ENVISION
ROUTE 7

Conceptual Engineering

Phase III

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NVTC
NORTHERN VIRGINIA TRANSPORTATION COMMISSION

Consultant Team

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Executive Summary

The Envision Route 7 Bus Rapid Transit (BRT) project is planned as a high performing BRT service that connects the Mark Center in Alexandria to Tysons through Bailey's Crossroads, Seven Corners, and Falls Church. The project is part of a network of BRT services being planned, designed, and implemented to better link Northern Virginia that includes the Metroway BRT in the City of Alexandria and Arlington County, the West End Transitway in the City of Alexandria, and the Embark Richmond Highway BRT in Fairfax County. The Envision Route 7 project will serve the Route 7 corridor and will operate in the West End Transitway infrastructure from Route 7 to the Mark Center.

High performing transit in the Route 7 corridor has been in the planning phase for more than five years. Early phases of the Envision Route 7 project found the need for transit in the broad corridor from Alexandria to Tysons, identified BRT as the transit technology to serve the corridor and defined an alignment for the service to travel along. Detailed analysis was undertaken in these early efforts to identify potential transit ridership, suggest the location for BRT operations within the roadway, also known as runningway, and select general station locations. Phase III, the current effort of the Envision Route 7 project, focuses on updating the initial runningway assumptions and identifying the specific station locations so that the needed rights-of-way (ROW) can be identified and a cost estimate may be determined.

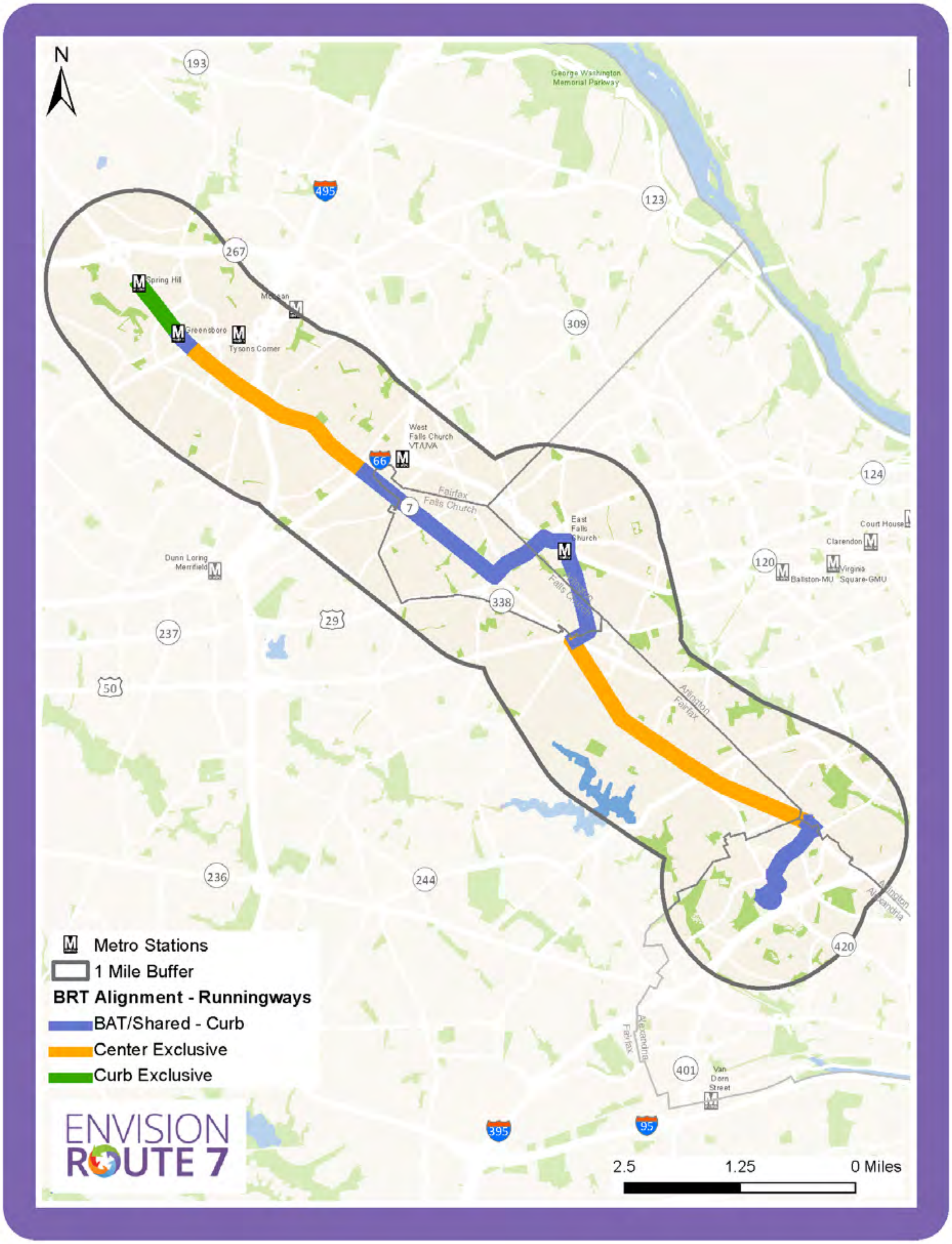
HIGH PERFORMANCE TRANSIT

To deliver a high-performance BRT project, it is necessary to provide priority treatment for the BRT system's runningway. Where possible, the BRT runningway should be exclusively for transit vehicles and separated from general-purpose vehicles. Existing facilities can be repurposed to serve the BRT system when the ROW is constrained. Where traffic operations allow, Business Access and Transit (BAT) facilities, which allow BRT buses and turning vehicles to mix in the curb lanes, can be utilized. Where the ROW and traffic operations are constrained, buses can travel in general-purpose travel lanes. Exclusive facilities are suggested through most of the corridor from Tysons to Falls Church and from Seven Corners to Beauregard Street, BAT lanes are suggested in the more constrained portions of the corridor through the City of Falls Church, and the City of Alexandria is using general-purpose travel lanes for the portion of the West End Transitway between the Mark Center and Route 7.

STATIONS AND ROLLINGSTOCK

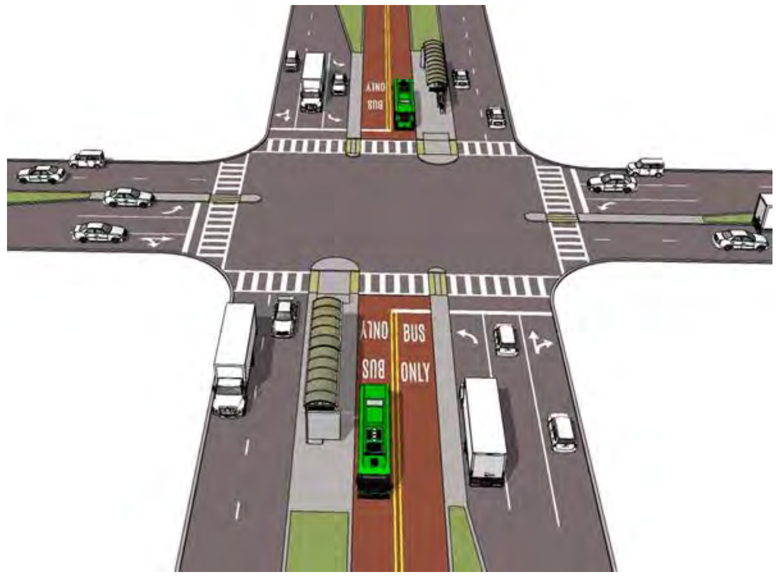
Specific station locations within the ROW have been defined for each station. Best practices for station sizing and location were identified, which ultimately led to the development of multiple station templates. In addition, demographic information, existing and future land use and population and employment forecasts were considered. Consideration was also made for the specific roadway and

Corridor Map Showing Runningway Type



development context of the station location. Specific station locations were then recommended considering these inputs. In some cases, slight location adjustments for stations are suggested along with additional stations and combinations of stations. Generally, stations are recommended for the far side of intersections and away from major intersections with multiple left or right turn lanes.

Center Running Station



The study also considered station types that would necessitate buses with left side doors. While this could increase the flexibility in the use of the ROW, it would require new rollingstock as current regional rollingstock only board and alight on the right side of the vehicle. This would limit the utility of the BRT infrastructure since only the BRT service would be able to serve the transit facility. Therefore, stations will only accommodate buses with typical right-side doors. Stations will be designed to accommodate both 40’ buses as well as 60’ articulated buses.

NVTC LED STUDY PROCESS

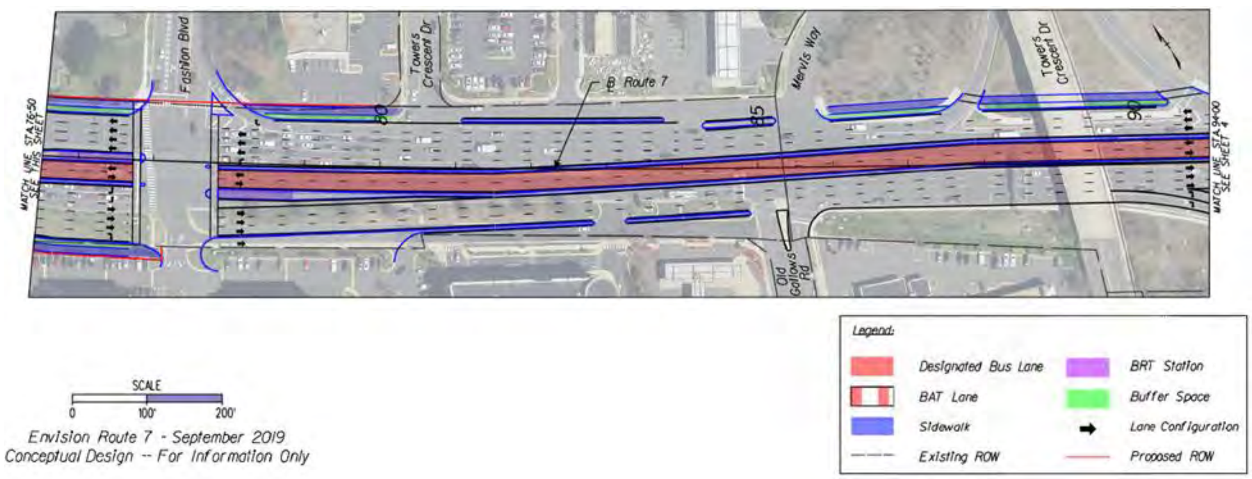
The study process has been guided by a technical advisory committee (TAC). The TAC consisted of staff representatives from Fairfax County, the City of Falls Church, Arlington County, City of Alexandria, Virginia Department of Transportation (VDOT), Virginia Department of Rail and Public Transportation (DRPT) Washington Metropolitan Area Transit Authority (WMATA), Northern Virginia Transportation Authority (NVTA), and Montgomery County, Maryland DOT. This group met regularly throughout the study process to review progress and provide input to the study team. In addition, two workshops were held where design details were discussed, and input was provided. The workshops included members of the TAC as well as technical staff from each of the agencies represented. Comments were solicited multiple times during the process and incorporated into the project.

CONCEPTUAL LAYOUT

Conceptual layouts were developed for the corridor from Spring Hill Metrorail Station to N. Beauregard Street, a span of approximately 10.5 miles. South of the N. Beauregard Street intersection, the Envision Route 7 BRT alignment joins the West End Transitway alignment to the terminus at the Mark Center. Design for this segment is being advanced by the City of Alexandria.

The conceptual layouts align with jurisdictional plans by meeting the number of lanes and preserving all existing lane movements and configurations at major intersections along the corridor. Additionally, a sidewalk or shared use path has been included on both sides of the street unless adequate sidewalk was already available. The BRT facility and accompanying roadway have been designed to include space from service lanes where available to minimize ROW needs. The need for additional or expanded bridge structures was carefully considered, but it was determined that all future roadway and BRT facilities can be accommodated by the existing bridge structures.

Sample Conceptual Layout



RIGHT-OF-WAY (ROW) NEEDED

ROW need is determined by comparing the edge of the conceptual layouts with the edge of the existing ROW. The additional ROW needed for the project is the area where the edge of the conceptual layout is beyond the existing ROW. The ROW analysis shows that some, but not all parcels adjacent to the facility will be necessary to implement the BRT service. However, in most cases, only a small portion of the parcel will be necessary for the expansion of the Route 7 ROW. The analysis found that although portions of one hundred parcels would be needed, less than 20 percent of the total area of each parcel will be needed in most cases. Where a larger portion of the parcel is needed, the parcel is either small or located in the path of the new Ring Road. Generally, additional ROW is needed in the southern portion of Tysons, the Pimmit Hills area, Seven Corners, and Bailey's Crossroads. In addition, small amounts of ROW are needed in immediate station areas throughout the corridor.

ESTIMATED COST

A capital cost estimate has been developed for the project. The capital costs for the project were developed in a parametric process based upon the quantities and unit rates of similar BRT projects. Quantities for each of the items were developed using the conceptual layout plans prepared for the corridor. Items were assigned to a Federal Transportation Agency (FTA) Standard Cost Categories (SCC) code. The right-of-way costs include the fee acquisition of permanent and temporary easements, relocation costs, legal fees, business damages, and other miscellaneous costs. Right-of-way cost estimates are based on average, local, per-acre value with factors for the above properties' costs being considered. No vehicle, maintenance facility, or operations costs are included in this estimate.

To account for the level of unknowns at this point of the project, two levels of contingencies have been included in the cost estimate, allocated and unallocated. Allocated contingencies focus on specific cost or service items and vary based on the risk of the item. Unallocated contingencies are general in nature and are added on top of all costs and allocated contingencies. The allocated contingency will be included for each SCC cost category. The allocated contingency is based on each of the estimate items per their respective costs and a level of certainty and judgment based on the estimate and design progress detail. For this estimate, lower risk line items have an allocated contingency of 15 percent, while higher risk line items have a higher allocated contingency of 30 percent. Allocated contingencies for ROW acquisition are the highest at 40 percent.

To account for the current labor and construction market in the Washington, D.C. metropolitan area, the cost estimate is presented as a range from low to high. For the low range estimate, the allocated contingencies described above were applied to each line item. For the high range estimate, the allocated contingencies were doubled. In addition, an unallocated contingency of 15 percent has been added on top of the full cost which also includes allocated contingencies.

	Base Year (2019)		Year of Expenditure (2030)	
	Low-End	High-End	Low-End	High-End
Construction Subtotal + Allocated Contingencies	$206.5 M	$230.0 M	$261.7 M	$291.1 M
ROW Acquisition + Allocated Contingencies	$32.6 M	$41.9 M	$43.5 M	$55.9 M
Professional Services (30 percent)	$59.9 M	$66.7 M	$77.8 M	$86.7 M
Unallocated Contingencies (15 percent)	$44.9 M	$50.8 M	$64.5 M	$73.1 M
Total	**$343.9 M**	**$ 389.4 M**	**$447.5 M**	**$ 506.8 M**

Chapter 1: Background and Area Context

Early phases of the Envision Route 7 project defined the need for transit in the broad corridor from Alexandria to Tysons and also identified a transit technology to serve the corridor as well as an alignment for the service to travel along. Detailed analysis was undertaken in these early efforts to identify potential ridership, suggest a type of runningway and select general locations for stations. The Phase III of the Envision Route 7 project has focused on identifying the type of runningway to be utilized in the corridor as well as the specific station locations so that an order of magnitude cost may be assessed and the needed rights-of-way (ROW) can be identified.

A variety of data have been mapped to better understand opportunities for runningway type and station locations. This mapping effort will help identify potential conflicts with various resources and infrastructure to be avoided when considering station locations and concept engineering for the Envision Route 7 project. As part of this effort, the project team conducted a corridor-wide data collection and mapping effort with a focus on capturing pertinent existing and future conditions across a variety of discipline areas. This chapter describes data obtained, collected, and organized for the base mapping as part of the Envision Route 7 Conceptual Engineering project.

Data collection and mapping efforts focused on a variety of categories including:

- Travel Conditions
- Demographics
- Property and Land Use
- Environmental and Cultural Resources
- Programmed Transportation Projects
- Likely Land Development Projects

The project team collected and organized data sets across the Route 7 Corridor's four jurisdictions: Fairfax County, City of Falls Church, Arlington County and City of Alexandria. Regional data (e.g., statewide ADT data from the Virginia Department of Transportation) was also collected.

These data were utilized to inform the process of identify the type of runningway to utilize and the locations of the station. Mapping is discussed in the context of each runningway segment and station area in Chapter 2. However, detailed appendices are provided detailing:

- Base Mapping
- GIS Data Dictionary for Mapping
- Development and Highway Plans

Chapter 2: Runningway and Station Location

Building on the results of previous studies as well as the mapping of various elements, the type of runningway to utilize across the alignment and where to site stations for the proposed Envision Route 7 Bus Rapid Transit (BRT) system has been identified. Of particular concern are the transit stations, as they provide access to the system and make up the widest part of the BRT corridor cross-section. Previous phases of the Envision Route 7 project identified general station locations at intersections. This phase of the project has identified more precise locations for the stations. Determining station locations requires an understanding of project parameters, relevant station types, and layouts. The process begins by identifying some best practices for BRT layout and operations, both locally and nationally. Building on best practices, an approach to the runningway is identified and station templates for various expected station types are created. Finally, the runningway type is determined for all portions of the corridor and specific station locations are defined.

BEST PRACTICES

The first step in updating the runningway assumptions and identifying more precise station locations was to consider the best practices of other relevant systems. There are many existing BRT facilities in the United States and many more being planned. A selection of local and national BRT projects was reviewed to identify design elements that provide the highest functionality for the planned service with the purpose of considering systems that may be similar in context and complexity. Existing and planned systems in Northern Virginia were a major focus in identifying relevant best practices. This effort was not intended to be exhaustive, but rather intended to identify specific design parameters, which inform the project. Our evaluation focused on specific BRT facilities across the country, including:

- Alexandria/Arlington, Virginia – Metroway
- Alexandria, Virginia – West End Transitway
- Cleveland, Ohio – HealthLine BRT
- Grand Rapids, Michigan – The Silver Line BRT
- Eugene, Oregon – EmX BRT

In general, the best practices review focused on transit properties that share similar land use and roadway facility character, by considering runningways, station sizing, station placement at the intersection, constrained right-of-way remedies/improvements, and regional practice consistencies. These elements helped define the ROW needs and, therefore, are the focus of this effort. It should be noted that this review of peer projects does not include transit properties, such as those in Pittsburgh, Pennsylvania, where dedicated ROW outside of a roadway facility are used as the runningway. This type of service, although a valuable transit service, is not relevant to the Route 7 context.

RUNNINGWAY AND STATION PLACEMENT

Runningways, or the locations of transit facilities with respect to the corridor cross-sections, are the key elements determining how the BRT system will operate. The BRT systems with the fastest and most reliable operations utilize exclusive lanes for their BRT systems and center-running exclusive lanes where possible. For instance, The HealthLine, EmX and Metroway all utilize center-running exclusive facilities for at least a portion of their BRT systems.

The placement of stations is also fairly consistent. Stations tend to be located at the far side of intersections. This serves two purposes; the first is to minimize run time for the BRT service, and the second is to allow a left turn pocket on the near side of the intersection. By allowing transit to stop at the far side of intersections, the transit vehicle can advance even when the signal behind it is showing stop, which is not possible when using a near side stop.

Station Size

BRT is a very flexible type of transit. As such, a variety of station sizes are employed. This review considered the size of stations in a variety of places and contexts. Station size varied most between location of the station in the ROW. Specifically, center running stations and curb running stations tend to be different sizes. The review was broadened to consider additional facilities, such as canopy coverage, though this is not an important element for station sizing.

Stations in the center of the roadway tend to be larger, and stations on the curb tend to be smaller. Center stations are often approximately 100’ in length and between 10’ and 14’ in width. Stations on the curb vary more. Length of curb stations tend to be between 50’ and 60’ where width was between 8’ and 10’. The center stations for Metroway are approximately 100’ long and approximately 12’ wide, and the curb stations are approximately 75’ long and 12’ wide. A variety of station sizes, along with canopy coverage shown in the shaded color, is noted in Figure 1.

Figure 1 Station Size

STATIONS CONSTRUCTED BY OTHER TRANSIT DISTRICTS

	PLATFORM DIMENSION	STATION DIAGRAM	CANOPY DIMENSION
VANCOUVER, WA CTRAN	12' x 50' SIDE (600 SF)		9' x 36' (324 SF)
	10' x 50' SIDE (500 SF)		9' x 24' (216 SF)
	9' x 50' SIDE (450 SF)		8' x 24' (192 SF)
EUGENE/SPRINGFIELD EmX	12' x 60' SIDE (720 SF)		10' x 30' (300 SF)
	12' x 50' SIDE (600 SF)		10' x 30' (300 SF)
	10' x 60' SIDE (600 SF)		7'-6" x 30' (225 SF)
	10' x 48' SIDE (480 SF)		7'-6" x 30' (225 SF)
	14' x 74' CENTER (1,036 SF)		12' x 48' (576 SF)
	14' x 104' CENTER (1,456 SF)		12' x 80' (960 SF)
FRESNO	11'-6" X 60' SIDE (690 SF)		7' x 30' (210 SF)
	10' X 50' SIDE (500 SF)		6' x 21' (126 SF)
CLEVELAND HEALTH LINE	12' X 60' CENTER (720 SF)		8'-6" x 40' (340 SF)
	12' X 100' CENTER (1,200 SF)		8'-6" x 50' (425 SF)
	12' X 26' SIDE (312 SF)		8'-6" x 19' (162 SF)
GRAND RAPIDS SILVERLINE	8' X 50' SIDE (400 SF)		8'-2" x 32' (261 SF)
	10'-3" X 60' SIDE (615 SF)		8'-2" x 48' (392 SF)
	8' X 60' SIDE (480 SF)		8'-2" x 48' (392 SF)

The outlined area indicates the relative station size and the shaded area indicates canopy coverage area

Source: Provo-Orem Transportation Improvement Project

CONSTRAINED ROW

Many of the BRT facilities traverse a constrained ROW and employ a variety of types of runningway when moving through the constrained locations. Some facilities utilize Business Access and Transit (BAT) lanes and others allow the facility to mix with traffic. For example, the HealthLine utilizes exclusive transit lanes in their constrained downtown segment. However, this area includes a robust network of streets that could accommodate the shifting of vehicle traffic. In Eugene, the EmX service utilizes a BAT lane in its downtown core to allow vehicles to turn right from the transit lane rather than turning from the general-purpose travel lane, and in Grand Rapids, the Silver Line utilizes largely existing, mixed travel lanes to minimize potential vehicle shifts from existing general-purpose lanes to exclusive transit lanes. There is no single standard approach to address how the BRT facility is incorporated into a constrained ROW.

APPROACH TO RUNNINGWAY AND STATIONS

In addition to best practices, consistency with regional BRT facilities was another important factor to consider as the Envision Route 7 corridor advanced. By building on the best practices review and understanding regional BRT facilities, an approach to runningway was identified and station templates were developed. This approach identified runningway types and station locations that yield relatively high speed and reliability while minimizing additional ROW needs where feasible.

CONSISTENCY WITH REGIONAL PRACTICES

BRT Facilities are being planned across Northern Virginia. In addition to the Envision Route 7 corridor, the City of Alexandria is planning for a BRT in the West End Transitway. Fairfax County is advancing a BRT on the Richmond Highway corridor, and a portion of the Metroway BRT corridor was constructed along Route 1 in Arlington County and the City of Alexandria. In general, these services use or plan to use existing rollingstock and are center-running exclusive facilities with far-side stops where space is available.

While some deviation from regional peer systems will be necessary, the design approach of the Route 7 corridor will preferably be consistent to its regional peer facilities. First and foremost, the Route 7 service will operate in portions of the West End Transitway, so the Route 7 service must be consistent with the planned West End Transitway. It is also important to design facilities for rollingstock already owned by regional transit providers. Procuring separate equipment to operate the BRT service is possible, as many transit agencies have done so. However, it increases the level of operations and planning complexity. While difficult to quantify, there is also value in creating a consistent design approach for systems in the region so that transit riders understand how to utilize the facilities and drivers know what to expect from facilities.

RUNNINGWAY APPROACH

The Envision Route 7 project is being advanced as a high performing BRT facility that is able to deliver relatively high transit speed and reliability. To deliver a high-performance facility, it is necessary for the service's runningway to be separated from general-purpose vehicles as much as possible. The project team considered utilizing runningway types that include:

- Center Running Exclusive Lanes

- Side Running Exclusive Lanes
- Side Running BAT Lanes
- Mixed Travel Lanes

In general, center running exclusive transit lanes achieve the fastest and most reliable transit speeds as conflicts with other vehicles on the roadway are minimal. As a result, center running exclusive facilities are employed wherever space and context permit. Where center running facilities are not possible due to various constraints, curb running exclusive lanes are employed. Curb running facilities, while exclusive, must accommodate vehicle right-turn conflicts at both driveways and intersections. Thus, average speeds and reliability are lower than center-exclusive facilities.

Exclusive facilities depend on having space available to accommodate the facilities. Some of the Route 7 corridor is along a constrained ROW that cannot be widened without adversely affecting residential areas or structures along the route. In the center of Falls Church, along both Route 7 and Washington Street, structures are located at or near the back of the sidewalk. In Arlington County, residential land uses are extremely close to corridor portions along Lee Highway, N. Sycamore Street, and N. Roosevelt Street. Both Falls Church and Arlington's areas make exclusive lanes difficult to implement.

When a ROW is constrained, existing facilities can be repurposed to serve the BRT system. Where traffic operations allow, Business Access and Transit (BAT) facilities can be employed. These facilities delineate space for transit vehicles, but the space is not exclusive to transit vehicles. Rather, the space is shared between transit vehicles and general vehicles, all of which can mix in the BAT lane to access adjacent businesses and roadways. However, speed and reliability are reduced compared to exclusive facilities. In addition, enforcement is difficult, making bus operations more problematic.

Where ROW is constrained and traffic operations do not allow for it, buses utilize regular travel lanes. Regular travel lanes may also be used as transitions from center to side running transit facilities. Future stages in the project development process may consider the use of queue jumps or transit signal priority (TSP) for transitions or highly constrained areas to minimize travel delays and reliability concerns from shared facilities. The speed and reliability of transit operations in shared lanes are subject to operations and street traffic. Therefore, they are the slowest and least reliable operations of all runningway types considered.

TRANSIT SYSTEM PARAMETERS

Transit systems operate various types of rolling stock, have varying levels of ridership and differing needs from different stations. Design parameters must consider elements such as travel volumes, transfer needs, or other concerns that would influence station size or vehicle needs. These elements, as well as a design vehicle, were important transit system considerations that influenced station templates.

Vehicles

Vehicle size and the boarding side(s) of the vehicle were identified. This study effort was the first step in determining a specific design vehicle for the Envision Route 7 corridor. Therefore, a conservative approach was used for determining the design vehicle. A relatively standard single articulated 60' bus with right side only boarding doors was assumed to be the design vehicle for the facility. It is assumed that the stations could also be serviced by 40' non-articulated buses. These assumptions allowed for vehicles that are standard in the region to serve the proposed facility.

Station Volume

Passenger volume at stations should also be identified so that stations can be appropriately sized. In general, station volume, as identified in the Phase II study, is expected to be relatively similar across the line, so standard sized stations that accommodate the travel demand were determined to be appropriate. However, the East Falls Church Station is above the typical ridership range. This is due to the high volume of transfer ridership between Metrorail and the BRT service. At this location, additional space may be necessary to accommodate rider queuing and flow, the station's layout reflects this fact. Final sizing of this facility will be made at a later design stage. It is expected that all other stations will be standard sized or sized to fit the surroundings.

Special Locations

The corridor also includes some other locations that will necessitate non-standard treatment. The first of these is the center of Falls Church. This portion of Falls Church is constrained with structures near the back of the sidewalk in many, if not most, areas. In at least some areas, it is possible that there will not be enough width to accommodate the station templates. It is also possible that there may be driveway conflicts in this area. In order to fit the stations, the station template may have to be adjusted.

There will also be end-of-line stations and transfer facilities that may warrant slightly different layouts as well. The Mark Center Station already exists and will be utilized as is. However, it is possible that in the future, adjustments may be needed in order to accommodate additional demand. Also, the station in Seven Corners will need to accommodate transit services transfers at the Seven Corners Transit Center. This station location and layout will remain very general at this point since the road network in the area is conceptual. In the future, this facility should consider interaction with the transit transfer facility in the area.

STATION LAYOUTS

With runningway preference and basic transit system parameters identified, templates for stations were created. In general, stations are located on the far side of the intersection in the direction of travel. This allows the transit vehicle to travel through the intersection before having passengers board and alight.

Once boarding and alighting are completed, the vehicle can advance even if the signal is still red for traffic since it has already passed the signal.

There are two basic station area templates: one for center running facilities and one for curb running facilities. The center-running exclusive lanes will have stations between the exclusive transit lanes and the general-purpose lanes, whereas the curb running facilities, exclusive, BAT, and shared lanes will have curb stations. However, for curb running facilities, there is the potential for slight design differences based on the runningway characteristics and available space.

Center Running Exclusive Lanes

Center running exclusive lanes will have stations on the right side of the vehicle in the direction of travel. These stations will be physically between the exclusive transit lanes and the general-purpose vehicle lanes. Riders would need to access the stations using crosswalks at the signals. The station would also be an off-set, far-side station, with platforms on either side of the intersecting street, such that the station is on the far side of the intersection in the direction of travel.

The previous review identified a variety of sizes for stations. In general, the center-running exclusive lanes' stations should be approximately 12' wide by 100' long. The width could potentially vary slightly depending on the speed limit in the area. A higher speed would necessitate a higher level of physical separation between the general-purpose lanes and the station area. The width is ADA compliant and accommodates movement needs for passengers boarding and alighting the BRT service. The station length allows for ADA compliant ramping necessary to achieve a higher platform, ticketing facilities, trash receptacles, and other station amenities. An example is provided in Figure 2.

Figure 2 Center Running Exclusive Lanes Example

Curb Running Lanes

Stations for curb running lanes, whether exclusive, BAT, or shared, will have stations on the right side of the vehicle in the direction of travel. These stations will be physically on the curb. Riders would access the station from the directly adjacent sidewalk or from the opposite side of the road using crosswalks at signals. The station would also be an off-set, far-side station, with platforms on either side of the intersecting street, such that the station is on the far side of the intersection in the direction of travel. The station location may vary depending on existing site conditions, jurisdictional master plans and future development plans, but the overall guidance for placing bus station close to the intersection will adhere to these guidelines.

The previous review identified a variety of station sizes. In general, the curb lanes' stations should be approximately 12' wide by 60' long. However, this template varied slightly in places depending on whether exclusive lanes, BAT lanes, or shared facilities are used. Generally, exclusive lane segments are considered in less constrained locations and as such, stations should have more available ROW and achieve the full station template. However, stations in more constrained areas where BAT lanes or shared facilities are necessary, had smaller station footprints.

The width of the station accommodates movement needs for passengers boarding and alighting the BRT service and the length allows for ticketing facilities, trash receptacles, and other station amenities. These dimensions allow for an ADA compliant facility. Examples of both exclusive bus lanes and BAT or shared lane approaches are provided in Figure 3 and Figure 4 respectively.

Figure 3 Curb Running Exclusive Lanes

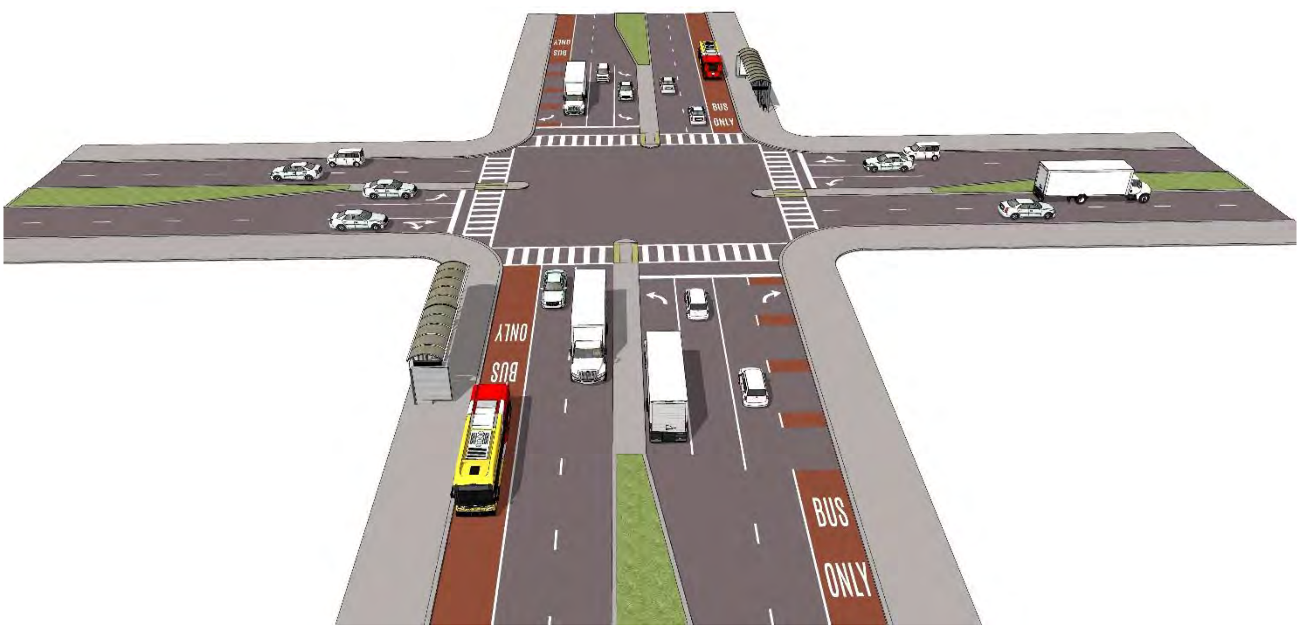
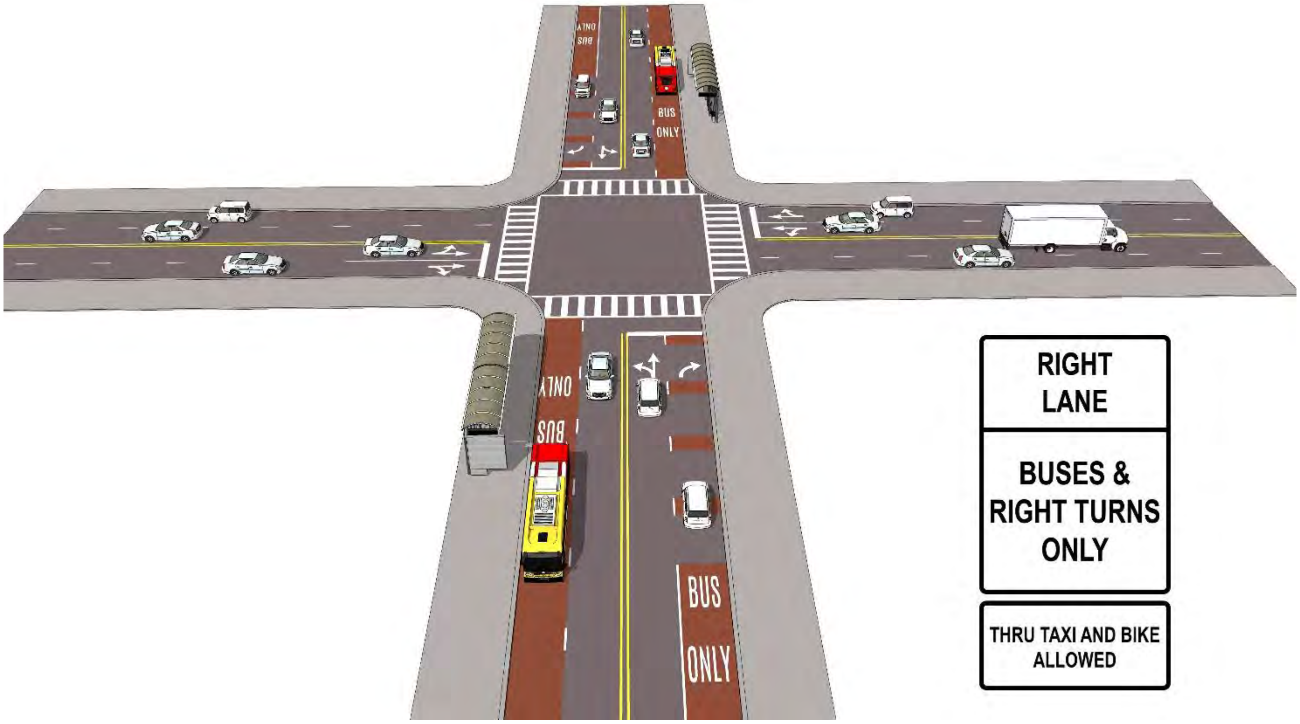


Figure 4 Curb Running BAT/Shared Lanes



PROPOSED RUNNINGWAY AND STATION LOCATIONS

After reviewing best practices and developing runningway and station templates, the project team identified proposed station locations and runningway configurations for the Envision Route 7 Corridor. Preliminary station locations and runningway recommendations were identified during Phase II of the Envision Route 7 project based on Phase II ridership modeling. The project team refined these general station locations and runningway recommendations based on a more detailed assessment of the different intersection and right-of-way configurations found along the corridor. The Phase III station locations and runningways were further refined based on a workshop with project TAC members and additional representatives from the TAC's jurisdictions and agencies.

The Envision Route 7 corridor contains distinct sections with consistent runningway and station character. For purposes of identifying the type of runningway and specific station locations, the corridor was divided into the following six sections:

- Spring Hill Metro Station to I-495
- I-495 to Haycock Road
- Haycock Road to Washington Street
- Washington Street to South Seven Corners
- South Seven Corners to Beauregard Street
- Beauregard Street to Mark Center

For each section, an overview of the area is provided, noting characteristics of the transportation networks as well as the land use context. In addition, both publicly funded transportation projects as well as privately funded land development projects are noted. The type of runningway or runningways for the section are then noted along with the specific station locations. Detailed reasoning on why these choices were made are provided and, where necessary, the section is further divided geographically to provide a more detailed overview of why these decisions have been made. Finally, an overview of potential changes that could be made later or special considerations are provided. Discussion of the six geographic sections follows and is organized into the following elements:

- Planned Projects
- Runningway Configurations
- Station Locations and Configurations
- Alternative Approaches and Special Considerations

TYSONS SECTION: SPRING HILL METRO STATION TO I-495

The Tysons Section extends from the intersection of Route 7 and Spring Hill Road to the Route 7 and I-495 interchange (Figure 5). Tysons is the business and retail center of Northern Virginia with significant density along Route 7. The area is home to two regional malls, a significant density of office users, and a growing high-density residential community, and yet Route 7 has somewhat of a main street function in this area.

Fairfax County DOT (FCDOT) is engaged in a concurrent planning process for the Envision Route 7 project in this portion of the corridor. FCDOT is studying various alignments of BRT infrastructure in the Tysons area and completing detailed microsimulation analysis to better understand transit speed and vehicle travel conditions. The FCDOT process is performing more detailed analysis that will allow the county to make decisions about the future alignment of the corridor. The process currently being led by NVTC informs the FCDOT process but does not supersede it.

Route 7 is an eight (8) lane, signalized, divided highway from Spring Hill Road to the Route 7 and Route 123 interchange. Metrorail facilities have been recently completed in the center of this portion of Route 7. The tracks emerge from a tunnel to the north and west of the interchange with Route 123, and the tracks become elevated to cross Westpark Drive/Gosnell Road. Route 7 and Route 123 are currently grade separated, and access from Route 123 is provided to and from Route 7 by way of ramps. To the south and west of the interchange, the corridor is a six (6) lane, signalized divided highway from the Route 7 and Route 123 interchange to the Route 7 and I-495 interchange. Frontage roads are included along this section of the facility. The posted speed limit is 35 mph for this section of the corridor.

