct pedestrian access will be maintained between the bridges and the waterfront on both sides of the river, and bicycle facilities will be connected to the Anacostia Riverwalk Trail along both banks of the river. The DC Bicycle Master Plan will also be implemented in the study area. All pathways for pedestrians and bicycles will meet AASHTO policy and ADA standards for construction.

The 11<sup>th</sup> Street Bridges project will also improve transit connectivity in the study area by providing movements that are currently missing from the 11<sup>th</sup> Street Bridge complex to the Anacostia Freeway (I-295). The project will also remove some traffic from the local street system, particularly in the historic Anacostia area, allowing for transit to operate under more favorable traffic conditions. In addition to proposed improvements, the low-speed local bridge will be designed and constructed so as not to preclude the implementation of a possible future streetcar system on 11<sup>th</sup> Street between M Street and Martin Luther King, Jr. Avenue.

#### **South Capitol Street Project**

The purpose of the South Capitol Street project is to improve safety, mobility, and accessibility and to support economic development in the vicinity of the project. The project will: (1) correct the design and deteriorating condition of the

transportation infrastructure which creates safety concerns for vehicular, pedestrian, and bicycle traffic and transit riders; (2) construct missing critical regional roadway connections for vehicles, pedestrians, and bicycles; (3) correct mobility barriers that limit access to activity centers in the study area; and (4) support economic growth in order to improve the density of employment and residential development. Ultimately, the goal of the South Capitol Street projects is to address the problems of the corridor in a way that both addresses the transportation issues, while also revitalizing the surrounding neighborhoods south of the National Mall and transforming the roadway into a grand urban gateway in to the District. The future South Capitol Street corridor will correct design deficiencies, improving safety issues for all users, including drivers, transit riders, pedestrians, and bicyclists, as well as providing key connections in the local, regional, and national transportation network.

The Preferred Alternative from the Final Environmental Impact Statement includes rebuilding South Capitol Street as a six-lane boulevard with a landscaped median west of the Anacostia River. Along South Capitol Street, at-grade intersections will be reconstructed at I, N, O, P, K, L, and M Streets. The existing ramp from northbound South Capitol Street to I-395 will also be reconstructed as an at-grade interaction. A four- to five-lane traffic oval will be constructed to connect South Capitol Street, Potomac Avenue, R Street, and Q Street. The existing Frederick Douglas Memorial Bridge will be replaced and will include bicycle and pedestrian access. An additional traffic circle will be constructed to connect South Capitol Street, Suitland Parkway, and Howard Road, and several other roadway improvements are included on the eastern/southern side of the Anacostia River.

In addition to vehicular improvements, streetscape design features will be added to project area streets, including South Capitol Street, New Jersey Avenue, and Suitland Parkway. The reconstruction of South Capitol Street will also include pedestrian and bicycle facilities, which will consist of widened sidewalks, widened curbside lanes on some streets for bicycle travel, and increased pedestrian- and bicycle-oriented elements such as street trees, benches, and decorative streetlights. The proposed bicycle routes through the project area will consist primarily of signed bicycle routes that connect to local activity centers, as well as other area facilities such as the Anacostia Riverwalk Trail.

The South Capitol Street project will also improve access to transit already in the corridor by providing additional pedestrian and bicycle facilities, streetscape, and pedestrian-friendly amenities. The Preferred Alternative will also provide linkages between transit nodes and the local and regional bicycle network, and will support future transit (streetcar and bus service) throughout the corridor. The Preferred Alternative will be better equipped to accommodate the proposed future Anacostia Line of the streetcar transit system due to the proposed wide sidewalks, streetlights, signed bike routes, and multi-use trails.

### ***1.7.2 Developments***

There are several other projects proposed, approved, or under construction located in the vicinity of the proposed development. The majority of these projects are mixed-use, consisting of office, residential, and retail development, as outlined below. A map of the locations of these developments is included as Figure 5.

- ***Akridge Half Street/Square 700***

The Akridge Half Street development is currently approved and awaiting construction. It consists of a mix of office, residential, and retail uses located south of M Street SE between Van Street SE and Half Street SE. The development is projected to be completed in 2014.

- **Arthur Capper/Carrollsborg and Capitol Quarter**  
The Arthur Capper/Carrollsborg development is currently under construction and a significant portion of the project has been completed. It consists of a mix of residential sites located north of M Street SE and office sites located along M Street SE between 2<sup>nd</sup> Street SE and 7<sup>th</sup> Street SE. The development is projected to be fully completed between 2012 and 2019.
- **The Yards at Southeast Federal Center**  
The Yards at the Southeast Federal Center development is currently under construction and partially completed. It consists of a mix of office, residential, and retail sites located south of M Street SE between 1<sup>st</sup> Street SE and 5<sup>th</sup> Street SE. The development is projected to be completed between 2012 and 2025.
- **1015 Half Street**  
The 1015 Half Street development consists of a mix of office and retail uses located north of K Street SE between South Capitol Street and Half Street SE. The development was completed in 2011. However, it is still included as a background development because the development was not fully complete and occupied at the time of the existing data collection.
- **The Plaza on K**  
The Place on K development consists of a mix of office and retail uses located north of K Street SE between Half Street SE and 1<sup>st</sup> Street SE. The first phase of the development is expected to be completed by 2014, with a second phase to be completed in 2016.
- **Square 699/Velocity**  
The Square 699N/Velocity development is a hotel building located north of L Street SE between Half Street SE and 1<sup>st</sup> Street SE. The development is anticipated to be completed by 2014. A second phase of development, which consists of office and retail uses, is expected to be completed by 2020.
- **Maritime Plaza Phases III, IV, & V**  
The Maritime Plaza development consists of a mix of office and hotel uses located south of M Street SE east of 12<sup>th</sup> Street SE. The development is currently under construction, with the remaining phases of the development projected to be completed in 2018.
- **1111 New Jersey Avenue**  
The 1111 New Jersey Avenue development consists of a mix of office and retail uses located along New Jersey Avenue north of M Street SE. The development is projected to be completed by 2014.
- **Half Street Phase II/Monumental Properties**  
The Half Street Phase II development is currently approved and awaiting construction, following the construction of Phase I of the development. Phase II consists of a mix of residential, retail, and hotel uses located north of N Street SE at Half Street SE, which is projected to be completed by 2013.
- **50 M Street**  
The 50 M Street development is a mix of office and retail uses located north of M Street SE between Half Street SE and 1<sup>st</sup> Street SE. The development is anticipated to be completed by 2015.



- **1 M Street**  
The 1 M Street development is a mix of office and retail uses located south of M Street SE between South Capitol Street and Van Street SE. The development is anticipated to be completed by 2016.
- **Square 701**  
The Square 701 development is an office building located south of M Street SE between Half Street SE and 1<sup>st</sup> Street SE. The development is anticipated to be completed by 2015. A second phase, which consists of a hotel, is projected to be completed in 2017.
- **Marina Place**  
The Marina Place development consists of a mix of residential and retail uses located west of South Capitol Street near Buzzard Point. The development is anticipated to be completed by 2017.
- **1000 South Capitol Street**  
The 1000 South Capitol Street development is an office building located north of K Street SE between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2017.
- **1100 South Capitol Street**  
The 1100 South Capitol Street development is an office building located north of M Street SE between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2015.
- **WMATA Chiller Plant Apartments**  
The WMATA Chiller Plant Apartments are a mix of residential and retail uses located north of M Street SE between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2017.
- **Admiral at Barracks Row**  
The Admiral at Barracks Row development consists of a mix of office and retail uses located north of M Street SE east of 9<sup>th</sup> Street SE. The development is projected to be completed by 2015.
- **225 Virginia Avenue**  
The 225 Virginia Avenue development is an office building located south of Virginia Avenue between 2<sup>nd</sup> Street SE and 3<sup>rd</sup> Street SE. The development is anticipated to be completed in 2012.
- **Historic Car Barn**  
The Historic Car Barn development is a renovated retail building located north of M Street SE between 7<sup>th</sup> Street SE and 8<sup>th</sup> Street SE. The development is anticipated to be completed by 2014.
- **Waterfront Station**  
The Waterfront Station development is currently under construction and partially completed, located north of M Street SW between 3<sup>rd</sup> Street SW and 5<sup>th</sup> Street SW. The remaining development consists of a residential building from Phase I, which is projected to be completed in 2013. The future phases of Waterfront Station, consisting of office and residential uses, are projected to be completed in 2020.
- **The Randall School**  
The Randall School development is a renovated building consisting of a mix of residential and hotel uses located north of I Street SW at Half Street SW. The development is anticipated to be completed by 2014.

- **St. Matthew's Church and Community Center**  
The St. Matthew's Church and Community Center development is a mix of church and residential uses located south of M Street SW at the intersection with Delaware Avenue SW. The development is anticipated to be completed by 2014.
- **Camden South Capitol**  
The Camden South Capitol development is a mix of residential and retail uses located west of South Capitol Street between N and O Streets SW. The development is currently under construction and anticipated to be completed in 2013.
- **L'Enfant Plaza**  
The L'Enfant Plaza development consists of expanding the existing development located north of the Southwest Freeway, between 9<sup>th</sup> and 10<sup>th</sup> Streets SW. The final L'Enfant Plaza development will contain approximately 2.2 million square feet of office uses, 115,000 square feet of retail uses, and 370 hotel rooms. The expansion is anticipated to be completed by 2015.
- **Homewood Suites**  
The Homewood Suites development consists of constructing a 234-room hotel on the southeast corner of 9<sup>th</sup> and D Streets SW. Construction of the development is anticipated to begin in 2012, with completion by 2014.
- **The Portals Phase IV & V**  
Phases IV and V of the Portals development consists of a mix of office and retail uses located at the southeast corner of 14<sup>th</sup> and D Streets SW. The development is currently under construction, with the two remaining phases of the development projected to be completed by 2020 and 2025.
- **The View at Waterfront**  
The View at Waterfront (Fairfield at Marina View) development is located on the northeast corner of 6<sup>th</sup> and M Streets SW. The development, which consists of residential and retail uses, is projected to be completed in 2014.
- **Parcel 69**  
The Parcel 69 development, located at 400 E Street SW, consists of office uses. The development is projected to be completed in 2013.
- **Square 494**  
The Square 494 development, located at 555 E Street SW, consists of a mix of office and retail uses. The development is projected to be completed in 2015.
- **National Community Church**  
The National Community Church development, located at 733 Virginia Avenue SE, consists of the redevelopment of the property to contain a mix of office and retail uses. The development is projected to be completed in 2015.
- **Building 170**  
The Building 170 redevelopment, which is located at 250 Tingey Street SE, adjacent to The Yards at Southeast Federal Center development, consists of retail uses. The building redevelopment is projected to be completed in 2016.

- 100 V Street SW

The 100 V Street SW development, located west of 1<sup>st</sup> Street SW, between T and V Streets SW, consists of office uses. The development is projected to be completed in 2017.

- 37 L Street SE

The 37 L Street SE development consists of office uses and is located south of L Street SE, between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2020.

- Southwest Waterfront PUD

The Southwest Waterfront Development is located southwest of Maine Avenue SW between the I-395 Freeway and 6<sup>th</sup> Street SW. The proposed development contains a mix of retail, residential, office, hotel, church, cultural, and marina uses. The full development is projected to be completed by 2018.

- Square 737

The Square 737 development is a mix of residential, and retail uses located between H Street SE and I Street SE, west of 2<sup>nd</sup> Street SE. The first phase of development is anticipated to be completed in 2014, with a final completion in 2020.

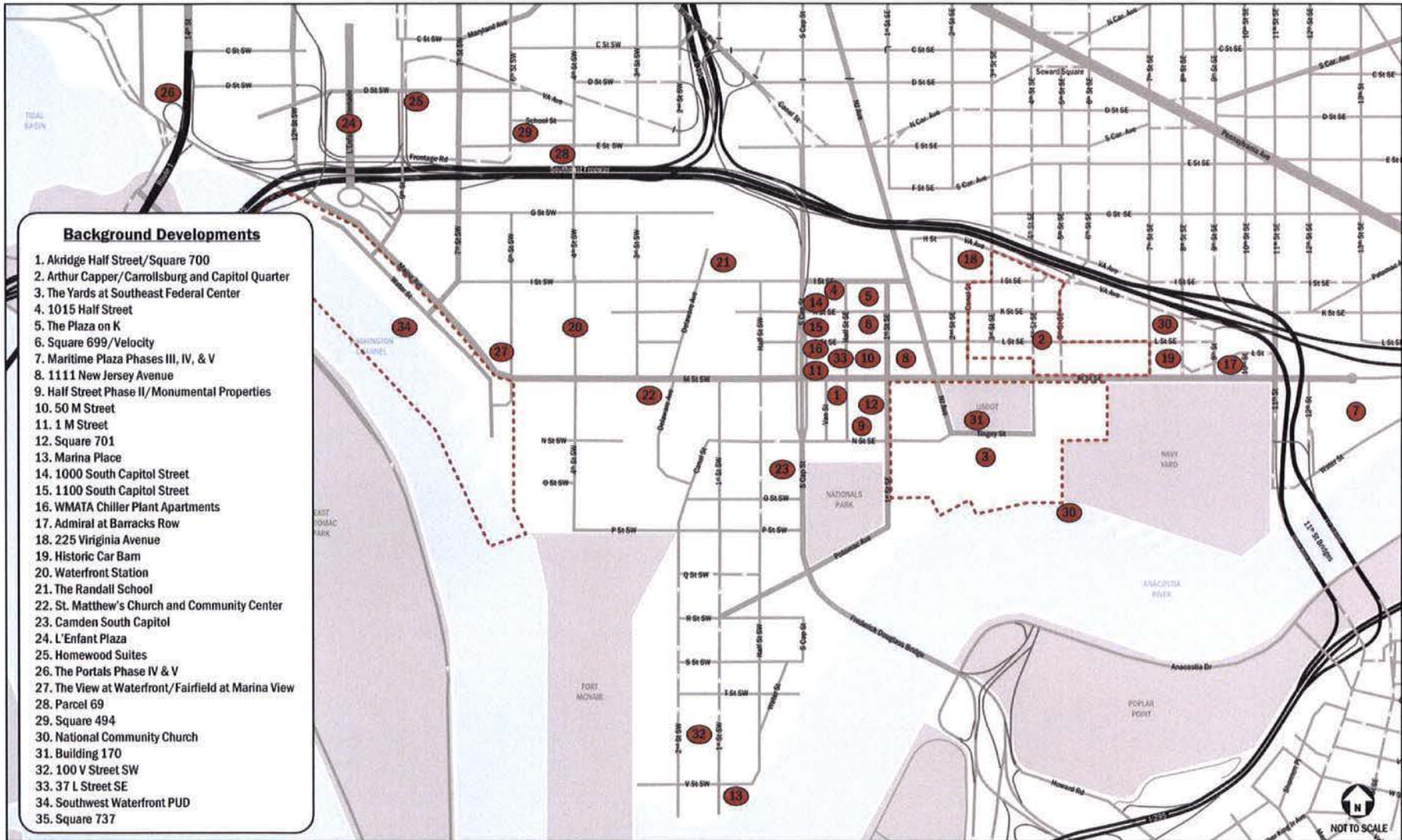


Figure 5: Location of Future Developments

## **2: DESIGN REVIEW**

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

The RiverFront PUD consists of four buildings, each comprising a phase of the development, starting on the eastern edge of the site, and ending at the western edge. The western buildings cannot be constructed until the improvements from the South Capitol Street EIS are constructed. Phase 1, a residential building, is applying for consolidated approvals. The other three phases are only applying for Stage 1 approval. Figure 6 provides an overview of the PUD's development program.

### ***2.1 Site Access and Internal Circulation***

#### ***2.1.1 Vehicular Access***

All vehicular access to the site will be located from Potomac Avenue. The PUD site design shows two full-access curb cuts on Potomac Avenue, which access the projects internal roadways. The four parking garages and four loading docks within the PUD are all accessed from the internal streets. Similarly, all pick-up and drop-off activity will take place on the internal streets. Figure 7 shows the site access plan.

These curb cuts will replace two existing curb cuts into the existing site. Both of the new curb cuts are located where no on-street parking exists on Potomac Avenue, as the on-street parking is removed to make room for a turn lane as Potomac Avenue approaches South Capitol Street. One of the existing curb cuts is located where Potomac Avenue has on-street parking. Thus, the removal of this existing curb cut will provide space for one or two more on-street parking spaces on Potomac Avenue.

Although both curb cuts are proposed to be full access, the western curb cut may need to be restricted to right-in/right-out only traffic in the future. The planned traffic oval at the intersection of Potomac Avenue and South Capitol Street will be constructed with a traffic island along Potomac Avenue. This island may extend past the western driveway, eliminating left turns into and out of RiverFront at that location. The technical analysis contained in the following chapter analyses this driveway under both conditions. This report proposes that the new driveways for Phase 1 be installed as full-access, and the concept of altering the western driveway to right-in/right-out only operations be revisited when the traffic oval is designed, or when a Stage 2 PUD application is submitted for future RiverFront parcels.

#### ***2.1.2 Loading***

Each phase/building within the RiverFront PUD will have a dedicated loading facility. All of the loading docks are designed to include a 40' loading berth, a 20' foot loading berth and a 200 square foot platform. The amount of loading facilities contained within the PUD will be able to accommodate the expected truck activity. All loading will take place on internal roadways and will not require any back-in maneuvers from Potomac Avenue.

Figure 8 shows turning diagrams for trucks accessing Phase 1. These diagrams show the most typical large truck, a 40' single-unit truck, accessing the loading docks for Phase 1. Diagrams for the other buildings will be provided in their Stage 2 applications.

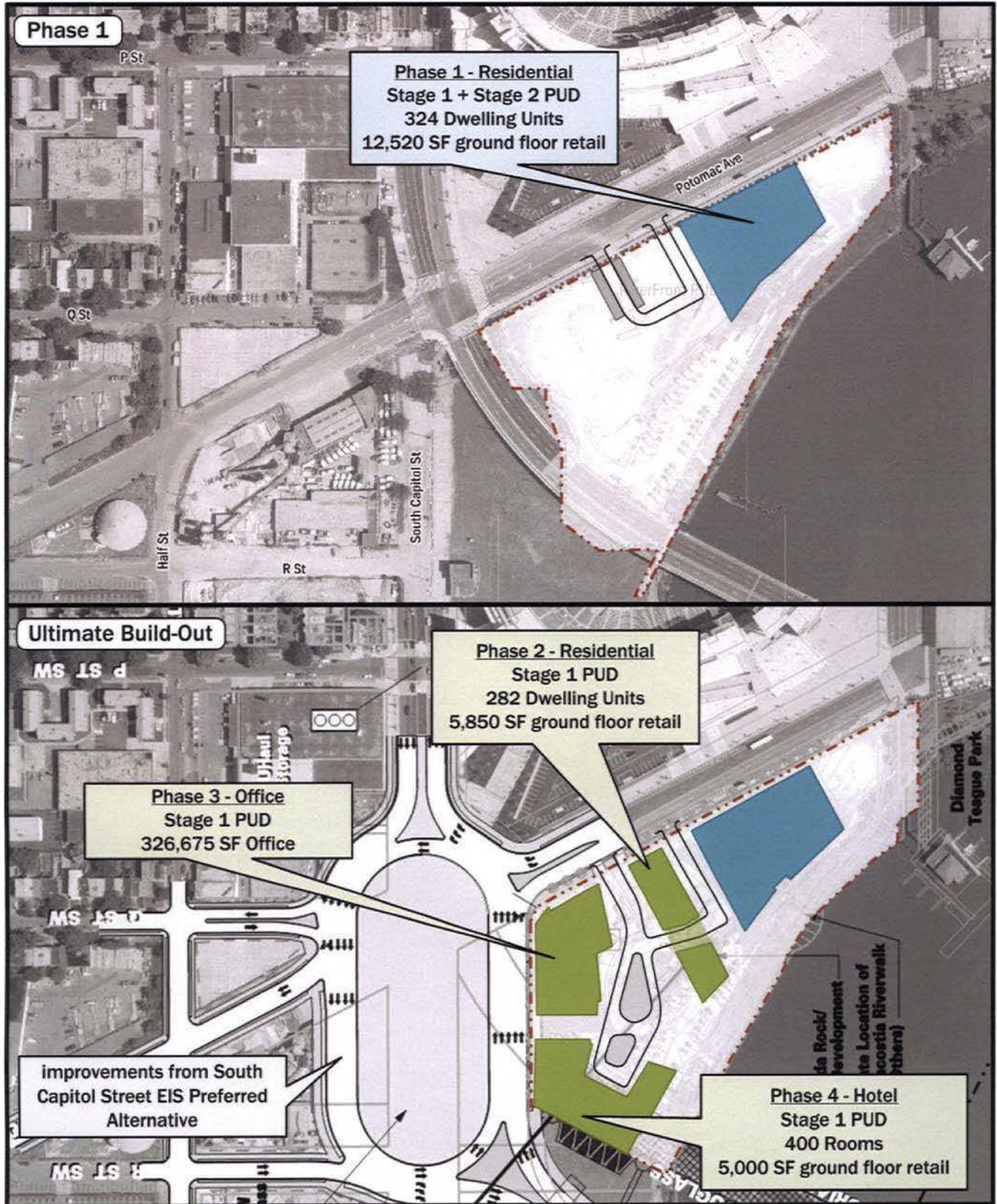


Figure 6: Summary of Development Program

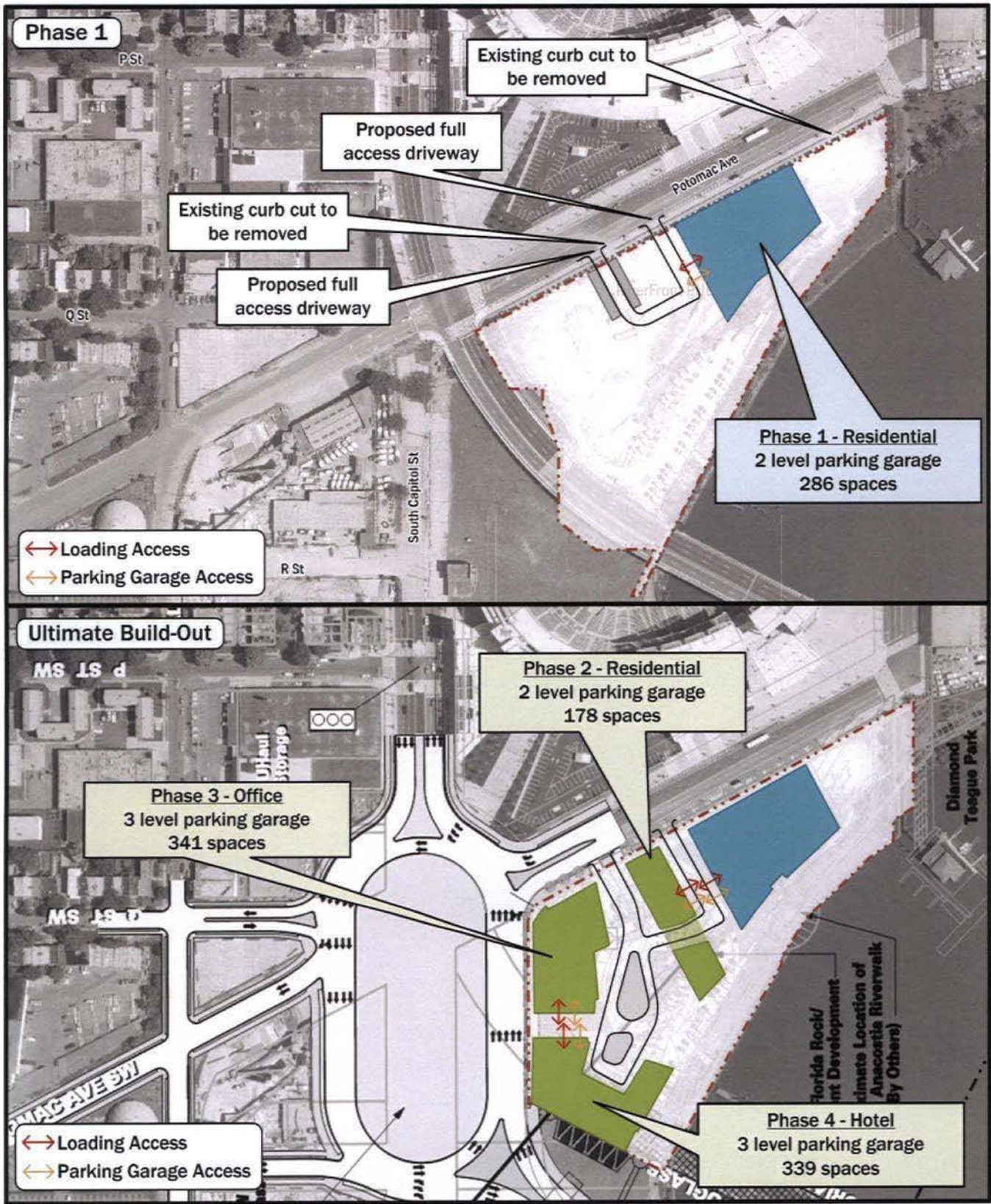


Figure 7: Site Access and Parking

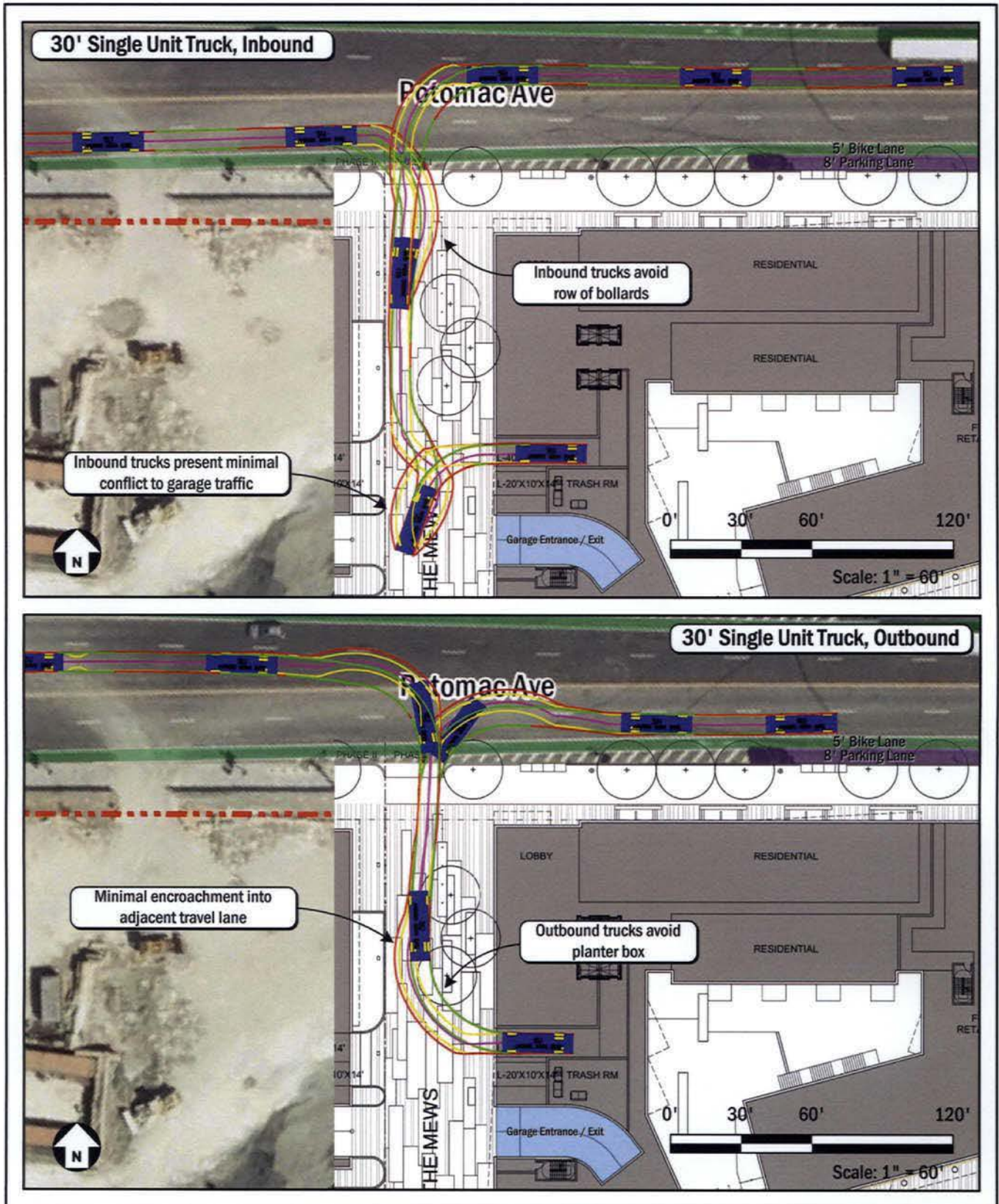


Figure 8: Phase 1 Truck Ingress and Egress



### 2.1.3 Parking

Ideally, the amount of parking on site supply reaches a balance between accommodating all users while not encouraging driving as a mode. The applicant has stated that all parking on site will be provided at market rates, and that residential parking prices will be unbundled from condo prices or rents. These measures greatly reduce the parking and traffic demand of a project, and will help the project meet the balance it needs between demand and supply.