Route 7 is a principal arterial in the area that links Tysons to I-495 and the Dulles Toll Road. It also connects to more distant communities, such as Leesburg and Alexandria, and to many suburban communities between. Since Tysons is a major business and retail center, the area is the destination of many regional trips. Thus, Route 7 serves to distribute trips to the destinations adjacent to the roadway and is consequently subject to extensive turn demand. Some of these trips originate along or near Route

7 in more distant communities, and other trips use Route 7 as a connection from the Dulles Toll Road and I-495.

Figure 5 Tysons Section: Spring Hill Metro Station to I-495

Planned Projects

There is extensive public and private investment planned and underway along this section of the Envision Route 7 corridor. Public roadways are scheduled to be expanded, and a grid of streets expanding highway capacity is planned for the area. While there is significant land use density in the area, much more is expected, especially adjacent to Route 7.

Public Projects

Public infrastructure projects along this section of the corridor are being advanced by the combined efforts of Fairfax County and VDOT. There are generally three (3) types of public infrastructure improvements being advanced including:

- Active transportation improvements
- Roadway capacity improvements
- Network connectivity improvements

Active transportation improvements

The Vesper Trail is an identified improvement from the Tysons Metrorail Station Access Management Study (TMSAMS). The 0.4-mile trail is under construction and will connect pedestrians and cyclists from the residential neighborhood west of the Tysons area to the Spring Hill Metro Station and the surrounding commercial area. The TMSAMS study also identified the pedestrian connection that is currently under construction. This connection is scheduled to be completed in 2019 across I-495 between Route 123 and Route 7.

Roadway capacity improvements

Fairfax County plans to remove the grade separated interchange of Route 7 and Route 123 and create an at-grade intersection of the two roadways. The final layout has not yet been determined. VDOT is also planning to widen Route 7 between Route 123 and I-495 from six (6) through lanes to eight (8) through lanes.

Network connectivity improvements

The current roadway network in the Tysons area focuses vehicle travel onto a few streets which leads to very high traffic on those streets and high turn movements where they intersect. Fairfax County, as articulated in their Comprehensive Plan for the Tysons Urban Center, proposes constructing an extensive local grid of streets in Tysons that would cover virtually the entire area. The urban grid of streets will improve connectivity, access, and system capacity.

Private Projects

The majority of private redevelopment along the Envision Route 7 corridor is occurring in the Tysons area. The total approved amount of development along Route 7 between Spring Hill Road and the Route 7 and Route 123 interchange is over 9,500,000 square feet of office, 23,000,000 square feet of residential, 1,450,000 square feet of retail, and 1,770,000 square feet of hotel. Much of this development has been entitled, is concentrated immediately along Route 7, and is focused on the parcels immediately adjacent to Metro stations. This development will increase the demand for mobility and the volume of pedestrians in the area.

Runningway Configurations

The layout of Route 7 in this section of the corridor varies between the northern, central, and southern portions. Elevated heavy rail tracks are in the median between Spring Hill and the Greensboro Metro station. Immediately to the south, there are loop ramps at the Route 7 and Route 123 interchange, though these will likely be replaced in the future. South of Route 123, the road is a divided suburban arterial. These roadway characteristics make it difficult to implement center-running bus-only lanes in the northern portion of the section and curb-running bus-only lanes in the center of the section. Consequently, the alignment of the bus only lanes proposed for this section will need to shift from curb-running exclusive lanes in the northern portion to center running exclusive lanes in the southern portion. The transition between these two areas will likely be in the vicinity of Route 123.

In general, lanes will be purposed for BRT use and new lanes that will be built are assumed to be used by the BRT service. This approach is consistent with assumptions made in TransAction 2040 where additional lanes are assumed in multiple portions of the corridor but are planned to be utilized by BRT rather than general vehicle traffic.

Spring Hill Road to Greensboro

The portion of the corridor between Spring Hill and Greensboro will include curb-running bus only lanes (Figure 6). The current ROW is constrained with little room to expand. The center of the ROW already contains Metrorail tracks and station infrastructure. In addition, the pedestrian bridges, which link the surrounding area to the stations, is in proximity to the curb. This leaves little ability to adjust the ROW, yet center running facilities would necessitate extra space in the center of the ROW. A curb-running exclusive facility would minimize the need for additional ROW as it could be implemented by repurposing an existing through lane to become a bus only lane. As a result, the future configuration would contain eight (8) through lanes, as it does today. However, two (2) would be repurposed and utilized exclusively for the BRT, and six (6), three (3) per direction, would be utilized for vehicle through movements. This approach would accommodate both the Envision Route 7 BRT and the elevated heavy rail tracks in the median. Earlier analysis of Tysons done by the county shows that the future grid of streets will provide at a minimum two parallel highway facilities to Route 7 in this section, therefore any reduction in capacity on Route 7 due to lane repurposing will be compensated with the grid of streets.

Figure 6 Tysons Section: Spring Hill Metro Station to I-495 Runningway and Stations

Transition of the BRT Facility – Route 123 Area

The BRT facility would need to transition from curb running to center running in the vicinity of the interchange with Route 123. The northbound and southbound transitions from the BRT alignments would likely occur south of the Route 123 and Route 7 intersection. In the southbound direction, an exclusive green phase or queue jump could be employed to allow the BRT vehicle to transition from curb running to center running. In the northbound direction, the transition would likely need to occur at a location south of Route 123 (Figure 6). The exact location of both transitions would need to be coordinated with the implementation of the Route 123 and Route 7 intersection, as well as any new street grid intersections. It is likely that the BRT facility would need to join with through movements in this area, depending on the design of the intersection.

International Drive to I-495

The portion of the corridor between the Route 7 and International Drive intersection and the Route 7 and I-495 intersection is planned to include center-running bus only lanes (Figure 6). There are no substantial conflicts in this area that would necessitate the BRT runningway to shift out of the center of the ROW. However, double left turns at multiple intersections in this area would directly conflict with the runningway. It is most likely that the double left turns would need to be reduced to single left turns. While this could lead to additional travel delay, the implementation of the street grid will facilitate a distribution of vehicle traffic so that the delay may be mitigated. A traffic study to be conducted during later phases of the project will confirm the number of turn lanes and lane configurations.

It is expected that this section will include a total of eight (8) through lanes. Three (3) will be vehicle travel lanes in each direction along with exclusive BRT lanes in each direction. It is expected that the needed expansion of the ROW will occur in the service roads adjacent to the through travel lanes. The access road along the north side of the corridor near Towers Crescent Drive and the south side of the corridor near Fashion Boulevard will be utilized to expand the service without needing land from surrounding parcels.

Station Locations and Configurations

The proposed BRT station locations along this section of the Route 7 corridor are closely aligned with Metrorail stations and the major retail location. These locations are not only in proximity to major transit facilities, but also to very dense land uses. The Phase II study suggested stations at the Spring Hill Metro Station, the Greensboro Metro Station, and International Drive. In general, these locations have largely been retained. However, a slight shift in the Greensboro Metro Station and International Drive Station to avoid roadway conflicts is necessary. In general, the stations are located approximately 0.75 miles apart from each other.

Spring Hill Station

The Spring Hill Station will be located along Route 7 to the north of the intersection with Spring Hill Road. The southbound side of the station is proposed to be a far-side curb station (Figure 6). The northbound side of the station is proposed to be a far-side curb station and will utilize the existing on-street bus facilities. This will be the line's north terminus station and will be approximately 0.40 miles west of the Greensboro Station. The BRT routing is anticipated to use Tyco Road and Spring Hill Road to turn around and start the southbound trip.

This station is in close proximity to the Silver Line Spring Hill Metro Station. In addition, there is significant existing and planned density of land use along this portion of the corridor. Parcels near the station consist of a robust mix of land uses including commercial, office, mixed use, and multi-family residential. Compared to the corridor, block groups near the station are characterized by a high density of zero- and one-car households, a high percentage of the population under 18 and over 65, and a high percentage of households with limited- and non-English speakers. The traffic analysis zones (TAZs) located near this station location are projected to experience increases in population and employment density by 2040 of up to 800 percent.

Greensboro Station

The Phase II study suggested a station at Greensboro Metrorail Station. To improve access to adjacent land uses, the Greensboro Station is shifted to the northwest to the intersection of Westpark Drive / Gosnell Road, in close proximity to the Greensboro Metrorail Station. The station includes far-side stops in both directions (Figure 6). The Greensboro Station is located approximately 0.40 miles east of the Spring Hill Station and approximately 0.98 miles west of the International Drive Station.

Parcels near the station consist of a robust mix of land uses including commercial, office, mixed use, and multi-family residential. Compared to the corridor, block groups near the station are characterized by a high density of zero- and one-car households. Parcels near the station consist of a robust mix of land uses including commercial, office, government, and institutional. The TAZs located near this station location are projected to experience increases in population by up to 70 times existing conditions and employment density by up to eight (8) times existing conditions by 2040.

Fashion Boulevard Station

The Phase II study suggested a station at International Drive. However, the Route 7 and International Drive intersection includes a wide cross-section with multiple left-turn lanes and high turning movement volumes. Locating a BRT station at this intersection increases the potential pedestrian-traffic conflicts, adds to an already wide cross-section, and will likely negatively impact traffic operations. Alternatively, Fashion Boulevard has fewer turning movements and turn lanes, a narrower cross-section, and good pedestrian access to Tysons Corner Center to the north. This location is recommended for a station.

The southbound side of the station is proposed to be a far-side center transit station located east of Fashion Boulevard (Figure 6). The northbound station is proposed to be a far-side center transit station located west of Fashion Boulevard. The International Drive station is located approximately 0.98 miles east of the Greensboro Station and approximately 1.08 miles west of the Dominion Drive station.

Compared to the corridor, block groups near the station are characterized by a high density of zero- and one-car households. Parcels near the station consist of a robust mix of land uses including commercial and office. The TAZs located near this station location are projected to experience increases in population density by 2040 up to 7,000 percent.

Alternative Approaches and Special Considerations

As efforts to implement the Envision Route 7 BRT advance, there are potential changes that should be considered in future phases of study. Fairfax County is conducting a simultaneous and more detailed analysis of the Tysons area to determine the alignment of the Envision Route 7 corridor. The Fairfax County effort is considering alternative alignments and routings that would potentially deviate the BRT route from Route 7 onto International Drive and to other termini. The results of the study may recommend an alternative BRT runningway alignment and a route through Tysons that differs from the current conceptual design.

Consideration should also be given to how the BRT runningway will transition from curb running to center running. Concepts for transitioning from curb running to center running should be coordinated with the Route 123 and Route 7 interchange adjustments and the new urban street grid network which are currently being planned.

Further considerations are needed to address access as the current access roads will be used to increase the ROW for the service room.

WEST FALLS CHURCH AND PIMMIT HILLS SECTION: I-495 TO HAYCOCK ROAD

The West Falls Church and Pimmit Hills Section extends from the interchange of Route 7 and I-495 interchange to Haycock Road (Figure 7). Land use in the area is generally a low to moderate residential density with some retail and office concentrations near Pimmit Drive and at the north end of Falls Church. In addition, there are two (2) large high schools and a library in this area.

Route 7 is a six (6) lane, signalized, divided highway as the roadway exits the Tysons area and crosses over I-495 to Ramada Road, and a four (4) lane, signalized, divided highway from Ramada Road to Haycock Road. Route 7 and I-495 are grade separated, and access from I-495 is provided to and from Route 7 by way of multiple loop ramps, which allow for all movements on the outside edge of I-495 to be free flow movements. As the facility moves south, frontage roads become intermittent north of I-66 and change sides. The interchange with Route 7 and I-66 is grade separated and also includes multiple loop ramps, which allow for all movements on the north side of I-66 to be free flow movements. The speed limit varies throughout this portion of the corridor between 25-35 mph.

Route 7 functions as a major arterial in this section of the corridor, generally carrying traffic from Falls Church and areas south of Tysons. This portion of the roadway also provides access for residential trip origins.

Figure 7 West Falls Church and Pimmit Hills Section: I-495 to Haycock Road

Planned Projects

Planned projects are generally public in nature along this portion of the corridor. However, a major land development project is planned for the George Mason High School site. Public investment is focused mostly on roadway and interchange capacity expansion.

Public Projects

Public infrastructure projects along this section of the corridor are being advanced by both Fairfax County and VDOT. There are generally three (3) types of public infrastructure improvements being advanced, including:

- Active transportation improvements
- Roadway capacity improvements
- Network connectivity improvements

Active transportation improvements

A shared use path is to be built along Route 7 in correspondence with the widening project of Route 7 between the City of Falls Church and I-495.

Roadway capacity improvements

VDOT plans to modify the interchange of I-66 at Route 7 to connect the eastbound movement on I-66 to the West Falls Church Metro Station. This modification will reduce the travel volume crossing Route 7 and thus the conflicts on Route 7 between the off-ramps on I-66 and Haycock Road. In addition, VDOT is planning to widen Route 7 by an additional through lane in each direction for a total of six (6) travel lanes.

Network connectivity improvements

An additional connection between the Tysons side of I-495 and the Pimmit side of I-495 is in the early phases of planning.

Private Projects

The area including and immediately adjacent to George Mason High School near the West Falls Church Metro is being redeveloped into a series of mixed-use buildings with commercial uses on their first and possibly second floors. This development will also include a new street grid and central spine road that would connect to the West Falls Church Metro Station area, where the retail will be focused. Minor curb and lane configuration changes on Route 7 are also planned as part of the redevelopment plan. The placement of the BRT station is consistent with the site plan.

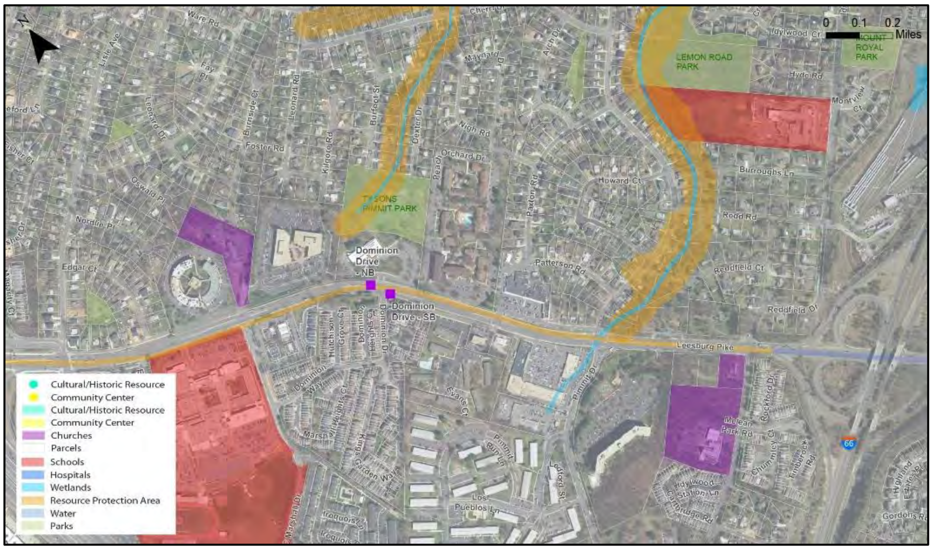
Runningway Configurations

This portion of the corridor is ideal for center running exclusive transit facilities (Figure 8). There are multiple sets of loop ramps at the Route 7 and I-495 interchange. In addition, there are relatively low left turn volumes in most of this corridor section, along with an existing median in the center of the roadway. These roadway characteristics allow for a center-running bus-only lane for the majority of the section. It is anticipated the BRT will transition to mixed-traffic operations at Idylwood Road near the Route 7 and I-66 interchange until it transitions to Business Access and Transit (BAT) Lanes just past the I-66 interchange.

There are relatively high left turn volumes at the southbound left turn onto the inner loop of I-495 and at Haycock Road. At the interchange with I-495, it is unlikely that the double left turn will be significantly changed, and an appropriate, identified design solution, such as a wider ROW in the area, will be necessary. With the addition of a new roadway in the vicinity of Haycock Road to serve that area's development, it is likely that the existing double left turn could be removed since left turns may be less concentrated.

The access road along the north and south sides of the corridor near Dominion Drive and Pimmit Drive will be incorporated into the roadway so that the service will need less land from surrounding parcels. it may also be necessary to adjust the ramps at I-495 as well which could possibly lead to an Interstate modification process. Future efforts should consider changes in this area and determine the process that may be necessary to change these ramps.

Figure 8 West Falls Church and Pimmit Hills Section: I-495 to Haycock Road Runningway and Stations



Station Locations and Configurations

The proposed BRT stations in this section of the corridor are more distantly spaced than in other areas and are sited in areas proximate to public facilities, such as Marshall High School, Tysons-Pimmit Regional Library, and George Mason High School. The Phase II recommendations suggest three (3) stations in this portion of the corridor, but due to the generally low ridership expected and the desire to minimize running time, two (2) stations are proposed. The first station is proposed for Dominion Drive, in the vicinity of Tysons-Pimmit Regional Library and Marshall High School. The second station is recommended to be located to the west of Haycock Road and will be sited consistent with the development plan for the George Mason High School area.

Dominion Drive Station

The Phase II study suggested two (2) separate stations along this portion of Route 7: one at the intersection of Lisle Avenue and the other at Pimmit Drive. Due to the relatively low ridership projected and the desire to maximize transit speed in the corridor, these stations have been combined and relocated to Dominion Drive. The new station location is at Dominion Drive near the Tysons-Pimmit Regional Library. The station will be in the center of the ROW and at the far side of the intersection in each direction (Figure 8). This station is located approximately 1.08 miles west of the Fashion Boulevard Station and 1.08 miles east of the Haycock Road Station.

This station is near George C. Marshall High School, the Tysons-Pimmit Regional Library, multiple retail facilities, and moderate density residential areas. Compared to the corridor, block groups near the station are characterized by high population density, a high density of zero- and one-car households, and a high percentage of households with limited- and non-English speakers. Parcels near the station consist of a mix of land uses including commercial and multi-family residential. Further surrounding areas consist of single-family residential parcels. The TAZs located near this station location are projected to experience increases in population and employment density by 2040. As the project advances, it will also be necessary to consider how residential areas which are in close proximity to the station are connected by pedestrian facilities to the station. Currently parcels have fences which inhibit pedestrian connectivity to Route 7.

Haycock Road Station

The Haycock Road Station site has been shifted slightly from its suggested location in the Phase II study and will be sited in coordination with the development occurring at George Mason High School such that the station will be in relatively close proximity to the West Falls Church Metrorail Station. The location is just to the west of Chestnut Street. The station will be located on the curb in order to be consistent with the proposed lane configuration changes of the development plan. A marked crossing will be located close to the station pair. This station is located approximately 1.08 miles east of the Dominion Drive station and approximately 0.53 miles west of the West Street Station.

This station is near George Mason High School and the retail node focused at the intersection of Route 7 and Haycock Road. Compared to the corridor, block groups near the station are characterized by relatively high median household incomes. Parcels near the station consist of a mix of land uses including schools, institutional, office, multi-family residential, and single-family residential. The TAZs located near this station location are projected to experience large increases in population density by 2040 and increases in employment density by 2040.

Alternative Approaches and Special Considerations

As previously noted, the Lisle Avenue/Pimmit Drive Station have been combined from their suggested locations in the Phase II study into one (1) station that is now located near the Tysons-Pimmit Regional Library. The Haycock Road Station will be built consistently with the development occurring at George Mason High School.

Further considerations will need to address access as the current access roads will be used to increase the right of way for the service room. In addition, an Interstate modification process may be necessary to adjust ramps at I-495 at Route 7.

FALLS CHURCH SECTION: HAYCOCK ROAD TO WASHINGTON STREET

The West Falls Church section extends from the intersection of Route 7 and Haycock Road to the intersection of Route 7 and Washington Street (Figure 9). The area includes much of the central business district of Falls Church which consists of moderate density and mostly office and commercial uses, as well as residential uses. In much of this portion of the corridor, buildings are at the edge of the ROW rather than set back from the street. When moving away from Route 7, land use becomes mostly single family with some multi-family residential.

Route 7 is a five (5) lane, signalized road from Haycock Road to just beyond West Street. From West Street to Washington Street, the facility is a four (4) lane, signalized road. The corridor provides access to the immediately adjacent parcels and includes many vehicle access points. The speed limit through this area is 25 mph.

Route 7 functions as more of a minor arterial in the area as the facility serves as a through street and as access for adjacent businesses and residences. This segment of roadway has extensive driveway connections, reducing the capacity for through traffic in the area. However, the facility still provides connections to I-66, I-495, and Tysons, creating demand for through movements as well.

Figure 9 Central Falls Church Section: Haycock Road to Washington Street

Planned Projects

There is moderate public and private investment planned or underway along this section of the Envision Route 7 corridor. Public projects focus on improving bus shelters, pedestrian crossings, and signalization. The few private projects entitled in the area tend to focus around Haycock Road, the W&OD Trail, and the intersection with Washington Street.

Public Projects

Planned and on-going public projects along this section of the corridor are being advanced by the City of Falls Church. The projects include active transportation projects and transit improvement projects.

Active transportation improvements

Signalization and pedestrian improvements are being advanced through this portion of the corridor at various locations. Upgrades will also include ADA compliant pedestrian crossings.

Transit improvements

The City of Falls Church is installing 20 bus stops at key intersections. Some of these locations may overlap with Envision Route 7 BRT stops.

Private Projects

Developments are planned for east of the Haycock Road intersection, which includes a large portion of the property adjacent to the corridor between Haycock Road and the W&OD Trail. In addition, there are multiple parcels expected to be redeveloped in the central core of Falls Church near the intersection of Washington Street.

Runningway Configurations

This portion of the corridor traverses highly constrained ROWs with high access needs. There is little opportunity to advance exclusive transit lanes and less opportunity to have center running facilities. Exclusive transit lanes would change vehicle travel patterns and provide much faster transit travel times. To gain efficiencies for BRT service and provide access businesses, Business Access and Transit (BAT) lanes are suggested for this portion of the corridor. BAT lanes are on the curb and allow for buses and turning vehicles, but not through vehicle movements. The previous corridor section will transfer from median-running alignment back to side-running near Haycock Street by merging across lanes or through special signal phases at one of the intersections in the area.

Figure 10 Central Falls Church Section: Haycock Road to Washington St Runningway and Stations

Station Locations and Configurations

Proposed stations in this portion of the corridor are generally closely spaced due to the higher density of land use in the area. Stations in this portion of the corridor are generally consistent with the locations suggested in the Phase II study and are planned for West Street, Pennsylvania Ave, and just north of Washington Street. The stations are located between approximately a third and a half mile apart.

West Street Station

The West Street Station is expected to be sited at the intersection of Route 7 with West Street using far-side curb stations (Figure 10). Currently, there are potential conflicts with curb cuts providing access to adjacent parcels, which will need to be addressed. The West Street Station is located approximately 0.53 miles east of the Haycock Road Station and approximately 0.46 miles west of the Pennsylvania Avenue Station.

This station is in close proximity to the denser land uses in the western portion of central business area. It is also near the W&OD Trail. Furthermore, West Street provides access into adjacent residential neighborhoods. Compared to the corridor, block groups near the station are characterized by a relatively high population density, a high density of zero- and one-car households, and a high percentage of the population under 18 and over 65. Parcels near the station consist of a mix of land uses including commercial, mixed use, multi-family residential, and single-family residential. The TAZs located near this station location are projected to experience increases in population and employment density by 2040.

Pennsylvania Avenue Station

The Pennsylvania Avenue Station is expected to be sited at the intersection of Route 7 with Pennsylvania Avenue using far-side curb stations (Figure 10). Most likely, spacing between streets and curb cuts should allow for sufficient station space, even though the design standard may not be achieved. The Pennsylvania Avenue Station is located approximately 0.46 miles east of the West Street Station and approximately 0.35 miles west of the Washington Street Station.

This station is near the higher density portions of the central business district in Falls Church. In addition, adjacent neighborhoods have good access to this location. Compared to the corridor, block groups near the station are characterized by a relatively high population density, a high density of zero- and one-car households, and a high percentage of the population under 18 and over 65. Parcels near the station consist of a mix of land uses including commercial, mixed use, and single-family residential. The TAZs located near this station location are projected to experience increases in population and employment density by 2040.

Maple Avenue Station

Due to BRT operational considerations, the Phase II station location at Washington Street was relocated to Maple Avenue (Figure 10). Stops in both directions will be located on the far side of the intersection. The southbound bus movement at this intersection could be provided by an exclusive signal phase at this location to allow the BRT vehicle to merge left and operate in the left turn at Washington Street. Currently, there are conflicts with curb cuts providing access to adjacent parcels, which will need to be addressed. The Washington Street Station is located approximately 0.35 miles east of the Pennsylvania Avenue Station and approximately 0.38 miles west of the Jefferson Street Station.

This station is in the center of Falls Church and is centrally located to higher density land uses as well as a variety of other destinations. Compared to the corridor, block groups near the station are characterized by a relatively high population density, a high density of zero- and one-car households, and a high percentage of the population under 18 and over 65. Parcels near the station consist of a mix of land uses including commercial, office, mixed use, multi-family residential, and single-family residential. The TAZs located near this station location are projected to experience increases in population and employment density by 2040.

Alternative Approaches and Special Considerations

There are multiple adjustments that could be made to the alignment or location of the runningway in this segment. The first potential adjustment would be to use center-running exclusive transit lanes instead of curb-running BAT lanes from Haycock Road to West Street. This could potentially be coordinated with adjacent to land development such that any additional ROW needs could be gained during from the private parcels during the development process. If this were to happen, the runningway could provide better transit speed and reliability without impacting existing building structures.

Consideration will also need to be made for the potential for traffic to divert in this portion of the alignment. Park Avenue is an under-capacity street parallel to Route 7 through the core of Falls Church. It is possible that this facility could realize additional travel demand in the future as Route 7 experiences travel demand growth. Consideration should be given to this segment of the corridor as part of a traffic analysis process to better understand the potential for traffic diversion and suggest how to best treat this area such that BRT operations are acceptable and potential impacts to the area are minimal.

EAST FALLS CHURCH SECTION: WASHINGTON TO SOUTH SEVEN CORNERS

The East Falls Church Section extends from the center business area of Falls Church at the intersection of Route 7 and Washington Street along Washington Street/Lee Road, to N. Sycamore Street/N. Roosevelt Street, and then through the Seven Corners area along future streets, such as Ring Road (Figure 11). The central core of Falls Church and Seven Corners serve as local activity centers for the area. Central Falls Church is pedestrian oriented, and Seven Corners contains large format, suburban style retail. However, in general, this section of the alignment consists of four (4) lane minor arterial streets through mostly residential neighborhoods.

The alignment functions as a series of minor arterials that connect the central business district of Falls Church nodes, the East Falls Church Metro Station, and the Seven Corners areas to the surrounding areas. These facilities function largely to move travelers between these relatively local nodes. Roadway volumes are moderate in this portion of the corridor, and the speed limit is posted at 25-30 mph. The southern portion near South Seven corners has a posted speed limit of 30-40 mph. In general, travel tends to be more local rather than regional on these facilities.

Figure 11 East Falls Church Section: Washington to South Seven Corners

Planned Projects

There are targeted public improvements and the potential for a major private investment along this section of the Envision Route 7 corridor. Public improvements tend to be focused around the East Falls Church Metro Station and in the Seven Corners area. There is potential for private development along the Downton Falls Church section, in the immediate vicinity of the East Falls Church Metro Station and in the Seven Corners area. However, very few parcels are advancing in the entitlement process.

Public Projects

Planned and on-going public projects along this section of the corridor are being undertaken by Arlington County, Metro, City of Falls Church and Fairfax County. They are organized under the following project type categories:

- Pedestrian, bicycle and signalization improvements
- Station area improvements
- Network connectivity improvements

Pedestrian, bicycle and signalization improvements

A variety of pedestrian facility, bicycle facility, and signal upgrades are planned in the corridor. Most of these changes are anticipated along the N. Washington Street/Lee Highway portion of the corridor. The City of Falls Church is installing ADA compliant pedestrian crossings at Fairfax Street and Berry Street. These improvements will increase pedestrian accessibility at these locations and will inform the BRT station locations and access.

A bicycle and pedestrian improvement project is planned by Arlington County to connect the East Falls Church Metro Station with Sycamore Street.

Signals are scheduled for upgrade at Sycamore Street near Columbia Street, on Lee Highway, and on both sides of I-66. Both of these signals are under the jurisdiction of Arlington County.

Station area improvements

Arlington County plans to increase the number of bus bays at the East Falls Church Metro Station. As part of this project, access to the Park & Ride will be consolidated to a single entrance off Washington Boulevard. A new signalized intersection, pedestrian crossings, and lane configurations will facilitate movements accessing the station Park & Ride. In addition, WMATA anticipates future land development on the parking lot of the East Falls Church Metro Station. This will potentially allow for connections through the Metro station property that do not currently exist and will potentially route the BRT service through the site.

Network connectivity improvements

The Seven Corners area has been the subject of extensive planning and is expected to have a new grid of streets in the future. The planned network of streets is anticipated to include a new Ring Road that will connect Wilson Boulevard and Route 7. It is expected that the Envision Route 7 corridor will be routed using the new Ring Road to connect from the terminus of Roosevelt Boulevard at Wilson Boulevard to Route 7 at Castle Road. This section of the corridor is likely to function like a downtown street and can be expected to be a vibrant, urban street. In addition, a grid of streets is anticipated in this area along Route 7 from Patrick Henry Drive to the new Ring Road.

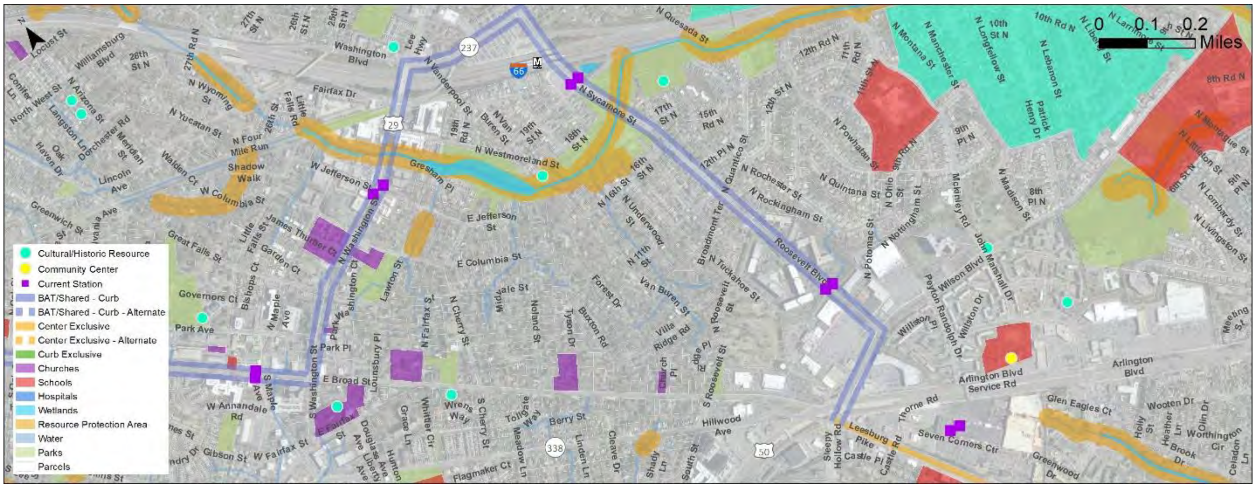
Private Projects

Previous efforts established a framework for streets in Seven Corners. These facilities will be at least partially implemented with land development projects. These streets will create smaller block sizes, support local and through trips, increase pedestrian connectivity, and facilitate a more urban development pattern. In addition, new development is expected in the East Falls Church Metrorail Station area.

Runningway Configurations

Much of the roadway in this portion of the alignment is highly constrained by residential development near the curb line. It is infeasible in some areas and undesired in others to widen the roadway in this section. Therefore, the runningway will have to fit into the context of the existing streets. Most of the runningway is this segment is anticipated as curb-running BAT lanes with the exception of the new Ring Road which extends Roosevelt Boulevard to Route 7 (Figure 12).

Figure 12 East Falls Church Section: Washington to South Seven Corners Runningway and Stations



N. Washington Street/Lee Highway

The N. Washington Street/Lee Highway portion of the corridor connects the central core of Falls Church to the East Falls Church Metro Station area in Arlington County. In general, the street is a suburban downtown street of four (4) lanes with moderate land use density that tends to focus on residential uses with retail in various portions of the corridor. This portion of the corridor is constrained by private development, which approaches the edge of the ROW. It would be extremely disruptive to expand the ROW in this portion of the corridor to accommodate additional roadway width. Consequently, it is anticipated that the BRT service will operate in BAT lanes in this portion of the corridor.

N. Sycamore Street/N. Roosevelt Boulevard

The N. Sycamore Street/N. Roosevelt Boulevard portion of the corridor connects the East Falls Church Metro Station area in Arlington County to the Seven Corners area of Falls Church and Fairfax County. In general, the street is a suburban arterial of four (4) lanes with low density residential uses along most of this corridor section and relatively low-density retail in Seven Corners. This portion of the corridor is constrained by single family residential land use near the edge of the ROW. It would be extremely disruptive to expand the ROW in this portion of the corridor to accommodate additional roadway width. As a result, it is anticipated that the BRT Service will operate in BAT lanes in this portion of the corridor.

Seven Corners Area

The Seven Corners area has been the subject of extensive planning and is expected to have a new grid of streets in the future. Ring Road is a new road that is anticipated to connect Roosevelt Boulevard and Castle Road/Thorne Road, generally through “The Corner at Seven Corners” shopping center. Ring Road is envisioned to be completed as part of the Seven Corners Conceptual Transportation Network and will provide a more direct connection from Route 7 to Roosevelt Street via a bridge over Arlington Boulevard.

This segment of Ring Road is designated to be a Transit Boulevard, including dedicated transit lanes, a buffered cycle track on each side of the street, landscape panels, wide sidewalks, evenly spaced street trees, and landscaped center medians.

The timing of delivery of the new Ring Road will be an important consideration for the BRT project. It is very likely that the Ring Road may not be constructed prior to completion of the BRT project. An interim alignment will likely be necessary which utilizes Wilson Boulevard and Route 7. As the project advances, coordination between these two efforts should occur so that the BRT service can adequately navigate this section of the corridor.

Station Locations and Configurations

The transit station locations along this section of the Route 7 corridor are sited near existing and future land use nodes or proximate to major regional transit facilities.

Four (4) transit stations are proposed on this portion of the Route 7 corridor, including:

1. Jefferson Street
2. East Falls Church Metro Station
3. North Seven Corners
4. South Seven Corners

The stations are located approximately a half mile apart.

Jefferson Street Station

The Phase II Study suggested a station at the intersection of Columbia Street and N. Washington Street. Much of the recent development and higher density land use in the area is centered to the east of this location near I-66. Thus, the recommended station location has shifted to the intersection of Jefferson Street and N. Washington Street. The station is anticipated to be a far-side curb station in both directions (Figure 12). The station is located approximately 0.38 miles east of the Maple Avenue station and approximately 0.70 miles west of the East Falls Church Station.

Compared to the corridor, block groups near the station are characterized by high population density, a high density of zero- and one-car households, and a high percentage of the population under 18 and over 65. Parcels near the station consist of a mix of land uses including commercial, office, and mixed use. The TAZs located near this station location are projected to experience up to 25 percent increases in population and employment density by 2040.

East Falls Church Metro Station

The southbound station is proposed to be a near-side curb transit station located north of the 19th Street N. and N. Sycamore Street intersection (Figure 12). The northbound station is proposed to be a far-side curb transit station north of the 19th Street N. and N. Sycamore Street intersection. The station utilizes a "floating platform" design to accommodate the existing curb bicycle lane. According to the Phase II study, this station is anticipated to be the major transfer point between the BRT and the Metrorail system. As the project advances, designs will be examined to ensure the platforms can accommodate large volumes of waiting passengers at the station.

The East Falls Church Metro Station is located approximately 0.70 miles east of the Jefferson Street Station and approximately 0.68 miles west of the North Seven Corners Station.

This station location is recommended based on its proximity to the Metrorail entrance at the East Falls Church Metro Station. Compared to the corridor, block groups near the station are characterized by high population density, a relatively high average household income, and a high percentage of the population under 18 and over 65. Parcels near the station consist mainly of single-family residential homes with some recreational/open space and mixed-use parcels. The TAZs located near this station location are projected to experience increases in population density up to 25 percent and employment density up to 150 percent by 2040.

North Seven Corners Station

The North Seven Corners Station was not noted as a need in the Phase II study. However, the area is distant from the more southern Seven Corners Station and provides access to both residential and retail areas north of Wilson Boulevard. The station is a curb bus station with both directions located north of the Eden Center shopping center (Figure 12). The southbound station is proposed to be a near-side curb transit station and the northbound station is proposed to be a far-side curb transit station. A marked crossing will be located close to the station pair. This station location provides an ideal location to support any future redevelopment in the North Seven Corners area. The station is located approximately 0.68 miles east of the East Falls Church Metro Station and approximately 0.43 miles west of the South Seven Corners Station.

This station would necessitate the installation of a traffic signal north of the Wilson Boulevard and Roosevelt Boulevard intersection. Compared to the corridor, block groups near the station are characterized by a high population density, high density of zero- and one-car households, a high percentage of the population under 18 and over 65, a high percentage of households with limited- to non-English speakers, a high percentage of households living below the poverty level, and a high percentage of minority population. Parcels near the station consist of a mix of land uses including commercial, office, and multi-family residential. The TAZs located near this station location are projected to experience increases in population density up to 25 percent and employment density up to 150 percent by 2040.

South Seven Corners Station

The South Seven Corners Station is anticipated to located along the Transit Boulevard on the new Ring Road, connecting Roosevelt Boulevard and Castle Road (Figure 12). The Ring Road alignment passes through the existing Seven Corners Transit Center, and a station here would be a logical location for a transit hub. The South Seven Corners Station is located approximately 0.43 miles east of the North Seven Corners Station and approximately 0.72 miles west of the Rio Drive Station.

Compared to the corridor, block groups near the station are characterized by a high density of zero- and one-car households, a high percentage of the population under 18 and over 65, high percentage of households with limited- to non-English speakers, a high percentage of households below the poverty level, and a high percentage of minority population. Parcels near the station consist of a mix of land uses including commercial, office, mixed use, and government. The TAZs located near this station location are projected to experience increases in population density up to 25 percent and employment density up to 150 percent and by 2040.

As previously noted, Ring Road may not be completed prior to the completion of the BRT project. This would necessitate either a new location or a temporary location for this station. Future efforts should consider the timelines for both efforts to determine if a different station location or temporary station may be necessary.

Alternative Approaches and Special Considerations

Moving the East Falls Church Station to the Route 66 flyover, where bus bays are being built through the East Falls Church Small Area Plan, should be considered. Also, at the East Falls Church Metrorail Station, WMATA is considering redeveloping the station parking lot into residential or commercial purposes. As part of this effort, the BRT runningway could be rerouted through the current parking lot.

Interim BRT facilities in the Seven Corners area may be necessary depending on the timeline to implement Ring Road. As the project advances, the potential for an interim alignment and station location should be considered.

BAILEY’S CROSSROADS SECTION: SOUTH SEVEN CORNERS TO BEAUREGARD STREET

The Bailey’s Crossroads Section extends from the intersection of Route 7 and I-495 interchange to the intersection of Route 7 and N. Beauregard Street (Figure 13). Land use in the area is generally a low to moderate density residential with some retail and office concentrations near Glen Carlyn Road and at the intersection of Columbia Pike and Route 7. In addition, there are two large high schools in this area.

Route 7 is a four-lane, signalized highway with a center turn lane as the roadway exits the South Seven Corners area and remains such until the Columbia Pike intersection. From the Columbia Pike intersection to Beauregard Street, Route 7 is a six lane, signalized highway. Route 7 and Route 244, Columbia Pike, are grade separated, and access from Route 244 is provided to and from Route 7 by way of multiple loop ramps, which allow all movements to and from Route 7 to be free flow. The speed limit in this area varies from 30 to 45 mph.

Route 7 functions as a major arterial in this section of the corridor, generally carrying traffic from residential areas to Bailey's Crossroads, as well as to southern areas, Alexandria, or Interstate 395. This portion of the roadway provides access for residential trip origins.