Each building/phase at the RiverFront PUD will have an underground parking garage, as identified on Figure 7. Table 4 breaks down the parking ratios for each phase versus ratios from their suburban counterparts.

**Table 4: Proposed Parking Ratios**

Phase	Land Use	Proposed Parking Ratio <sup>(1)</sup>	Suburban Demand Ratio <sup>(2)</sup>	Percent Proposed vs. Suburban Demand
1	Residential	0.84 spaces/unit	1.23 spaces/unit	68%
2	Residential	0.61 spaces/unit	1.23 spaces/unit	50%
3	Office	1.04 spaces/1000 SF	2.84 spaces/1000 SF	37%
4	Hotel	0.84 spaces/room	1.23 spaces/room	68%

<sup>(1)</sup> For buildings with ground floor retail, 1 space for each 1,000 SF of retail was assumed to be reserved for retail use.

<sup>(2)</sup> Parking Generation, 4th Edition, Institute of Transportation Engineers

The residential uses of the RiverFront PUD has proposed parking ratios of 0.84 and 0.61 spaces per unit. These ratios, especially when seen as a combined ratio of 0.73 per unit, fits within the pattern of how other new residential buildings in the area are provided parking. It also fits within the trip generation data and assumptions provided in the following chapter. The amount of parking provided will be sufficient without the unintended consequence of encouraging driving as a mode.

The office building proposes a ratio of 1.04 spaces per 1,000 SF, which is also consistent with new office construction in the area. The office building supply meeting 37% of demand from similar suburban sites fits with the trip generation and mode split data of office users discussed in the following chapter. The amount of parking provided will be sufficient without the unintended consequence of encouraging driving as a mode.

The hotel parking ratio of 0.84 spaces per room is slightly higher than other new hotels in the area. Providing 68% of the parking that a typical suburban location would need is also a little higher than mode split data for hotels in the DC area. Although many hotel guests arrive by car, the cars are taxis or car service vehicles that do not park within the hotel garage. This report recommends that the amount of hotel parking provided be reexamined in the hotel's Stage 2 application and possibly reduced. In addition, a sharing arrangement with the office building garage next door should be explored, as hotel parking peaks during weekends when office parking is at a minimum. It may be the case that the specific type of hotel may warrant the amount of parking provided, given the types of patrons it will attract and the amount of conference activity support, so a complete analysis cannot be performed until more details are known regarding the hotel.

### 2.1.4 Bicycle Facilities

As stated in Section 1, the site is directly served by multi-use trails, signed bicycle routes, and local streets that accommodate cycling. Notably, adjacent to the site are bike lanes on Potomac Avenue and 1<sup>st</sup> Street SE, and the Anacostia Riverwalk Trail.

At the PUD's ultimate build-out, the Anacostia Riverwalk Trail will be accommodated across the site, between Diamond Teague Park and the new South Capitol Street Bridge. The Trail will not be able to continue west from the site boundary until the improvements detailed in the final South Capitol Street EIS are constructed.

The project will include short-term public bicycle spaces on streets, near building entrances, and public places. These short-term spaces will include inverted U-racks placed in high-visibility areas. The project will also include secured long-term bicycle parking within the parking garages, and changing facilities for office and hotel employees in the last two phases.

## **2.2 Transportation Demand Management**

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

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

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

### **2.2.1 DDOT TDM Expectations for District Development Proposals**

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

Currently, TDM is handled on a project-to-project basis, with a one-size-fits-all framework to development. This approach does not allow for maximization of TDM opportunities or provide a process for consistent application of TDM goals. To address these issues, DDOT initiated an analysis of TDM in the development review process conducted by Michael Baker Jr., Inc. with the assistance of Nelson/Nygaard Consulting Associates; Strategic Transportation Initiatives, Inc.; and Patton Harris Rust & Associates, which is documented in *Incorporation of Transportation Demand Management (TDM) into the Development Review Process, Final Report and Recommendations* from July 2010.

This Final Report includes a *TDM Recommendations Matrix*, which outlines the expected TDM measures that development proposed are expected to include. The matrix breaks down development proposals by their type (for example by-right vs. PUD), and by the amount of peak hour trip generation.

This report focuses on developing a TDM plan for Phase 1 only, because Phase 1 is the only PUD building applying for consolidated approval. This report recommends that detailed TDM plans be submitted for Phases 2 through 4 at the time of their Stage 2 application submissions. It is highly likely that DDOT TDM expectations and requirements, as well as changes in transportation options (for example, the growth of Capitol Bikeshare and the DC Circulator in recent years), will change the landscape of TDM planning thus making it more beneficial to detail TDM plans for Phases 2 through 4 at a later time.

The trip generation for Phase 1 (detailed in Chapter 3) places it within the “Proposed requires a variance (or is a PUD) and project generates less than 100 peak hour auto trips” category of the TDM Recommendations Matrix (Table 2) from the DDOT TDM report.

According to the TDM Recommendations Matrix, the following five TDM measures are required based on the type of development.

- During construction, maintain or coordinate relocation of any existing bus stops at the developer’s expense.
- Comply with zoning requirements to provide bicycle parking/storage facilities.
- Require all parking costs be unbundled from the cost of lease or purchase. Parking costs must be set at no less than the charges of the lowest fee garage located within ¼ mile.
- Post all TDM commitments on-line, publicize availability, and allow the public to see what commitments have been promised.
- Identify a project’s TDM Leader (for planning, construction, and operations). Provide DDOT/Zoning Enforcement with annual TDM Leader contact updates.

In addition to the five measures above, three TDM measures are designated as expected with the option to substitute potential other TDM measures.

- Provide website links to [CommuterConnections.com](http://CommuterConnections.com) and [goDCgo.com](http://goDCgo.com) on developer and property management websites.
- Provide an on-site business center to residents with access to copier, fax, and internet services.
- Provide a one-time membership fee subsidy in a car sharing program for each residential unit.

The TDM measures that can be substituted for the three expected measures listed above are:

- Install a Transportation Information Center Display (kiosk) containing printed materials related to local transportation alternatives, and maintain a stock of materials at all times.
- At no cost, dedicate one space in the garage for car sharing services to use with right of first refusal. Locate spaces that are convenient to the garage entrance, available to members of the car sharing service twenty-four hours a day, seven days a week, without restrictions (the garage may be gated – members of the service would have access to the spaces via a key pad combinations to a pass code system or other similar device). Count the car sharing space towards the project’s parking requirements.
- Provide reserved spaces for carpools and vanpools that are conveniently located with respect to the elevators serving the buildings. Oversee a program to provide carpools and vanpools with a parking subsidy.
- Provide secured bicycle parking/storage facilities (lockers, bicycle valet parking, etc.).

- Contribute funding to available, non-exclusive Shuttle Service to Metro or DC Circulator (based on total number of trips generated). Only applies to development not considered Transit Oriented Developments by DDOT.\*
- Provide location for Bikeshare Program Station/Kiosk.
- Provide Ongoing Funding for on-site Bikeshare Program.
- Provide each new resident with a 1-year subscription to DC Bikesharing program.
- Provide residents with \$75 mail-in refund on bicycle purchases.
- Provide SmarTrip cards plus \$100.00 Metro fare media per person, for free, one time, per employee, to each of the tenants' employees and each on-site employee of the property management company and/or building operator. (30-year commitment required.)
- Provide SmarTrip cards plus \$100.00 Metro fare media per person, for free, one time, per resident. (30-year commitment required.)
- Locate and furnish an on-site Transit Store free of charge.
- 30-year commitment to operate an on-site Transit Store.
- Operate a Shuttle service to Metro (or other appropriate destinations) specific to the site/development.\*
- Install and maintain new bus stop infrastructure.
- Construct new Metro Rail stations connection (entrance, escalator, fare array).\*

*\*Shuttles and Direct Access to Metro are site specific. DDOT expectations for these measures will be dependent on the practicality of adopting them at a specific location.*

In addition to the TDM measures presented in *Incorporation of Transportation Demand Management (TDM) into the Development Review Process*, DDOT specifically requested that the project monitor TDM measures after construction to gauge their effectiveness.

### **2.2.2 Proposed TDM Plan**

Based on the DDOT expectations for TDM programs, the following is the proposed TDM requirements for the RiverFront PUD. The proposed requirement meets all expectations from the TDM Recommendations Matrix and DDOT's specific request for performance monitoring.

- During construction, the applicant will maintain or coordinate relocation of any existing bus stops at their expense. (There are currently no bus stops adjacent to the site)
- The site design complies with zoning requirements to provide bicycle parking/storage facilities.
- The development will unbundle all parking costs from the cost of lease or purchase. Parking costs will be set at no less than the charges of the lowest fee garage located within ¼ mile.
- The developer will post all TDM commitments on-line, publicize availability, and allow the public to see what commitments have been promised.
- The developer will identify a TDM Leader (for planning, construction, and operations), and provide DDOT/Zoning Enforcement with annual TDM Leader contact updates.

- The developer will provide website links to CommuterConnections.com and goDCgo.com on developer and property management websites.
- The developer will provide an on-site business center to residents with access to copier, fax, and internet services.
- The developer will provide a one-time membership fee subsidy in a car sharing program for each residential unit.
- Two years after Phase 1 is constructed, the developer will conduct a performance monitoring study of TDM measures. At minimum, this study will include a peak hour trip generation analysis and parking demand analysis of the Phase 1 parking garage. The report will include a comparison of the peak hour trip generation measured and the projections contained within this report.

### 2.3 Compliance with Comprehensive Plan

The following table lists the transportation policies and actions from DC’s Comprehensive Plan that are relevant to the development review process. As noted in the table, the RiverFront PUD complies with all of the relevant policies and actions from the Comprehensive Plan.

**Table 5: Relevant Comprehensive Plan Policies & Actions**

DC Comprehensive Plan Policy/Action related to transportation and development projects	Comments
<p><i>Policy T-1.1.2: Land Use Impact Assessment</i> Assess the transportation impacts of development projects using multimodal standards rather than traditional vehicle standards to more accurately measure and more effectively mitigate development impacts on the transportation network.</p>	<p>This transportation study includes discussion and analysis of transit, pedestrian and bicycle traffic that exceeds a traditional transportation study, especially those performed in suburban environments.</p>
<p><i>Action T-1.1.A: Transportation Measures of Effectiveness</i> Develop new measures of effectiveness such as a multi-modal level of service standard to quantify transportation service and assess land use impacts on the transportation system.</p>	<p>DDOT has yet to develop a standard level of service standard to access land use impacts. The transportation engineering industry has no readily available metrics that can be easily used in the development review process beyond traditional vehicular capacity metrics. As stated above, this study includes discussion and analysis of transit, pedestrian and bicycle traffic that exceeds a traditional transportation study.</p>
<p><i>Action T-1.1.B: Transportation Improvements</i> Require transportation demand management measures and transportation support facilities such as crosswalks, bus shelters, and bicycle facilities in large development projects and major trip generators, including projects that go through the Planned Unit Development (PUD) Process.</p>	<p>This application includes many improvements to the site, including bicycle parking and construction of the Anacostia Riverwalk Trail through the site. In addition, the application meets and exceeds DDOT’s stated expectations for TDM measures.</p>
<p><i>Policy T-1.2.3: Discouraging Auto-Oriented Uses</i> Discourage certain uses, like “drive-through” businesses or stores with large surface parking lots, along key boulevards and pedestrian streets, and minimize the number of curb cuts in new developments. Curb cuts and multiple vehicle access points break-up the sidewalk, reduce pedestrian safety, and detract from pedestrian-oriented retail and residential areas.</p>	<p>The PUD contains no surface parking lots beyond a small interim lot that would exist only until construction of Phase 2. New curb cuts are minimized, and the net change in curb cuts will be zero, as the amount of new curb cuts is equal to the amount of existing curb cuts.</p>

DC Comprehensive Plan Policy/Action related to transportation and development projects	Comments
<p><i>Action T-2.3.A: Bicycle Facilities</i>                      Wherever feasible, require large new commercial and residential buildings to be designed with features such as secure bicycle parking and lockers, bike racks, shower facilities, and other amenities that accommodate bicycle users.</p>	<p>As described above, the PUD contains a significant amount of bicycle features, including accommodation of the Anacostia Riverwalk Trail. This includes short and long term parking as well as showers in the commercial building parking garages.</p>
<p><i>Action T-3.1.A: TDM Strategies</i>                      Develop strategies and requirements that reduce rush hour traffic by promoting flextime, carpooling, transit use; encouraging the formation of Transportation Management Associations; and undertaking other measures that reduce vehicular trips, particularly during peak travel periods. Identify TDM measures and plans as appropriate conditions for large development approval. Transportation Management Plans should identify quantifiable reductions in vehicle trips and commit to measures to achieve those reductions. Encourage the federal and District governments to explore the creation of a staggered workday for particular departments and agencies in an effort to reduce congestion.</p>	<p>The application has proposed to include TDM measures meeting and exceeded DDOT’s expectations contained within <i>Incorporation of Transportation Demand Management (TDM) into the Development Review Process</i>.</p>
<p><i>Action T-3.2.D: Unbundle Parking Cost</i>                      Find ways to “unbundle” the cost of parking from residential units, allowing those purchasing or renting property to opt out of buying or renting parking spaces. “Unbundling” should be required for District-owned or subsidized development, and the amount of parking in such development should not exceed that required by Zoning. Further measures to reduce housing costs associated with off-street parking requirements, including waived or reduced parking requirements in the vicinity of Metrorail stations and along major transit corridors, should be pursued during the revision of the Zoning Regulations. These efforts should be coupled with programs to better manage residential street parking in neighborhoods of high parking demand, including adjustments to the costs of residential parking permits.</p>	<p>The developer will unbundle parking costs from residential units.</p>

### 3: IMPACTS REVIEW

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

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

#### 3.1 Site Transportation Demand

##### 3.1.1 Base Trip Generation

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

First, ITE *Trip Generation* was used to develop base vehicular-trip rates, not accounting for reductions due to mode split. The Shopping Center trip rate was applied in lieu of individual trip rates, such as bank, pharmacy, and supermarket, for the retail uses because applying individual rates would not account for interaction between the retail uses (shoppers visiting more than one store). The Shopping Center trip rate accounts for these uses and interactions.

Second, the vehicle-trips were converted to person-trips by assuming an average vehicle occupancy of 1.1 persons per vehicle, based on the Census Data Transportation Planning Package (CTPP) 2000. Table 6 and Table 7 show the base number of trips generated by the proposed development for Phase 1 and for Phases 2-4, respectively.

**Table 6: Base Vehicle- and Person-Trip Generation (Phase 1 Only)**

Land Use	Size*		Trip Generation for Phase 1						Weekday Total
			AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
<b>Vehicle Trips</b>									
Retail	12,520	Square Feet	8	5	13	23	24	47	538
Residential	324	Dwelling Units	32	130	162	127	69	196	2,088
<b>Total Vehicle-Trips</b>			<b>40</b>	<b>135</b>	<b>175</b>	<b>150</b>	<b>93</b>	<b>243</b>	<b>2,626</b>
<b>Person-Trips</b>									
Retail	1,1	Persons/Vehicle	9	5	14	25	27	52	592
Residential	1,1	Persons/Vehicle	35	143	178	140	76	216	2,297
<b>Total Person-Trips</b>			<b>44</b>	<b>148</b>	<b>192</b>	<b>165</b>	<b>103</b>	<b>268</b>	<b>2,889</b>

**Table 7: Base Vehicle- and Person-Trip Generation (Phases 2, 3, and 4)**

Land Use	Size*		Trip Generation for Phases 2, 3, and 4						Weekday Total
			AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
<b>Vehicle Trips</b>									
Retail (Phase 2)	5,850	Square Feet	4	2	6	11	11	22	252
Retail (Phase 4)	5,000	Square Feet	3	2	5	9	10	19	216
Office (Phase 3)	326,675	Square Feet	426	58	484	76	369	445	3,320
Hotel (Phase 4)	400	Rooms	164	118	282	138	143	281	3,568
Residential (Phase 2)	282	Dwelling Units	28	114	142	112	61	173	1,834
<b>Total Vehicle-Trips</b>			<b>625</b>	<b>294</b>	<b>919</b>	<b>346</b>	<b>594</b>	<b>940</b>	<b>9,190</b>
<b>Person-Trips</b>									
Retail	1,1	Persons/Vehicle	8	4	12	22	23	45	515
Office	1,1	Persons/Vehicle	469	63	532	84	406	490	3,652
Hotel	1,1	Persons/Vehicle	180	130	310	152	157	309	3,925
Residential	1,1	Persons/Vehicle	31	125	156	123	67	190	2,017
<b>Total Person-Trips</b>			<b>688</b>	<b>322</b>	<b>1,010</b>	<b>381</b>	<b>653</b>	<b>1,034</b>	<b>10,109</b>

### 3.1.2 Mode Split

Following the base trip generation shown in Section 3.1.1, the trips were split into each mode: transit (consisting of both Metrorail and Metrobus/DC Circulator), walking, biking, and vehicle. Each land use was analyzed by mode separately in order to account for varying mode splits. The mode split estimates for the RiverFront PUD were developed using survey information contained in several sources, WMATA’s 2005 Development-Related Ridership Survey, WMATA’s Station Site and Access Planning Manual, Commuter Connections’ 2010 State of the Commute Survey Report, results from the 2000 U.S. Census, and files from Gorove/Slade’s library. The following describes in detail how the mode split assumptions were assembled based on information from these sources.

#### Retail Uses

The main source of mode split information for retail sites is WMATA’s Ridership Survey. Contained within the report are summaries of mode splits for five retail sites within the Metropolitan area, and one within the District. The one site within the District was the U Street area, which of all of the sites surveyed is the closest in characteristics to the RiverFront, as it is a ‘main street’ retail area with ground floor retail mixed in with other land uses. Table 8 summarizes the mode split information for the U Street site, and all of the retail sites surveyed.

**Table 8: WMATA Ridership Survey Mode Split for Retail Sites**

Retail Location	Mode			
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other
Central Business District	44%	13%	19%	25%
All sites surveyed	29%	8%	36%	27%



Although the U Street site is closest in characteristics to the RiverFront PUD, in order to maintain a conservative assumption, this report uses the mode splits for the all retail sites surveyed as a basis for assumptions. This report uses the following mode split assumptions for retail:

- Vehicle: 35%
- Transit: 40%
- Walk: 20%
- Bike: 5%

**Office Uses**

WMATA’s 2005 *Development-Relates Ridership Survey* has generally been used as the standard source for developing mode split estimates. Information provided within the report shows that office sites in the central business district and all office sites surveyed had the following mode splits, shown in Table 9.

**Table 9: WMATA Ridership Survey Mode Split for Office Sites**

Office Location	Mode			
	<i>Metrorail</i>	<i>Metrobus &amp; Other Transit</i>	<i>Auto</i>	<i>Walk &amp; Other</i>
Central Business District	63%	12%	21%	5%
All sites surveyed	25%	9%	62%	6%

The central business district mode split is an average of several sites surveyed. Applying it to the RiverFront PUD may not be appropriate because the sites surveyed do not have similar characteristics, such as the amount of parking per square foot of space, walking distance to Metrorail and employee benefits for non-auto commuters. Notably, the walking distance from RiverFront to the Navy Yard station is longer than all of the central business district sites surveyed. *The Ridership Survey* includes an analysis that concludes that the percentage ridership via Metrorail decreases 0.96% for every 100 feet the site is located from a Metrorail station. Applying this to RiverFront, using a starting assumption of 63% and an average walking distance of 2200 feet, the expected Metrorail mode split for RiverFront would be 42%.

Using data from other office sites surveyed in WMATA’s report would also not be appropriate, because they also differ greatly. Each site has significantly more parking spaces per square foot of office space. Even more notable is that the *Ridership Survey* notes that 72% of the office commuters that responded to the survey were offered subsidized or free parking by their employers. The Transportation Demand Management (TDM) plan for the RiverFront PUD contains measures that will ensure that the parking garage will be priced at market rate for the majority of users, including office workers.

Information contained within the *2010 State of the Commute* report shows why only offering market rate pricing will have a large influence on the office mode split. Table 10 shows the mode split difference between all commuters surveyed in the State of the Commute surveys split between whether the commuter was offered free parking.

**Table 10: Mode Split Difference Based on Free Parking (Entire DC Area)**

Parking Benefit	Mode				
	Drive Alone	Carpool	Bus	Train	Walk/Bike
Free Parking	82%	6%	3%	5%	4%
No Free Parking	42%	10%	11%	32%	6%

The *State of the Commute* report also contains responses of mode splits for all commuters employed in the District, as follows:

- Drive alone: 42%
- Carpool: 11%
- Bus: 10%
- Metrorail: 31%
- Commuter Rail: 2%
- Bike: 1%
- Walk: 3%

Because these surveys are from sites averaged across the entire District, and not just sites from the CBD like the WMATA *Ridership Survey*, this study uses these mode splits as a starting point for building assumptions for the RiverFront.

The following steps were taken to assemble the mode split estimates, starting with the *State of Commute's* average for all office sites within the District. The amount of transit use was assumed to be 40%, because it is expected that the RiverFront PUD will have similar transit use to both all employment sites in the District (43%) and of all sites surveyed that charge for parking (42%) per the *State of the Commute* survey. The amount of cycling was set to 3%, to reflect the site's location near the Anacostia Riverfront Trail and the amount of residents located within a 10-15 minute bicycle ride from the site. Similarly, the walk mode split was increased to reflect the number of existing and future residents living within in walking distance of the site, compared to the District average as a whole.

Thus, the assumptions on office mode split for the RiverFront are as follows:

- Vehicle: 50%
- Transit: 40%
- Walk: 7%
- Bike: 3%

### **Residential Uses**

Several sources provide mode split information that can be used to develop mode split estimates for future residents of the RiverFront, including results from the 2000 census, WMATA's *Ridership Survey* of residential sites within the District, and the *State of the Commute* report that contains the average mode split of commuters who live in the District. The mode splits from these three sources are shown in Table 11.

**Table 11: Mode Split Information for Residential Uses**

Information Source	Mode			
	<i>Train</i>	<i>Metrobus &amp; Other Transit</i>	<i>Auto</i>	<i>Walk &amp; Other</i>
2000 Census <sup>1</sup>	20%	25%	33%	22%
State of the Commute <sup>2</sup>	27%	14%	48%	11%
WMATA Ridership Survey <sup>3</sup>	50%	6%	18%	26%

Of these three sources of information, the one that most closely contains the transportation characteristics of the RiverFront PUD would be the census information from the tracts where it is located. The sites that comprise the *Ridership Survey’s* average mode splits do not compare well based on location and distance from the Metrorail station. The *State of the Commute* is an average for the entire District, and the difference between its mode splits and the census data make sense, given that the census tracts adjacent to the RiverFront site have high quality bus service.

Thus, this report uses the census information as a starting point for assembling residential mode split assumptions. The following steps were taken to assemble the mode split estimates, using this data as a starting point.

- The amount of transit use was assumed to be 40%, slightly less than the census tracts surrounding it (45%).
- The amount of cycling was set to 5%, to reflect the site’s location near the Anacostia Riverfront Trail and the amount of residents located within a 10-15 minute bicycle ride from the site.
- Similarly, the walk mode split was set to 15% to reflect the amount of existing and future resident in walking distance of the site, compared to the District average as a whole. The total amount of bicycling and walking totals 20%, which is close to the ‘Walk & Other’ percentages observed in the census data.

Thus, the assumptions for residential mode split at the RiverFront are as follows:

- Vehicle: 40%
- Transit: 40%
- Walk: 15%
- Bike: 5%

**Hotel Uses**

The main source of mode split information for hotel sites is WMATA’s *Ridership Survey*. Contained within the report are summaries of mode splits for four retail sites within the Metropolitan area. Table 12 summarizes the mode split information of the hotel sites surveyed.

**Table 12: WMATA Ridership Survey Mode Split for Hotel Sites**

Office Location	Mode			
	<i>Metrorail</i>	<i>Metrobus &amp; Other Transit</i>	<i>Auto</i>	<i>Walk &amp; Other</i>
All sites surveyed	27%	4%	38%	31%

<sup>1</sup> Weighted average for responses from census tracts 64 and 72

<sup>2</sup> Survey respondents that live within the District

<sup>3</sup> For ‘CBD’ locations, which includes all residential sites surveyed within the District

This report uses the mode splits for the all retail sites surveyed as a basis for assumptions, stating with assuming that transit use of hotel traffic will be 30%, similar to the WMATA survey results.

- Drive: 45%
- Transit: 30%
- Walk: 20%
- Bike: 5%

**Summary**

Table 13 summarizes the mode split assumptions.

**Table 13: Mode Split Assumptions**

Land Use	Mode Split			
	Vehicle	Transit	Walk	Bike
Retail	35%	40%	20%	5%
Office	50%	40%	7%	3%
Residential	40%	40%	15%	5%
Hotel	45%	30%	20%	5%

**3.1.3 Multi-Modal Trip Generation**

Based on the trip generation calculations outlined in Section 3.1.1 and the mode split assumptions shown in Section 3.1.2 (and summarized in Table 13), Table 14 shows the resulting calculations by mode for Phase 1. Phase 1 of the proposed PUD will generate approximately 69 vehicular trips, 77 transit trips, 30 walking trips, and 10 bicycle trips during the morning peak hour; 95 vehicular trips, 107 transit trips, 42 walking trips, and 14 bicycle trips during the afternoon peak hour; and 1,023 vehicular trips, 1,156 transit trips, 463 walking trips, and 145 bicycle trips during a typical weekday.