Figure 13 Bailey's Crossroads Section: South Seven Corners to Beauregard Street

Planned Projects

Planned projects are generally public in nature along this portion of the corridor with the exception of Bailey's Crossroads Road Transportation.

Public Projects

Public infrastructure projects along this section of the corridor are being advanced by VDOT and Fairfax County along with the City of Alexandria. There are generally three types of public infrastructure improvements being advanced including:

- Active transportation improvements
- Network connectivity improvements
- Capacity increases

Active transportation improvements

The City of Alexandria Pedestrian and Bicycle Master Plan addresses bicycle and pedestrian accessibility improvements on Route 7. The Route 7 Pedestrian Initiative, from Falls Church to Alexandria will increase pedestrian safety, accessibility, and mobility by providing pedestrian facilities along the length of this segment.

Network connectivity improvements

The City of Alexandria is improving multi-modal facilities. The King Street and Beauregard Street Intersection Improvement is removing the slip lane from Route 7 to Beauregard Street. In addition, a shared use path on portions of King Street and North Beauregard Street is planned. These intersection improvements will increase capacity and safety in this area and will help BRT operations by providing an additional turn lane for buses to access N. Beauregard Street from Route 7.

Capacity Increases

Route 7 is scheduled to be widened from 4 to 6 lanes from Seven Corners to Bailey's Crossroads.

Private Projects

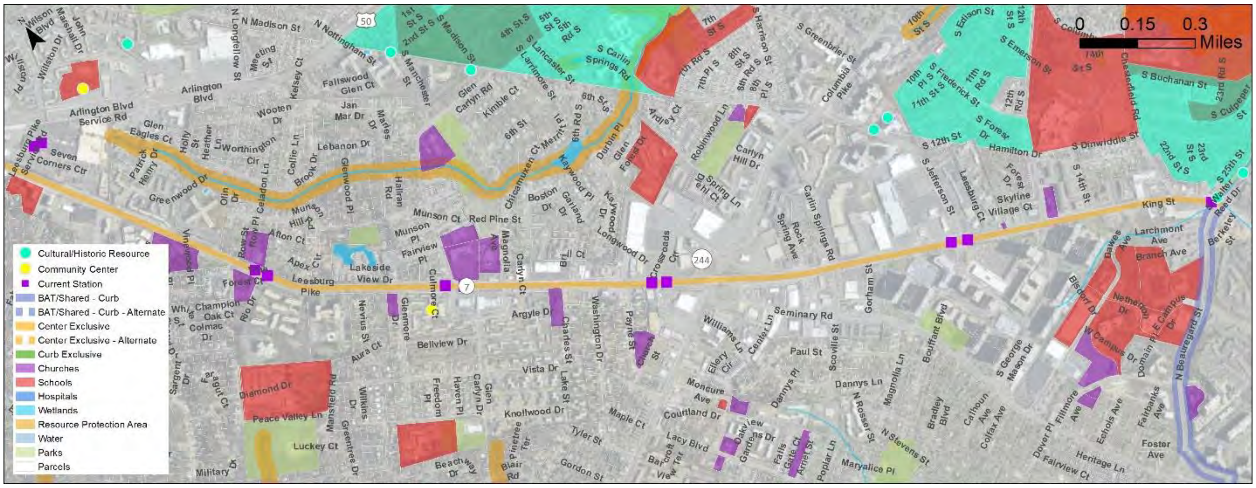
Other projects that could affect the routing of the BRT include the Bailey's Crossroads Road Transportation Improvements. In coordination with the Bailey's Planning District, plans include various sidewalk, intersection, and streetscape improvements and a local grid expansion to promote and support development in the area. The Fairfax County Transportation Plan shows multiple new, local streets that can potentially be created alongside future commercial and residential development. The plan also includes realigning Seminary Road to tie into Columbia Pike south of Route 7.

Runningway Configurations

This portion of the corridor is planned for center-running exclusive transit facilities (Figure 14). There are multiple sets of loop ramps at the Route 7 and Route 244 interchange. In addition, there are relatively low left turn volumes in most of this section of the corridor, along with an existing median in the center of the roadway. These roadway characteristics allow for a center-running bus-only lane to run for the full length of the section.

The access road along the north and south sides of the corridor will be incorporated into the design to expand the service and minimize land needed from adjacent parcels.

Figure 14 Bailey's Crossroads Section: South Seven Corners to Beauregard St Runningway and Stations



Station Locations and Configurations

The proposed BRT stations in this section of the corridor are sited in areas proximate to density. Most stations are approximately one-half mile to three-fourths mile apart.

Rio Drive Station

The Rio Drive Station will be in the center of the ROW between the Row Street and Rio Drive intersections (Figure 14). This configuration was developed due to the closely spaced intersections at this location. This station is located approximately 0.72 miles east of the South Seven Corners Station and approximately 0.54 miles west of the Glen Carlyn Station.

This station is close to Justice High School, multi-family housing, and many churches and religious organizations. Block groups near the station are characterized by a high population density, a high density of zero- and one-car households, a high percentage of households with limited- and non-English speakers, and a high percentage of households living below the poverty level. Parcels near the station consist of land uses including institutional, commercial, multi-family residential, and single-family residential. The TAZs located near this station location are projected to experience increases in population density and employment density of up to 25 percent by 2040.

However, the Phase II study indicated low ridership at this station. Future evaluations should consider the potential of removing this station or combining it with the Glen Carly station.

Glen Carlyn Station

The Glen Carlyn Station will be in the center of the ROW and at the far-side of the intersection in each direction (Figure 14). This station is located approximately 0.51 miles east of the Rio Drive Station and approximately 0.54 miles west of the Bailey's Crossroads Station.

This station is near many churches and religious organizations, as well as multi-family housing. Compared to the corridor, block groups near the station are characterized by a high density of zero- and one-car households, a high percentage of limited- and non-English speaking households, a high percentage of households below poverty level, and a high percentage of minority population. Parcels near the station consist of a mix of land uses including government, institutional, office, commercial, and multi-family residential. The TAZs located near this station location are projected to experience increases in population density and increases in employment density of up to 25 percent by 2040.

Bailey's Crossroads Station

The Bailey's Crossroads Station located at Columbia Pike (Route 244), will be in the center of the ROW and at the far-side of the intersection in each direction (Figure 14). At this location, the roadway design and lane configurations were modified to reduce turn lanes in order to avoid impacts to adjacent structures. This station is located approximately 0.54 miles east of the Glen Carlyn Station and approximately 0.79 miles west of the Crossroads Shopping Center Station.

This station is close to the retail node focused at the intersection of Route 7 and Route 244. Compared to the corridor, block groups near the station are characterized by a high density of zero- and one-car households, a high percentage of households with limited- to non-English speakers, a high percentage of households below the poverty level, and a high percentage of minority population. Parcels near the station consist of a mix of land uses including commercial, institutional, industrial, and multi-family residential. The TAZs located near this station location are projected to experience large increases in population density up to 800 percent and increases in employment density up to 150 percent by 2040.

Crossroads Shopping Center Station

The Crossroads Shopping Center Station site located at S. Jefferson Street will be in the center of the ROW and at the far-side of the intersection in each direction (Figure 14). This station is located approximately 0.79 miles east of the Bailey's Crossroads Station and approximately 0.67 miles west of the Beauregard Street Station.

This station is close to the retail node at the intersection of Route 7 and S. Jefferson Street, multi-family residential apartments, and Skyline Park. Compared to the corridor, block groups near the station are characterized by a high population density, a high density of zero- and one-car households, a high percentage of the population under 18 and over 65, a high percentage of households with limited- to non-English speakers, a high percentage of households below the poverty level, and a high minority population. Parcels near the station consist of a mix of land uses including institutional, office, multi-family residential, and single-family residential. The TAZs located near this station location are projected to experience large increases in population density up to 800 percent and increases in employment density up to 150 percent by 2040.

Beauregard Street Station

The Beauregard Street Station is located at the intersection of Route 7 and N. Beauregard Street and S. Walter Reed Dr. This station will include a far-side center transit station on Route 7 in the northbound direction and a far-side curb transit station Beauregard Street in the planned West End Transitway in the southbound direction (Figure 14). This station is located approximately 0.67 miles east of the Crossroads Shopping Center Station and approximately 0.27 miles west of the E. Campus Drive Station.

This station is close to the retail node focused at the intersection of Route 7 and Beauregard Street and nearby single-family neighborhoods. Compared to the corridor, block groups near the station are characterized by a high population density, a high density of zero- and one-car households, a high percentage of households with limited- to non-English speakers, a high percentage of households below poverty level, and a high percentage of minority population. Parcels near the station consist of a mix of land uses including schools, commercial, office, multi-family residential, and single-family residential. The TAZs located near this station location are projected to experience large increases in population density up to 800 percent and increases in employment density up to 150 percent by 2040.

This station may need a southbound que jump to transition from center to exclusive BAT lanes on Beauregard Street.

Alternative Approaches and Special Considerations

As previously noted, the Rio Drive station has the potential to be eliminated and the Bailey's Crossroads Station is a candidate for relocation. The Bailey's Crossroads Station could be moved west away from the current intersection to avoid potential traffic operations impacts.

Further consideration will be needed to address access to adjacent parcels as some of the existing access roads will be repurposed to expand the roadway. In addition, the ramps to and from Columbia Pike may need to be adjusted.

WEST END TRANSITWAY: N. BEAUREGARD STREET TO MARK CENTER

The West End Transitway Section extends along N Beauregard Street from Route 7 to the Mark Center on Seminary Road (Figure 15). This portion of the alignment completely overlaps with the West End Transitway being advanced by the City of Alexandria. No elements of the planned West End Transitway are assumed to be changed by the Envision Route 7 project. Rather, the Envision Route 7 facility will operate in the West End Transitway. A brief overview of this portion of the alignment is provided.

Figure 15 West End Transitway: N. Beauregard Street to Mark Center

Runningway Configurations

The BRT service will operate in general-purpose lanes for the entirety of this segment. Thus, the runningway will fit into the context of the existing streets. The service is planned to share lanes with general purpose vehicles in this segment. There are two basic sections of runningway in this segment:

- Shared – N. Beauregard Street
- Shared – southern Towers to Mark Center

Figure 16 West End Transitway: N. Beauregard Street to Mark Center Runningway and Stations

N. Beauregard Street

The N. Beauregard Street portion of the corridor is parallel to and north of I-395. In general, the street is a suburban four-lane arterial in a moderate density residential land use area. Speeds are low with a speed limit of 35 mph. As planned in the West End Transitway project, the runningway in this portion of the corridor will operate in shared general-purpose lanes.

Southern Towers/Mark Center

The Southern Towers/Mark Center portion of the corridor connects the terminus of the line, the Mark Center, and the Southern Towers area to Beauregard Street. The facilities utilized by the transitway are largely internal circulation streets immediately adjacent to both Southern Towers and the Mark Center. Speeds are low with a speed limit of 25-35 mph. As planned in the West End Transitway project, the BRT service will utilize shared general-purpose lanes in this portion of the corridor.

Station Locations and Configurations

The transit station locations along this section of the Route 7 corridor have been planned as part of the West End Transitway project. It is anticipated that the Route 7 service would stop at each of the overlapping West End Transitway Stations.

In this portion of the West End Transitway, stations are planned for the curb and are located approximately a quarter mile apart.

E. Campus Drive/Braddock Road

The E. Campus Drive/Braddock Road Station will serve the Northern Virginia Community College, Alexandria Campus as well as the medium density residential neighborhood to the immediate south. The southbound station is proposed to be a far-side curb transit station located on Beauregard Street, west of E. Campus Drive/Braddock Road (Figure 16). The northbound station is proposed to be a far-side curb transit station located on Beauregard Street, east of E. Campus Drive/Braddock Road. The station is located approximately 0.27 miles east of the Beauregard Street Station and approximately 0.21 miles west of the Fillmore Avenue Station.

Fillmore Avenue Station

The Fillmore Avenue Station will serve the medium-density residential neighborhood in the immediate vicinity of the station. The southbound station is proposed to be a far-side curb transit station located on Beauregard Street, west of Fillmore Avenue (Figure 16). The northbound station is proposed to be a far-side curb transit station located on Beauregard Street, east of Fillmore Avenue. The station is located approximately 0.21 miles east of the E. Campus Drive/Braddock Road Station and approximately 0.31 miles west and north of the Southern Towers Station.

Southern Towers Station

The Southern Towers Station will serve the higher density residential neighborhood in the immediate vicinity of the station. The station is proposed on internal service roads in the Southern Towers Complex (Figure 16). The station will be located approximately 0.31 miles west and south of the Fillmore Avenue Station and approximately 0.43 miles east and north of the Mark Center Station.

Mark Center Station

The Mark Center Station will serve the higher density office node in the immediate vicinity of the Mark Center. There will be a single platform for this station, since it is a terminus station. Buses will circle around the Mark Center parking structure to dock at the Mark Center bus facility heading back in the northbound direction (Figure 16). The station is located approximately 0.43 miles west of the Southern Towers Station.

Alternative Approaches and Special Considerations

The runningway and station locations are adopted from the West End Transitway project. Where Route 7 and the West End Transitway meet, there is potential for an adjustment of the station sites. Ultimately, the Route 7 service envisions a station on Route 7 that is near a West End Transitway station on Beauregard Street. It is possible that, in the future, these stations could be combined. As the project advances, consideration will be given to this potential adjustment.

Chapter 3: Conceptual Layout

Conceptual layout drawings were developed for most of the corridor length from Spring Hill Metrorail Station to N Beauregard Street, a span of approximately 10.5 miles. South of the N Beauregard Street intersection, the Envision Route 7 BRT routing follows and shares facilities with the West End Transitway alignment to the terminus at the Mark Center. Conceptual layout drawings were not developed for this shared segment as the West End Transitway conceptual layout has already been completed by the City of Alexandria. Conceptual layout drawings are seen in Appendix D.

ROADWAY DESIGN ASSUMPTIONS AND APPROACH

A variety of guidelines were referenced in the process to complete the conceptual design of Envision Route 7 BRT facilities. Civil design elements in public rights-of-way were designed in conformance with the specification and design guidelines of VDOT, City of Alexandria, Fairfax County, Arlington County, and City of Falls Church. A traffic study should be completed during Preliminary Engineering to confirm acceptability of the design assumptions. Specific design guidelines and criteria are listed in Appendix C. A high-level summary of the design assumptions used for creating the conceptual layout follows.

Geometry and ROW Approach

The intent of the design was to meet Fairfax County's Comprehensive Plan for the number of lanes and to preserve all existing lane movements and configurations at all major intersections along the corridor. The geometries have been assumed to be standard sized and have not gone through a process to minimize the widths. Such an approach is relatively conservative and is likely to lead to a conceptual layout that is wider than may be realized at full design. The purpose of this approach is to take a conservative approach to ROW needs and cost. However, to minimize ROW needs and avoid existing infrastructure, the roadway has been designed to utilize service lanes in attempt to minimize property takes. In a small number of locations, the design was modified to eliminate an existing dedicated turn lane or auxiliary lane to reduce ROW impacts. As the project advances, future traffic studies will verify the need of various turn facilities and their necessary geometries.

Transition Areas

At various points along the corridor, the BRT service will need to move between center and side running facilities. Generally, moving in and out of curb running facilities is rather simple as there tends to be little separation or conflicts. However, for center running BRT lanes, the project has two different approaches on how the BRT lanes begin and end. The first approach opens the inside BRT lanes between intersections and allows the bus to enter the dedicated BRT lanes while maintaining speed and course. The second approach relies on a dedicated signal phases at an intersection that allows the bus to egress and ingress the BRT lanes in a separate movement from regular traffic.

Design Speed

Design speed was identified by utilizing existing posted speed limits combined with observed 75th and 95th percentile vehicle speeds using INRIX cell phone data. In all locations where the existing speed is less than or equal to 35 miles per hour, a 35 mile per hour design speed was used. In all locations where the existing speed was greater than 35 miles per hour, a 45 mile per hour design speed was used. The roadway widening design, including lane shifts, tapers, widths, and buffers, was developed based on these speeds. Future design efforts should reevaluate the design speed and potentially make adjustments based on future travel volume and speed character of the corridor.

Sidewalks/Shared Use Path

Wherever roadway widening is occurring, a sidewalk or shared use path has been included on both sides of the street, unless adequate sidewalk was already available. For the corridor in Fairfax County, a 10-foot shared-use path was used with an eight-foot buffer on both sides of the roadway.

Concrete Raised Median Strip

For the median running BRT lanes, one four-foot wide raised concrete median is used on each side of the running lanes. This is used to physically separate the general-purpose travel lanes from the BRT lanes in order to increase safety and improve operations. Utilizing the median strip also allows for a conservative estimate of ROW needs. Future efforts may determine that less than a four-foot median is adequate to separate the BRT facility from the general-purpose lanes.

Safety

Pedestrian safety improvements include proposed sidewalks, shared use paths, buffer spaces, and minimized intersection crossing lengths.

Bridges

All future facilities should not need additional bridge width provided the lane assumptions in this effort are held constant. As such, no proposed widening of existing bridges is proposed nor are any new bridges proposed. However, by not widening bridges, it is possible that this will necessitate adjustments to some ramp terminals.

Chapter 4: Rights-of-Way (ROW) Needs Analysis

A rights-of-way (ROW) needs analysis was completed to assess additional property needed for the expanded roadway segments accommodating the BRT runningway and facilities on the Envision Route 7 corridor. During the Conceptual Layout design process, a concerted effort was made to utilize existing public ROW in service lanes and avoid potential conflicts with various environmental, cultural, and natural resources along with other existing infrastructure and structures. The Conceptual Layout represents approximately a 10 percent design, so there is the potential for variation between the planned ROW and the future ROW needed once the project is fully designed.

The ROW analysis was completed by overlaying the Conceptual Layout drawings with parcel data for Fairfax and Arlington Counties and the City of Falls Church. The specific ROW needed was identified by performing a GIS analysis. Where the concept design layer intersected the parcel layer, parcels were selected and the percentage of property intersecting the design layer was quantified. For the purpose of this summary, five categories of proportion of parcel taken are identified, ranging from smallest (0-5 percent) to largest (greater than 50 percent).

The ROW analysis shows that some, but not all parcels adjacent to the corridor will be impacted. However, of those parcels impacted, most will be marginally impacted by the expansion of the Route 7 ROW. The analysis found that while nearly one hundred parcels intersected the Conceptual Layout, there are very few of these parcels where more than 20 percent of the total area of the parcel is needed for the BRT. Parcels where a larger percentage of that parcel is needed are either small parcels or are located in the path of the new Ring Road. A total of eight out of 96 parcels where property is needed will experience a loss of more than 50 percent of the parcel. Generally, additional ROW is needed in the southern portion of Tysons, the Pimmit Hills area, Seven Corners and Bailey's Crossroads. In addition, small amounts of ROW are needed in immediate station areas throughout the corridor.

The findings of this analysis are presented by the north, central, and south segments. ROW needs by parcel were also used in the development of the estimate of capital cost to asses approximate ROW acquisition costs.

NORTHERN SEGMENT OF PROPOSED ROW

Additional ROW needed in the northern segment are focused in the area around Tysons Corner Center and the Pimmit Hills area. ROW needed in this area are from mostly medium and large parcels that will lose a very small percentage of the parcel, close to 1 percent in some cases. Smaller parcels in this section will also lose small portions of their land area. No substantial losses above 20 percent of parcel square footage is expected for these parcels. Figure 17 zooms in on the cluster of ROW needs in the Pimmit Hills area. This cluster is composed of a range of lot sizes between I-495 and I-66, none of which would lose above 20 percent of the parcel space.

Figure 17 Northern Segment Parcel Needs by Acquisition Percentage

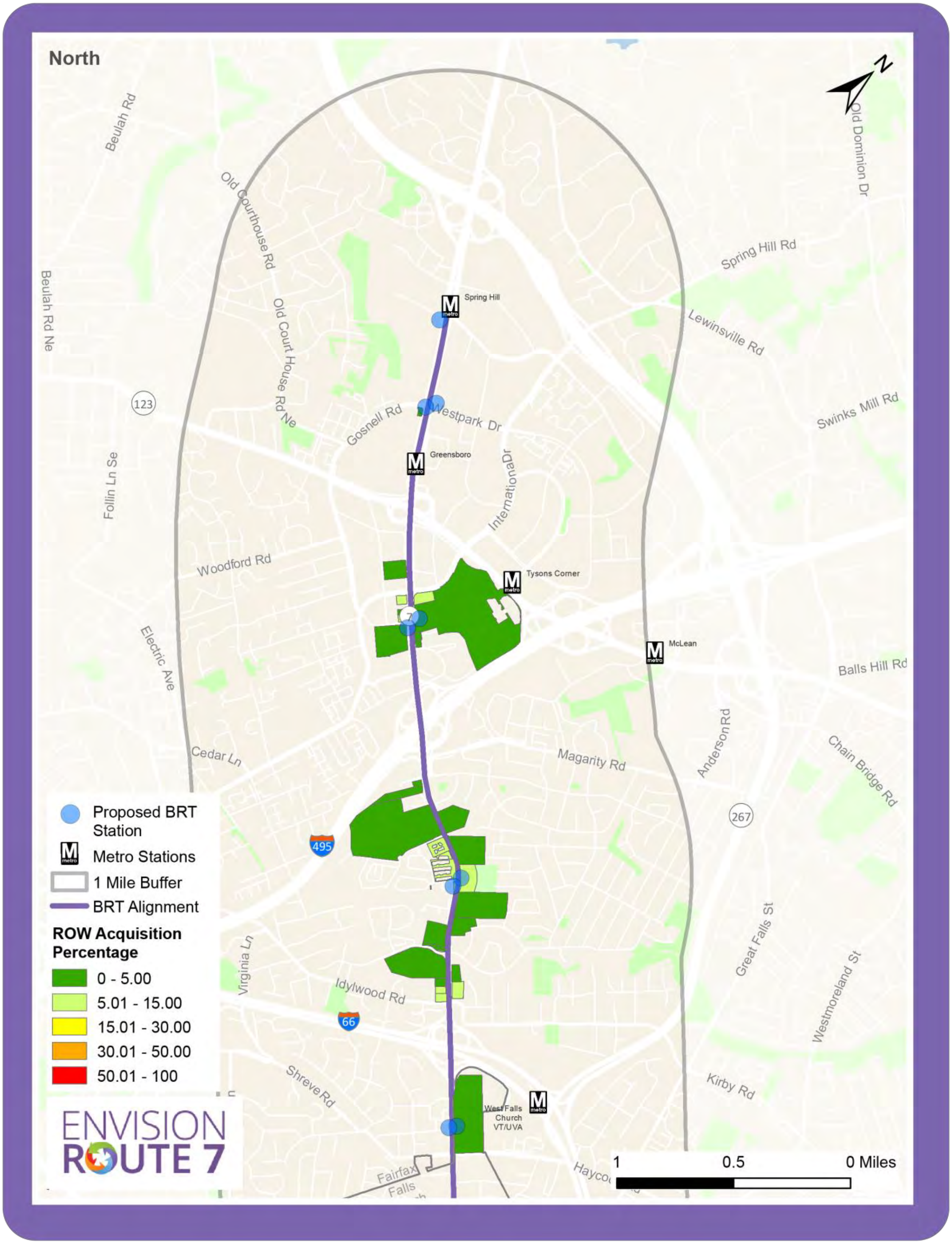
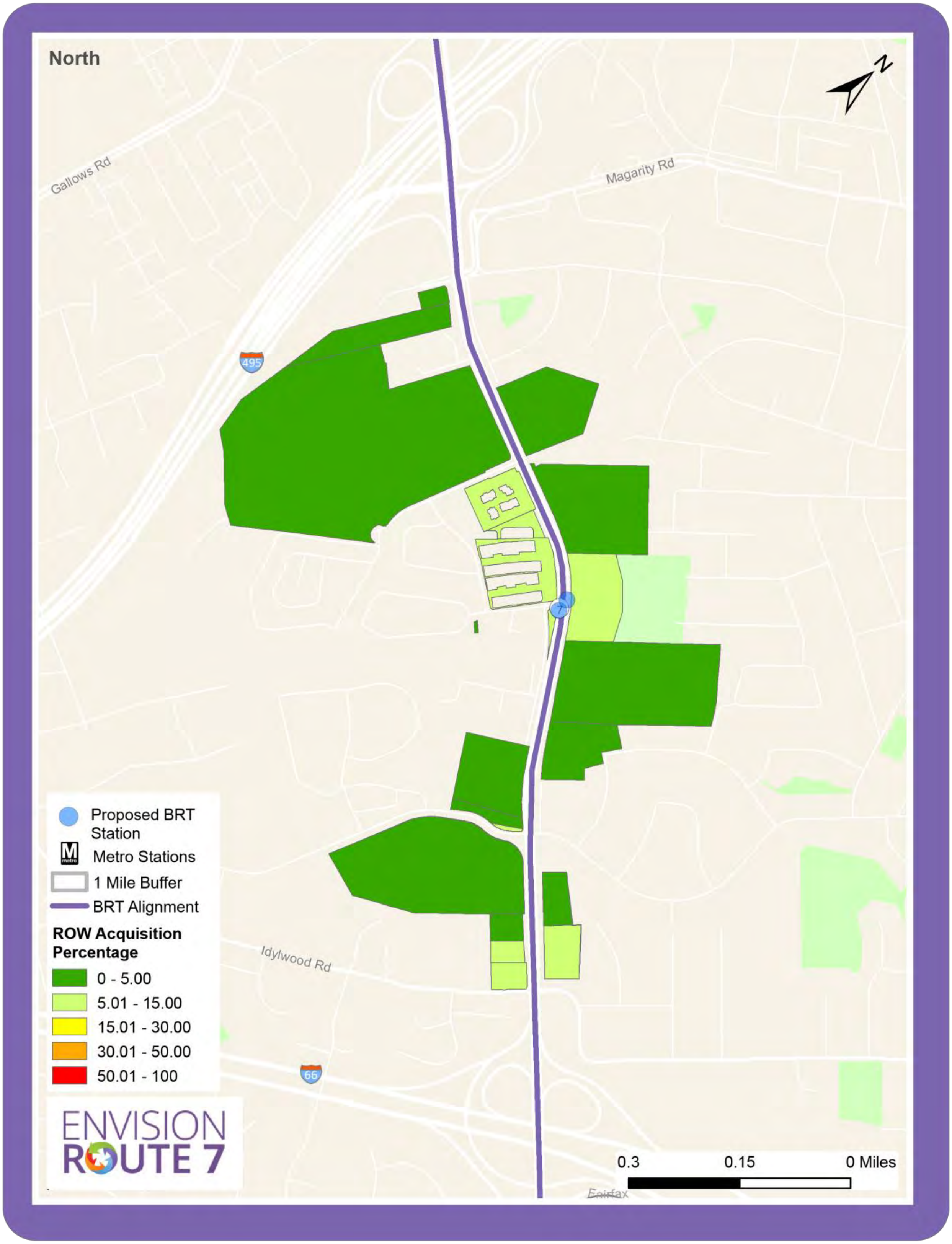


Figure 18 Parcel Needs – Pimmit Hills



CENTRAL SEGMENT OF PROPOSED ROW

ROW needs in the central segment of the corridor are focused on station areas and in the Seven Corners area as shown in Figure 19. Parcels where ROW is needed within the City of Falls Church and Arlington County are generally associated with station locations. The portions of these parcels needed are generally in the required set-back of the parcels. As the design progresses, these ROW needs have the potential to be minimized where necessary. There are three small parcels showing high loss percentages in the Seven Corners area, which are located directly in the proposed Ring Road ROW that will connect Route 7 with Roosevelt Boulevard. More detail of the ROW needs in the Seven Corners area is shown in Figure 20. Three small parcels are located in the proposed Ring Road ROW. One of the parcels will experience a loss of land area of 66 percent while the other two will experience close to 100 percent loss of land area. Further to the south, there is one lot in the same cluster that will experience a 30.8 percent loss, as well as one shown in yellow that will experience a 50.4 percent loss of land area. These high percentages are the outliers in this study, as most parcels will not experience a significant loss of land.

Figure 19 Central Segment Parcel Needs by Acquisition Percentage

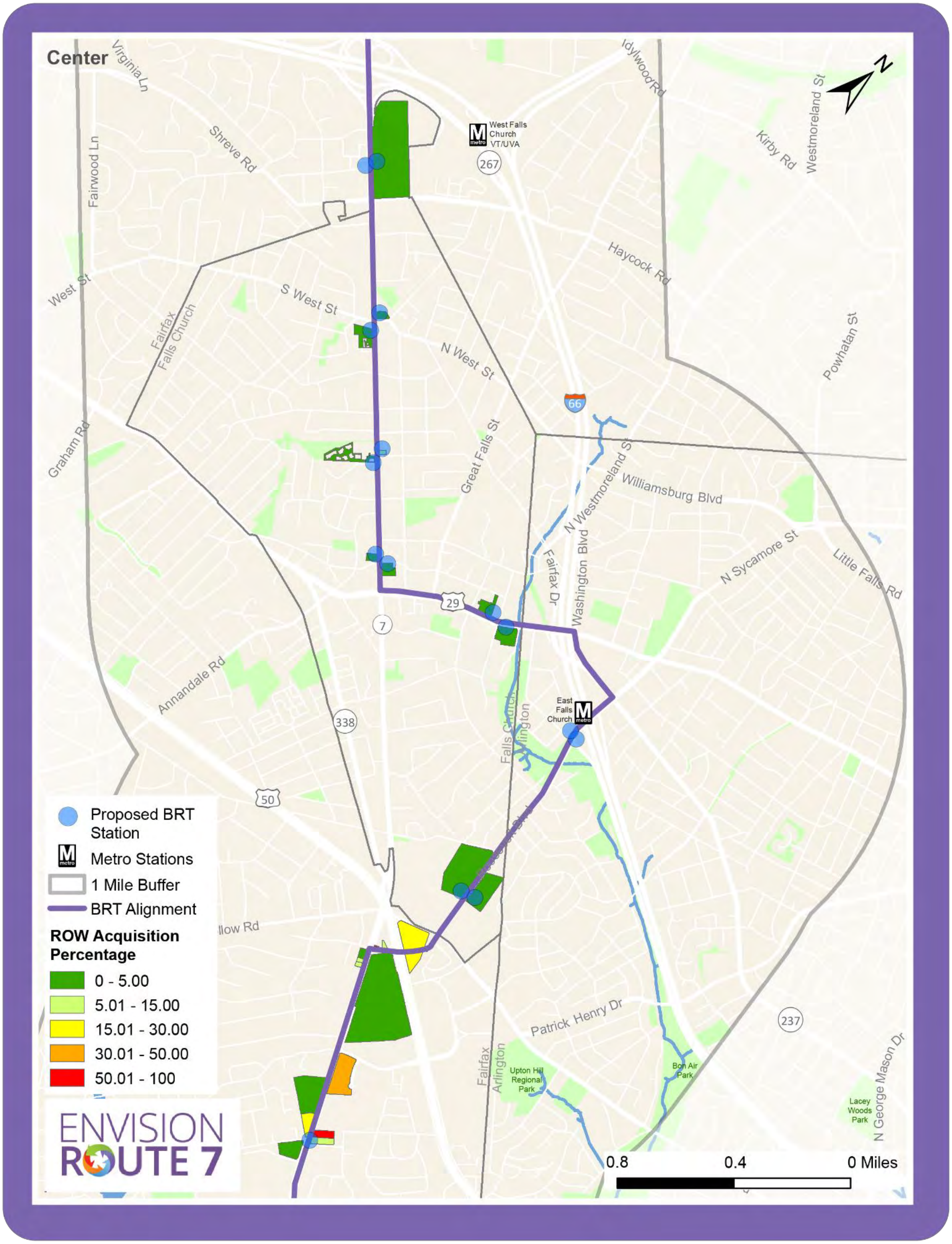
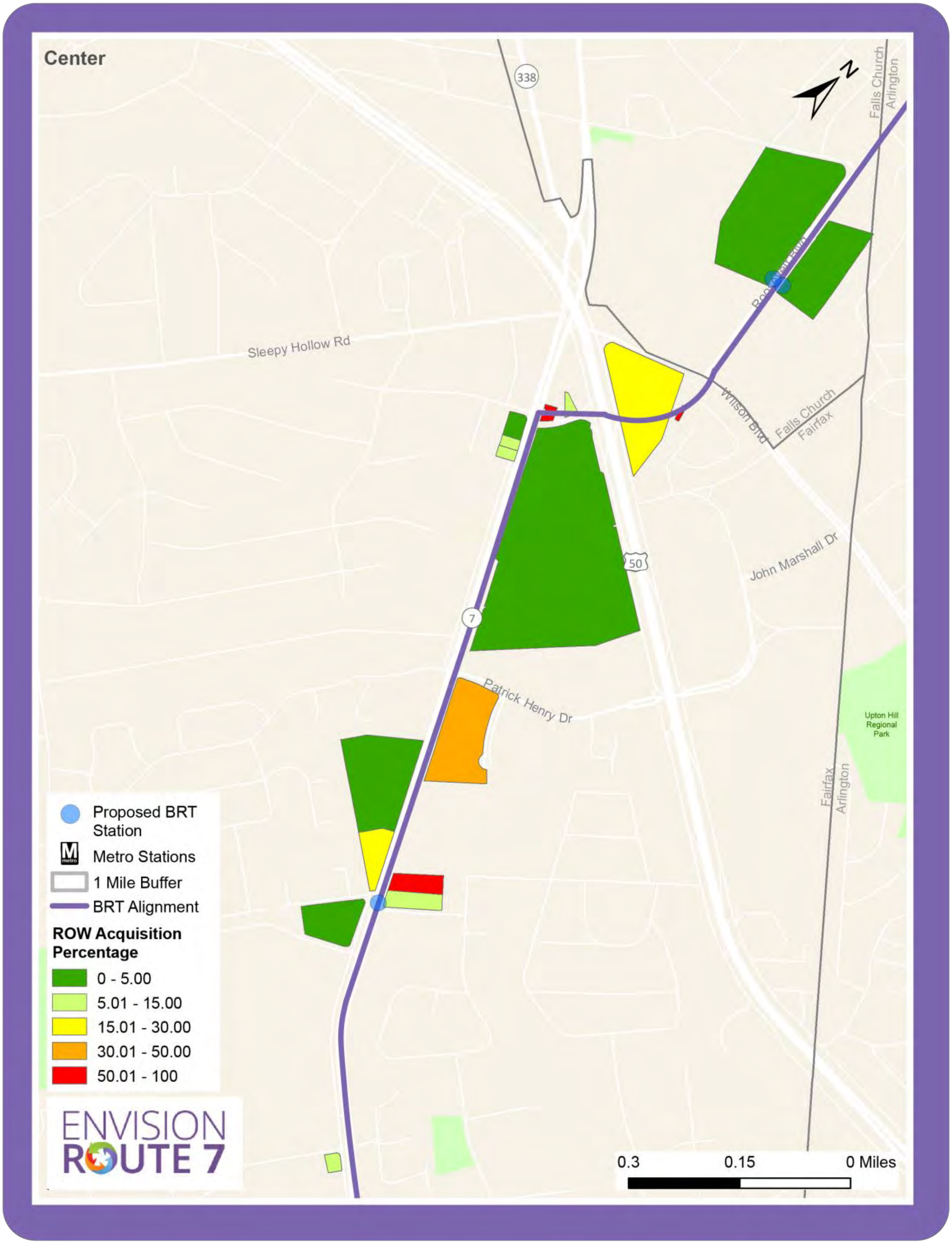


Figure 20 Parcel Needs – Seven Corners



SOUTHERN SEGMENT OF ROW

ROW needs in the southern segment of the corridor are focused on the Bailey's Corner and Skyline areas as shown in Figure 21. Several parcels experience moderate loss of land area between 5.0 and 15.0 percent in the Bailey's Crossroads and Skyline areas of the corridor. A few parcels experience larger losses of land area. More detail of the ROW needs in this area is shown in Figure 22.