Table 15 shows the resulting calculations by mode for Phases 2, 3, and 4. The remaining phases of the proposed PUD will generate approximately 429 vehicular trips, 373 transit trips, 124 walking trips, and 41 bicycle trips during the morning peak hour; 432 vehicular trips, 383 transit trips, 134 walking trips, and 42 bicycle trips during the afternoon peak hour; and 4,161 vehicular trips, 3,652 transit trips, 1,447 walking trips, and 433 bicycle trips during a typical weekday.

**Table 14: Trip Generation for Proposed Development by Mode (Phase 1 Only)**

Land-Use/Mode	Trip Generation by Mode for Phase 1						Daily Total
	AM Peak Hour			PM Peak Hour			
	In	Out	Total	In	Out	Total	
<b>Vehicle Trips</b>							
Retail	3	1	4	8	8	16	188
Residential	13	52	65	51	28	79	835
<i>Total New Vehicle Trips</i>	16	53	69	59	36	95	1,023
<b>Transit Person-Trips</b>							
Retail	4	2	6	10	11	21	237
Residential	14	57	71	56	30	86	919
<i>Total New Transit Person-Trips</i>	18	59	77	66	41	107	1,156

Land-Use/Mode	Trip Generation by Mode for Phase 1						Daily Total
	AM Peak Hour			PM Peak Hour			
	In	Out	Total	In	Out	Total	
<b>Walking Person-Trips</b>							
Retail	2	1	3	5	5	10	118
Residential	5	22	27	21	11	32	345
<i>Total New Walking Person-Trips</i>	7	23	30	26	16	42	463
<b>Bicycling Person-Trips</b>							
Retail	0	1	1	1	2	3	30
Residential	2	7	9	7	4	11	115
<i>Total New Bicycling Person-Trips</i>	2	8	10	8	6	14	145
<b>Total Trips*</b>	<b>43</b>	<b>143</b>	<b>186</b>	<b>159</b>	<b>99</b>	<b>258</b>	<b>2,787</b>

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

**Table 15: Trip Generation for Proposed Development by Mode (Phases 2, 3, and 4)**

Land-Use/Mode	Trip Generation by Mode for Phases 2, 3, and 4						Daily Total
	AM Peak Hour			PM Peak Hour			
	In	Out	Total	In	Out	Total	
<b>Vehicle Trips</b>							
Retail	3	1	4	7	8	15	164
Office	213	29	242	37	186	223	1,659
Residential	74	52	126	62	64	126	1,605
Hotel	11	46	57	45	23	68	733
<i>Total New Vehicle Trips</i>	301	128	429	151	281	432	4,161
<b>Transit Person-Trips</b>							
Retail	3	2	5	9	9	18	206
Office	188	25	213	34	162	196	1,461
Residential	54	39	93	46	47	93	1,178
Hotel	12	50	62	49	27	76	807
<i>Total New Transit Person-Trips</i>	257	116	373	138	245	383	2,652
<b>Walking Person-Trips</b>							
Retail	2	0	2	4	5	9	103
Office	33	4	37	6	28	34	256
Residential	36	26	62	30	32	62	785
Hotel	5	18	23	18	11	29	303
<i>Total New Walking Person-Trips</i>	76	48	124	58	76	134	1,447
<b>Bicycling Person-Trips</b>							
Retail	0	1	1	1	1	2	26
Office	14	2	16	3	12	15	110
Residential	9	7	16	8	7	15	196
Hotel	2	6	8	6	4	10	101
<i>Total New Bicycling Person-Trips</i>	25	16	41	18	24	42	433
<b>Total Trips*</b>	<b>659</b>	<b>308</b>	<b>967</b>	<b>365</b>	<b>626</b>	<b>991</b>	<b>9,693</b>

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

### 3.2 Roadway Capacity and Operations

This section details the vehicular trips generated in the study area along the vehicular access routes, defines the analysis assumptions, analyses the vehicular impacts of the proposed PUD, and makes recommendations for improvements where needed.

#### 3.2.1 Scope of Analysis

The purpose of the vehicular capacity analysis is to determine the existing conditions of the intersections located in the immediate vicinity of the proposed development. The following intersections were selected, as shown in Figure 9:

1. South Capitol Street & Potomac Avenue
2. 1<sup>st</sup> Street & N Street
3. South Capitol Street Southbound & M Street
4. South Capitol Street Northbound & M Street
5. 1<sup>st</sup> Street & M Street
6. New Jersey Avenue SE & M Street
7. 4<sup>th</sup> Street & M Street
8. 5<sup>th</sup> Street & M Street
9. 1<sup>st</sup> Street & I (Eye) Street

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

- 2011 Existing Conditions
- 2015 Future Conditions without Development (2015 Background)
- 2015 Future Conditions with Phase 1 Development (2015 Future)
- 2020 Future Conditions with Phase 1 Development Only (2020 Background)
- 2020 Future Conditions with All Development (2020 Future)

The *Synchro, Version 7.0* software package was used to analyze the study intersections based on the Highway Capacity Manual (HCM) methodology. The *Synchro* model was compiled using signal timings provided by DDOT and with lane configurations and traffic volumes collected by Gorove/Slade. The following sections review the assumptions made for the technical analyses, as summarized in Table 19.

#### 3.2.2 Traffic Volume Assumptions

The following section reviews the traffic volume assumptions made and methodologies used in the roadway capacity analyses, summarized in Table 19.

##### 2011 Existing Conditions

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

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

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

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

The peak period counts are analyzed to determine the one hour during the morning and afternoon periods that contains the highest cumulative directional traffic demands. From each peak period count, the morning and afternoon “peak hours” are determined by summing up the four fifteen-minute consecutive time periods in the study area that experience the highest cumulative traffic volumes. These morning and afternoon “peak hours” are analyzed for the system of intersections investigated, choosing the “peak hour” of the entire system instead of each individual intersection.

Following the above guidelines, traffic counts, including vehicular and pedestrian volumes, were conducted by Gorove/Slade at the key study intersections between the hours of 6:30 and 9:30 AM and between 4:00 and 7:00 PM on Wednesday, September 28, 2011. A few of the study intersections in the study area were counted previously by Gorove/Slade on Tuesday-Wednesday, September 14-15, 2010. These count dates represent “typical” weekdays when the DC public school systems were in session, as well as those in the surrounding counties in Maryland and Virginia. These “typical” weekdays also represent time periods that include normal operation for other major traffic generators in the study area. The results of the traffic counts are included in the Technical Attachments. The morning and afternoon peak hours for the system of intersections being studied occurred between 7:45 – 8:45 AM and 4:30 – 5:30 PM, respectively. Peak hour traffic volumes are shown on Figure 12 and Figure 13 for the morning and afternoon peak hours, respectively.

#### **2015 Future Conditions without Development (2015 Background)**

Phase 1 of the RiverFront PUD is anticipated to be complete in 2015. The traffic projections for the future condition without the development consist of the traffic generated by background developments with planned completion by 2015, listed in the section 1.7.2 of this report, added to the existing traffic volumes.

Available background development traffic studies were used to determine the number of trips added for the background developments. This included the “Maritime Plaza Traffic Impact Study” performed by Gorove/Slade in October 2005, the “Monument Ballpark – Square 700 & 701 Transportation Impact Study” performed by Wells & Associates in December 2006, the “Waterfront Development Traffic Impact Study” performed by Gorove/Slade in May 2007, the “Square 700 Development Traffic Impact Assessment” performed by Gorove/Slade in January 2009, the “Square 737 Traffic Impact Study” performed by Gorove/Slade in June 2011, the “St. Matthew’s Church and Community Center Planned Unit Development Traffic Impact Study” performed by Gorove/Slade in February 2012, and the “Southwest Waterfront Stage 1 PUD Transportation Impact Study” performed by Gorove/Slade in June 2011. These documents were used to determine the number of trips generated by the aforementioned background developments, the mode split percentages, and the trip routing.

Trip generation for the other background developments was calculated based on the methodology outlined in the Institute of Transportation Engineers’ (ITE) *Trip Generation*, 8<sup>th</sup> Edition. For developments consisting of a mix of retail uses with office, residential, or hotel uses, a 20% internal capture reduction was applied for retail trips originating from within the proposed development. The Shopping Center trip rate was applied in lieu of individual trip rates, such as bank, pharmacy and supermarket, for the retail uses because applying individual rates would not account for interaction between the retail uses (shoppers visiting more than one store), and the Shopping Center trip rate does account for these uses and interactions. Additionally, the General Office Building, Residential Apartments, and Residential Condominiums/Townhomes rates were applied for office and residential uses to estimate trips generated by the background developments.

For this report, the methodology was supplemented to account for the urban nature of the site (Trip Generation provides data for non-urban, low transit use sites). The WMATA Ridership Survey was used to determine transit reduction rates in order to account for trips taken by walking, bicycling, and transit. The mode split assumptions were based on the patterns and general findings from that document, observations of existing traffic, and the type and density of surrounding land uses. It was assumed that retail uses would generate a lot of local demand and therefore, have the highest assumed percentage of walking and biking trips. Residential based trips would be the most likely to use public transit, since they will be regular users that will be able to figure out and take advantage of the various routes and schedules. Although the location of the site near several major highways could lead to driving mode splits, the Metrorail, Metrobus, and DC Circulator service will be utilized to reach destinations in downtown areas of the District and to surrounding areas.

Table 16, shown below, summarizes the mode split assumptions for the background developments. Table 17 shows the total number of trips generated by the background developments. The trips generated for each background development are shown in the Technical Appendix.

**Table 16: Mode Split Assumptions for Background Developments**

Land Use	Mode Split			
	Vehicle	Transit	Walk	Bike
Office	50%	35%	10%	5%
Retail/Restaurant	25%	35%	30%	10%
Residential	35%	45%	15%	5%
Hotel	35%	45%	15%	5%
Church	50%	35%	10%	5%
Marina	35%	45%	15%	5%



**Table 17: Year 2015 Background Development Trip Generation**

Land Use	Size		Trip Generation						Weekday Total
			AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
<b>Vehicle Trips</b>									
Retail	664,101	Square Feet	243	143	386	657	604	1,261	14,015
Residential	3,876	Dwelling Units	132	519	651	501	265	766	8,352
Office	5,183,307	Square Feet	2,914	395	3,309	545	2,653	3,198	22,863
Hotel	1,125	Rooms	232	100	332	178	198	376	4,567
Church	8,746	Square Feet	2	1	3	1	2	3	44
<b>Subtotal</b>			<b>3,523</b>	<b>1,158</b>	<b>4,681</b>	<b>1,882</b>	<b>3,722</b>	<b>5,604</b>	<b>49,841</b>
<i>Existing Trips</i>			<i>-507</i>	<i>-141</i>	<i>-648</i>	<i>-114</i>	<i>-515</i>	<i>-629</i>	<i>-6,290</i>
<b>Total Vehicle-Trips</b>			<b>3,016</b>	<b>1,017</b>	<b>4,033</b>	<b>1,768</b>	<b>3,207</b>	<b>4,975</b>	<b>43,551</b>

These trips were then distributed and assigned to the network. Where a background study was not available, trips generated by the background developments were distributed using an analysis based on Metropolitan Washington Council of Governments (MWCOC) transportation planning models. Data from Traffic Analysis Zones (TAZs), including home-based and non-home-based trips, were used to determine the inbound and outbound vehicular trip distribution. The data used encompassed trips to and from the Southwest Waterfront development in 2010 and 2030. The data obtained from the MWCOC model was used in order to estimate the directions of approach for the study area. The major routes originate from the Francis Case Memorial Bridge/Southwest Freeway (I-395) and the George Mason Memorial Bridge/14<sup>th</sup> Street Bridge (Route 1) from the west, Maine Avenue SW from the west, 9<sup>th</sup> Street/12<sup>th</sup> Street from the north, 7<sup>th</sup> Street from the north, I-395 from the north, the Southeast Freeway/John Philip Sousa Bridge from the south and east, the 11<sup>th</sup> Street Bridges (I-295) from the south and east, and the Frederick Douglas Bridge/South Capitol Street from the south. Some trips will also originate from the local area roadways as well. One trip distribution was assumed for all land uses because the MWCOC data for Southwest Waterfront aggregated all land uses for each TAZ. Figure 10 shows the direction of approach for the background developments.

Typically, a percent growth rate is applied to the existing traffic volumes in order to account for other traffic increases, including inherent growth in the roadway network. However, due to the number of background developments included in the analysis, no additional percent growth was added. It was assumed that the growth added to the study area would be generated by the background developments and that including an inherent growth rate would overestimate the future traffic volumes without the proposed development.

The traffic volumes generated by the background developments were added to the 2011 existing traffic volumes in order to establish the 2015 background traffic volumes. The traffic volumes for the 2015 background conditions are shown on Figure 12 and Figure 13 for the morning and afternoon peak hours, respectively.

**2015 Future Conditions with Phase 1 Development (2015 Future)**

Existing traffic volumes and travel patterns in the study area were analyzed and combined with the data obtained from the MWCOC for Southwest Waterfront in order to determine the trip distribution for the trips added by the proposed development, as shown in Figure 11. Based on this review and the proposed site access locations shown previously on Figure 7, the site-generated trips shown in Section 3.1 were distributed through the study area intersections, as shown on Figure 12 and Figure 13 for the morning and afternoon peak hours, respectively.

The traffic volumes for the 2015 future conditions were calculated by adding the development-generated traffic volumes to the 2015 background traffic volumes. Thus the future condition with the proposed development scenario includes traffic

generated by: existing volumes, background development through the year 2015, and Phase 1 of the proposed RiverFront PUD. The 2015 future traffic volumes are shown on Figure 12 and Figure 13 for the morning and afternoon peak hours, respectively.

**2020 Future Conditions with Phase 1 Development Only (2020 Background)**

The entirety of the RiverFront PUD is anticipated to be complete in 2020. The traffic projections for the future condition without the full development consist of the traffic generated by background developments with planned completion between 2016 and 2020, listed in the section 1.7.2 of this report, added to the traffic volumes from the 2015 future scenario.

As stated previously, trip generation for the other background developments was calculated based on the methodology outlined in the Institute of Transportation Engineers’ (ITE) *Trip Generation*, 8<sup>th</sup> Edition. For developments consisting of a mix of retail uses with office, residential, or hotel uses, a 20% internal capture reduction was applied for retail trips originating from within the proposed development. The Shopping Center trip rate was applied in lieu of individual trip rates, such as bank, pharmacy and supermarket, for the retail uses because applying individual rates would not account for interaction between the retail uses (shoppers visiting more than one store), and the Shopping Center trip rate does account for these uses and interactions. Additionally, the General Office Building, Residential Apartments, and Residential Condominiums/Townhomes rates were applied for office and residential uses to estimate trips generated by the background developments.

For this report, the methodology was supplemented to account for the urban nature of the site (Trip Generation provides data for non-urban, low transit use sites). The WMATA Ridership Survey was used to determine transit reduction rates in order to account for trips taken by walking, bicycling, and transit. The mode split assumptions were based on the patterns and general findings from that document, observations of existing traffic, and the type and density of surrounding land uses. It was assumed that retail uses would generate a lot of local demand and therefore, have the highest assumed percentage of walking and biking trips. Residential based trips would be the most likely to use public transit, since they will be regular users that will be able to figure out and take advantage of the various routes and schedules. Although the location of the site near several major highways could lead to driving mode splits, the Metrorail, Metrobus, and DC Circulator service will be utilized to reach destinations in downtown areas of the District and to surrounding areas.

Table 16, shown previously, summarizes the mode split assumptions. Table 17 shows the total number of trips generated by the background developments. The trips generated for each background development are shown in the Technical Appendix.

**Table 18: Year 2020 Background Development Trip Generation**

Land Use	Size	Trip Generation						Weekday Total
		AM Peak Hour			PM Peak Hour			
		In	Out	Total	In	Out	Total	
<b>Vehicle Trips</b>								
Retail	543,347 Square Feet	200	131	331	478	463	941	10,391
Residential	6,039 Dwelling Units	263	982	1,245	680	363	1,043	11,625
Office	5,940,780 Square Feet	3,415	464	3,879	6,57	3,202	3,859	26,360
Hotel	1,025 Rooms	193	120	313	161	167	328	4,371
Church	15,000 Square Feet	3	2	5	3	2	5	69
Marina	382 Berths	7	3	10	19	5	24	1,693
<b>Total Vehicle-Trips</b>		<b>4,081</b>	<b>1,702</b>	<b>5,783</b>	<b>1,998</b>	<b>4,202</b>	<b>6,200</b>	<b>54,509</b>

These trips were then distributed and assigned to the network. Where a background study was not available, trips generated by the background developments were distributed using an analysis based on Metropolitan Washington Council of Governments (MWCOG) transportation planning models. Data from Traffic Analysis Zones (TAZs), including home-based and non-home-based trips, were used to determine the inbound and outbound vehicular trip distribution. The data used encompassed trips to and from the Southwest Waterfront development in 2010 and 2030. The data obtained from the MWCOG model was used in order to estimate the directions of approach for the study area. The major routes originate from the Francis Case Memorial Bridge/Southwest Freeway (I-395) and the George Mason Memorial Bridge/14<sup>th</sup> Street Bridge (Route 1) from the west, Maine Avenue SW from the west, 9<sup>th</sup> Street/12<sup>th</sup> Street from the north, 7<sup>th</sup> Street from the north, I-395 from the north, the Southeast Freeway/John Philip Sousa Bridge from the south and east, the 11<sup>th</sup> Street Bridges (I-295) from the south and east, and the Frederick Douglas Bridge/South Capitol Street from the south. Some trips will also originate from the local area roadways as well. One trip distribution was assumed for all land uses because the MWCOG data for Southwest Waterfront aggregated all land uses for each TAZ. Figure 10 shows the direction of approach for the background developments.

Typically, a percent growth rate is applied to the existing traffic volumes in order to account for other traffic increases, including inherent growth in the roadway network. However, due to the number of background developments included in the analysis, no additional percent growth was added. It was assumed that the growth added to the study area would be generated by the background developments and that including an inherent growth rate would overestimate the future traffic volumes without the proposed development.

The traffic volumes generated by the background developments were added to the 2015 future traffic volumes in order to establish the 2020 background traffic volumes. The traffic volumes for the 2020 background conditions are shown on Figure 14 and Figure 15 for the morning and afternoon peak hours, respectively.

#### **2020 Future Conditions with All Development (2020 Future)**

As stated previously, existing traffic volumes and travel patterns in the study area were analyzed and combined with the data obtained from the MWCOG for Southwest Waterfront in order to determine the trip distribution for the trips added by the proposed development, as shown in Figure 11. Based on this review and the proposed site access locations shown previously on Figure 7, the site-generated trips shown in Section 3.1 were distributed through the study area intersections, as shown on Figure 14 and Figure 15 for the morning and afternoon peak hours, respectively.

The traffic volumes for the 2020 future conditions were calculated by adding the development-generated traffic volumes to the 2020 background traffic volumes. Thus the future condition with the proposed development scenario includes traffic generated by: existing volumes, background development through the year 2020, and all phases of the proposed RiverFront PUD. The 2020 future traffic volumes are shown on Figure 14 and Figure 15 for the morning and afternoon peak hours, respectively.