Figure 21 Southern Segment Parcel Needs by Acquisition Percentage

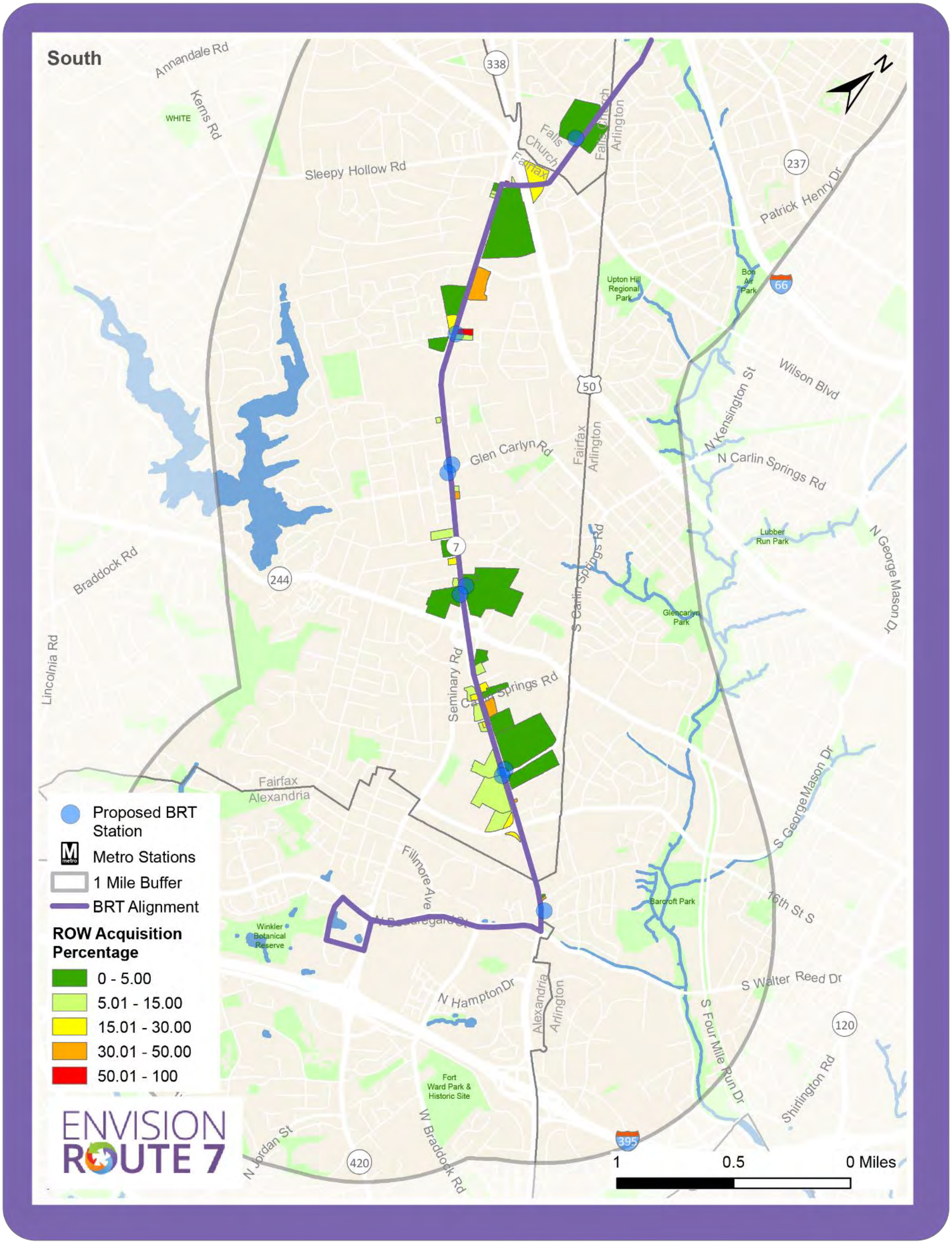
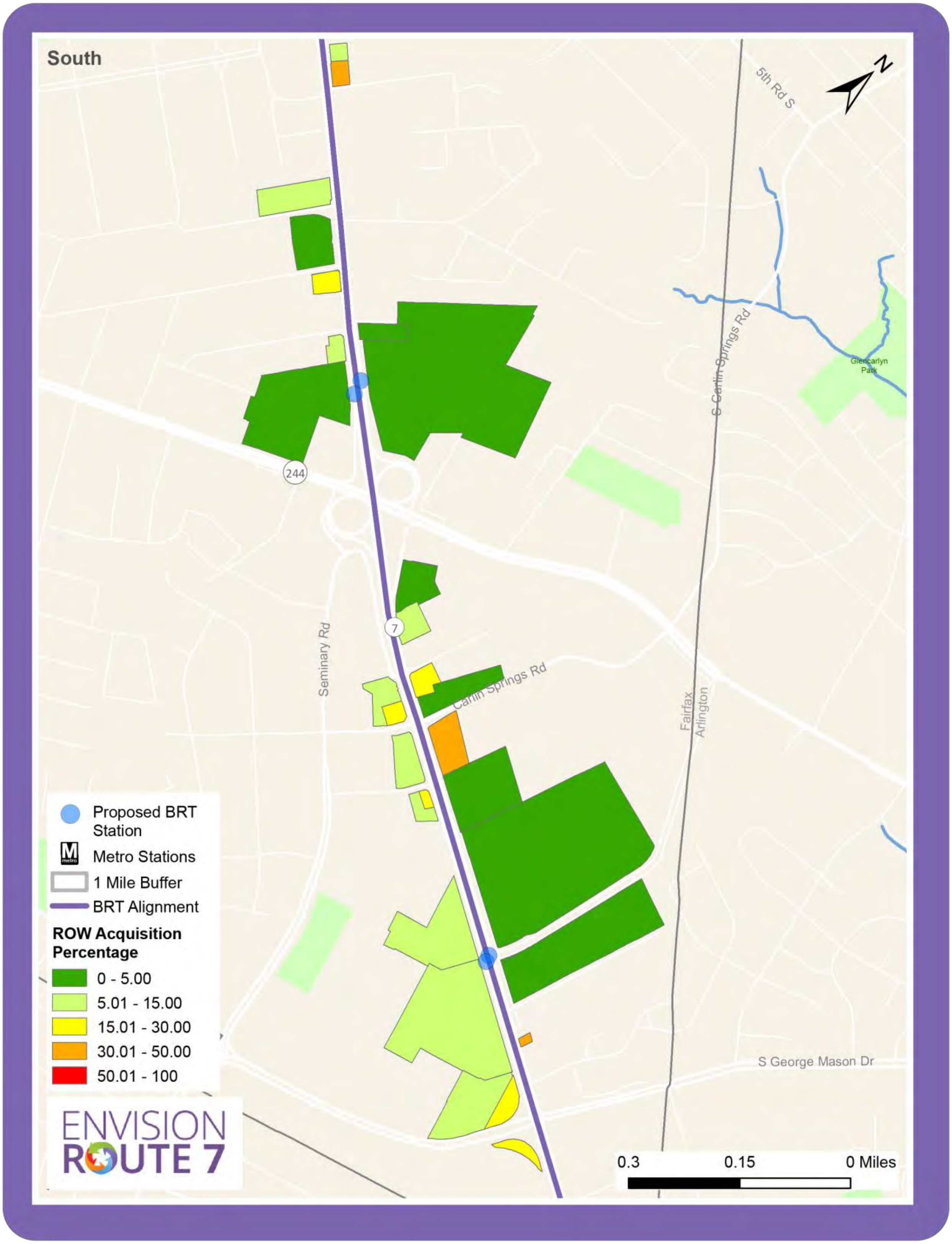


Figure 22 Parcel Needs – Bailey's Crossroads and Skyline



Chapter 5: Preliminary Capital Cost

A preliminary estimate of capital cost has been developed for the proposed design. The project includes changes to both physical infrastructure and transit operations along the Route 7 corridor. The proposed BRT Corridor improvements extend approximately 10.5 miles in each direction using existing surface streets, widening existing roadways, and adding additional roadway. The project will include 18 branded stations, dedicated transit lanes, transit signal priority implementations, curb bump outs, areal-time bus arrival information system, retaining walls, rights-of-way (ROW) purchases, and Temporary Construction Easements (TCE). No vehicle, maintenance facility, or operations costs are included in this estimate. Additionally, planned projects within the corridor are included in the design. However, costs associated with the planned projects are excluded from the cost estimate. It should be noted that while a widening of Route 7 is planned in the corridor, that cost is not excluded from the estimate. In fact, the widening of the facility is much of the cost in this estimate.

The capital costs for the project were developed in a parametric process based upon quantities and unit rates from similar BRT projects for this scope of work. Quantities for each of the items were developed using the Conceptual Layout plans prepared for the corridor. Items are assigned to a Federal Transportation Agency (FTA) Standard Cost Categories (SCC) code.

The ROW costs include the fee acquisition of permanent and temporary easements, relocation costs, legal fees, business damages, and other miscellaneous costs. ROW cost estimates are based on average, local per-acre value with factors for the above properties' costs being considered.

CONTINGENCIES

In accordance with the FTA SCC, there are two levels of contingencies: allocated and unallocated. The Allocated Contingency will be included for each SCC cost category to address risk, scope, and quantity definition relative to the level of design. This allocated contingency amount is based on each of the estimate items per their respective costs and a level of certainty and judgment based on the estimate and design progress detail. For this estimate, lower risk line items, such as concrete and asphalt pavement, have an allocated contingency of 15 percent, while higher risk line items related to utility work have a higher allocated contingency of 30 percent. Allocated contingencies for ROW acquisition are the highest at 40 percent.

To account for the current labor and construction market in the Washington, D.C. metropolitan area, the cost estimate is presented as a range from Low to High. For the low range estimate, the allocated contingencies described above were applied to each line item. For the high range estimate, the allocated contingencies were doubled.

Each SCC item total will be applied its specific allocated contingency, and then the contingencies will be totaled as per the FTA SCC format. The contingency levels will generally decrease with design progression due to increased detail. The amount of contingency depends on the complexity of any item as well as the stage of engineering completion.

The unallocated contingency will be applied to the total project costs as per FTA SCC guidelines. This contingency is designed to represent the costs of scope changes, and uncertainty in the present design, including political events, labor strife, weather, variable commodity pricing, unfavorable market conditions, bid risk, changed conditions, etc. that occur during construction for all SCC line items.

INFLATION

The Year of Expenditure is determined by applying an inflation rate to the base year capital cost. The base year will be 2019. For this project, the inflation rate of 3.5 percent is proposed to use based on recent "Construction Cost Index" (CCI) by Engineering News Record (ENR). This inflation rate will be included in the FTA SCC Inflation worksheet to calculate the project escalation. The current project schedule and its tentative completion date of the end of 2030 will be the basis for this escalation calculation.

PROFESSIONAL SERVICES

The soft costs in the FTA format use ten of the SCC sub-categories. These allowances are computed by applying a percentage to the total construction cost estimated for each cost category (excluding ROW) or as otherwise described. Table 1 provides a list of the percentage multipliers that were applied to the total construction costs to cover these items:

Table 1: Professional Services Percentages

Soft Costs	Percentage Multiplier
Project Development - includes preliminary engineering, environmental documentation, etc. up to final funding.	5.0 %
Engineering – includes final design including design services during construction.	7.0
Project Management for Force Account and Administration - An estimated Professional Services percentage will be used for administration and force account work.	5.0
Construction Administration & Management - includes costs of construction administration.	8.0
Professional Liability and other non-Construction Insurance - Project insurance includes all premium costs to provide "wrap-up" insurance coverage through a Contractor Controlled Insurance Program (CCIP). This category includes professional liability, comprehensive general liability, builder's risk, worker's compensation and employer's liability, construction equipment loss or damage, and automobile insurance.	1.5
Legal; Permits; Review Fees by other agencies, cities, etc. – Includes legal fees (except real estate legal fees), permitting fees, and review fees by other entities.	1.0
Surveys, Testing, Investigation, Inspection – Includes independent testing, third party surveying during construction to confirm progressed work, investigations of contractor claims or differing site conditions, and special inspections required, or the local building authorities.	1.00

Start-up* (Safety Certification and Activation) - Includes the costs in training transit personnel and testing of the new systems. This includes safety certification and activation.	0.5
TOTAL Soft Costs	30.0

*Includes only the training and start-up for the agency personnel. Contractor related costs are included in their respective line item estimates.

SUMMARY

A summary of the ROW cost estimates for the conceptual design is seen in Table 2 below. Appendix E and Appendix E Part 2 provides the construction cost estimate details.

Table 2 Preliminary Cost Estimate Summary

	Base Year (2019)		Year of Expenditure (2030)	
	Low-End	High-End	Low-End	High-End
Construction Subtotal + Allocated Contingencies	$206.5 M	$230.0 M	$261.7 M	$291.1 M
ROW Acquisition + Allocated Contingencies	$32.6 M	$41.9 M	$43.5 M	$55.9 M
Professional Services (30 percent)	$59.9 M	$66.7 M	$77.8 M	$86.7 M
Unallocated Contingencies (15 percent)	$44.9 M	$50.8 M	$64.5 M	$73.1 M
Total	**$343.9 M**	**$ 389.4 M**	**$447.5 M**	**$ 506.8 M**

Appendix A: Mapping of Demographics and Land Use

- GIS Data Dictionary Included

Appendix A: Mapping of Demographics and Land Use

INTRODUCTION

A variety of available data were mapped to better understand opportunities for the BRT service. These data identified various potential resource and infrastructure conflicts to avoid when considering station locations and concept engineering. Data collection and mapping efforts focused on four categories:

- Travel Conditions
- Demographics
- Property and Land Use
- Environmental and Cultural Resources

The data were collected and organized across the Route 7 Corridor's four jurisdictions: Fairfax County, City of Falls Church, Arlington County, and City of Alexandria. Regional data (e.g., statewide ADT data from the Virginia Department of Transportation) was also collected. The data is stored in five spatial databases and organized by jurisdiction for analysis and mapping purposes. This data was provided in conjunction with spatial databases.

The data were also used to produce the baseline maps detailed in the following sections. The data dictionary for the accompanying GIS databases notes details of the data such as the origin of the data, the files utilized, and the data specifics.

TRAVEL CONDITIONS

Projected transit ridership form the Phase II study and existing daily traffic volumes was mapped to better understand how travelers are currently moving through the corridor and to understand expected ridership patterns in the future.

Baseline Conditions – Transit Ridership

Station-level ridership projections from Phase II of the Envision Route 7 project were mapped. NVTC used a travel demand forecasting model to develop year 2040 ridership projections for the project's proposed BRT stations. Figure A 1, Figure A 2, and Figure A 3 show projected boardings at stations located in the northern, central, and southern portions of the corridor, respectively.

Table A 1 lists projected boardings at proposed stations along the corridor.

Table A 1 Projected Corridor Ridership

Name	Daily Boardings
Spring Hill Metro	275
Greensboro Metro	3,050
International Drive	2,475
Lisle Avenue	600
Pimmit Drive	1,850
Haycock Road	250
West Street	550
Pennsylvania Avenue	2,750
Washington Street	1,075
Columbia Street	75
East Falls Metro	10,900
Castle Road	3,100
Rio Drive	3,850
Glen Carlyn Drive	675
Bailey's Crossroads	2,350
Crossroads SC	2,650
Beauregard Street & King Street	2,400
East Campus/Braddock	750
Beauregard/Fillmore	675
Southern Towers	1,475
Mark Center	250

As shown in

Table A 1, stations with higher projected ridership relative to the rest of the corridor (over 3,000 projected daily riders) include Greensboro Metro, Castle Road, Rio Road, and East Falls Church Metro. The East Falls Church Metro station has the highest ridership project on the corridor. At 10,900 projected daily riders, East Falls Church Metro Station has nearly three times more projected riders than the next busiest transit station, Rio Drive (3,850 projected daily riders). Stations with lower projected ridership relative to the rest of the corridor (under 500 projected daily riders) include Columbia Street, Haycock Road, Mark Center, and Spring Hill Metro. In general, projected ridership is focused at various nodes in the corridor, including Tysons, Falls Church (downtown), Seven Corners, and between Baileys Crossroads and Beauregard Street.

Baseline Conditions – Existing Daily Traffic Volumes

Existing daily traffic volumes (AADT) recorded in 2016 by the Virginia Department of Transportation (VDOT) were also mapped. Several roadways carrying heavy traffic volumes ranging between 26,000 and 64,000 AADT cross the corridor's northern, central, and southern portions (Figure A 1, Figure A 2, Figure A 3). These roadways include Route 123 near the Greensboro Metro Station, US 50 near the Castle Road Station and Seven Corners, Columbia Pike in Bailey's Corner, and Seminary Road near the Southern Towers Station. It is important to note that the existing roadway network is planned to change in select areas along the corridor, including Tysons, Seven Corners, and Bailey's Crossroads. A future roadway network map showing how the Envision Route 7 Corridor will align with the planned roadway network will be provided in Appendix B: Development and Highway Plans.

Figure A 1 Route 7 Travel Conditions – Northern Corridor Section

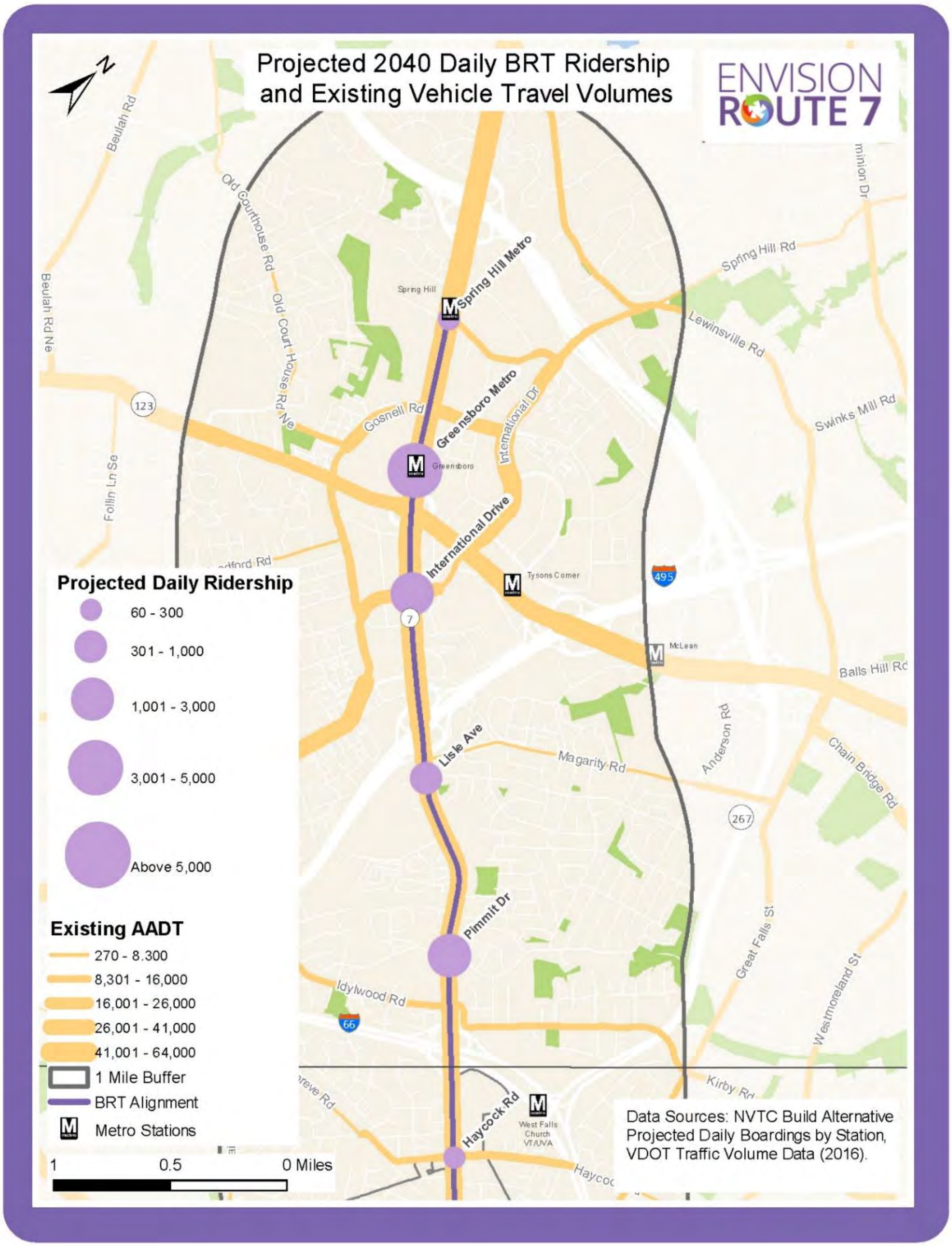


Figure A 2 Route 7 Travel Conditions – Central Corridor Section

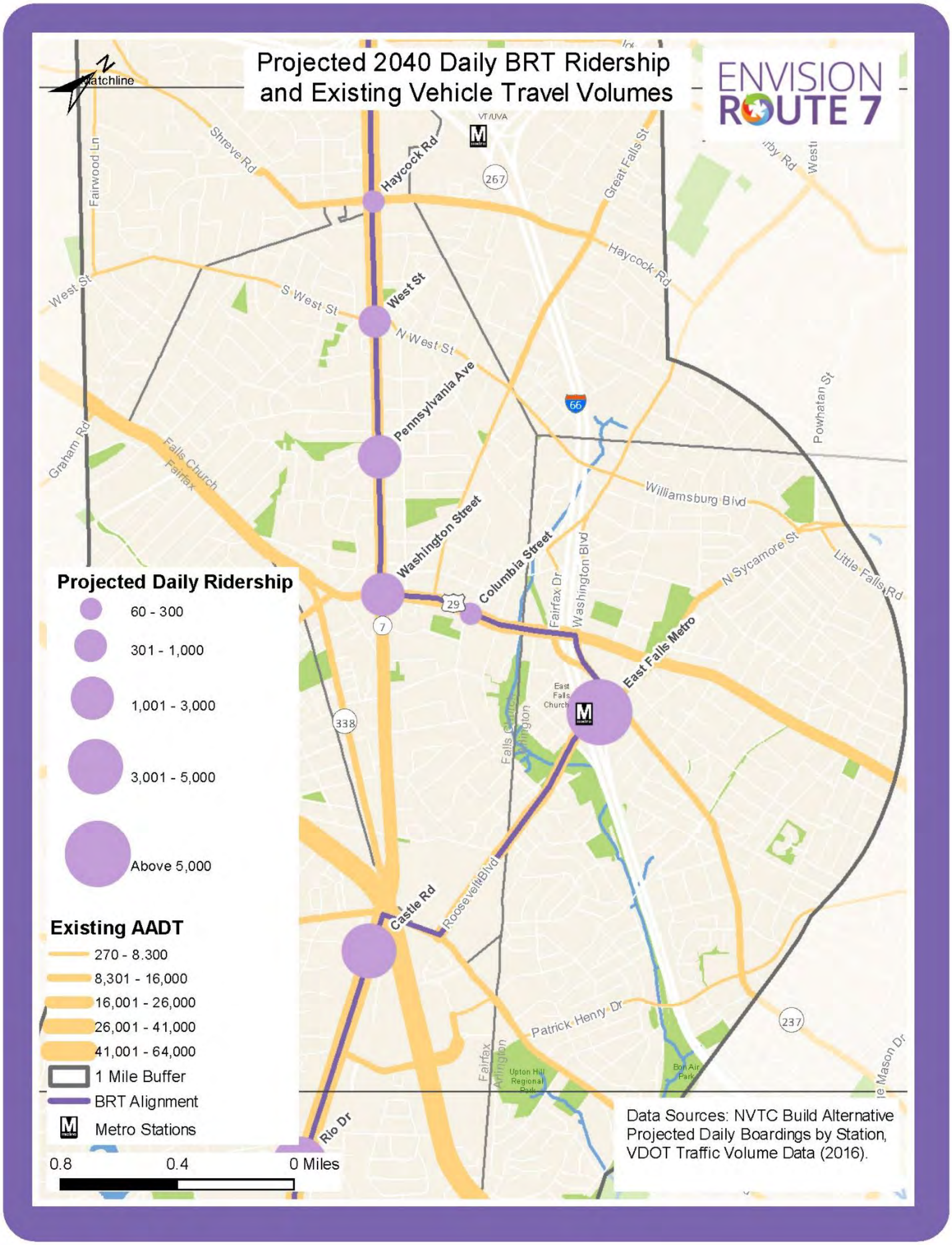
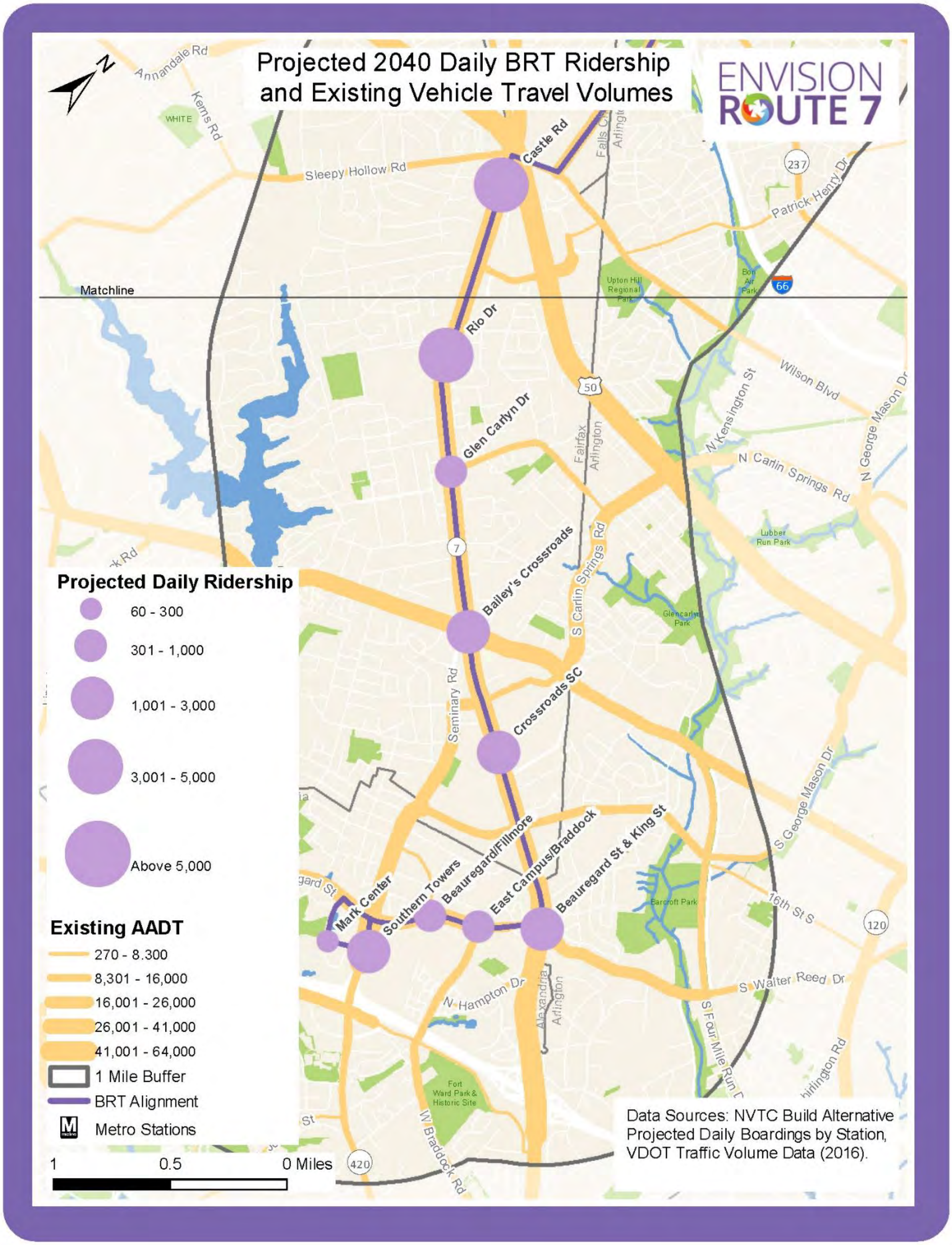


Figure A 3 Route 7 Travel Conditions – Southern Corridor Section

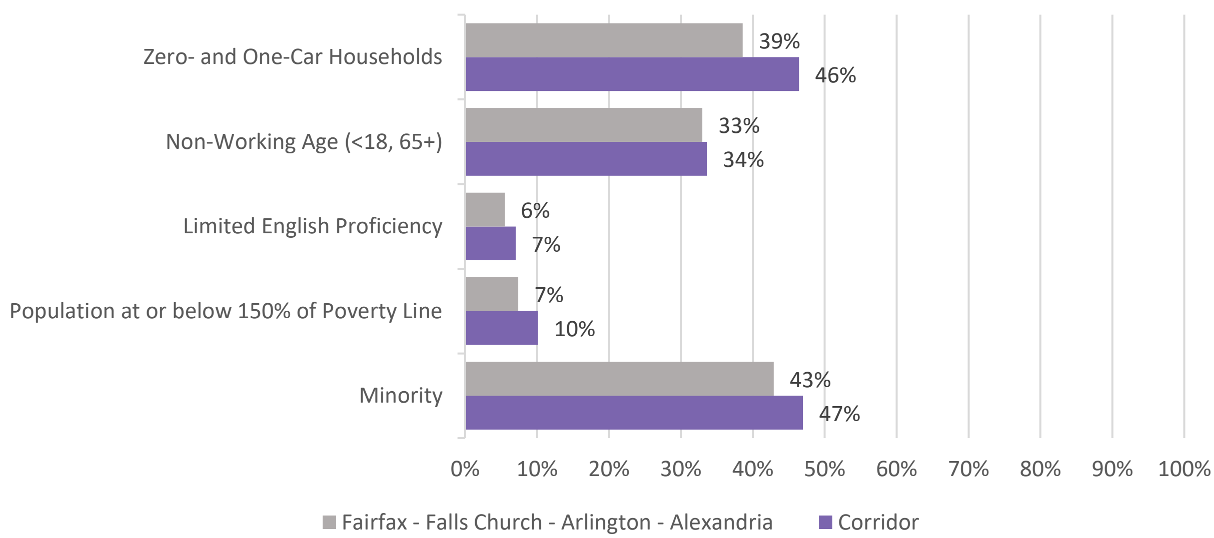


DEMOGRAPHICS

American Community Survey (ACS) 2016 5-year estimates at the census block group level were mapped to understand demographic conditions on the study corridor. The seven specific demographics were mapped: zero to one car households, limited and non-English speaking households, median household income, minority population, population density, population under 18 and over 65, and poverty.

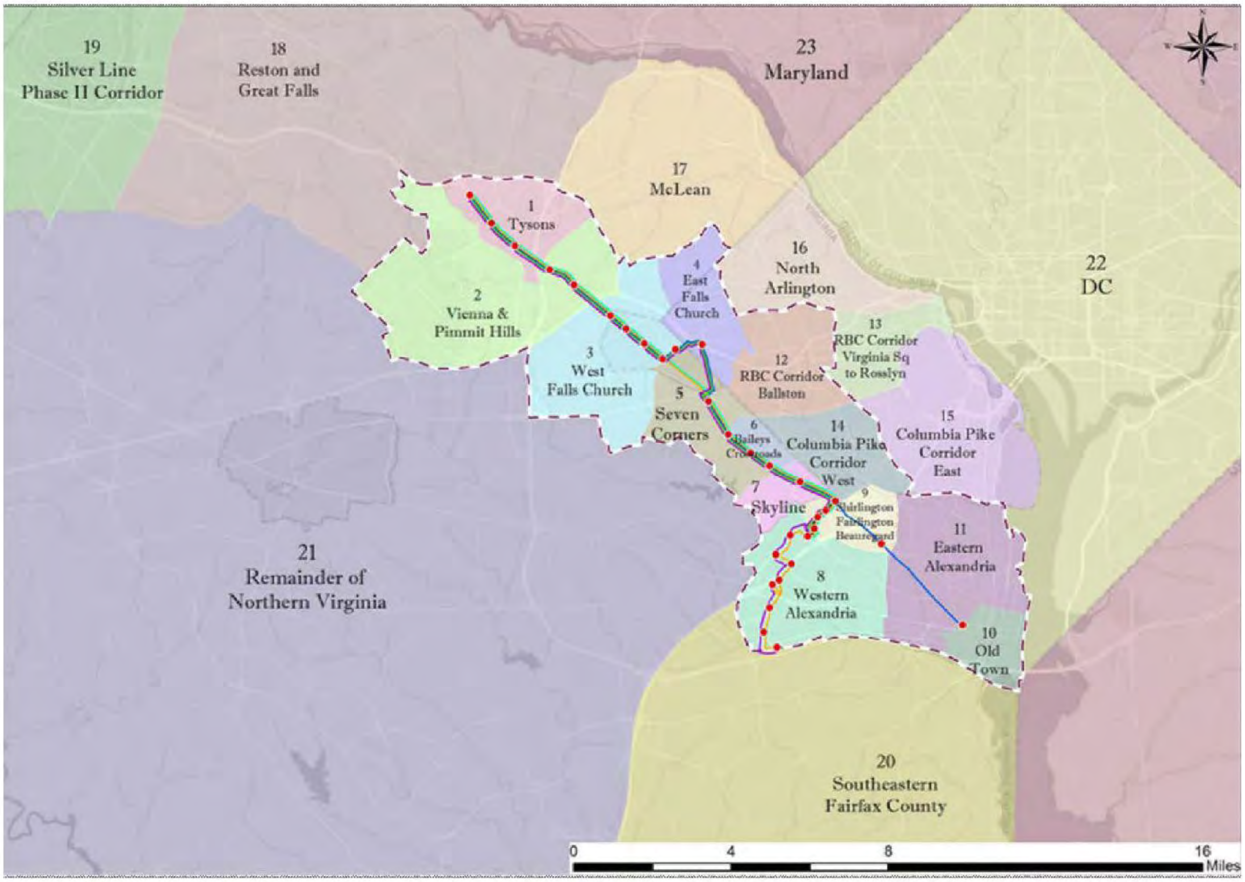
In general, the people who live on the Envision Route 7 corridor own fewer cars, are slightly more likely to be in poverty and slightly more minority than their associated jurisdictions (Fairfax County – Falls Church – Arlington County – City of Alexandria) as a whole. As seen in Figure A 4, the study corridor has higher percentages of zero- and one-car households, non-working age, limited English proficiency, poverty, and minority populations than the surrounding jurisdictions.

Figure A 4 Demographics of Study Area and Surrounding Jurisdictions



In the following sections, the corridor is described in terms of 14 geographic "Districts" defined during Phase II of the Envision Route 7 study as shown in Figure A 5. Findings will generally be noted by the name of the District from which they represent.

Figure A 5 District Definition



Baseline Conditions – Population Density

Figure A 6 shows the density of households along the Envision Route 7 corridor. The average density along the corridor (13,700 people per square mile) is slightly higher than the average regional population density (9,900 people per square mile). Pockets of suburban household density are present along the corridor southeast of I-495, between I-66 and Seven Corners, and between Bailey's Crossroads and the corridor's southern point at North Beauregard Street.

Baseline Conditions – Median Household Income

Figure A 7 shows the median household income across the Envision Route 7 corridor. The average median income along the corridor ($109,600) is slightly lower than the average regional median household income ($122,700). The lowest median incomes are found in the Pimmit Hills, Seven Corners, Baileys Crossroads, Skyline, Columbia Pike Corridor West, Shirlington-Fairlington-Beauregard, and Western Alexandria Districts. The highest median incomes are found in the Tysons Corner, West Falls Church, and East Falls Church Districts.

Baseline Conditions – Zero to One-Car Households

As shown in Figure A 8, higher concentrations (50%-70%) of zero- and one-car households are found in Tysons and Pimmit Hills between the Dulles Toll Road and Margarity Road and between I-495 and Idylwood Road. Concentrations of zero- and one-car households are also found in West Falls Church north of Route 29, in the eastern and southern sections of Seven Corners, in Skyline east of Seminary Road, and in Shirlington-Fairlington-Beauregard and Western Alexandria both north and south of Beauregard Street.

Baseline Conditions – Population Under 18 and Over 65

In the Envision Route 7 corridor, notable districts containing census blocks where over 50% of the population is composed on non-working age people include the Tysons Corner, Skyline, and Shirlington-Fairlington-Beauregard Districts (Figure A 9). Other districts with substantial but slightly less pronounced concentrations (40%-50%) of non-working age people live include the Pimmit Hills, West Falls church, East Falls Church, Seven Corners, and Baileys Crossroads Districts.

Baseline Conditions – Limited and Non-English Speaking Households

Although households with limited English proficiency (LEP) make up less than ten percent of the study area population, they are highly concentrated in certain Districts. Census block groups where 15%-45% of households are limited or non-English speaking are located within the Tysons Corner, Seven Corners, Bailey’s Crossroads, Skyline, Columbia Pike Corridor West, Western Alexandria, and Shirlington-Fairlington-Beauregard Districts (Figure A 10).

Baseline Conditions – Poverty

As shown in Figure A 11, the highest concentrations of individuals living in poverty (over 40%) are found in the Seven Corners, Skyline, and Western Alexandria Districts. Other areas with high levels of individuals living in poverty (20%-40%) can be found in the Pimmit Hills and Columbia Pike Corridor West Districts. High-poverty locations like these can serve as an indicator of transit-dependent populations.

Baseline Conditions – Minority Population

Figure A 12 shows the distribution of racial or ethnic minorities throughout the Envision Route 7 study corridor. Minority populations can be found throughout the corridor, and census blocks with high concentrations of minority populations (over 60%) can be found in the Pimmit Hills, Seven Corners, Bailey’s Crossroads, Skyline, and Western Alexandria Districts. Identifying locations with ethnic and racial minority populations can help align improvements along the corridor to the needs of historically underserved populations.