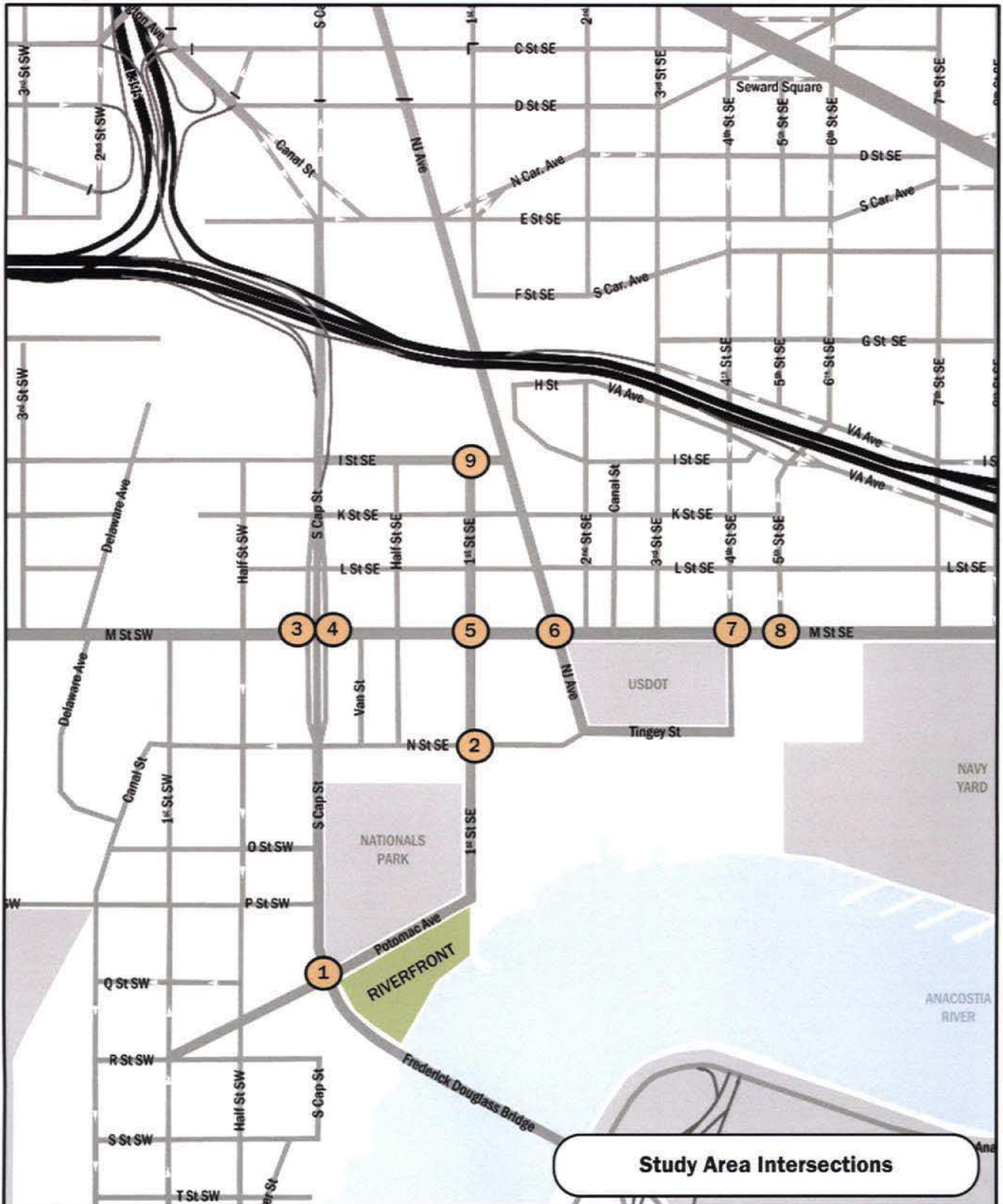


Figure 9: Study Intersections

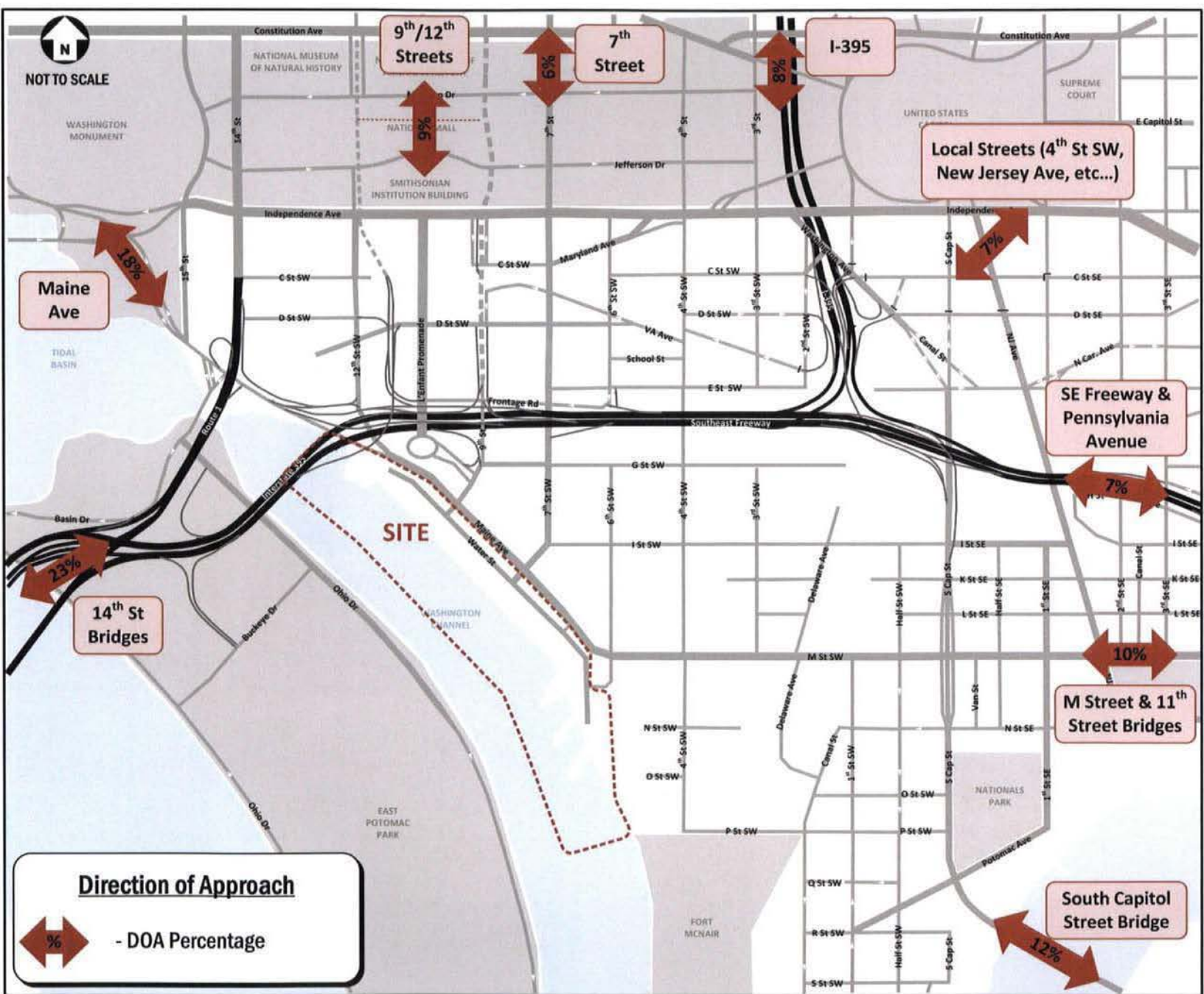


Figure 10: Direction of Approach for Background Developments

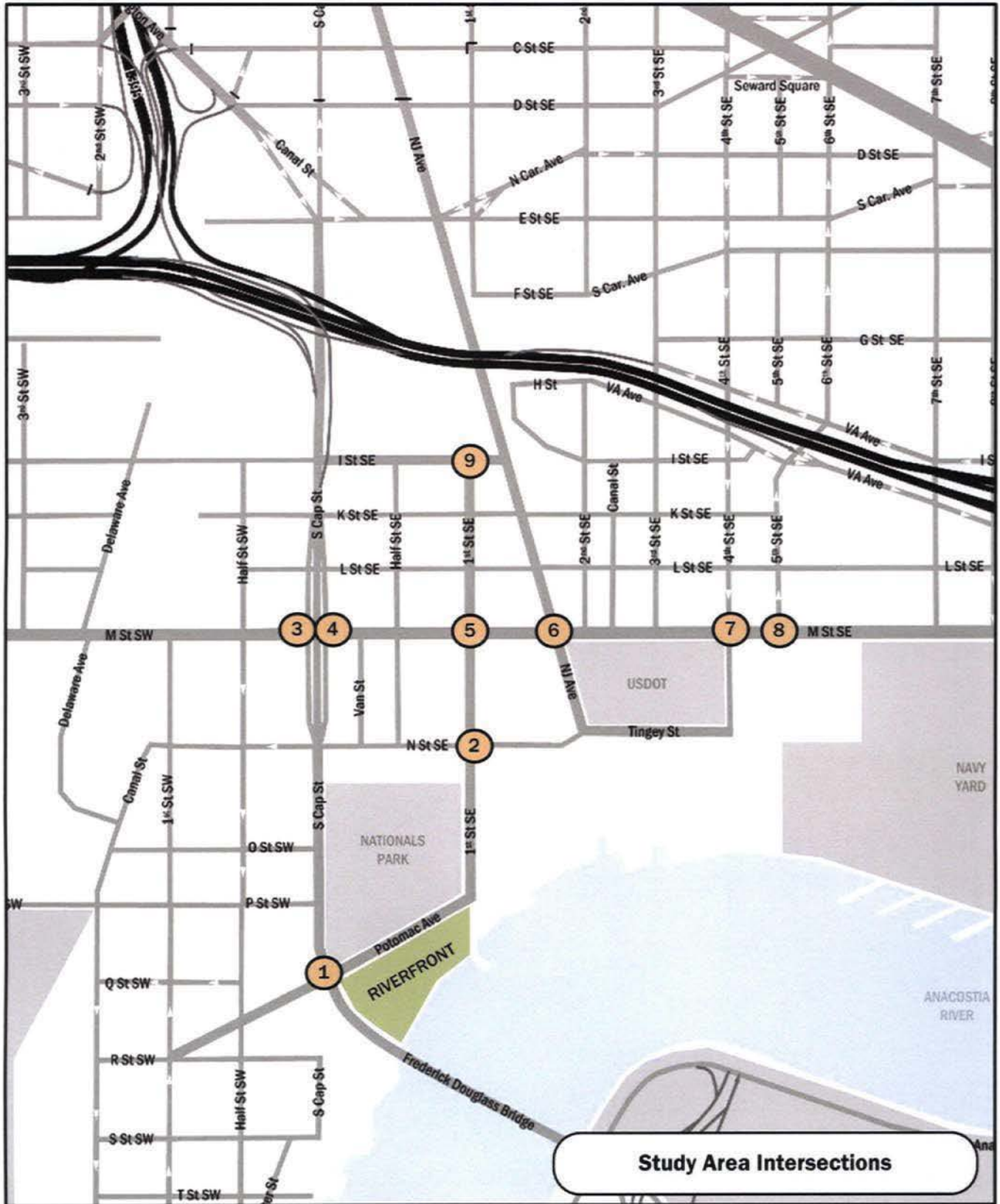


Figure 11: Trip Distribution for Site-Generated Trips

### ***3.2.3 Geometry and Operations Assumptions***

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses, summarized in Table 19.

#### **2011 Existing Conditions**

Gorove/Slade conducted field reconnaissance to confirm the existing lane configurations and traffic controls at the intersections within the study area, shown on Figure 16. Existing signal timings and offsets were obtained from DDOT and confirmed during field reconnaissance.

#### **2015 Future Conditions without Development (2015 Background)**

The lane configurations for the 2015 future conditions without the proposed development are based on the existing lane configurations. No roadway infrastructure changes were assumed for the future conditions without development for 2015. The lane configurations and traffic controls for the 2015 background conditions are shown on Figure 16.

#### **2015 Future Conditions with Phase 1 Development (2015 Future)**

The lane configurations for the 2015 future conditions with the proposed development are based on the lane configurations for the 2015 conditions without the proposed development. No roadway infrastructure changes were assumed for the future conditions with development for 2015. However, the new site driveways, as described previously in Section 2.1.1 and as shown on Figure 7, were added to the roadway network. The lane configurations and traffic controls for the 2015 future conditions are shown on Figure 17.

#### **2020 Future Conditions with Phase 1 Development Only (2020 Background)**

As stated previously, the entirety of the RiverFront PUD is anticipated to be complete in 2020. The future conditions with Phase 1 development only include the reconstruction of South Capitol Street as described in Section 1.7.1. The following improvements, as shown in FIGURE, were included in the 2020 background scenario from the “Concept Plans” of the Preferred Alternative from the Final Environmental Impact Statement for the South Capitol Street Improvement project:

- Reconstruct the intersection of South Capitol Street and M Street to an at-grade intersection
  - Northbound and southbound approaches: two left-turn lanes, two through lanes, one shared through/right-turn lane
  - Eastbound and westbound approaches: one left turn lane, two through lanes, one shared through/right-turn lane
  - Assumed actuated and coordinated signal operation with a 120-second signal cycle (similar to existing signals along South Capitol Street in vicinity)
  - Optimized signal timing and intersection offset
- Reconstruct the intersection of South Capitol Street and Potomac Avenue to an oval connecting them with Q and R Streets
  - Reconstruct existing Frederick Douglas Memorial Bridge
    - Three lanes in each direction (inbound and outbound)

- Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic in the Oval
- Westbound approach of Potomac Avenue
  - Two lanes entering the oval and two lanes exiting the oval to Potomac Avenue
  - Intersection controlled by a signal
  - Assumed to be actuated and coordinated signal operation with a 100-second signal cycle (standard for District intersections)
  - Optimized signal timing and intersection offset
- Southbound South Capitol Street
  - Three lanes entering and exiting the Oval
  - Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic in the Oval
- Eastbound Q Street
  - One lane entering and exiting the Oval
  - Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic entering the Oval from Q Street
- Eastbound Potomac Avenue
  - One-way outbound approach from the Oval
  - Two lanes exiting the Oval
- Eastbound R Street
  - One-way inbound approach towards the Oval
  - Two lanes entering the oval
  - Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic entering the Oval from R Street.

No other roadway infrastructure changes were assumed for the 2020 background conditions. The lane configurations and traffic controls for the 2020 background conditions are shown on Figure 18.

#### **2020 Future Conditions with All Development (2020 Future)**

The lane configurations for the 2020 future conditions with the proposed development are based on the lane configurations for the 2020 conditions with Phase 1 development only. No additional roadway infrastructure changes were assumed for the future conditions with development for 2020. The lane configurations and traffic controls for the 2020 background conditions are shown on Figure 18.



**Table 19: Summary of Vehicular Capacity Analysis Assumptions**

<b>2011 Existing Conditions</b>
<ul style="list-style-type: none"> <li>• Dates of data collection:             <ul style="list-style-type: none"> <li>○ Wednesday, September 28, 2011</li> <li>○ Tuesday-Wednesday, September 14-15, 2010</li> <li>○ Counts taken from 6:30 – 9:30 AM and 4:00 – 7:00 PM</li> <li>○ Count sheets in Appendix</li> </ul> </li> <li>• System Peak: 7:45 – 8:45 AM, 4:30 – 5:30 PM</li> <li>• Geometries and lane configurations based on existing conditions</li> <li>• Signal timings/phasings/offsets provided by DDOT</li> </ul>
<b>2015 Future Conditions without Development (2015 Background)</b>
<ul style="list-style-type: none"> <li>• Background developments:             <ul style="list-style-type: none"> <li>○ Developments assumed completed by 2015 listed in Section 1.7.2</li> <li>○ Mode split &amp; assignment assumptions taken from individual transportation studies for each development, where possible. If no study was on record, mode split assumptions shown in Table 16 and assignment methodologies were similar to those used for the site, based on trip distribution shown in Figure 10.</li> </ul> </li> <li>• Background growth percentage:             <ul style="list-style-type: none"> <li>○ None assumed due to comprehensive list of background developments</li> <li>○ In addition, existing LOS results show very high delays on South Capitol Street, indicating that regional growth will be unlikely to increase.</li> </ul> </li> <li>• No roadway infrastructure improvements assumed.</li> </ul>
<b>2015 Future Conditions with Phase 1 Development (2015 Future)</b>
<ul style="list-style-type: none"> <li>• Site trip generation and mode split assumptions are detailed in Section 3.1 of report</li> <li>• Trip distribution for vehicles based on existing traffic volumes and travel patterns in the study area, along with MWCOG model origin/destination data, as shown on Figure 11.</li> <li>• No signal timing changes assumed</li> <li>• Included addition of site driveways as shown on Figure 7.</li> </ul>
<b>2020 Future Conditions with Phase 1 Development Only (2020 Background)</b>
<ul style="list-style-type: none"> <li>• Background developments:             <ul style="list-style-type: none"> <li>○ Developments assumed completed by 2020 listed in Section 1.7.2</li> <li>○ Mode split &amp; assignment assumptions taken from individual transportation studies for each development, where possible. If no study was on record, mode split assumptions shown in Table 16 and assignment methodologies were similar to those used for the site, based on trip distribution shown in Figure 10.</li> </ul> </li> <li>• Background growth percentage:             <ul style="list-style-type: none"> <li>○ None assumed due to comprehensive list of background developments</li> </ul> </li> <li>• Roadway infrastructure improvements assumed from South Capitol Street FEIS             <ul style="list-style-type: none"> <li>○ Convert South Capitol Street and M Street to signalized at-grade intersection</li> <li>○ Convert intersection of South Capitol Street and Potomac Avenue to Oval, with Q and R Streets</li> </ul> </li> </ul>
<b>2020 Future Conditions with All Development (2020 Future)</b>
<ul style="list-style-type: none"> <li>• Site trip generation and mode split assumptions are detailed in Section 3.1 of report</li> <li>• Trip distribution for vehicles based on existing traffic volumes and travel patterns in the study area, along with MWCOG model origin/destination data, as shown on Figure 11.</li> <li>• No signal timing or roadway infrastructure assumed</li> </ul>

### 3.2.4 Vehicular Analysis Results

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

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

Table 20 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the 2011 Existing and 2015 Background and Future scenarios. The capacity analysis results for the morning peak hour are shown on Figure 19 and for the afternoon peak hour are shown on Figure 20.

The majority of study intersections operate at acceptable conditions during the morning and afternoon peak hours for the 2011 Existing, 2015 Background, and 2015 Future scenarios. However, the following intersections/approaches operate under unacceptable conditions during one or more peak hour:

- South Capitol Street South and M Street
- South Capitol Street and Potomac Avenue
- 5<sup>th</sup> Street & M Street

Phase 1 of the proposed development is considered to have an impact at an intersection within the study area if the capacity analyses show an LOS F at an intersection or along an approach in the future conditions with the proposed development where one does not exist in the future conditions without the proposed development. Table 21 summarizes the results of the capacity analyses including discussion of what is generating the delays and potential mitigation, and Table 22 shows the capacity analysis results with the improvements proposed in Table 21. Additionally, Table 22 shows the capacity analysis results for the proposed driveways if the western driveway is limited to right-in/right-out access.

Table 23 shows the queuing results for the intersections that operate under unacceptable levels of service during the 2011 Existing and 2015 Background and Future scenarios. The queuing results are shown with and without the improvements and mitigation measures outlined in Table 21.

Table 24 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the 2020 Background and Future scenarios. The capacity analysis results for the morning peak hour are shown on Figure 21 and for the afternoon peak hour are shown on Figure 22.

As stated previously, the later phases (Phases 2-4) of the proposed development are considered to have an impact at an intersection within the study area if the capacity analyses show an LOS F at an intersection or along an approach in the

future conditions with all Phases developed where one does not exist in the future conditions with Phase 1 development only. Table 25 summarizes the results of the capacity analyses including discussion of what is generating the delays and potential mitigation, and Table 26 shows the capacity analysis results with the improvements proposed in Table 25. Additionally, Table 26 shows the capacity analysis results for the proposed driveways if the western driveway is limited to right-in/right-out access.

Table 27 shows the queuing results for the intersections that operate under unacceptable levels of service during the 2011 Existing and 2015 Background and Future scenarios. The queuing results are shown with and without the improvements and mitigation measures outlined in Table 25.