Figure A 6 Route 7 Demographics – Population Density

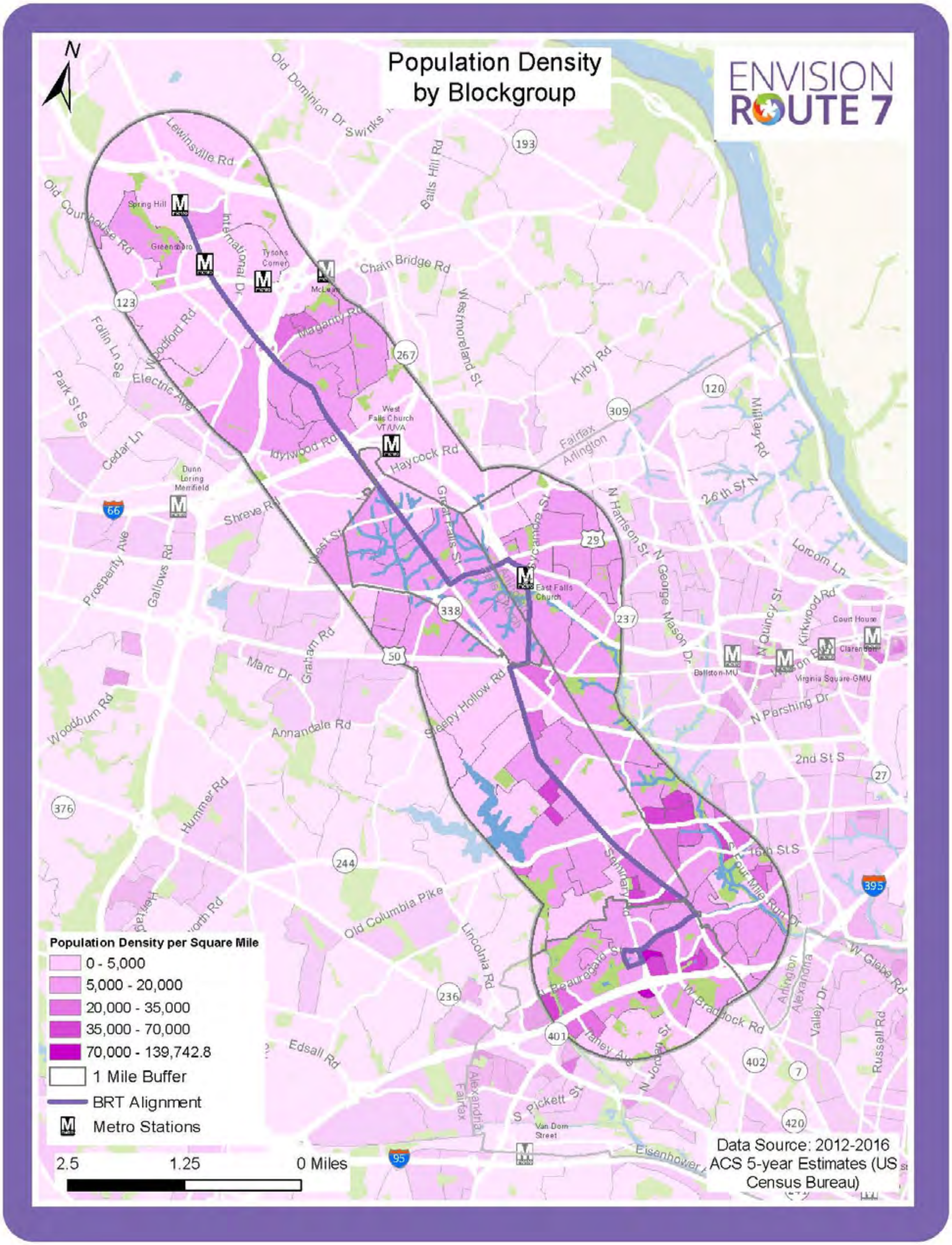


Figure A 7 Route 7 Demographics – Median Household Income

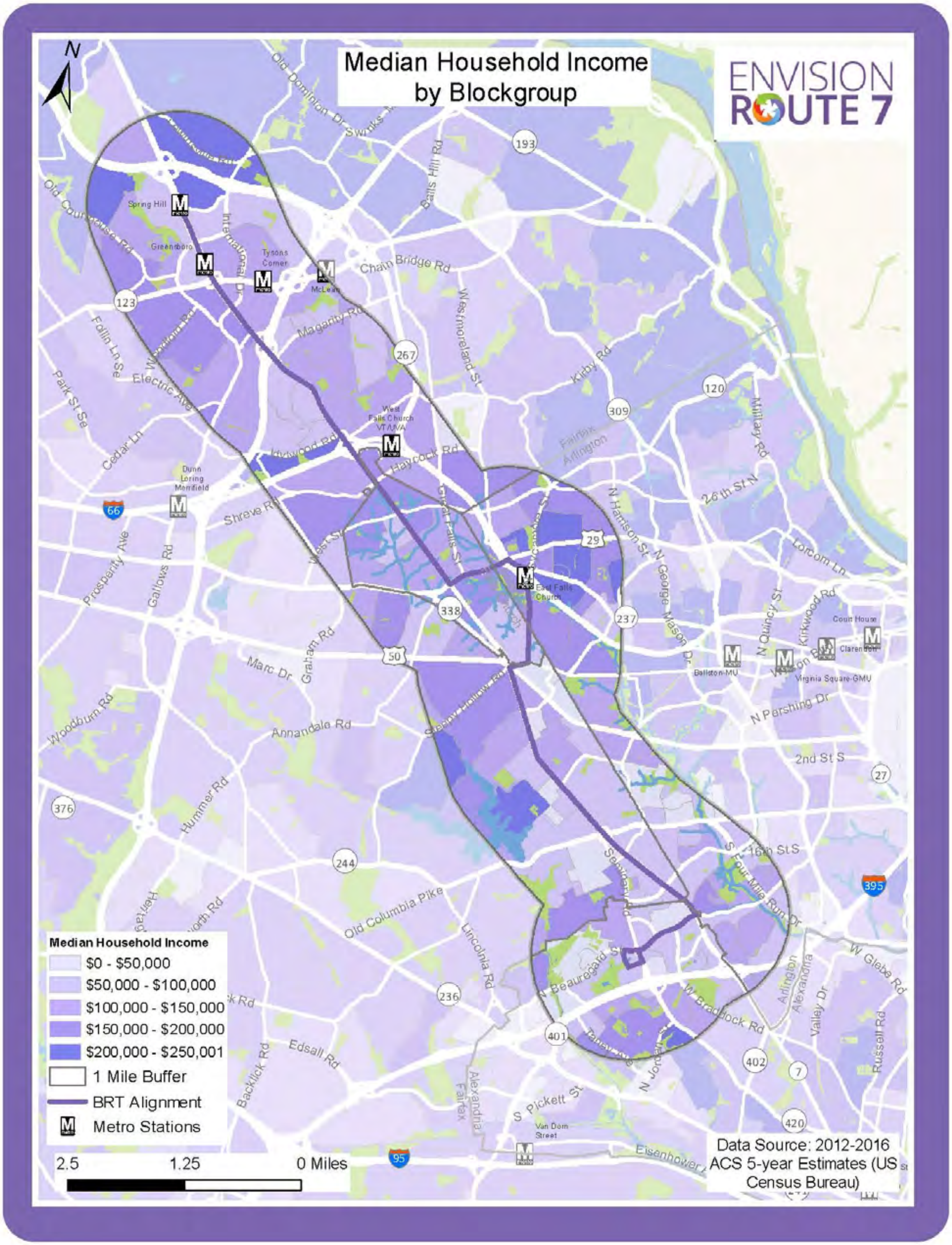


Figure A 8 Route 7 Demographics – 0 to 1 Car Households

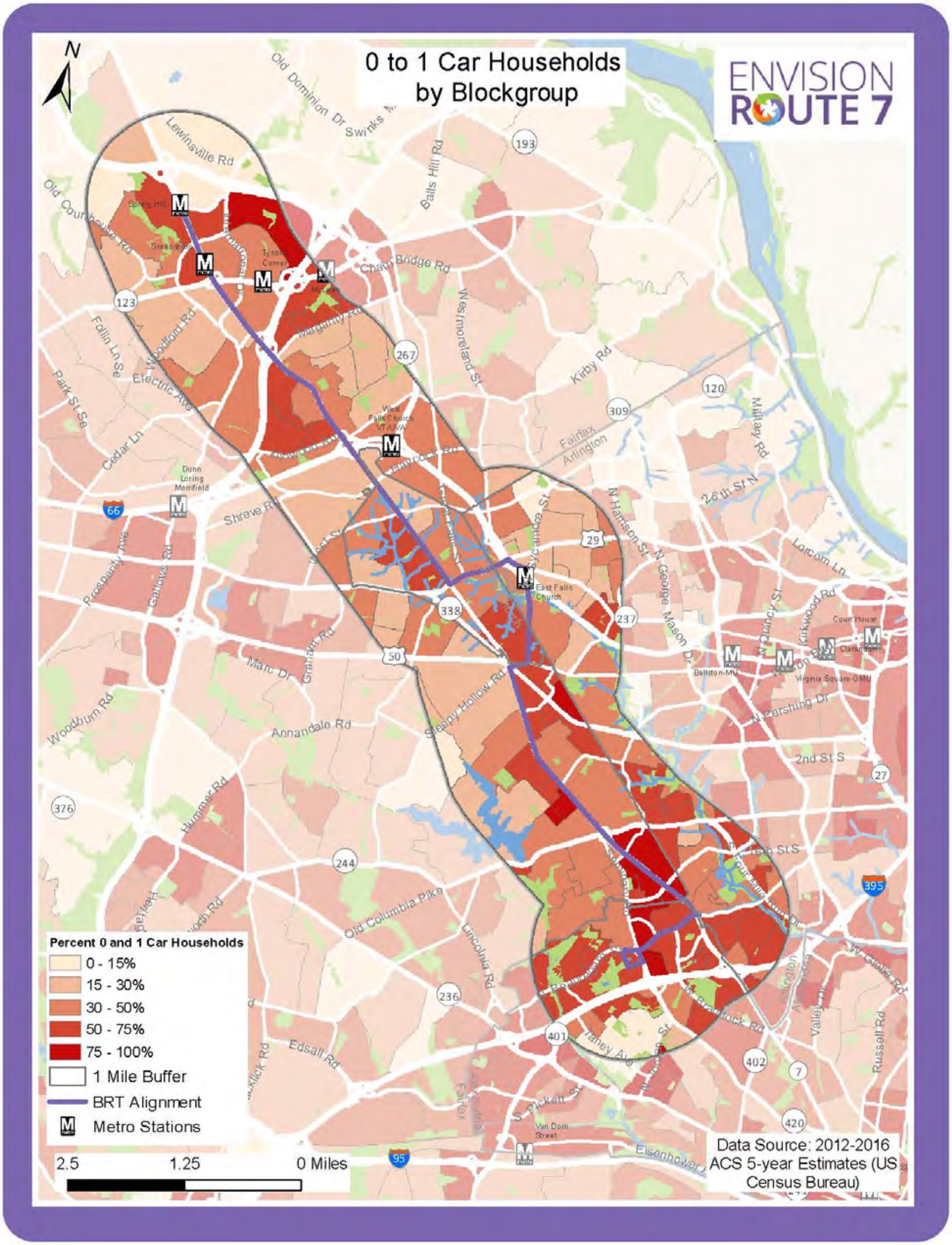


Figure A 9 Route 7 Demographics – Population Under 18 and Over 65

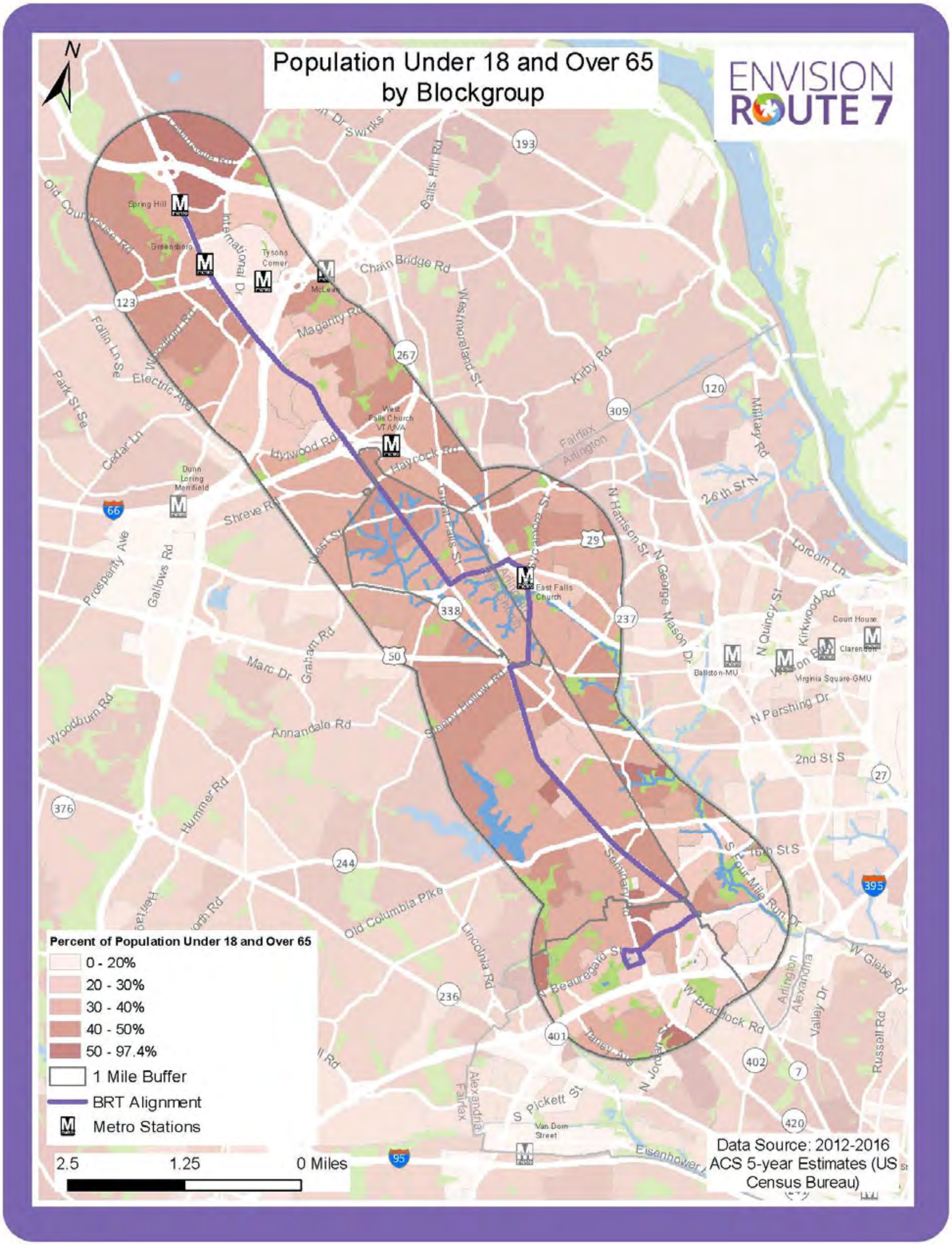


Figure A 10 Route 7 Demographics – Limited and Non-English Speaking Households

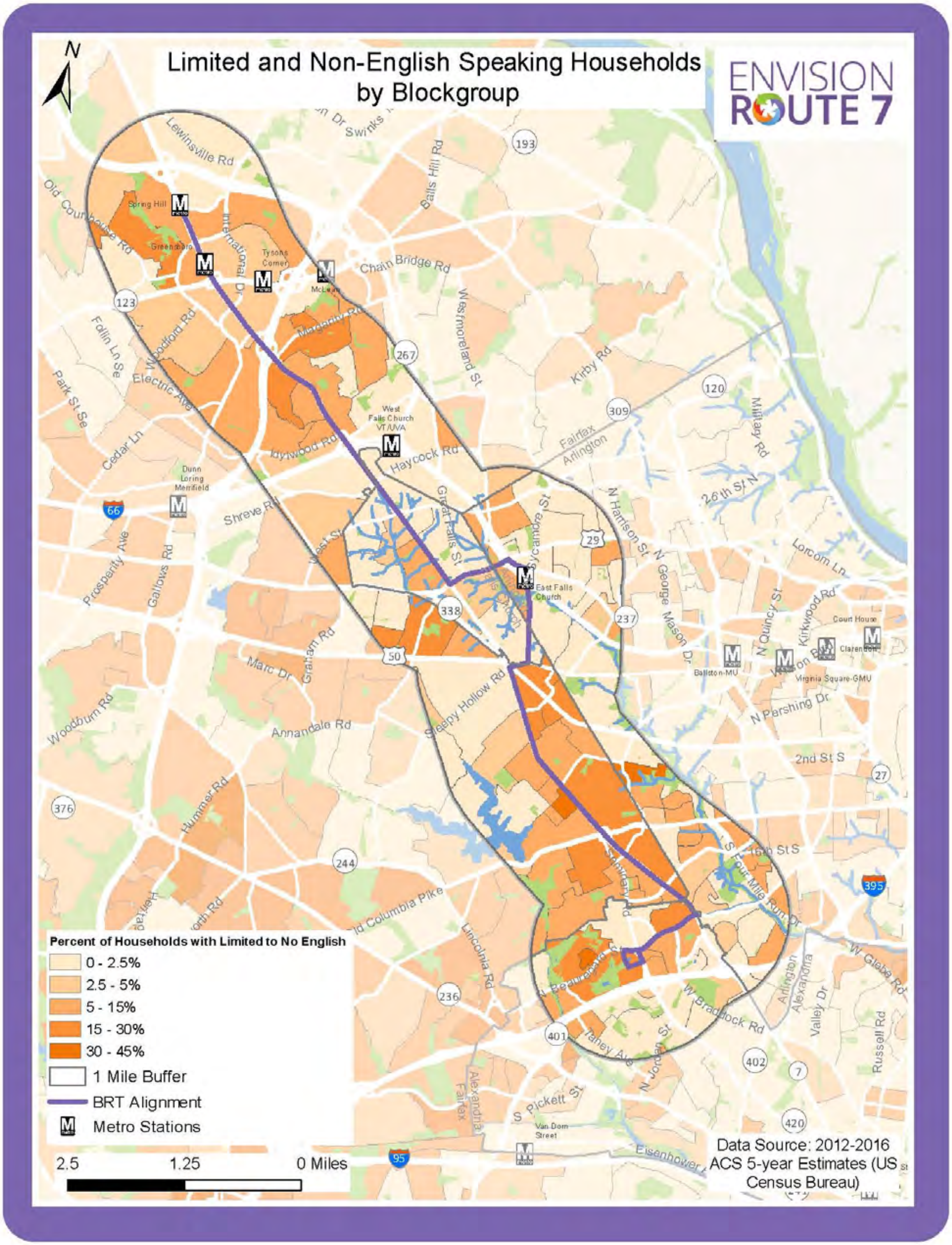


Figure A 11 Route 7 Demographics – Poverty

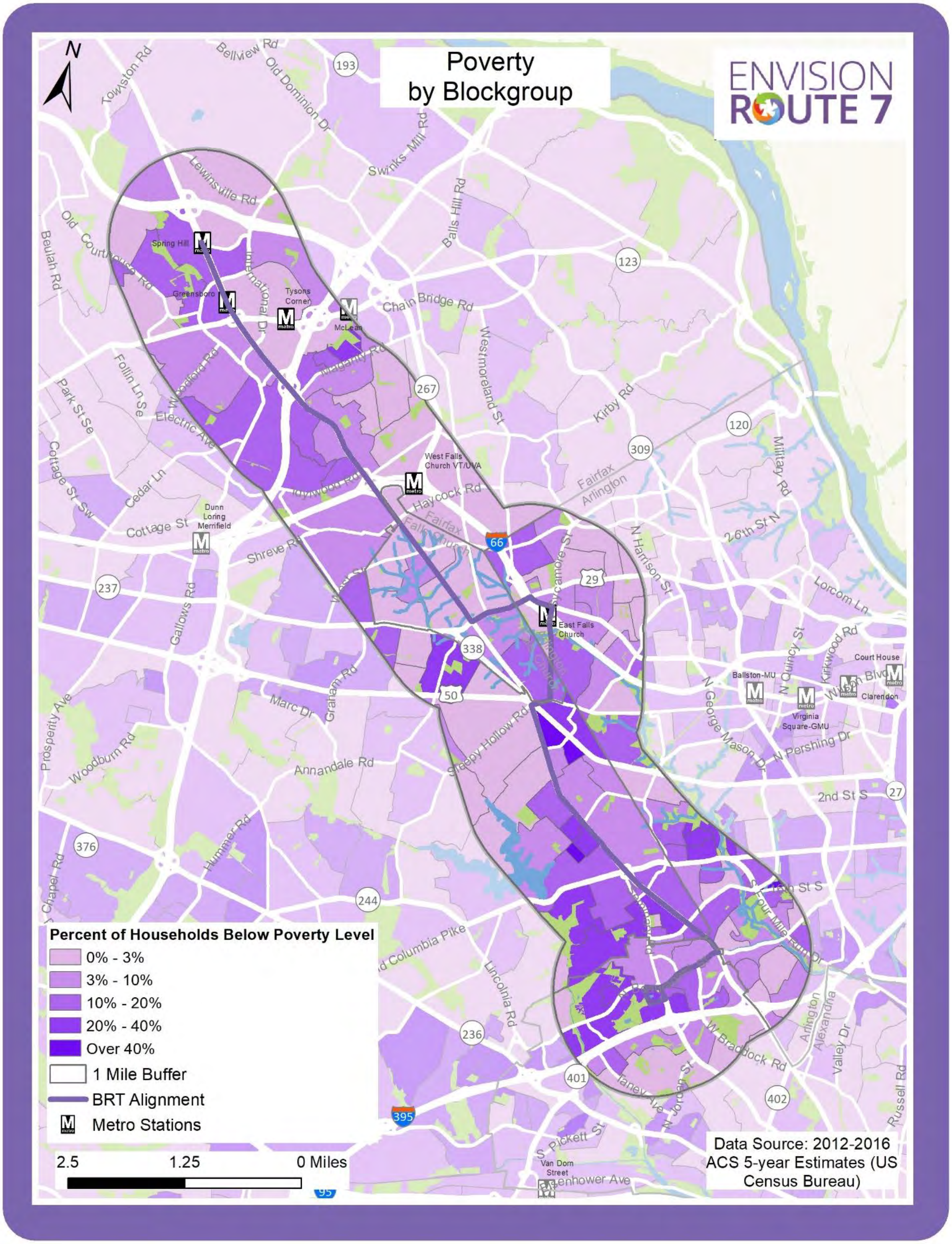
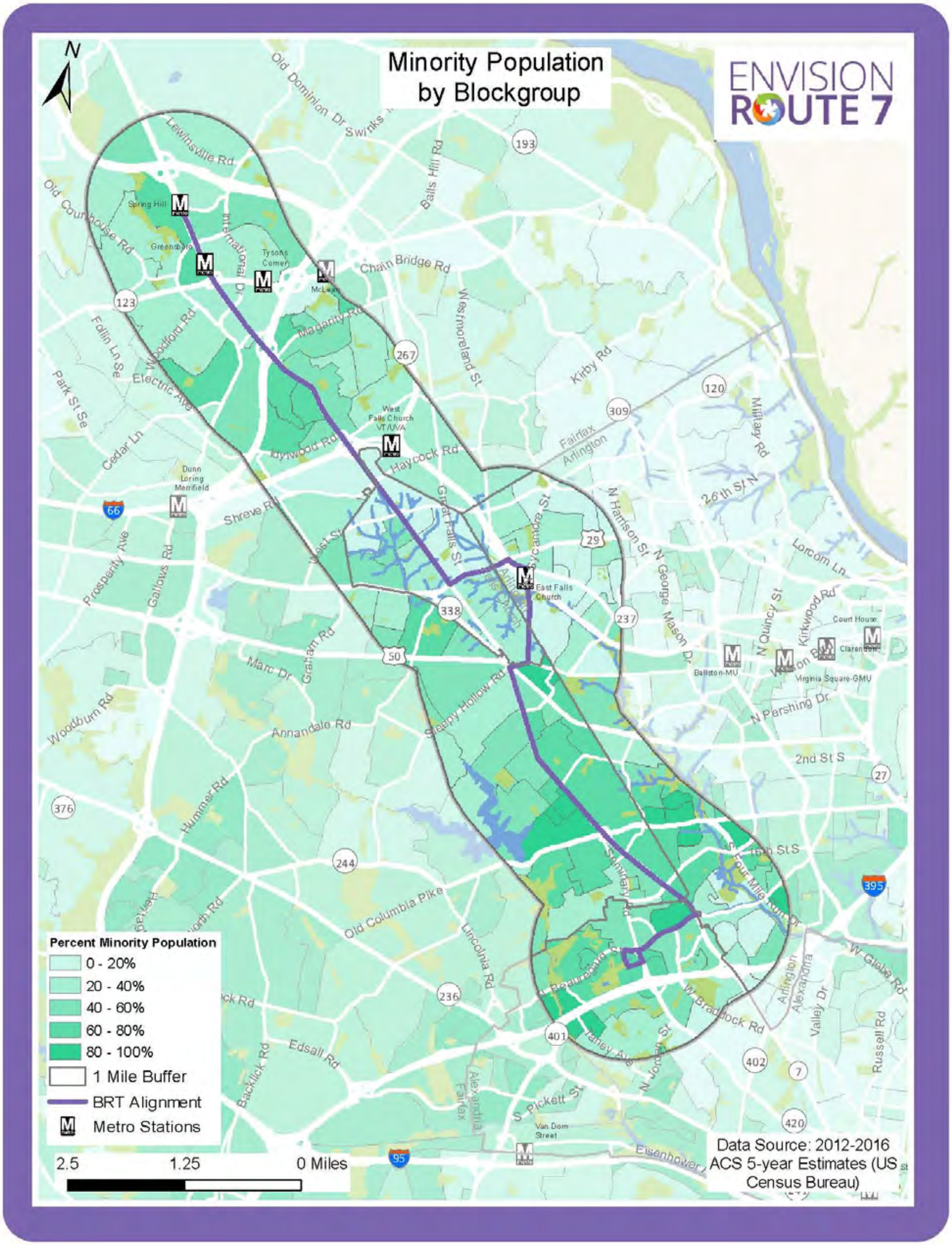


Figure A 12 Route 7 Demographics – Minority Population



PROPERTY AND LAND USE

Current land use and future land use was mapped.

Baseline Conditions – Current Land Use

Current land use data forall four jurisdictions located along the corridor was mapped: Fairfax County, Falls Church, Arlington County, and the City of Alexandria. Figure A 13, Figure A 14, and Figure A 15 show current land use by parcel located in the northern, central, and southern portions of the corridor, respectively.

As shown in Figure A 13, Figure A 14, and Figure A 15, the Envision Route 7 corridor is comprised of a wide mix of land uses dominated by single-family housing. Multi-family residential pockets can be observed in Tysons Corner, Seven Corners, Bailey's Crossroads and Western Alexandria. These residential land uses are primarily set back from the corridor in neighborhoods of varying densities and age.

Parcels immediately fronting the corridor include commercial uses, office buildings, institutional uses, and very few industrial uses. Pockets of educational uses including public schools and Northern Virginia Community College can be found throughout the corridor. Very few vacant land uses are located directly on the corridor.

Figure A 13 Route 7 Current Land Use – Northern Corridor Section

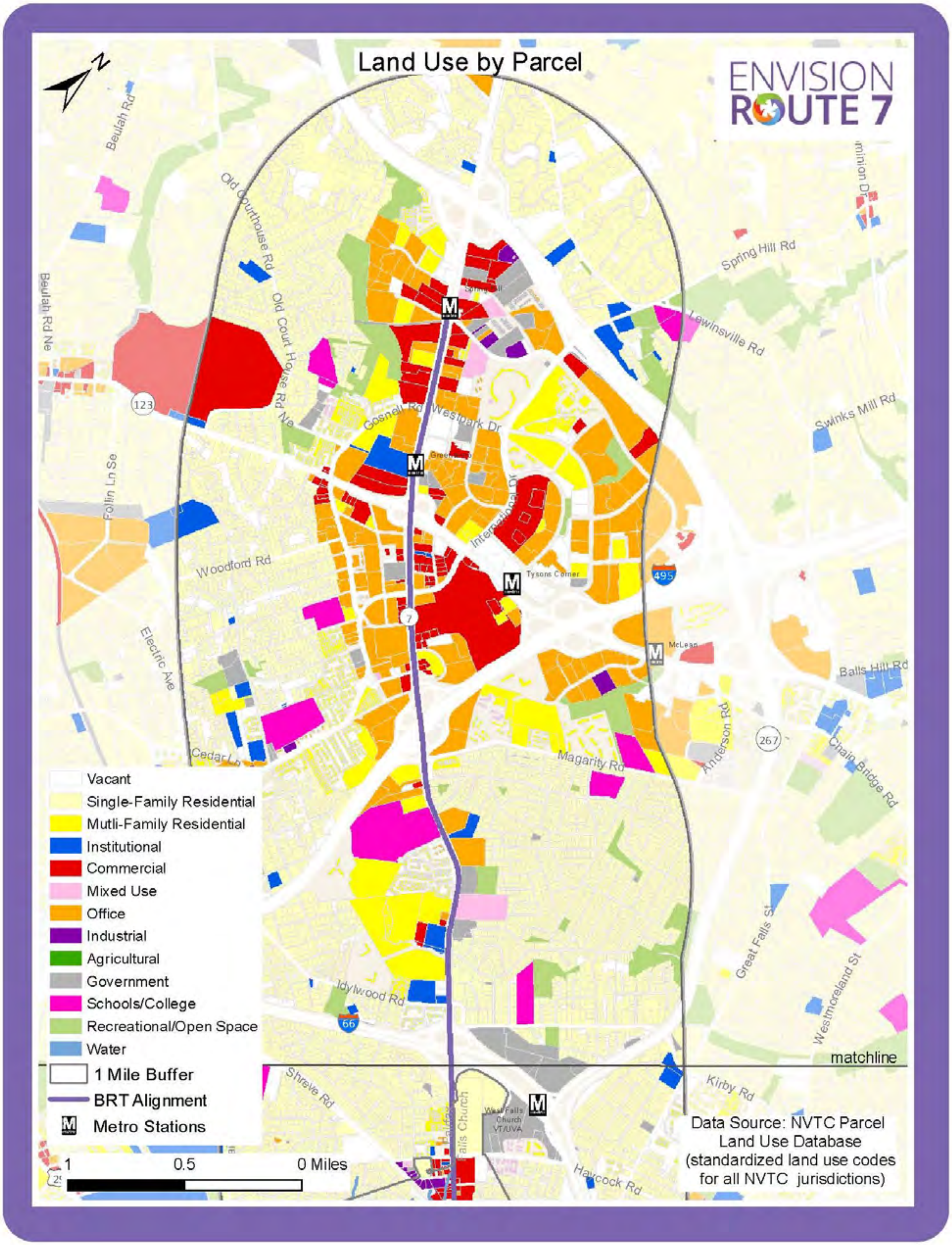


Figure A 14 Route 7 Current Land Use – Central Corridor Section

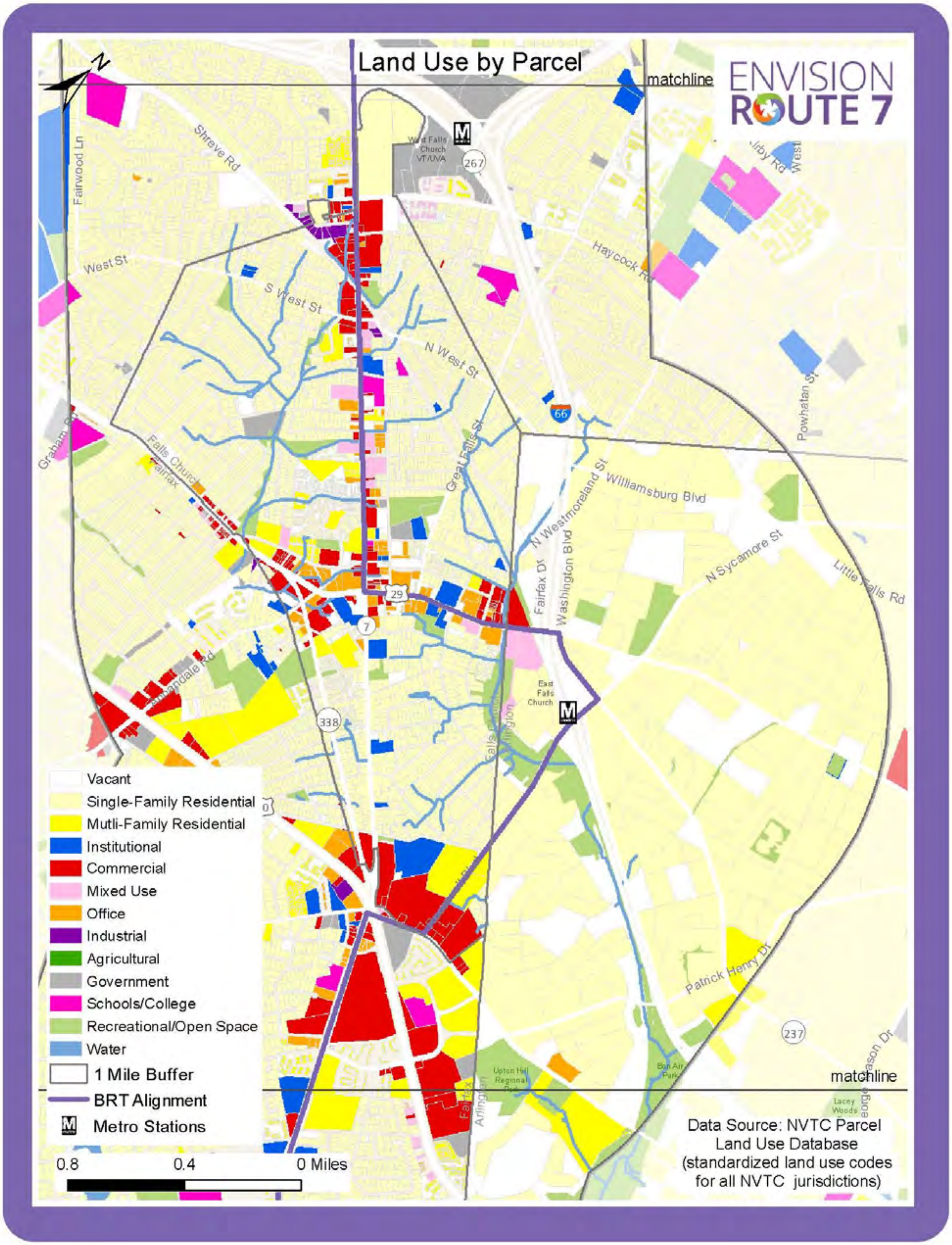
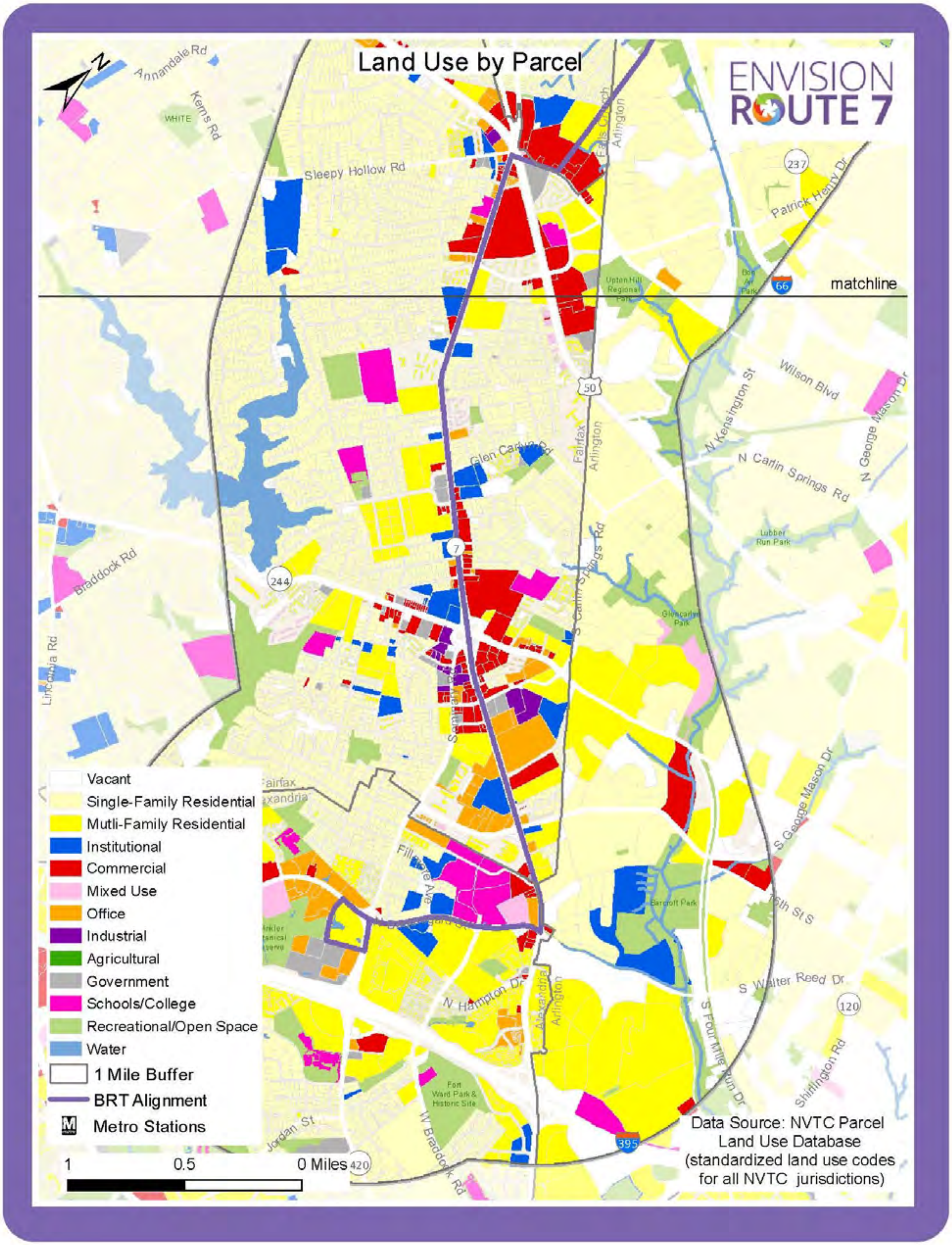


Figure A 15 Route 7 Current Land Use – Southern Corridor Section



Baseline Conditions – Future Land Use

Future land use with data from the Metropolitan Washington Council of Governments' (MWCOG) cooperative population and employment forecasts was mapped. The 2040 population and employment density by traffic analysis zone (TAZ) was mapped (Figure A 16, Figure A 17), and the percent change over time in population and employment density was assessed (Figure A 18, Figure A 19).

Population density along the full length of the corridor is projected to increase except to the south of Beauregard Street. The highest increases in population growth are projected to occur in the Tysons Corner District. Other areas with high projected population growth include the TAZs near the McLean Metro Station in the Vienna and Pimmit Hills District, the Bailey's Crossroads area in multiple districts and the area north of Beauregard Street.

Employment density is projected to increase along most of the Envision Route 7 corridor, with a few exceptions. Employment density is projected to have major increases in some portions of the Tysons Corner District while slight decreases are expected in other sections of this District where land use will transition from employment focused land uses to residential focused land uses. In addition, more moderate increases in employment density are expected in the West Falls Church District, Seven Corners District, Skyline District and Shirlington-Fairlington-Beauregard District.

Figure A 16 Route 7 Future Land Use - Population Density

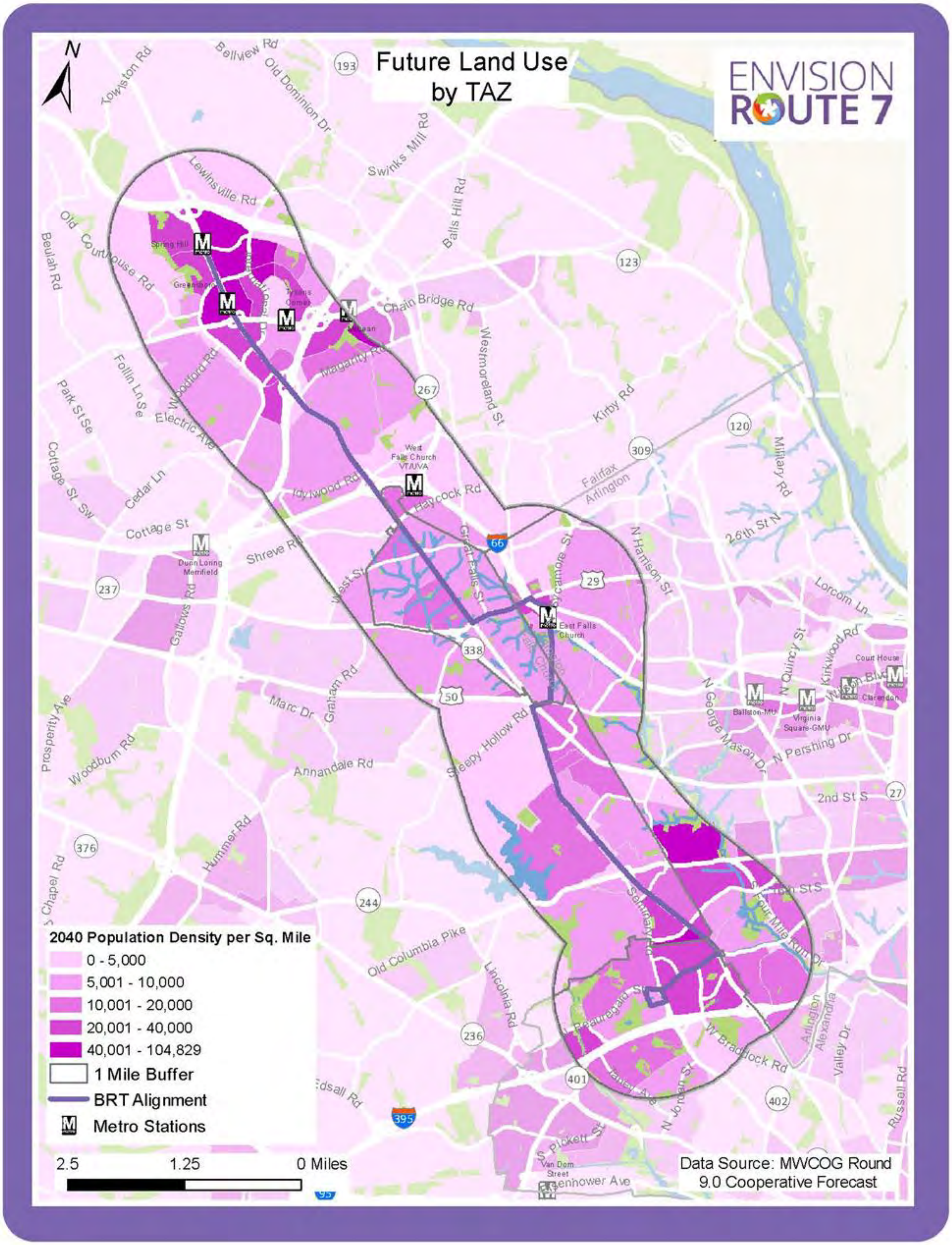


Figure A 17 Route 7 Future Land Use – Employment Density

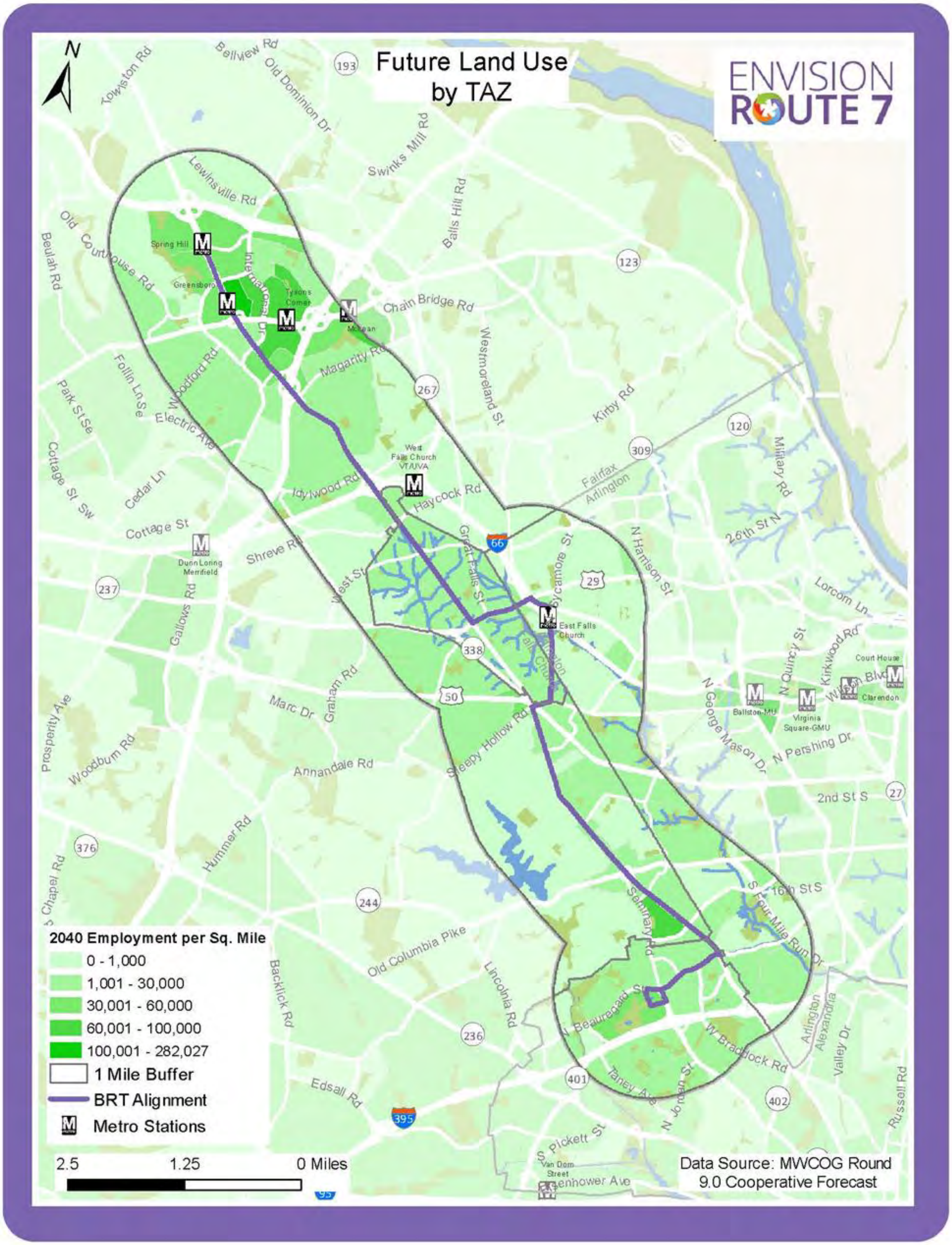


Figure A 18 Change Over Time in Population Density (2020 – 2040)