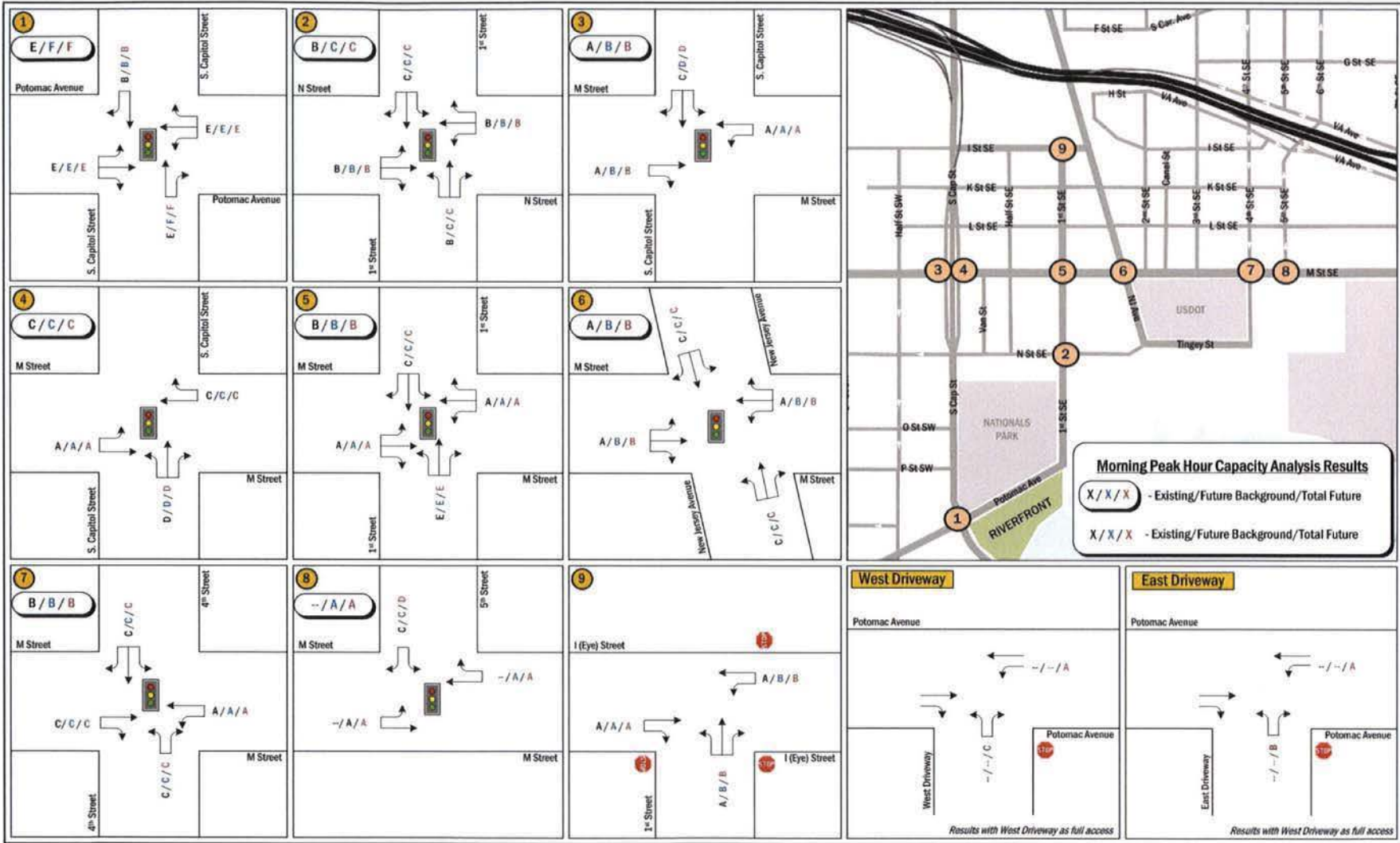


Figure 12: Morning Peak Hour Traffic Volumes for 2011 Existing and 2015 Background/Future

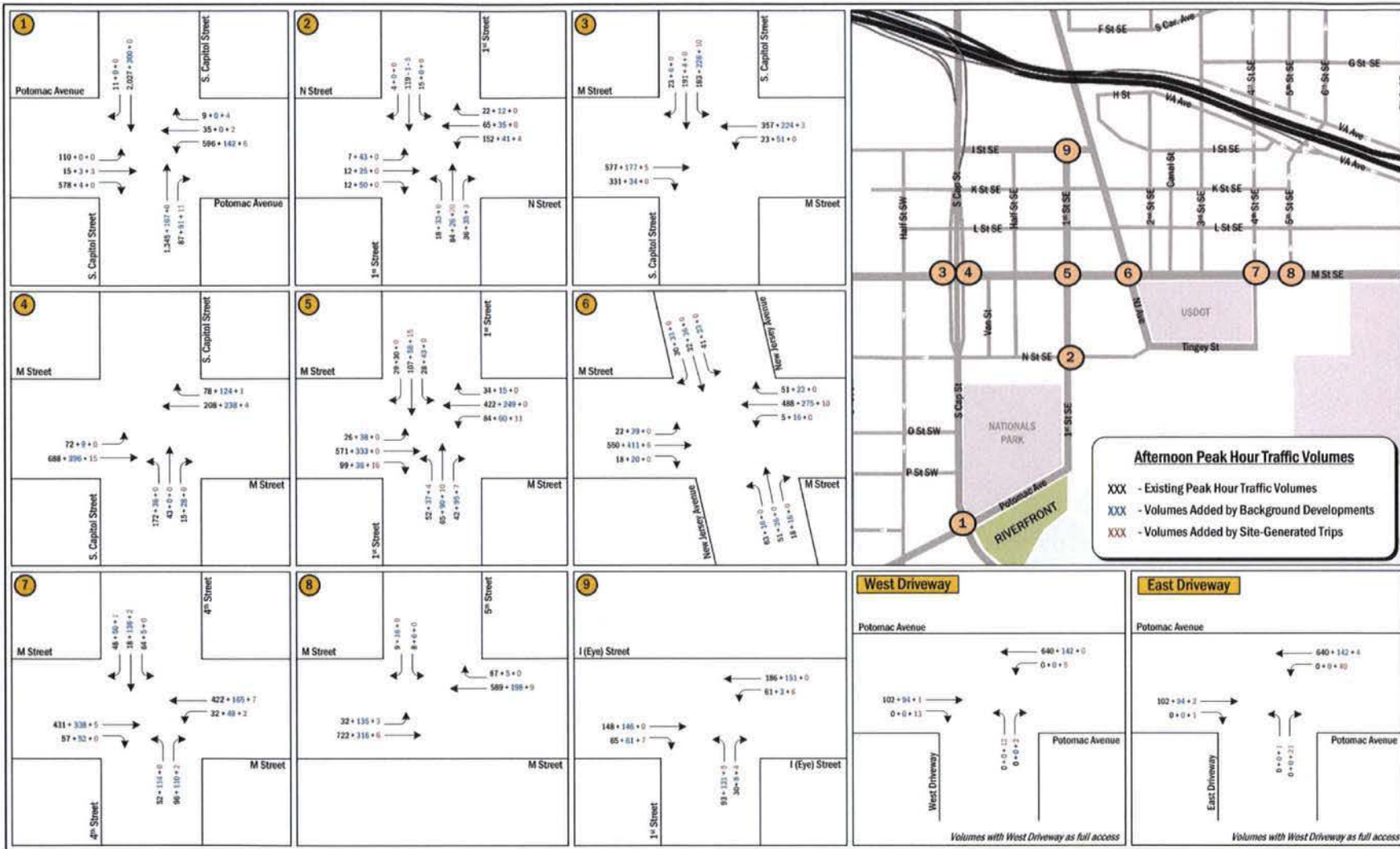


Figure 13: Afternoon Peak Hour Traffic Volumes for 2011 Existing and 2015 Background/Future



Figure 14: Morning Peak Hour Traffic Volumes for 2020 Background/Future

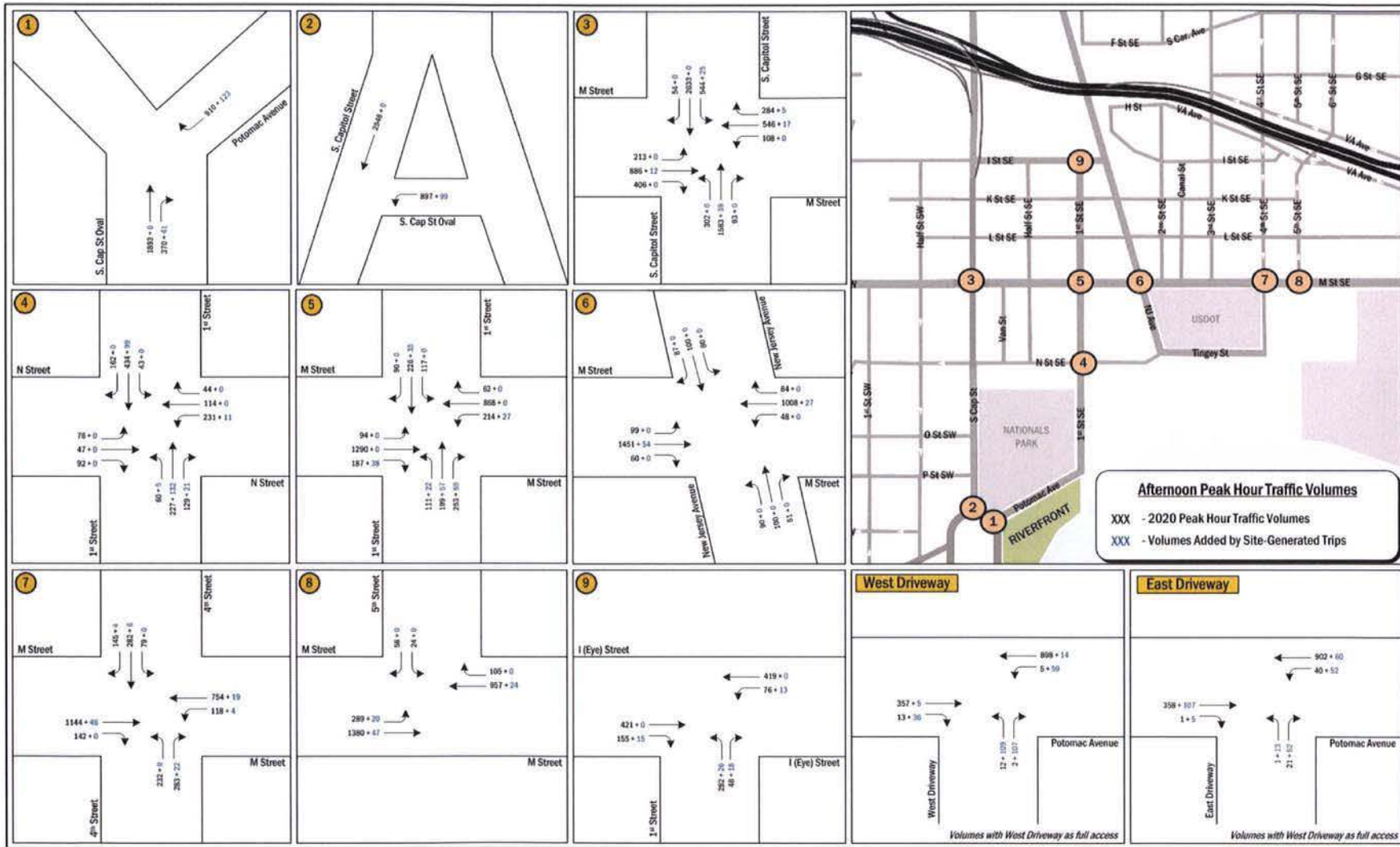


Figure 15: Afternoon Peak Hour Traffic Volumes for 2020 Background/Future



Figure 16: 2011 Existing and 2015 Background Lane Configurations





Figure 17: 2015 Future Lane Configurations

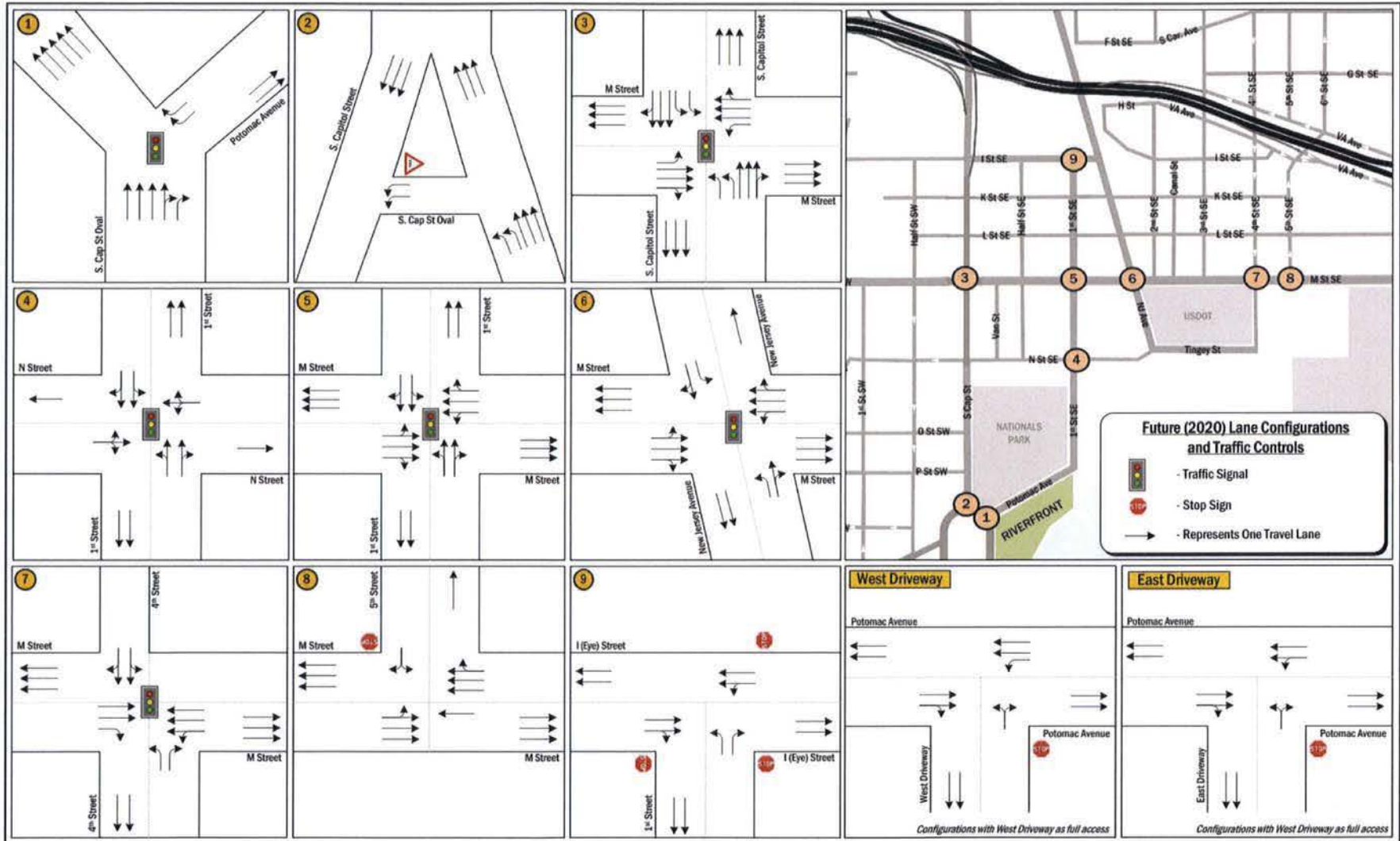


Figure 18: 2020 Background and Future Lane Configurations