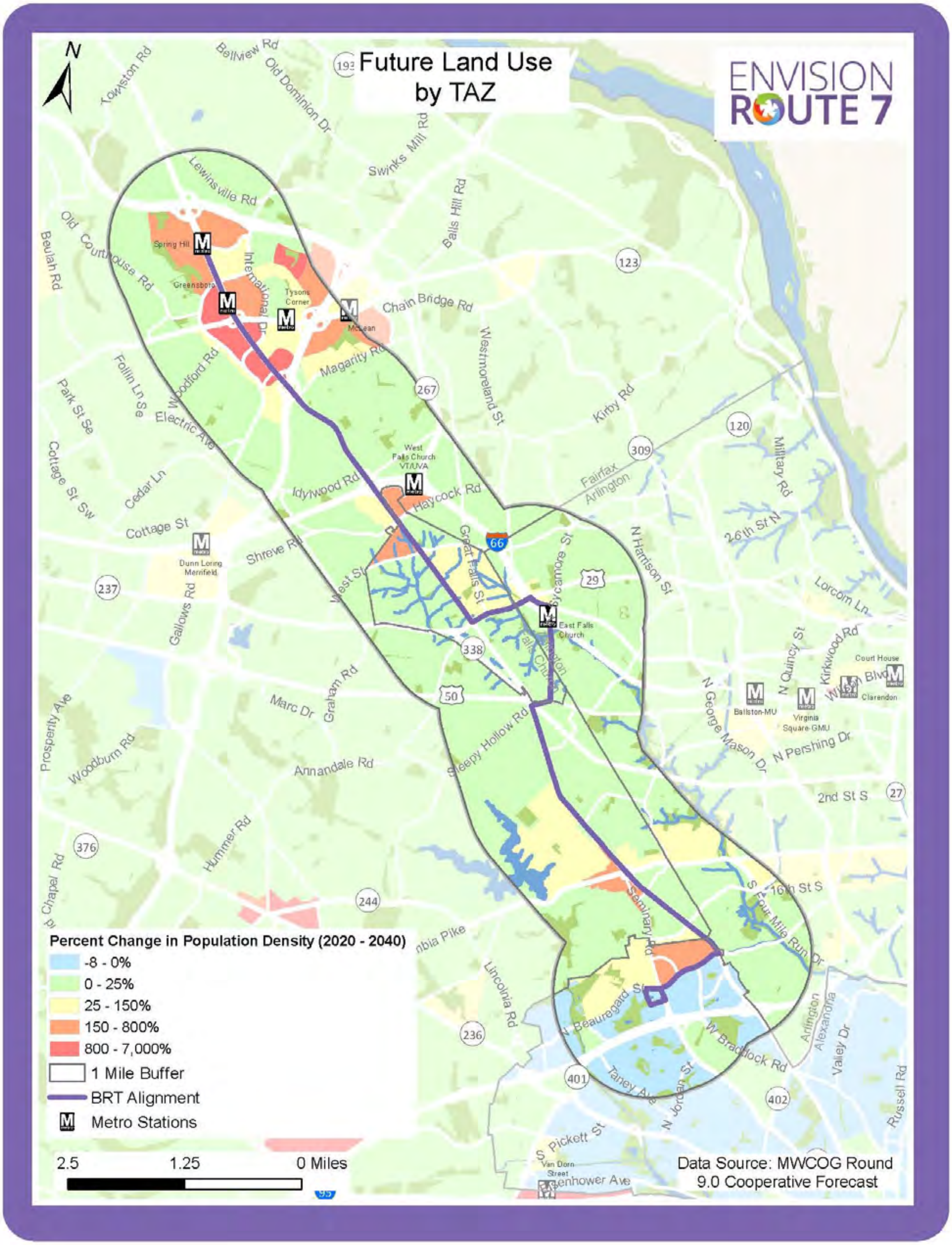
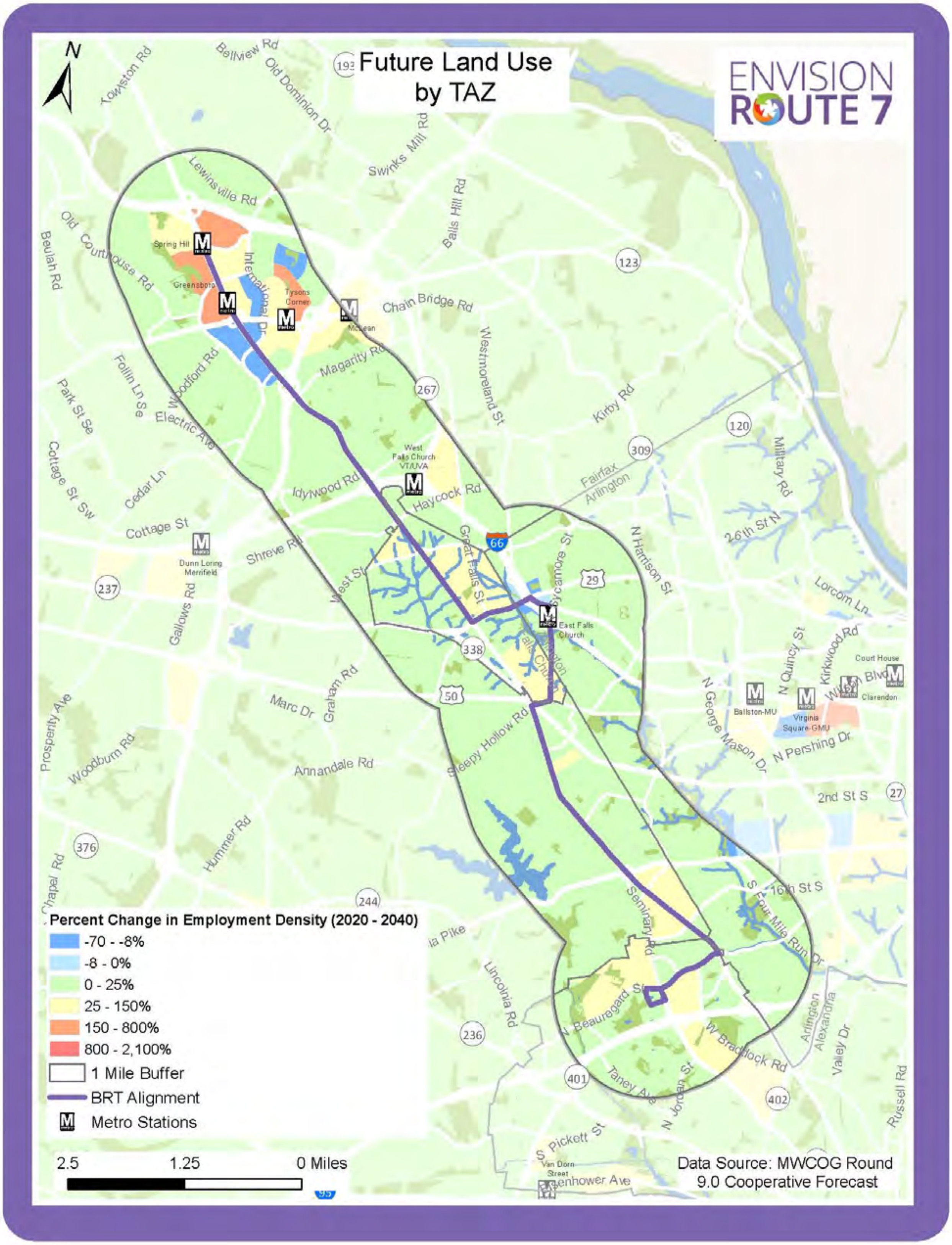


Figure A 19 Change Over Time in Employment Density (2020 – 2040)



ENVIRONMENTAL AND CULTURAL RESOURCES

Environmental resources and cultural resources were mapped.

Baseline Conditions – Environmental Resources

Environmental resources from Virginia Department of Environmental Quality (VDEQ), National Fish and Wildlife Service (FWS), and open data from local jurisdictions were mapped. Figure A 20, Figure A 21, and Figure A 22 show environmental resources including storage tanks, wetlands, stormwater easements, resource protection areas and parks located in the northern, central, and southern portions of the corridor, respectively.

Wetlands

Riverine wetlands located on or near the Envision Route 7 Corridor can be found:

- South of Route 7 and west of Gosnell Road in Tysons
- Intersecting Route 7 west of Idylwood Road and Route 66
- Intersecting Route 29 south of Route 66
- Intersecting Roosevelt Boulevard south of Route 66

Resource Protection Areas

Resource Protection Areas (RPAs) are corridors of environmentally sensitive land that lie alongside or near the shorelines of waterways which drain into the Potomac River and the Chesapeake Bay. RPAs located on or near the Envision Route 7 Corridor can be found:

- Intersecting Route 7 west of Idylwood Road and Route 66
- Intersecting Route 29 south of Route 66
- Intersecting Roosevelt Boulevard south of Route 66

Open Space and Parkland

Major open space and parkland is located on or near the Envision Route 7 Corridor at:

- West End Park (North side of Route 7 north of North West Street)
- Isaac Crossman Park, East Falls Church Park, Benjamin Banneker Park, and Madison Manor Park (this group of parks cross N Roosevelt Street south of Route 66)
- Winkler Botanical Preserve (South of Mark Center Drive)

Figure A 20 Route 7 Environmental Resources - Northern Corridor Section

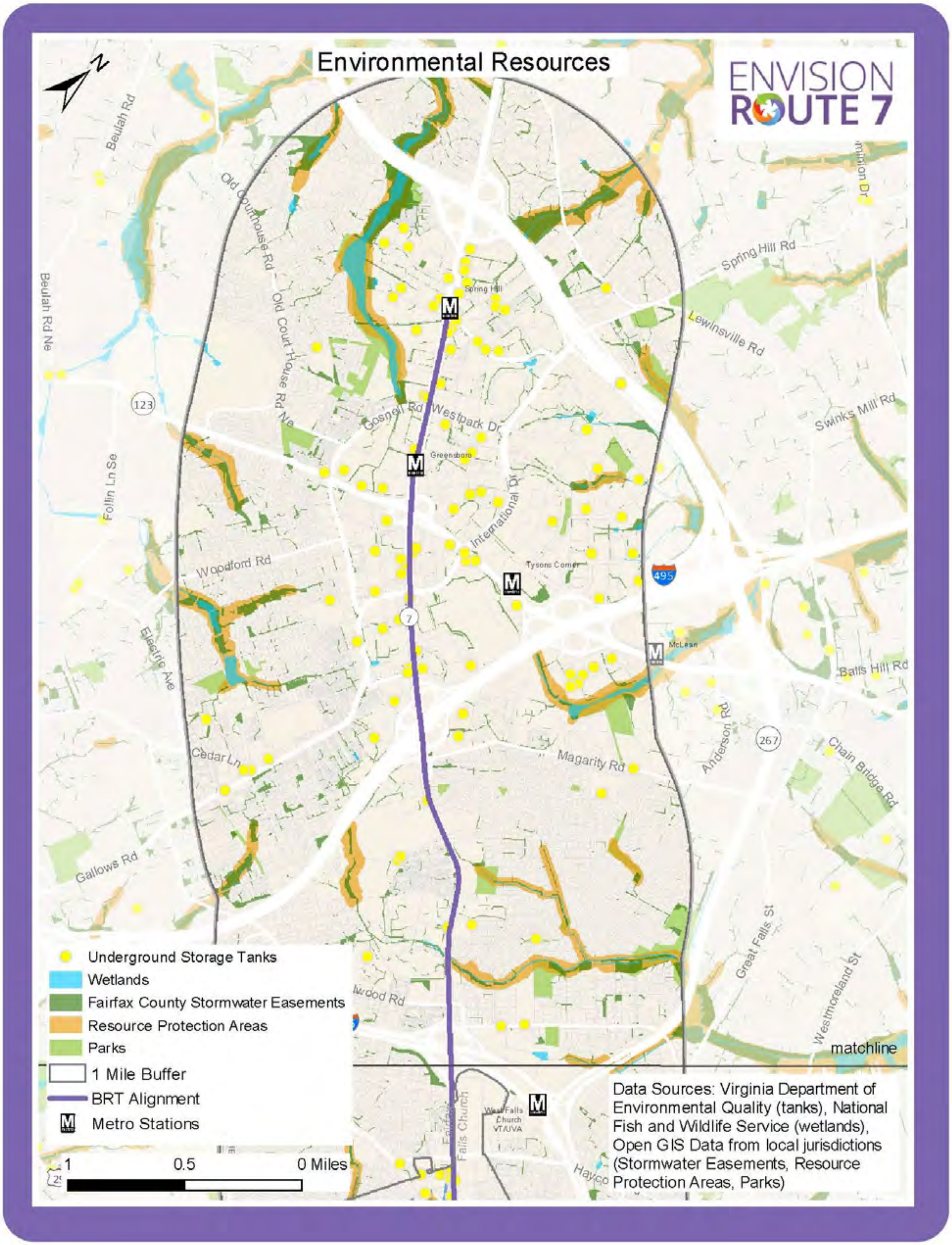


Figure A 21 Route 7 Environmental Resources – Central Corridor Section

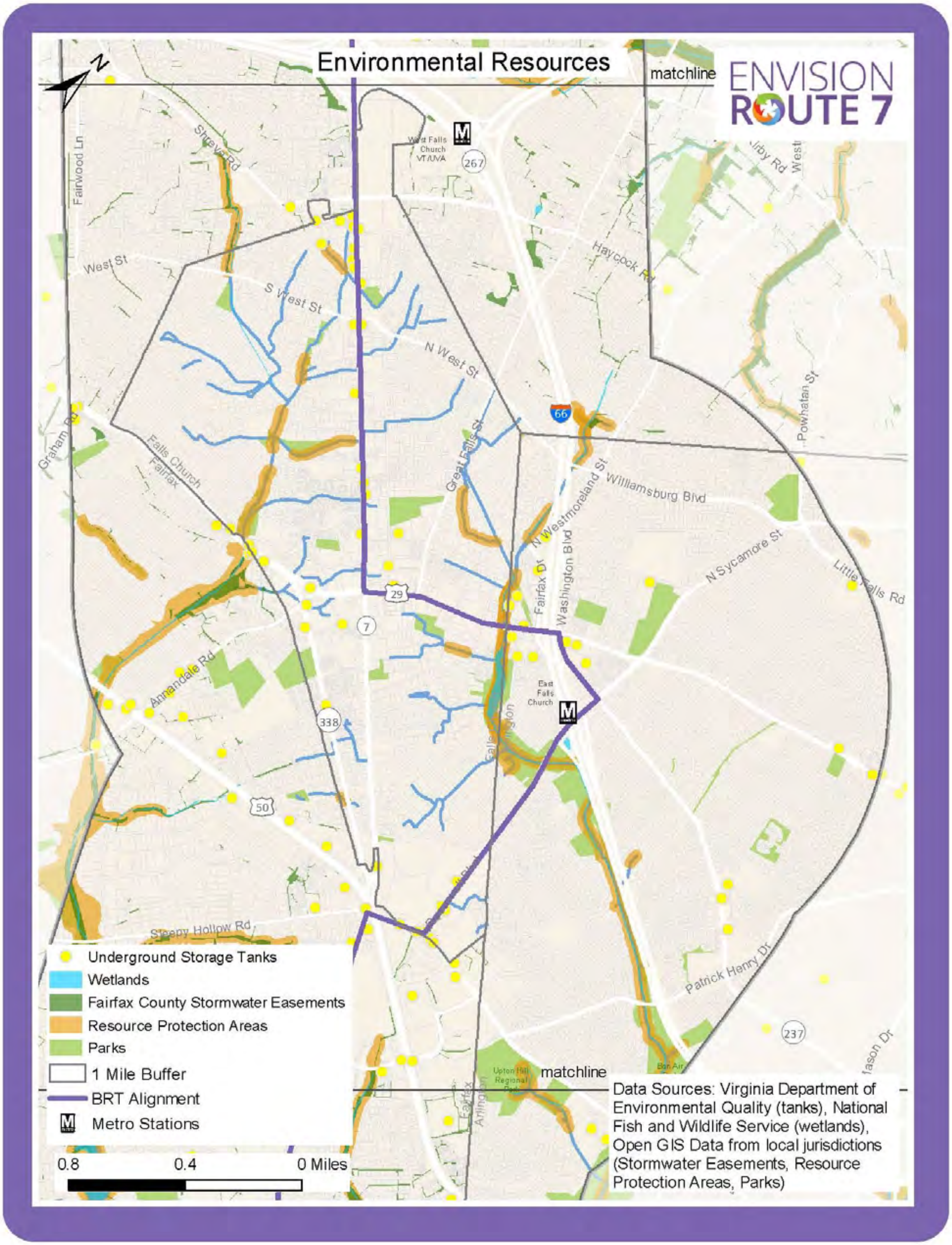
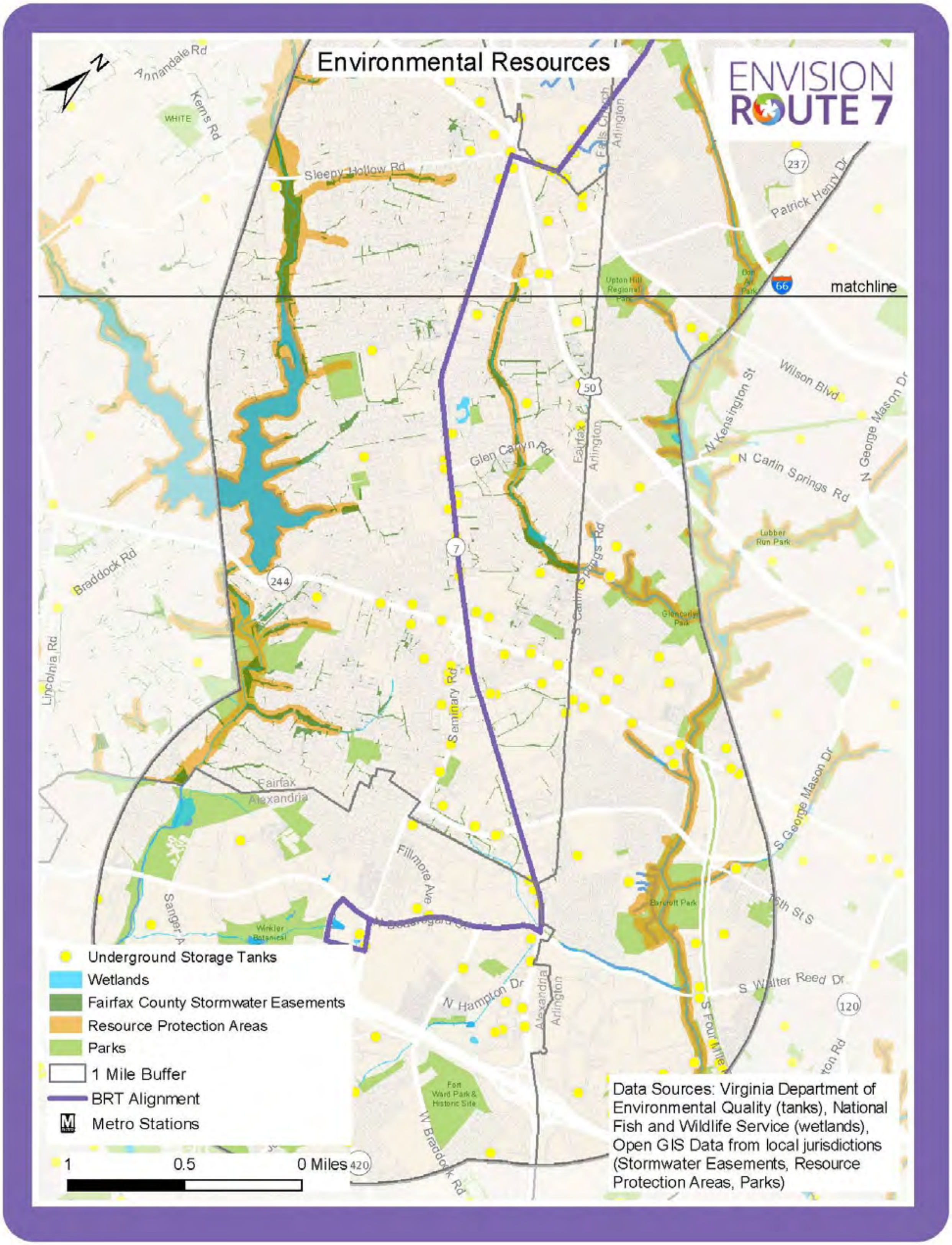


Figure A 22 Route 7 Environmental Resources – Southern Corridor Section



Baseline Conditions – Cultural Resources

Cultural resources using land use data from NVTC and open GIS data from local jurisdictions were mapped. Figure A 23 shows the number and type of cultural resources that are located within 500 feet of the study corridor. Figure A 24, Figure A 25, and Figure A 26 show cultural resources located in the northern, central, and southern portions of the corridor, respectively. Three historic sites are located directly along the potential route:

- Eastman-Fenwick House
    - Arlington County National Historic Point
    - Located at the intersection of Route 66 and Route 29
- Falls Church Episcopal Church
    - National Register of Historic Places
    - Located at the Intersection of Route 7 and Route 29
- SW No. 5 Boundary Marker
    - Arlington County National Historic Point
    - Located at the intersection of Route 7 and South Walter Reed Drive

One historic district, Claremont, is in Arlington County near the intersection of Route 7 and South Walter Reed Drive.

Figure A 23 Cultural Resources within 500 feet of Study Area

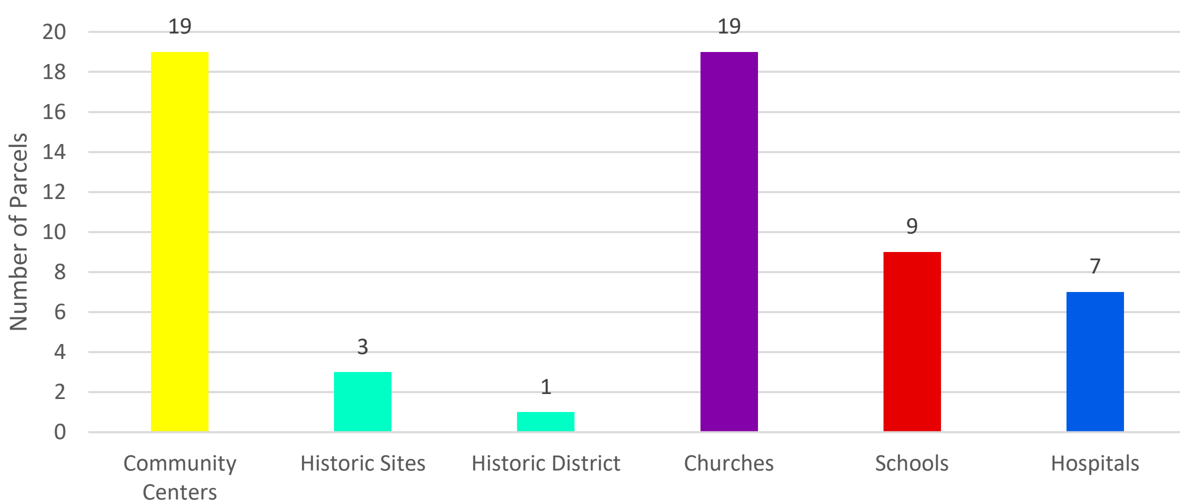


Figure A 24 Route 7 Cultural Resources – Northern Corridor Section

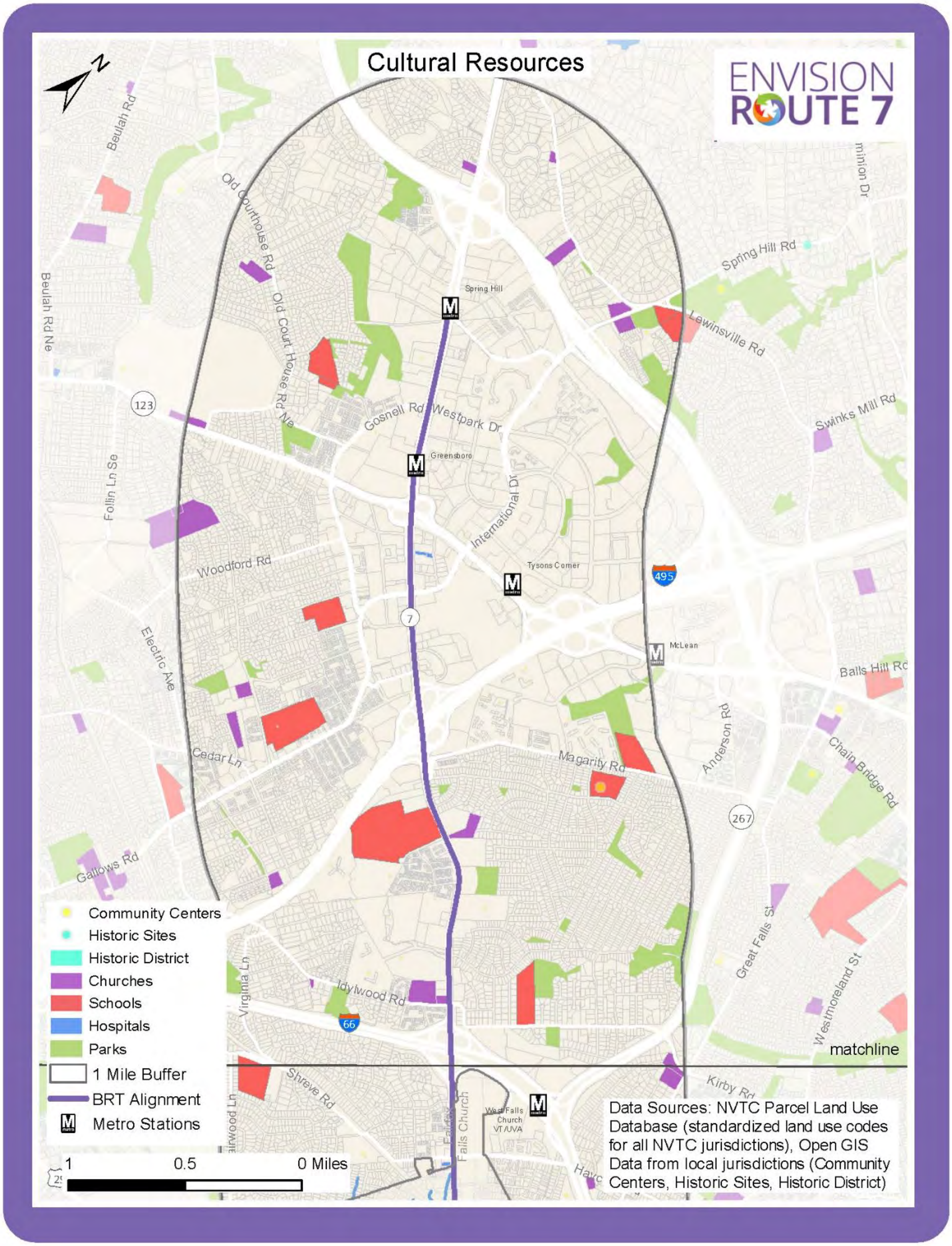


Figure A 25 Route 7 Cultural Resources – Central Corridor Section

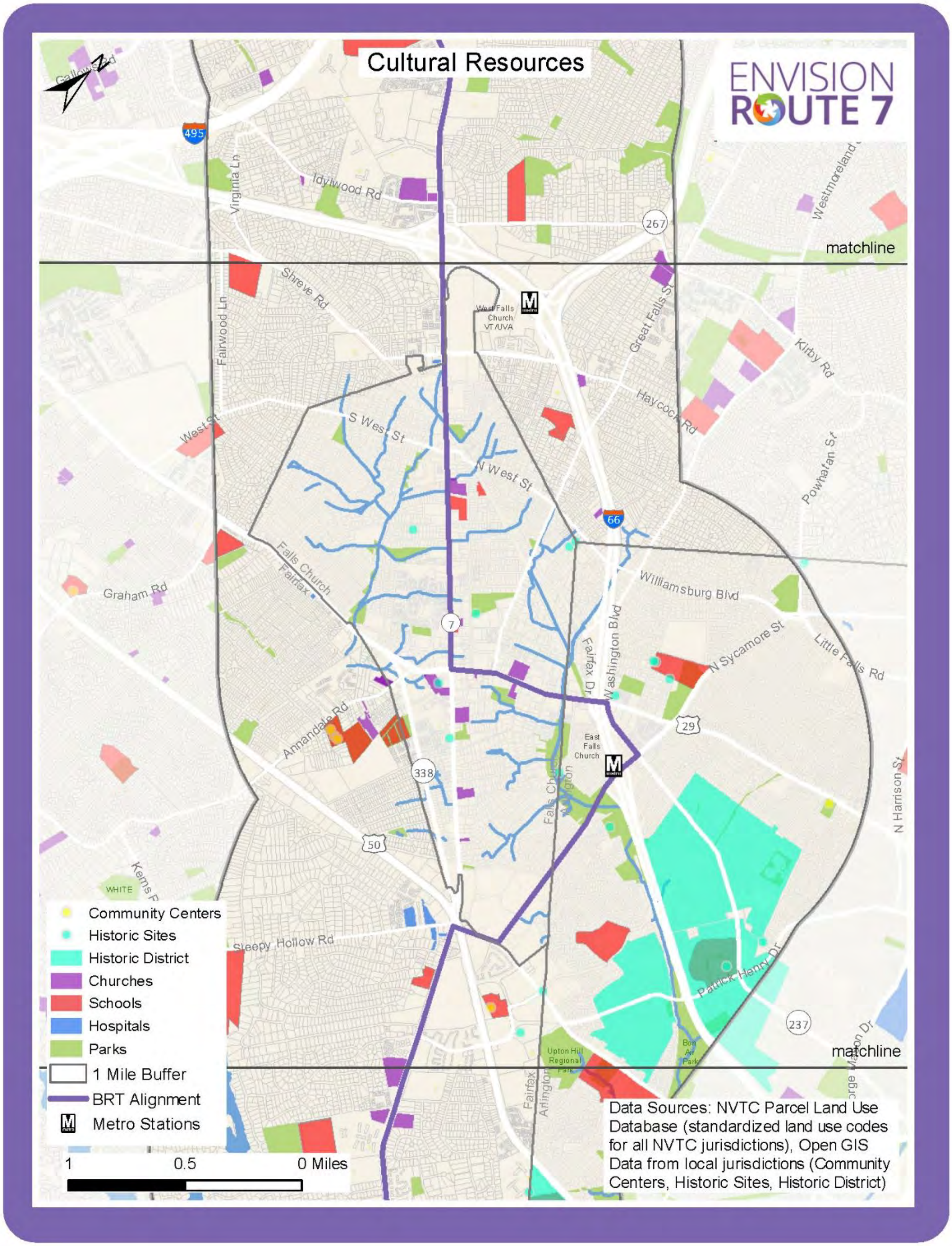
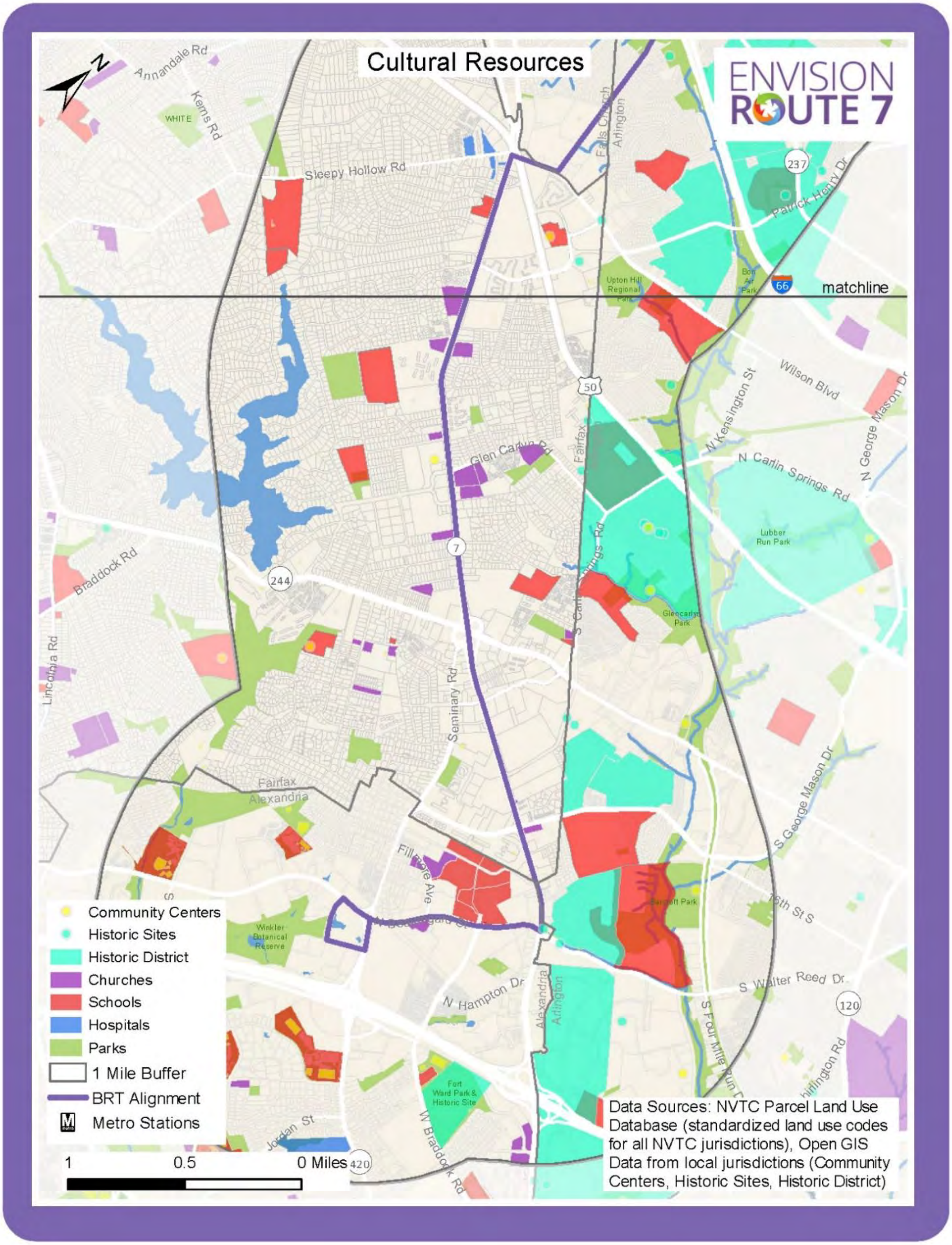


Figure A 26 Route 7 Cultural Resources - Southern Corridor Section



GIS DATA DICTIONARY -- FILES IN GEODATABASE

Alexandria

File name	Description	Source
AlexandriaLandUsePolygons_SpatialJoin	Parcel polygon layer that has been spatially joined to land use parcel point layer.	Northern Virginia Transportation Commission (NVTC) Parcel Land Use Geodatabase; Kittelson & Associates, 2018
Alexandria_Parcels	Location of parcels.	Northern Virginia Transportation Commission (NVTC) Parcel Geodatabase
Hydrology	Polygon feature representing larger hydrologic features in the City of Alexandria, Virginia. Provides location of all streams, rivers, and lakes larger than 5 feet in width.	Alexandria GIS (AlexGIS)
Park	This polygon layer provides the location of all areas within the City of Alexandria that are maintained in some capacity by the City's Recreation, Parks & Cultural Activities Department	Alexandria GIS (AlexGIS)
Recreation_Amenity	A polygon feature representing Park & Recreation Department amenities for the City of Alexandria, Virginia. Provides location and description of public facilities maintained by the Park & Recreation Department, City of Alexandria, Virginia.	Alexandria GIS (AlexGIS)

Arlington County

File name	Description	Source
ArlingtonLandUsePolygons_SpatialJoin	Parcel polygon layer that has been spatially joined to land use parcel point layer.	Northern Virginia Transportation Commission (NVTC) Parcel Land Use Geodatabase; Kittelson & Associates, 2018
Arlington_Parcels	Location of parcels.	Northern Virginia Transportation Commission (NVTC) Parcel Geodatabase
County_Facilities	Boundaries and facilities for Arlington County, Virginia. Community Centers in Arlington County.	Arlington GIS (arlgis)
National_Historic_Points	Boundaries and facilities for Arlington County, Virginia. Historic Points in Arlington County.	Arlington GIS (arlgis)
National_Historic_Poly	Boundaries and facilities for Arlington County, Virginia. Historic Polygons in Arlington County.	Arlington GIS (arlgis)
Nature_Centers	Boundaries and facilities for Arlington County, Virginia. Nature centers in Arlington County.	Arlington GIS (arlgis)
Park	Boundaries and facilities for Arlington County, Virginia. Arlington County Parks, NVRPA Parks, and Private Open Space.	Arlington GIS (arlgis)
Resource_Protection_Buffer	Feature service for Streams, Soils, Resource Protection Areas, and Geology layers. Resource Protection Areas for Arlington County.	Arlington GIS (arlgis)
Streams	Feature service for Streams, Soils, Resource Protection Areas, and Geology layers. Location of culverts and streams in Arlington County.	Arlington GIS (arlgis)

Fairfax County

File name	Description	Source
Community_Centers	The locations of the community centers within Fairfax County which includes data type TC = Teen Center, SC = Senior Center, CC = Community Center, RC = Rec Center, and MC = Multicultural Center.	Fairfax County GIS (FairfaxCounty)
Community_Pools	The visible pools that belong to a community but not to individual properties. This includes outdoor pools at recreation sites and outdoor pools at hotels and condominium complexes and multi-family residential complexes such as rental communities within Fairfax County.	Fairfax County GIS (FairfaxCounty)
FaifaxCountyPolygons_SpatialJoin	Parcel polygon layer that has been spatially joined to land use parcel point layer.	Northern Virginia Transportation Commission (NVTC) Land Use Parcel Geodatabase; Kittelson & Associates, 2018
Fairfax_Parcels	Location of parcels.	Northern Virginia Transportation Commission (NVTC) Parcel Geodatabase
Historic_Sites	Locations of historic sites within Fairfax County.	Fairfax County GIS (FairfaxCounty)
Resource_Protection_Areas	Sensitive areas along streams throughout Fairfax County that have been designated as Resource Protection Areas. These are general locations of RPA boundaries for planning purposes and the actual limits may be further refined by detailed field studies conducted at the time a plan is submitted to obtain a permit to develop a property.	Fairfax County GIS (FairfaxCounty)

File name	Description	Source
Stormwater_Easements	Stormwater easements (ex: storm drainage, storm sewer, floodplain) as captured from recorded plats using coordinate geometry (COGO) capture method. All easements are contained within the Fairfax County boundary.	Fairfax County GIS (FairfaxCounty)
Water_Features_polys	Hydrography covering Fairfax County, developed/updated from 2009 stereo models. This dataset captures lakes, ponds, streams, rivers, etc. within the established constraints of the dataset development.	Fairfax County GIS (FairfaxCounty)

Falls Church

File name	Description	Source
Falls_Church_Parcels	Location of parcels.	Northern Virginia Transportation Commission (NVTC) Parcel Geodatabase
FallsChurchPolygons_SpatialJoin	Parcel polygon layer that has been spatially joined to land use parcel point layer.	Northern Virginia Transportation Commission (NVTC) Land Use Parcel Geodatabase; Kittelson & Associates, 2018
Parks	City maintained Parks within the City of Falls Church.	Falls Church GIS (FallsChurchMaps)
ResourceProtectionArea	Resource Protection Areas (RPAs) are the corridors of environmentally sensitive land that lie alongside or near the shorelines of streams, rivers and other waterways which drain into the Potomac River and eventually into the Chesapeake Bay. In their natural condition, RPAs protect water quality, filter pollutants out	Falls Church GIS (FallsChurchMaps)

File name	Description	Source
	of stormwater runoff, reduce the volume of stormwater runoff, prevent erosion and perform other important biological and ecological. Development in RPAs is regulated by the Chesapeake Bay Preservation Ordinance, enacted by the Board of Supervisors in 1993.	
Streams	Streams within the City of Falls Church.	Falls Church GIS (FallsChurchMaps)

All

File name	Description	Source
1milebuffer	1 mile buffer area around the BRT potential route alignment.	Kittelson & Associates, 2018
Age	Proportion of population age groups per block group	American Community Survey (ACS) 2016 (5-Year Estimates)
crbldg_pt	National Historic Places registry building points.	U.S. National Park Service (NPS); National Register of Historic Places Geodatabase
crobj_pt	National Historic Places registry object points.	U.S. National Park Service (NPS); National Register of Historic Places Geodatabase
crsite_py	National Historic Places registry site polygons.	U.S. National Park Service (NPS); National Register of Historic Places Geodatabase

File name	Description	Source
LimitedEnglish	Proportion of limited and non-English speaking households per block group.	American Community Survey (ACS) 2016 (5-Year Estimates)
Metro_Stations_Regional	Location of metro stations.	Washington Metropolitan Area Transit Authority (WMATA)
MHI	Total population divvied out by median household income per block group.	American Community Survey (ACS) 2016 (5-Year Estimates)
nps_boundary	Location of National Parks.	U.S. National Park Service (NPS)
Points	Projected Daily Ridership for potential station locations.	Kittelson & Associates, 2018
Population_Density	Total population divvied divided by square mile for each block group.	American Community Survey (ACS) 2016 (5-Year Estimates)
Poverty	Total households divvied out by poverty status per block group.	American Community Survey (ACS) 2016 (5-Year Estimates)
projectboundary	Extents for project area.	Kittelson & Associates, 2018
Race	Total population divvied out by race per block group.	American Community Survey (ACS) 2016 (5-Year Estimates)
Reg_Tank_Facilities	Registered underground storage tanks.	Virginia Department of Enviornmental Quality (VDEQ) Registered Tanks Geodatabase

File name	Description	Source
Rt7_BRT_Alignment_VirginiaStatePlane	Potential BRT route for project.	Kittelson & Associates, 2018
TAZ_Cooperative_join	Shapefile containing the Metropolitan Washington Council of Governments' (MWCGO) 9th cooperative population and employment forecasts.	Metropolitan Washington Council of Governments (MWCOG)
VA_Centerline	Roadway centerlines for the state of Virginia.	Virginia_RCL_Dataset Geodatabase
VA_Wetlands	Locations in Virginia that include Estuarine and Marine Deepwater, Estuarine and Marine Wetland, Freshwater Ponds, Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetland, Lakes, and Riverine	National Fish & Wildlife Services (FWS)
VDOT_Existing_ADT_NoVa_Clipped	ADT for roads clipped to the study area.	Virginia Department of Transportation (VDOT)
ZeroCar	Total households divvied out by car leasing/ownership for each block group.	American Community Survey (ACS) 2016 (5-Year Estimates)

FIELD NAMES AND DESCRIPTIONS

File name	Field Name	Field Description	Data Type	Notes
Age	PercCombo	Percent of population below 18 and above 65 per block group.	Double	Identifies populations in need of effective transit service.
AlexandriaLandUsePolygons_SpatialJoin	dor_uc	Land use code.	Long	Informs conversations around station placement and right-of-way availability.
ArlingtonLandUsePolygons	dor_uc	Land use code.	Long	Informs conversations around station placement and right-of-way availability.
Crbldg_pt	Source	Location of buildings located on the National Register of Historic Places	Text	Informs system design decisions to minimize impacts and project costs.
Crobj_pt	Source	Location of objects located on the National Register of Historic Places	Text	Informs system design decisions to minimize impacts and project costs.

File name	Field Name	Field Description	Data Type	Notes
Crsite_py	Source	Location of sites located on the National Register of Historic Places	Text	Informs system design decisions to minimize impacts and project costs.
FaifaxCountyPolygons_SpatialJoin	LU_Code	Land use code.	Long	Informs conversations around station placement and right-of-way availability.
FallsChurchPolygons_SpatialJoin	dor_uc	Land use code.	Long	Informs conversations around station placement and right-of-way availability.
Historic_Sites	Description	Name of historic sites in Fairfax County	Text	Informs system design decisions to minimize impacts and project costs.
LimitedEnglish	PercNonEng	Percent per block group that speaks no or limited English.	Double	Identifies populations in need of effective transit service.

File name	Field Name	Field Description	Data Type	Notes
MHI	MHI	Median Household Income.	Double	Identifies populations in need of effective transit service.
National_Historic_Points	Location	Location of historic points in Arlington County	Text	Informs system design decisions to minimize impacts and project costs.
National_Historic_Poly	District	Location of historic Districts in Arlington County	Text	Informs system design decisions to minimize impacts and project costs.
Park, Park, County_Parks, Parks	Shape_Length	Locations of existing parks	Double	Informs system design decisions to minimize impacts and project costs.
Points	DailyRidership	Daily boardings and alightings at each proposed station area	Long	Informs discussions about station placement and typology.
Population_Density	PopDen	Total Population per square	Double	Identifies populations in need of

File name	Field Name	Field Description	Data Type	Notes
		mile for each block group.		effective transit service.
Poverty	PercUn150	Percent of the population within each block group that is living under 150% of the poverty level.	Double	Identifies populations in need of effective transit service.
Race	PercMinori	Percent per block group that is non-white and/or Latino.	Double	Identifies populations in need of effective transit service.
ResourceProtectionArea	Status	Location of existing RPAs	Text	Informs system design decisions to minimize impacts and project costs.
Resource_Protection_Areas	Type	Location of existing RPAs	Text	Informs system design decisions to minimize impacts and project costs.
Resource_Protection_Buffer	KEEP	Location of existing RPAs	Text	Informs system design decisions to minimize

File name	Field Name	Field Description	Data Type	Notes
				impacts and project costs.
TAZ_Cooperative_join	ChPop2_4	Change in projected population density between 2020 and 2040	Double	Informs system design decisions to account for the future needs of surrounding neighborhoods.
TAZ_Cooperative_join	ChEmp2_4	Change in projected employment density between 2020 and 2040	Double	Informs system design decisions to account for the future needs of surrounding neighborhoods.
TAZ_Cooperative_join	PopDen40SM	Future projected population density for 2040 (population per square mile).	Long	Informs system design decisions to account for the future needs of surrounding neighborhoods.
TAZ_Cooperative_join	Emp40SqMi	Future projected employment density for 2040 (employment per square mile).	Long	Informs system design decisions to account for the future needs of surrounding neighborhoods.

File name	Field Name	Field Description	Data Type	Notes
VA_Wetlands	WETLAND_TY	Wetland type	Text	Informs system design decisions to minimize impacts and project costs.
VDOT_Existing_ADT_NoVa_Clipped	ADT	Average daily traffic volumes.	Long	Informs discussions about station placement.
ZeroCar	PerNo1Car	Percent per block group with one or zero cars for the household.	Double	Identifies populations in need of effective transit service.

Appendix B: Highway and Development Plans

Appendix B: Highway and Development Plans

INTRODUCTION

Plans for changes to the transportation network in the study area and parcels with an active development proposal in the study area were documented. Additionally, an approach to gain the necessary rights-of-way for the proposed BRT project was identified. A corridor-wide review of proposed transportation projects and development plans was conducted. This information was obtained and organized as part of the Envision Route 7 Conceptual Engineering project.

Information was obtained and organized across the Route 7 Corridor's four jurisdictions: Fairfax County, City of Falls Church, Arlington County and City of Alexandria. Regional information from the Virginia Department of Transportation and the Virginia Department of Rail and Public Transportation was also obtained.

HIGHWAY PLANS

A variety of multi-modal plans along the Route 7 BRT alignment are being advanced by various agencies. A summary of these plans which discusses their potential interaction and relationship with the Route 7 BRT system is provided. Most of the planned improvements will enhance multi-modal access to the proposed stations. The summary of plans is organized by corridor geography:

- Area 1: Southern end of the corridor including the Mark Center area
- Area 2: Central corridor including Baileys Crossroads/Seven Corners, East Falls Church, and Falls Church City
- Area 3: Northern end of the corridor including the neighborhoods of Pimmit Hills/Idylwood and Tysons

Area 1: Southern-End of Corridor

The southern end of the corridor focuses on the City of Alexandria and includes the area around the Mark Center as well as the Beauregard Corridor.

Mark Center Area

The Route 7 BRT will terminate at the Mark Center Transit Center. The Mark Center is a major employment area and the location of the Washington Headquarters Services (WHS) of the US Department of Defense (DoD) and other DoD agencies.

The City of Alexandria is planning to expand its existing **Mark Center Transit Center** to accommodate new BRT stations and layover facilities for two planned BRT lines, the Route 7 BRT and The West End Transitway.

Beauregard Corridor

The **West End Transitway** is a proposed 8-mile BRT line that will connect major transit facilities - Van Dorn Metro Station, Mark Center Transit Center, Shirlington Transit Center, and the Pentagon Transit Center. These two BRT lines will share a common alignment between King Street and the Mark Center, and the expanded Transit Center will be an important transfer area between the two BRT lines as well as other local routes. BRT operations are proposed mostly in mixed traffic between King Street and the Mark Center.

In 2017, the Commonwealth Transportation Board approved $10 million for the **West End Transitway – Southern Towers Segment** project. Set for implementation in 2022, this project will improve bus stops and shelters, and construct portions of the planned transit-only lanes through this area of high-density residential development and high transit ridership. The Route 7 BRT project will coordinate closely with both the West End Transitway project and the Mark Center Transit Expansion to ensure transfers are easy, safe, and intuitive to riders.

The City of Alexandria is also improving multi-modal facilities within the Mark Center area. The **King Street and Beauregard Street Intersection Improvement** is adding an additional left turn lane in each direction on King Street and constructing a shared use path on portions of King Street and North Beauregard Street. These intersection improvements will increase capacity and safety in this area, and will help BRT operations by providing an additional turn lane for the bus to turn onto N Beauregard Street from Route 7. Further analysis and coordination are needed to determine whether the proposed West End Transitway stops at this intersection lend themselves to joint use by the two projects.

The City's ***Pedestrian and Bicycle Master Plan*** includes bicycle and pedestrian improvements that will increase non-motorized access to the Mark Center Transit Center.

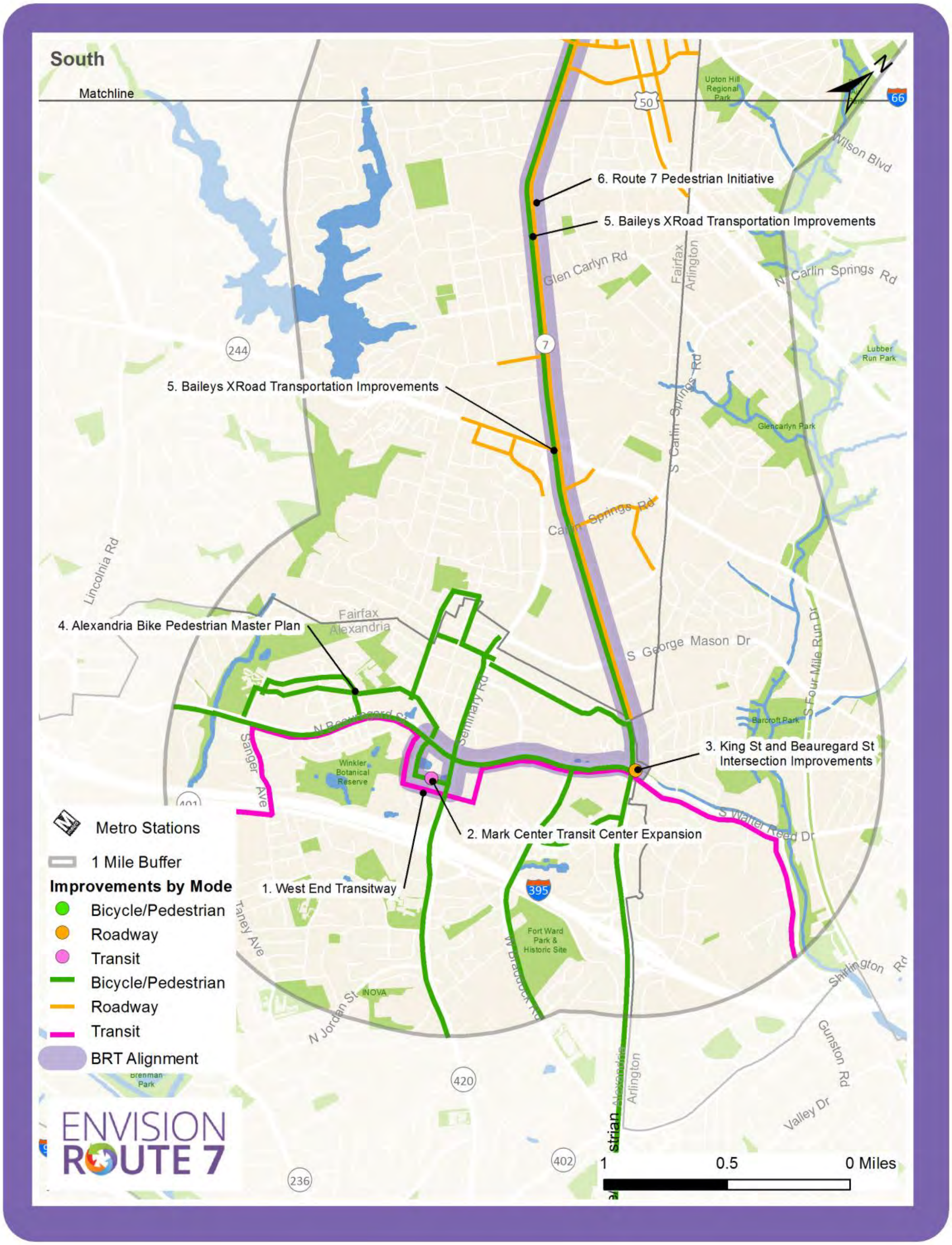
Table B 1 summarizes and **Figure B 1** shows the four relevant projects around the Mark Center area of the City of Alexandria that will impact the Route 7 BRT.

Table B 1 Relevant Projects: Mark Center Area (City of Alexandria)

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7 BRT
1.West End Transitway	BRT system using shared and dedicated bus lanes	NVTA, Developer Contribution, State and Federal Grants / Design	Beauregard Street from Mark Center Ave to King Street	Transit	Shared corridor and station locations at Southern Towers and Mark Center; Transfer between BRT Routes

2.Mark Center Transit Center Expansion	Bus station expansion to accommodate additional transit services, including West End Transitway and Envision Route 7 BRT		Mark Center Transit Center on Mark Center Avenue	Transit	Shared corridor and station locations at Mark Center; Transfer between BRT and other bus Routes
3.King and Beauregard Intersection Improvements	Improve traffic and ped/bike flow by adding a dedicated left turn lane, medians, and a 10' shared use path	GO Bonds, City, State and Federal Grants / Phase 1 = complete, Phase 2 = design	King Street and Beauregard Street	Roadway	Improved transit and traffic movement at a critical corridor intersection
4.City of Alexandria Pedestrian and Bicycle Master Plan	Bicycle and pedestrian accessibility improvements	RSTP, Developer Contributions, State and Federal Grants / Multiple projects: project initiation, design	Alexandria; Route 7 between northwest border and Commonwealth Ave	Bicycle/ Pedestrian	Shared corridor and intersecting connections

Figure B 1 Relevant Projects: Southern End of the Corridor



Area 2: Center of the Corridor

The middle of the corridor includes the neighborhoods of Baileys Crossroads/Seven Corners, East Falls Church, and the City of Falls Church.

Baileys Crossroads/Seven Corners

The Baileys Crossroads/Seven Corners area has two funded projects that will be constructed in the near-term. These two projects include the **Route 7 Pedestrian Initiative** and the **Seven Corners Interchange Improvements**. The Seven Corners Interchange will construct a new "Ring Road" from the Arlington Boulevard Westbound Ramp to the intersection of Castle Place and Sleepy Hollow Road, with a cycle track and parking lanes. The ring road is envisioned to be completed as part of the Seven Corners Conceptual Transportation Network and provide a more direct connection from Route 7 to Roosevelt Street over Arlington Boulevard. This segment of the Ring Road is designated to be a Transit Boulevard to include dedicated transit lanes, a buffered cycle track on each side of the street, landscape panels, wide sidewalks, evenly spaced street trees, and landscaped center medians.

Figure B 2 Seven Corners "Ring Road" Transit Boulevard

Other projects that could affect the routing of the BRT include the **Baileys Crossroads Road Transportation Improvements** and the **Conceptual Seven Corners Transportation Network**. As the

Seven Corners/Baileys Crossroads area is redeveloped, there is an opportunity to improve the street grid, creating shorter blocks and more internal roadway network connections. This potential redevelopment will increase roadway capacity and influence the potential BRT alignment and station locations. However, both of these projects are not currently funded.

Baileys Crossroads is considered one of Fairfax County's Commercial Revitalization Districts. In coordination with the Baileys Planning District, future plans include various sidewalk, intersection, and streetscape improvements and a local grid expansion to promote and support development in the area. The Fairfax County Transportation Plan shows multiple new local streets to potentially be created alongside future commercial and residential development. The plan also includes realigning Seminary Road to tie into Columbia Pike south of Route 7. In general, this segment of Leesburg Pike is anticipated to be widened or improved to 6 lanes.

Table B 2 summarizes and **Figure B 3** shows the four relevant projects in the Baileys Crossroads and Seven Corners area of Fairfax County that will impact or interact with the Route 7 BRT.

Table B 2 Relevant Projects: Baileys Crossroads/Seven Corners Area (Fairfax County)

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7 BRT
5.Baileys Crossroads Road Transportation Improvements	Construction collector or local streets as development occurs; construct arterial road for the Seminary Road realignment	C&I Tax, Developer Contribution, Unknown / Pre-Concept	Approximate half mile radius from the intersection of Route 7/ Columbia Pike	Roadway	Intersecting traffic and pedestrian connections
6.Route 7 Pedestrian Initiative	Increase pedestrian safety, accessibility, and mobility	Local, State and Federal Grants / Multiple projects: design, construction, complete	Route from Falls Church to Alexandria	Bicycle/ Pedestrian	Shared corridor; Improved pedestrian access to BRT

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7 BRT
7.Seven Corners Interchange Improvements	Construction of a "Ring Road" to ease congestion and increase multi modal accessibility	RSTP, NVTA / Project initiation	Arlington Blvd (Route 50) Westbound Ramp, Castle Road and Sleepy Hollow Road, and Wilson Blvd	Roadway	Adjacent to the corridor; Diverts traffic from corridor; potential alignment of BRT through Seven Corners
8.Conceptual Seven Corners Transportation Network	Conceptual "Grid of Streets" creates smaller block sizes, supports local and through trips, increases pedestrian connectivity, and urban development pattern	C&I Tax, Developer Contribution, Unknown / Pre-Concept	Route 7 from Patrick Henry Drive to S Roosevelt St	Roadway	Intersecting traffic and pedestrian connections

East Falls Church (Arlington County)

The planned Envision Route 7 BRT station at the East Falls Church Metrorail station is an important transfer point to/from the Metrorail system and to other bus routes serving the I-66 corridor. Arlington County is expanding the bus bays and shelters at the East Falls Church Metro to serve both the Route 7 BRT and the additional local and regional bus routes serving the I-66 corridor. The **East Falls Church Metrorail Station Bus Bay Expansion** also includes pedestrian access improvements which will help connect the station to the surrounding neighborhoods. Additional pedestrian safety and access improvements are planned for surrounding streets including Sycamore Street, Washington Boulevard, Lee Highway, Westmoreland, and Fairfax Drive as part of the **East Falls Church Street Improvements**.

Table B 3 summarizes and **Figure B 3** shows the three relevant projects in the East Falls Church area of Arlington County that will impact or interact with the Route 7 BRT.

Table B 3 Relevant Projects: East Falls Church (Arlington County)

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7
9.East Falls Church Metrorail Station Bus Bay Expansion	Add three new bus bays and replace existing shelters to accommodate increased bus traffic on I-66. Install pedestrian access improvements	NVTA, DRPT, Transform 66 Outside the Beltway Concessionaire Funding / Design	East Falls Church Station	Transit	Transfer from Route 7 BRT to Metrorail
10.East Falls Church Street Improvements	Safety and access improvements to Sycamore Street, Washington Boulevard, Lee Highway, Westmoreland Street and Fairfax Drive	State, Bond, NVTA	Sycamore Street, Washington Boulevard, Lee Highway, Westmoreland Street and Fairfax Drive	Bicycle/ Pedestrian	Shared corridor; Improved pedestrian access to BRT

Falls Church City

The City is currently installing shelters at 20 bus stops located at the following intersections:

- Birch St. & W. Broad St.
- Pennsylvania Ave. & W. Broad St.
- Virginia Ave. & W. Broad St.
- Washington St. & Broad St.
- Fairfax St. & E. Broad St.
- Roosevelt St. & E. Broad St.
- Columbia St. & N. Washington St.
- Park Ave. & N. Washington St.
- Hillwood Ave. & S. Washington St.

However, these shelters will not have the needed BRT features such as real time arrival information or any branding. The Route 7 BRT project will need to coordinate improvements at the future BRT stations. These stop locations will also be important transfer locations from local bus service to the BRT. The City is also installing ADA compliant pedestrian crossings at Oak Street, Fairfax Street, and Berry Street. These improvements will increase pedestrian accessibility at these locations and will inform the BRT station locations and access.

The City is improving its Downtown Plaza to include new landscaping and additional seating and lighting. This can be an attractive destination to pedestrians.

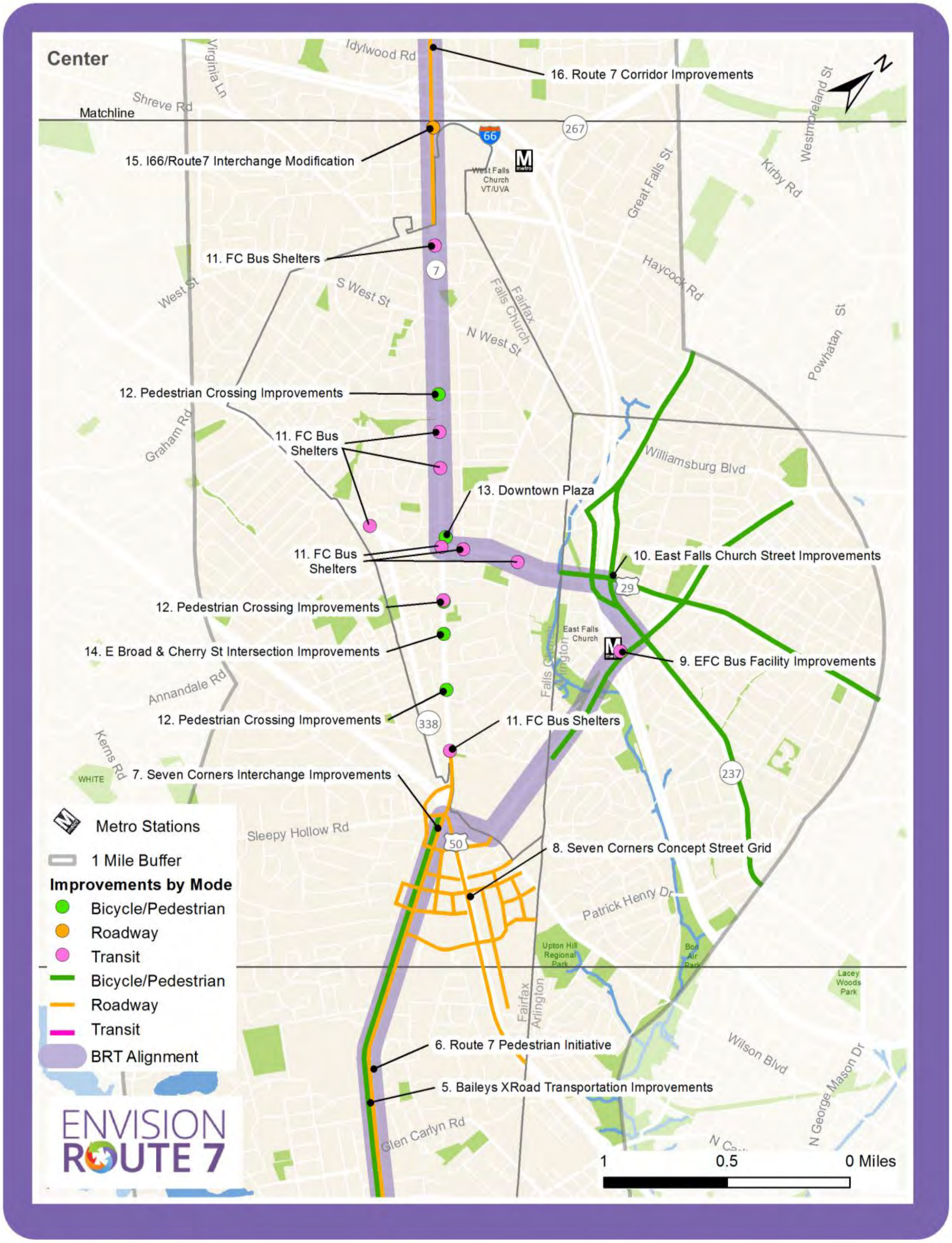
Table B 4 summarizes and **Figure B 3** shows the four relevant projects in the City of Falls Church that will impact or interact with the Route 7 BRT.

Table B 4 Relevant Projects: Falls Church City

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7
11.City of Falls Church Bus Shelters	Install shelters at the 20 bus stops located at key intersections	Local, NVTA, State and Federal Grants / Complete	East and West Broad Street and North and South Washington Street within Falls Church limits	Transit	Shared corridor and intersecting corridor; potential shared station/shelter locations within the City
12.Pedestrian Crossings along Broad Street @ Oak St, Fairfax St, and Berry St	Install ADA compliant pedestrian crossings.	SmartScale, NVTA, BPSP / Design	Intersections of Broad Street and Oak Street, Fairfax Street, and Berry Street	Bicycle/ Pedestrian	Shared corridor; Improved pedestrian access to BRT
13.Downtown Plaza	Improvements to the Downtown Plaza including new landscaping	Falls Church Economic Development Authority Grant, SmartScale	100 block of West Broad Street	Bicycle/ Pedestrian	Adjacent to the corridor; creates pedestrian demand

	and new benches and lighting	Grant, NVTA / Construction			
14. E Broad & Cherry St Signal and Intersection Improvements	Traffic signal and pedestrian accessibility improvements.	VDOT Revenue Sharing grant, NVTA / Construction	Intersection of East Broad Street and Cherry Street	Roadway	Shared corridor; Improved pedestrian access to BRT

Figure B 3 Relevant Projects: Center Area of the Corridor



Area 3: Northern End of the Corridor

The northern end of the corridor includes Idylwood/Pimmit Hills and Tysons.

Idylwood/Pimitt Hills

The Idylwood/Pimmit Hills neighborhood connects the City of Falls Church and Tysons Corner and is served by the West Falls Church Metrorail Station. The **I-66 Eastbound Connector Ramps** to West Falls Church will improve connections from I-66 to the West Falls Church Metrorail station. Although the Route 7 BRT will not be directly affected by this project, the new ramps will help reduce congestion along Route 7 and reduce conflicts from cars entering and exiting I-66 from Route 7.

VDOT is constructing an additional travel lane and a shared use path along Route 7 as part of its **Route 7 Corridor Improvements** project. This project will help accommodate a dedicated lane for the BRT on Route 7 and will improve pedestrian accessibility to the BRT stations. VDOT is also looking into constructing a new connection between Magarity Road and Route 7 and I-495. This project is unfunded and in the conceptual planning phase. This segment of Leesburg Pike is anticipated to be widened or improved to 6 lanes.

Table B 5 summarizes and **Figure B 5** shows the three relevant projects in the Idylwood and Pimmit Hills area of Fairfax County that will impact or interact with the Route 7 BRT.

Table B 5 Relevant Projects: Idylwood/Pimmit Hills

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7 BRT
15.I-66 Eastbound Connector Ramp to West Falls Church	Modified Interchange at I-66 to connect to WFC Metro Station	Construction 2019	I-66 to West Falls Church Station	Roadway	Crosses BRT Corridor; Reduces Auto conflicts exiting Highway
16.Route 7 Corridor Improvements: Widen or Improve Route 7 to 6 Lanes (inside the beltway) and to 8 lanes	Widen Route 7 from four to six lanes, and six to eight; construct shared-use paths, and intersection improvements.	Local, State, NTVA, House Bill 2 / Design	Route 7 between City of Falls Church and 495 (6); and 495 to Dulles Toll Road (8)	Roadway	Shared corridor; Improved pedestrian access to BRT

(outside of beltway)					
17.Route 7 and Magarity Road and I-495	Construct new connection between Magarity Road and Route 7, I-495, and the I-495 express lanes	Unfunded / pre-concept	Route 7 and I-495 Interchange	Roadway	Shared corridor

Tysons

The northern terminus of the Route 7 BRT is the Tysons Central Business District (CBD). This segment of Leesburg Pike is anticipated to be widened or improved to 8 lanes. Additionally, within Tysons, the Conceptual Tysons Transportation network would establish a connected grid of streets around each of the Greensborough, Spring Hill, and McLean Metrorail stations. This proposed grid will help alleviate traffic on Route 7 and provide additional pedestrian and bicycle connectivity within the Tysons area.

The **Tysons Metrorail Station Access Management Study** (TMSAMS, completed 2011) identified multi-modal transportation improvement projects, specifically to access the Metrorail stations in Tysons Corner. These projects include the following along with an overview of their status:

- Route 7 walkways on both sides of Route 123 (Complete)
- Vesper Trail from Vesper Court to Route 7 (Complete)
- Scotts Run Walkway from Magarity Road to Colshire Meadow Drive (Design; Completion 2020)
- Route 7 Walkway from Dulles Toll Road to Beulah Road (Complete)
- Pedestrian connection across I-495 between Route 123 and Route 7 (Design; Completion 2020)
- Pedestrian connection on Route 123 from Great Falls Street to McLean (Construction; Complete 2019)
- The Jones Branch Connector Arterial (Construction; Completion in 2019)

The **Route 123/Route 7 Interchange Study** is evaluating specific design alternatives for this critical location along the corridor. Two alternatives, shown in **Figure B 4**, are currently being considered: 1) Two quadrant; and 2) Continuous Flow intersection. The two quadrant option features acceptable traffic flow, some pedestrian/traffic interaction, and overall a better "grid of streets" connectivity. The continuous flow intersection option allows for the most efficient traffic flow, however requires that all pedestrian traffic to be vertically separated and limits the overall "grid of streets" connections. Adoption of a recommended plan and initiation of final design is expected later in 2019.

Figure B 4 Conceptual Route 7/123 Interchange Options (L – Two quadrant; R – Continuous Flow)

Fairfax County is initiating the **Route 7 Bus Rapid Transit Tysons Study**, which is being conducted in parallel with the Envision Route 7 Phase III work. The scope of the FCDOT effort, extending from the Beltway northwest along Route 7 to the Spring Hill Metrorail Station, includes detailed evaluation of the Route 7 cross-section in combination with BRT alignment and station configuration options.

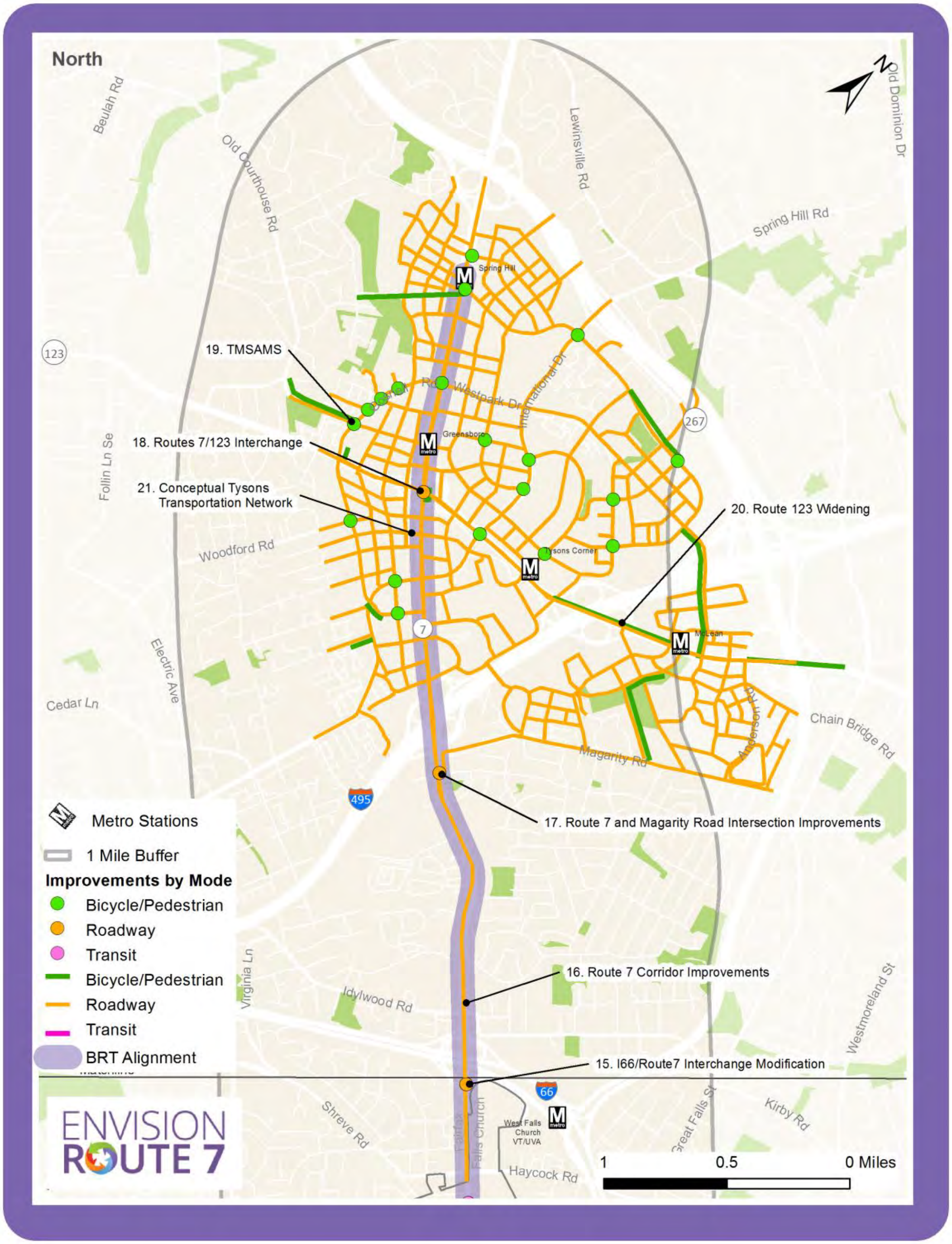
Table B 6 summarizes and **Figure B 5** shows relevant projects in the Tysons area of Fairfax County that will impact or interact with the Route 7 BRT.

Table B 6 Relevent Projects: Tysons

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7 BRT
18.Route 7/Route 123 Interchange	Roadway relocation to support the future Tysons Central 7 station in the median of Route 7 and accompanying tunnel work.	Dulles Toll Road, MWAA, USDOT TIFIA, FTA New Starts grant, NVTA, Loudon County, Fairfax County, Commonwealth of Virginia / Construction	Route 7 and Route 123 Interchange	Roadway	Shared corridor
19.Tysons Metrorail Station Access Management Study (TMSAMS)	Multi-modal transportation improvement projects, specifically to access the Metrorail	Dulles Toll Road, MWAA, USDOT TIFIA, New Starts grant, NVTA, Loudon County, Fairfax County, Commonwealth of	Intersection of Route 7 and Gosnell Road, spring Hill Road, and Tyco Road; Route	Bicycle/ Pedestrian	Shared corridor and intersections

Project Name	Description	Funding/Status	Extents	Mode	Interaction or Impact to Route 7 BRT
	stations in Tysons Corner.	Virginia / Construction	7 from Jarrett Valley Drive to Beulah Road; Route 7 under Route 123 interchange		
20.Route 123 Widening	Widen Route 123 from four to six lanes, and six to eight; construct shared-use paths, and intersection improvements.	Local, State, NTVA, House Bill 2 / Design	Route 123 between Old Court House Road and 495	Roadway	
21.Conceptual Tysons Transportation Network	Establish and construct a grid of streets as the primary organizing element of the new urban Tysons.	Tysons Grid of Streets Transportation Fund; federal, state, regional, and local level and through contributions from the private sector; Pre-concept	Tysons-wide	Roadway	Shared corridor, intersections; improved pedestrian access to BRT
22.Route 7 Bus Rapid Transit Tysons Study	FCDOT led effort to define Route 7 cross-section and BRT configuration through Tysons.	Fairfax County	I-495 to Dulles Toll Road	Transit and roadway	Portion of the Envision Route 7 corridor

Figure B 5 Relevant Projects: Northern Area of the Corridor (Tysons)



DEVELOPMENT PLANS

Development plans exist for many parcels along the proposed BRT route. However, some plans are for small zoning changes and others are for larger development projects. Larger development projects are summarized here along with the research process identifying how projects were selected. These projects are mapped and additional information such as a complete list of developments along with site plans where available are provided in **Appendix A**.

Research Steps

The first step in assembling the list of development was to identify potential developments in each of the jurisdictions concerned (Fairfax County, The City of Falls Church, Arlington County, The City of Alexandria). This was done using files from the project team's library (e.g. Traffic Impact Studies), local knowledge from working in the jurisdictions, and websites run by the jurisdictions. This information provided approximately 50 projects identified along the corridor for further exploration.

Then, each of these sites were further explored using more detailed information obtained from sources such as traffic impact reports, Fairfax County Land Development System, the East Falls Church Area Plan, the Beauregard Small Area Plan, and Bailey's Crossroads/Seven Corners Revitalization Report. During this stage, some developments were eliminated or consolidated as follows:

- Developments that were already completed or withdrawn from approval processes were removed.
- Developments that were in the entitlement process, or had entitlement approvals, for minor changes that could not be considered re-developments (e.g. obtaining a drive-through permitted for an existing shopping center) were removed.
- Developments with multiple phases were consolidated for simplicity.
- Development sites that were identified in local jurisdiction planning projects such as the Beauregard Small Area Plan were consolidated for simplicity.

Finally, parcels along the corridor were reviewed and a few potential development sites were added to the list. These are parcels of land that are not in the entitlement process or are even publicly considering redevelopment but would be prime redevelopment sites based on experience working along the corridor and with local developers.

The final list contains over 30 potential development sites. Each site was mapped in GIS where development parcels are identified as shown in **Figure B 6**, **Figure B 7**, and **Figure B 8** . A table with penitent information is also included along with site plans for the developments in **Appendix A**.

Figure B 6 Development Map: Northern Area of the Corridor

Figure B 7 Development Maps: Center Area of the Corridor

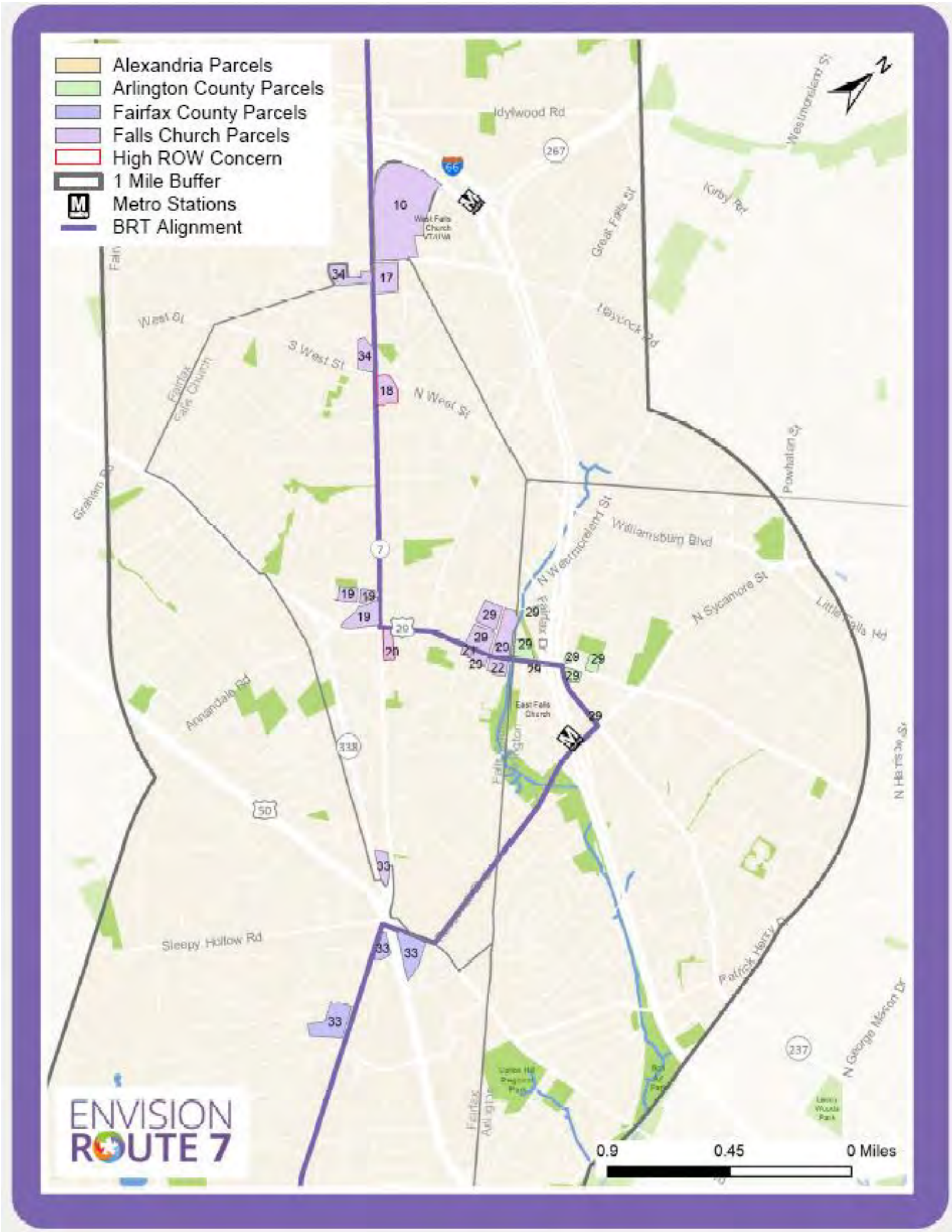


Figure B 8 Development Map: Southern Area of the Corridor

The following characteristics of each proposed project were identified where available:

- Development name and developer
- A short project Description
- Development program, including the square footage of the development and/or number of dwelling units
- The approval status of the development, year of approval and planned completion date (where applicable).
- Right of way concerns generated by the development, including if the development included driveways on the BRT corridor

Development Patterns Identified Summary

Upon review of the development patterns in the corridor, it is easily discernable that a majority of developments adjacent to the proposed Route 7 BRT are found in Tysons Corner and The City of Alexandria. These correlate to other transit initiates, the new Metrorail stations in Tysons Corner, and the West End Transitway in Alexandria. Between these two areas, there is less activity along the corridor, although there are some site and initiatives underway.

In general, development plans along the corridor are consistent with plans for the BRT. Specifically, the Beauregard Small Area Plan is accommodating the proposed West End Transitway into the plans for development, and as such, developments along the Route 7 BRT corridor that overlap the West End Transitway are not expected to have right-of-way concerns. However, 10 of the developments were identified as having a high right of way concern, meaning that the development is directly adjacent to the Route 7 BRT corridor and abuts the property line. Most of the developments with a high right of way concern are found in Tysons Corner. Development sites with concerns are also noted in **Figure B 6**, **Figure B 7**, and **Figure B 8** as well as in **Appendix A**.

GAINING RIGHTS-OF-WAY THROUGH THE DEVELOPMENT PROCESS

At first glance, there seem to be ample opportunities for redevelopment to support the Envision Route 7 corridor project. Redeveloped parcels on the corridor could provide improved street grids and connectivity to stations, provide additional riders, and could be away to gain necessary rights-of-way and/or funding. Along the corridor there are already pockets of intense redevelopment occurring (e.g. Tyson's Corner), and other areas that have aging shopping centers that appear to be good candidates for transit-oriented redevelopment.

Although this is the case, after completing a review of the development patterns along the corridor shows that instead of redevelopment supporting BRT, that BRT may have to be a catalyst to trigger development projects first, so they can then support BRT. At the ends of the corridor, the new Metrorail stations in Tysons Corner and the West End Transitway project in Alexandria have triggered redevelopment plans that would work in concert with the Envision Route 7 project. In the middle of the corridor these types of redevelopments are not occurring. The current zoning process and status of parcels along the corridor is not conducive to the types of redevelopments that would have the most synergy with the BRT. Some of these areas have redevelopment plans and efforts, but what appears to be a small amount of developer interest.

Based on these patterns, the best path forward to a synergistic Route 7 corridor where redevelopment and BRT work together would be to create local plans surrounding each planned station, especially in the middle portions of the corridor. These plans would examine multi-modal access to the station, revisions to the street grid, mixed-use development opportunities, and right-of-way/funding provisions from developers. These plans can be new though in some areas, they can build from existing local plans.

Synergies between Development and BRT

There are several reasons redeveloped parcels on the corridor would help BRT succeed. They can provide improved street grids and connectivity to stations, additional riders, and could be a way to gain necessary right-of-way and/or funding. These synergies can be increased by developers assembling parcels into larger projects, or through a coordinated effort led by a local jurisdiction. With more land to work with, the more opportunities there are to rearrange street grids surrounding stations provide better access for pedestrians and cyclists.

Beyond simply replacing auto-centric development with transit-oriented ones around stations, redevelopment can also contribute via providing additional density to areas around new stations, brining potential ridership to help make the BRT a success. This could be further enhanced by adding a variety of land uses in the area surrounding stations, and between different stations could help produce ridership at different times and directions. Different pockets of office and residential space along the corridor would help produce ridership demand in both directions, making the line more efficient.

Redevelopment projects could in turn provide right-of-way of funding to help the BRT directly or adjacent infrastructure changes that would help the BRT (e.g. multi-modal improvements within the station area). Developer contributions would likely come in the form of trading density for contributions, something that has been done in many places in the DC metropolitan area.

Development Patterns along the Envision Route 7 Corridor

As previously noted, a clear trend was found that most developer interest is concentrated at either end of the corridor in Tysons Corner and in the West End of the City of Alexandria, with most of the development in the middle of the corridor at the conceptual level only. Each of the nodes are described in more detail.

Tysons Corner

The majority of redevelopment along the corner is occurring in Tysons Corner. This project identified over a dozen developments on the corridor, several with large high-rise buildings and significant density.

The total approved amount of development on these parcels if over 9,500,000 square feet of office, 23,000,000 square feet of residential, 1,450,000 square feet of retail, and 1,770,000 square feet of hotel. The development plans for these parcels does allow some flexibility, but even if these numbers shift slightly, they are still very significant. The concentration of office and residential uses approved could make BRT stations in this corridor very large generators of demand.

West End Alexandria

The Beauregard Street/Walter Reed Drive corridor in the West End of Alexandria has several development sites either identified within future plans or already in the entitlement process. These properties are all along the alignment of the West End Transitway, and as such are being planned to accommodate the additional right-of-way for that transit improvement.

Central Area

Tysons and West End contrast with other activity nodes along the corridor, such as Bailey's Crossroads, Falls Church, and Seven Corners. Some of these areas have generalized plans for redevelopment, notably a comprehensive plan amendment was performed in Fairfax County for Seven Corners several years ago, but there are currently no significant approved redevelopments in those areas or even any currently in the entitlement process.

Based on redevelopments trends and experience from working with the development community, there are several reasons why these areas along the corridor are not experiencing the same level of developer interest. The main reason is that many of the old shopping centers that at first glance appear to be good development sites, due to their large size and current age, are not. One of the main reasons for this is the underlying zoning along the corridor. For example, many Sevens Corners shopping centers are in C-7 and C-8 zones, which have the following language:

> *"The C-8 District is established to provide locations on heavily traveled collector and arterial highways for those commercial and service uses which (a) are oriented to the automobile, or (b) are uses which may require large land areas and good access, and (c) do not depend upon adjoining uses for reasons of comparison shopping or pedestrian trade."*

Another reason developers are hesitant to redevelop these parcels are that many are also already profitable, and it is currently not worth the cost to redevelop from a time or financial standpoint, especially when there is no additional density supported.

An increase in density could change how developers envision these properties in the future. Although transportation planners can easily envision shopping centers redeveloped into transit-oriented mixed-use housing with retail on the ground floor, that sort of redevelopment is not viable under the current zoning not only because residential isn't allowed as a use, but the density isn't either. Even if a developer had potential density and the land uses permitted, it would still be difficult to redevelop in an ideal manner to support BRT unless parcels could be consolidated to create the room needed to establish grids and greenspace between buildings. Alternatively, a coordinated planning effort between adjacent land-owners could work.

Based on the trends along the corridor, and other examples of transit-oriented development, all the obstacles to redevelopment listed above can be addressed, and some are already being addressed (e.g. the Seven Corners Comprehensive Plan Amendment). Thus, the role of the Envision Route 7 project could be to serve as a catalyst for change at activity nodes within the corridor centered around stations.

Suggested Approach to Gain Rights-of-Way

At the onset of this project, the goal was to development how could redevelopment parcels be leveraged to gain right-of-way for the Envision Route 7 project, but after reviewing development trends it appears that the Envision Route 7 project may need to serve as a catalyst to spur development interest which in turn could be planned in a synergistic way with BRT. At least, that is the case in the middle of the corridor, as at either end there is already development activity. Thus, the best path forward to a synergistic Route 7 corridor where redevelopment and BRT work together would be to create local plans surrounding each planned station, especially in the middle portions of the corridor. These plans would examine multi-modal access to stations, revisions to the street grid, mixed-use development opportunities, and right-of-way/funding provisions from developers. These plans can be new, although in many activity nodes they can build from of existing local plans. Specific implementation considerations for each jurisdiction along the corridor follow.

Fairfax County

In Fairfax County an example of how this would work already exists for the BRT on US Route 1. The County recently updated the Route 1 Comprehensive Plan (through the Embark Planning Process) to include BRT service in the US Route 1 corridor. This process involved an update to the Countywide Comprehensive Plan, the Countywide Transportation Plan, and the Countywide Transit Plan. As a result, future zoning projects will have to honor the guidelines in those plans to include, but not be limited to, elements such as right-of-way contributions, pedestrian accessibility to transitway elements, streetscape and set back elements and driveway limitations that may impact the corridor transitway. The County was able to secure preliminary funding and the transitway project is now moving through the VDOT public review and design process. This could serve as a model to follow for the Route 7 project.

In Fairfax County specifically, the development community often provides through proffers, programmatic and cash contributions to reduce single occupancy vehicle use and promote the use of other modes of travel. If a defined Route 7 plan was in place at the time these zoning applications came through, some of those contributions could be focused on promoting a transitway through provision of right of way, design elements that would embrace the plan, or cash contributions that could help support capital investment. Development intensity could be increased, and the developers could receive a higher level of total density by supporting and promoting transit-oriented development.

Specifically, the Seven Corners comprehensive plan amendment could be revised to account for a future BRT station, without having to significantly change the plans, and a similar effort could be performed for Bailey's Crossroads. In the Tyson's Corner area, a significant amount of redevelopment is already entitled as part of the new Metrorail stations. The BRT corridor will need to adapt more to these plans, than redevelopment adapting to the future BRT.

City of Falls Church

In the City of Falls Church, the rights-of-way along the proposed BRT corridor are highly constrained and obtaining additional rights-of-way are unlikely in most areas. It will be critical to utilize available right-of-way as much as possible to be able to provide for a facility that can balance both existing development and new development constraints. Given several new development projects that are likely not going to redevelop for some time, and historic facilities that will likely remain, a creative corridor design that provides flexibility in the overall use of the roadway network may be necessary. As an example, some areas may have parking on street while others will not. Some areas may have mixed travel lanes where others have dedicated transit lanes or transitway. This balance in this more historic area may help to build consensus among property owners while also providing for an earlier implementation schedule.

Specifically, a local planning effort could identify areas where parcel consolidation and/or land owner cooperation could create parcels large enough to support both density and right-of-way provisions. Many existing parcels could not afford to contribute right-of-way while maintaining a viable development project.

City of Alexandria

As noted above, in the City of Alexandria much planning work has been done through the adoption of the West End Transitway Plan which envisions BRT on the Beauregard Avenue corridor. In addition, there is the Beauregard Corridor Small Area Plan (SAP) and Coordinated Development District (CDD) Plan, which encapsulates the area around the Mark Center. The Beauregard SAP/CDD anticipates the transitway and increased density associated with it. Much of the groundwork has already been set in Alexandria for this portion of the Route 7 Corridor project and the terminus at the Mark Center. The transitway is expected to occur within available public right-of-way, however, the development community will be expected to aid implementation along a site's frontage should the timing coincide.

Arlington County

In Arlington County, most development must go through the 4.1 Site Plan approval process, which involves a heavy community involvement component. The 4.1 approvals are guided by the General Land Use Plan, the County's Master Transportation Plan and any specific area plans that are in place. In this case, the County adopted the East Falls Church Area Plan in 2011 and included the BRT corridor in this portion of the County. The East Falls Church Plan focused on fostering transit-oriented development and enhancing pedestrian and bicycle connections to the East Falls Church Metrorail station. The Metrorail station already serves as an important transit hub, but the Plan did not consider BRT connecting to it. It would be expected in Arlington that the Area Plan and the Master Transportation Plan be updated, then these documents would guide implementation of the Route 7 transitway project. Negotiations of ROW would take place through the site plan approval process.

Appendix C: Design Parameters

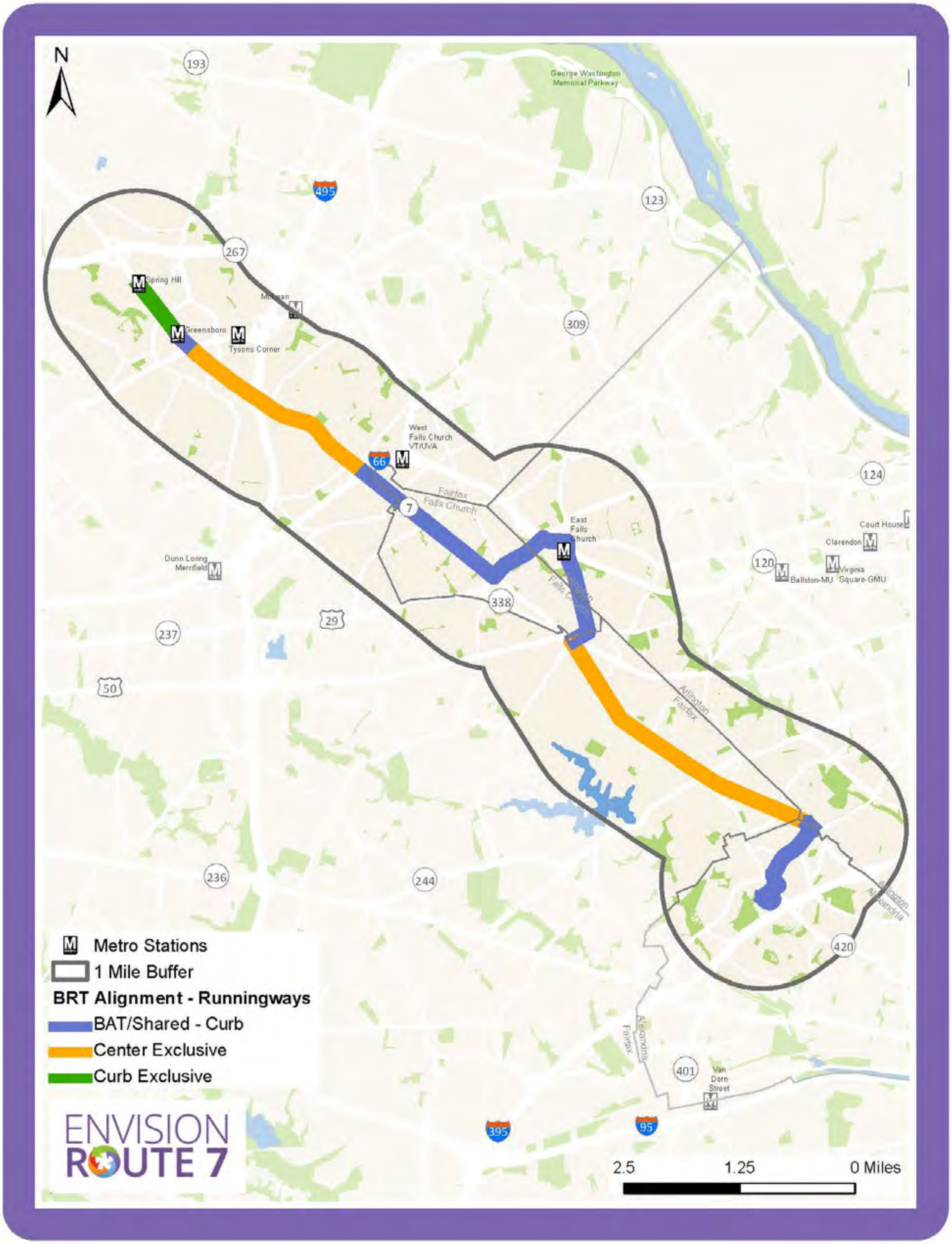
Appendix C: Design Parameters

INTRODUCTION

The objective for this project is to produce a conceptual layout of the Envision Route 7 Bus Rapid Transit (BRT) corridor from end to end. The first step in that effort is to identify the parameters to which the project will be designed. Parameters providing design direction regarding lane width, turn radius, sidewalk width, and other elements will be identified. The intent of this document is to identify the design parameters and establish a basis of design, inclusive of agency staff, agency stakeholders and consultants, and to agree on the parameters so that the design can be advanced in a way that minimizes the need to adjust the design once underway. The document is divided into roadway and station design parameters.

This project consists of reconfiguring streets and some adjacent properties to accommodate exclusive median and curb lane BRT runningway and enhanced bus stations. The improvements will occur generally on Route 7, between Mark Center in Alexandria, Virginia and the Spring Hill Metrorail Station in Tysons, Virginia (Fairfax County) (see Figure C 1).

Figure C 1 Envision Route 7 BRT Alignment



ROADWAY DESIGN

This section establishes the basic roadway design guidelines to be used in design of BRT facilities. Civil design in public right-of-ways shall be in conformance with the specification and design guidelines of Virginia Department of Transportation (VDOT), City of Alexandria, Fairfax County, Arlington County, City of Falls Church, or as determined otherwise for the local authority having jurisdiction.

For general project consistency, the design standards for arterial, collector, and local roads shall be in conformance with AASHTO Standards and the standards of the jurisdictional agency of that road, except as modified herein.

Applicable Standards

The most current editions of these documents, as of March 2019, are incorporated into these design guidelines by reference and shall be adhered to wherever possible in the design of streetscapes and related traffic control except when modification is specified in this document. The following jurisdictional manuals shall be applicable when designing within each locality's limits, unless otherwise specified in this document. The designer shall begin with the governing locality and then, if necessary, adhere to the larger encompassing jurisdiction with VDOT being the last reference. Should there be conflicting jurisdictional standards where the roadway crosses jurisdictional boundaries and specific exceptions are not noted in this document, VDOT manuals and specifications will supersede.

Virginia Department of Transportation

- VDOT Road Design Manual
- VDOT 2016 Road and Bridge Standards
- VDOT 2016 Road and Bridge Specifications Book
- VDOT Right of Way Manual
- VDOT Utility Relocation Manual

City of Alexandria

- Alexandria Complete Streets Design Guidelines
- General Design Principles for the City of Alexandria – May 2006
- Beauregard Urban Design Standards and Guidelines – July 2013

Fairfax County

- Public Facilities Manual

- Transportation Design Standards for Tysons Corner Urban Center, Attachment D, September 13, 2011
- Tysons Urban Design Guidelines

Arlington County

- Arlington County Design Standard Details
- Arlington County Construction Standards & Specifications
- Arlington County Infrastructure Design Standards
- Arlington County Pavement Marking Specifications

City of Falls Church

- City of Falls Church Design Guidelines
- Public Infrastructure Development Resources Facilities Manual

American Association of State Highway and Transportation Officials (AASHTO)

- A Policy on Geometric Design of Highways and Streets
- Roadside Design Guide
- AASHTO (LRFD) Bridge Design Specifications
- Guide for the Planning, Design, and Operation of Pedestrian Facilities

Manual of Uniform Traffic Control Devices (MUTCD)

- Virginia Supplement to the 2009 MUTCD

National Association of City Transportation Officials (NACTO)

- NACTO Transit Street Design Guide
- Urban Street Design Guide

American Public Transportation Association (APTA)

- Bus Rapid Transit Stations and Stops Standards
- Bus Rapid Transit Recommended Practices

Roadway Geometry

New facilities shall be designed in accordance with the criteria listed hereafter and shall follow VDOT'S 2014 Functional Classification.

Table C 1 Functional Classifications

Roadway:	2014 VDOT Functional Classification
Rte. 7	Other Principal Arterial (GS-5)
N Washington St	Other Principal Arterial (GS-5)
Washington Blvd	Minor Arterial (GS-6)
N Sycamore St	Minor Arterial (GS-6)
Roosevelt Blvd	Minor Arterial (GS-6)
Wilson Blvd	Other Principal Arterial (GS-5)
N Beauregard St	Minor Arterial (GS-6)
Mark Center Ave	Local (GS-8)

Design Speed

Where the existing posted speed limit is less than 35 miles per hour, the roadway design speed (DV) will be 35 mph to foster compact, walkable, and transit-supportive land uses and development while also addressing pedestrian safety concerns raised by the public in Phase II of this study. Where the existing posted speed limit is greater than 35 miles per hour, the roadway design speed (DV) will be 45 mph. These design parameters are based on existing posted speed limits and observed peak and off-peak period travel speeds. A traffic study should be completed during Preliminary Engineering to confirm acceptability of the design speed. See Figure C 1 for the map of the corridor for the design speed.

Number of Traffic Lanes

Roadways shall be designed with the existing or future lane configurations as defined by VDOT or the local agency having jurisdiction unless noted specifically in the plans. Jurisdiction comprehensive plans shall be used to define the future condition to the extent possible. Designs shall be justified by a traffic study to be completed during Preliminary Engineering.

Lane Width Criteria

See Part 4 in this Design Parameters document for roadway widening lane width standards.

On Street Parking

It is not anticipated to design for future on-street parking along the project corridor and will be omitted from the conceptual design.

Profile

When widening is not being proposed, the existing profile shall be used along the corridor. In locations where the existing roadway is being widened, the existing profile may be raised to reduce streetscape and right of way conflicts.

Superelevation and Cross Slopes

Superelevations and cross slopes shall be in accordance with local jurisdictional standards. Cross slope shall be considered when designing bus-specific paved areas. Existing superelevation and slope shall be utilized as much as possible.

Lane Shifts/Transitions/Tapers

Lane shifts, transitions and taper lengths shall follow the rate shown in Part 4 of this document.

ADA Curb Ramp Placement

Pedestrian access ramps and curb cuts shall be provided in the following locations and circumstances:

- Existing ramps affected by construction shall be replaced or relocated.
- At intersections where a sidewalk exists and the curb returns are to be modified. It is not necessary to provide ramps and curb cuts where no sidewalk exists.
- At intersections and mid-block crosswalks where new curb and sidewalk are to be constructed.

Detectable warnings shall be installed at all pedestrian access ramps. The design and location of curb cuts and ramps shall be in accordance with the applicable provisions of VDOT, the local agency jurisdiction, the USDOT Standards for Accessible Transportation Facilities and shall comply with the Americans with Disabilities Act (ADA).

Bike Lanes

Due to the functional classification of the roadway, and the type of traffic along the corridor, it is not recommended to include any bike lanes, shared bike lanes or cycle tracks within the project. Thus, new bicycle facillites are omitted from the conceptual layout. An exception will be made for existing bike lanes: the project shall incorporate the existing bike lanes into its design.

Sidewalks

Sidewalks shall comply with the standards of the local agency having jurisdiction or lastly VDOT. Sidewalks at station locations must meet ADA criteria for slope. In order to be ADA compliant, the sidewalk at all station locations must be a minimum 8' wide to provide clear boarding/alighting area. See Section 4 of this document for details.

Shared Use Path (SUP)

SUP's shall comply with the standards of the local agency having jurisdiction or lastly VDOT. SUP's at station locations and intersections must meet ADA criteria for slope. See Section 4 of this document for details.

Intersections

Intersections will be reviewed based on established guidelines and considerations including the following:

- Lane realignment;
- Right turn/BRT interaction;
- Return curb radii and stop bar locations for turning movements;
- Lateral Offsets; and
- Visibility.

Driveways/Entrances/Frontage Roads

Driveway/entrance characteristics, including pavement type and minimum width, shall meet state, county, or local standards as applicable. In general, all existing driveways and entrances impacted by the project shall be replaced in kind. The design speed, type of entrance, enhanced lateral offsets, and property characteristic will also be considered in the replacement of this facility. Reconstruction of frontage roads, driveways, and entrances is not addressed for this conceptual design. Some areas are sketched to assist in understanding mobility and complexities along the corridor, but preliminary designs will need to be evaluated in the future studies.

Curb and Curb & Gutter

Standard curb and gutter per jurisdiction standards are to be used at all station locations, where full-depth reconstruction is performed and at roadway widening locations. Standard curb and gutter shall be used within the BRT median running lanes to help collect and distribute stormwater.

Concrete Raised Median Strip

The concrete raised median shall be used whenever the BRT lanes are running in the median and will be located on the right side of each bus lane. This will help separate general purpose traffic from the bus lanes and increase the functionality of the BRT lanes. Between station locations and intersections the concrete raised median shall be four feet with a one foot offset (shy line) from the adjacent lane edges. In the case for enough pedestrian refuge space specifically for widened intersections without bus platforms, the designer may reduce or remove one median and increase the other running median up to eight feet.

Pavement Markings/Striping

The project pavement markings shall be MUTCD and Virginia Supplement to the MUTCD compliant designs that incorporate the BRT, new lane uses and pedestrian crossings. Existing pavement markings in conflict with the proposed conditions shall be removed. All existing pavement markings that do not meet current standards shall be upgraded. Installation of new pavement markings shall follow jurisdiction or VDOT standards and may include milling and overlay of the existing roadway.

CAD

The plans will be developed with Microstation V8i and will be consistent with VDOT's CAD standards.

STATIONS

This section establishes specific guidelines and standards for the design of stations. The stations will be at-grade, standardized, and cost-effective in design. Elements discussed in this section include the design of platforms or platform access.

The design of the stations shall be prototypical to the extent possible to create similar stations throughout the corridor. Equipment, shelters, platform features, structural elements, and signage used shall be the same system-wide and compatible with BRT branding identity. Deviations from standard design elements may be required for specific sites.

Station Locations

On February 6, 2019, a workshop was held with the jurisdictional stakeholders to discuss conceptual running ways and station locations. The station locations described below were agreed upon to move forward into conceptual design. The narrative presents justification for station location changes from what was presented at the workshop and prior study materials. In the segment where the Envision Route 7 BRT alignment is shared with the West End Transitway, stations will be co-located with the planned West End Transitway station locations and are not part of this design document. This project includes the following stations:

- *Spring Hill Station* – no change from previous phase.
- Greensboro Station – no change from previous phase.

- *Fashion Boulevard* – the previously considered “International Drive” station location has been relocated to Fashion Boulevard due to operations considerations.
- *Peach Orchard Drive* – previously considers station locations at “Lisle Avenue” and “Pimmit Drive” were consolidated to a location between the two intersections, close to Marshall High School.
- *New Grid near West Falls Church (Between Dale Drive and Chestnut Street)* – previously considered “Haycock Street” station location has been relocated to align with a new grid of streets and spine road at the George Mason High School redevelopment. This location provides a direct connection to the new development and a direct sight line to the West Falls Church Metrorail Station.
- *West Street* – no change from previous phase.
- *Pennsylvania Avenue* – no change from previous phase.
- *Maple Avenue* – previously considered “Washington Street” station location has been relocated to Maple Avenue due to operations considerations.
- *Jefferson Street* – previously considered “Columbia Street” station location has been relocated to Jefferson Street to better align to higher density land uses.
- *East Falls Church Station (N Sycamore Street South of Overpass)* – no change from previous phase.
- *North Seven Corners (Near Planet Fitness Entrance)* – no change from previous phase.
- *South Seven Corners (New Ring Road)* – no change from previous phase.
- *Rio Drive* – no change from previous phase..
- *Glen Carlyn Drive* – no change from previous phase.
- *Bailey Crossroads (Crossroads Circle)* – no change from previous phase.
- *South Jefferson Street* – no change from previous phase.
- *Beauregard Street (Northbound Stop Only)* – no change from previous phase.

Station Placement

Far-side platforms on the roadway edge are generally the preferred station placement.

Platform Geometrics

Platform Access

- In order for bus boarding and alighting to be ADA compliant, the sidewalk at all station locations must be a minimum of 8’ wide.

Platform Configuration

- Right-side bus boarding

Platform Dimensions

- Generally, platform dimensions shall be designed for 12’ wide and 100’long for median stations and 10’ by 60’ for side stations.
- Accommodate 60’ articulated bus.
- Bay configuration for one transit vehicle.
- Accommodate anticipated passenger volumes and associated passenger amenities, including, but not limited to shelter, seating, trash receptacles, ticket vending machines, and passenger communications.
- Consider wider platforms for higher-speed segments.

Platform Height and Offsets

- The platform height shall be 7” or 8” inches above the top of roadway surface to accommodate level boarding.
- All platforms shall have a drainage cross slope to the running way of 2% maximum.

Table C 2 Envision Route 7 BRT Design Criteria

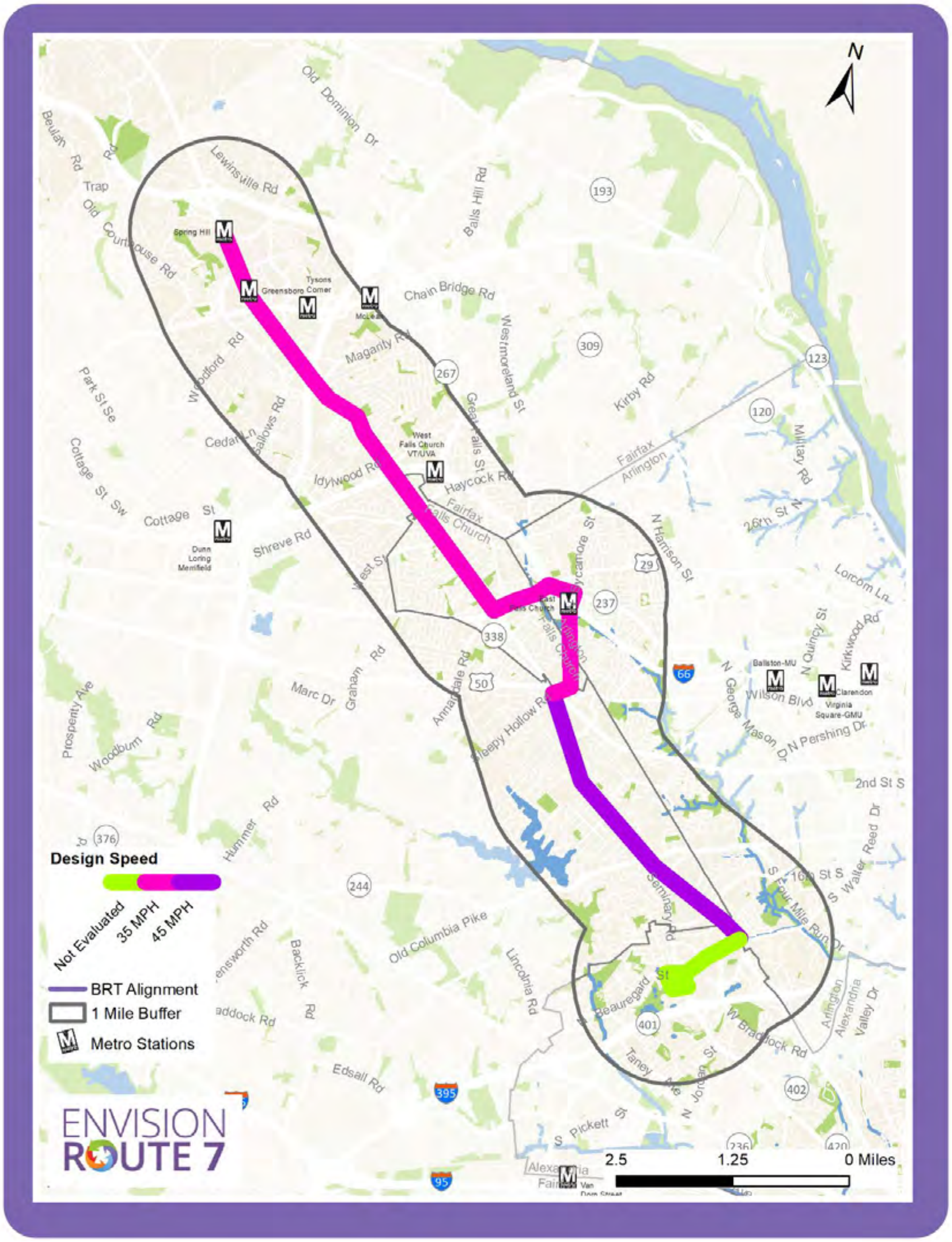
Design Element	Unit	Criteria	Source
General			
Design Speed, existing speed limit is ≤35 mph	mph	Max: 35 mph Min: 25 mph	VDOT RDM App. A
Design Speed, existing speed limit is ≥35 mph	Mph	Max: 45 mph Min: 35 mph	VDOT RDM App. A
Design Vehicle along route		Articulated Bus (60' length) and WB-67	NACTO - Urban Street Design Guide & VDOT RDM App. A
Design Criteria			
Lane Transition		$L = WS^2/60$	VDOT RDM & Manual on Uniform Traffic Control
Maximum Superelevation	%	4	VDOT Road and Bridge Standards Sect. 800
Curb Return Radius	Ft.	Varies	Jurisdiction Guidelines
Intersection Approach Angle	Deg.	15 degrees from right angle	AASHTO: A Policy on Geometric Design of Highways and Streets
Intersection and Driveway Sight Distance	Ft.	Varies	VDOT RDM App. F

Design Element	Unit	Criteria	Source
Minimum Overhead Clearance	Ft.	16.5	VDOT Manual of the Structure and Bridge Division
Shy line: inside travel lane to face of median	Ft.	1	VDOT RDM App. A
Raised Concrete Median	Ft.	4	VDOT RDM App. 2E
Bus Platforms			
Median Platform Length	Ft.	100 min	NACTO - Urban Street Design Guide
Median Platform Width	Ft.	12 min	NACTO - Urban Street Design Guide
Platform Height	In.	8 max	NACTO - Urban Street Design Guide
Boarding & Alighting Areas (clear space for mobility devices)	Ft.	5' x 8' (w x d) min located at each boarding/lighting location	VDOT RDM App. A(1)
Cross Slope	%	2	VDOT RDM App. A(1)
Maximum Gradient for Ramps	%	8	VDOT RDM App. A(1)
Bus Pad			
Pad Length	Ft.	60 min	NACTO - Transit Street Design Guide
Pad Width	Ft.	12	VDOT RDM App. A(1)
Concrete Bus Shelter Pad (behind sidewalk)	Ft.	8’ x 14’ min. (w x l)	VDOT RDM App. A(1)
Lane Dimensions			
Bus Lane	Ft.	12	VDOT RDM App. A
Traffic Lane	Ft.	12	VDOT RDM App. A
Sidewalk Width			
City of Falls Church	Ft.	10	City of Falls Church Streetscape Design Standards

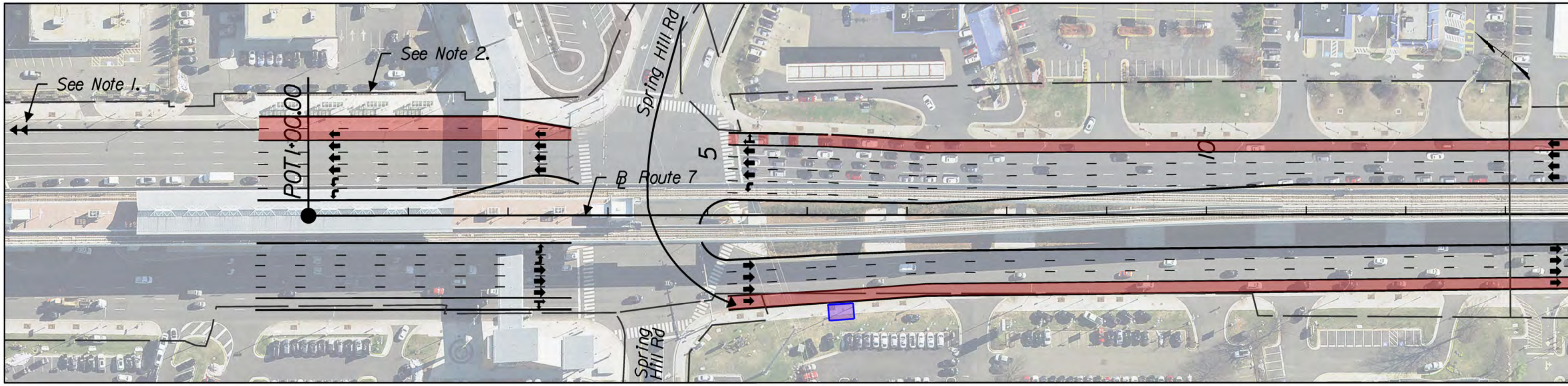
Design Element	Unit	Criteria	Source
City of Alexandria	Ft.	6	Alexandria Complete Streets Design Guidelines
Tysons Corner	Ft.	10	Transportation Design Standards for Tysons Corner Urban Center
Fairfax County	Ft.	5	Fairfax County Public Facilities Manual
Arlington County	Ft.	6	Arlington County Horizontal Standards
Sidewalk Rear Bench			
City of Falls Church	Ft.	4	City of Falls Church Streetscape Design Standards
City of Alexandria	Ft.	2	Alexandria Complete Streets Design Guidelines
Tysons Corner	Ft.	2	Transportation Design Standards for Tysons Corner Urban Center
Fairfax County	Ft.	1	Fairfax County Public Facilities Manual
Arlington County	Ft.	1	Arlington County Horizontal Standards
Buffer Width (from BC)			
City of Falls Church	Ft.	6	City of Falls Church Streetscape Design Standards
City of Alexandria	Ft.	6	Alexandria Complete Streets Design Guidelines
Tysons Corner	Ft.	7.5	Transportation Design Standards for Tysons Corner Urban Center
Fairfax County	Ft.	4.5	Fairfax County Public Facilities Manual
Arlington County	Ft.	6	Arlington County Horizontal Standards
Shared Use Path			
SUP Width	Ft.	10 min	Fairfax County Public Facilities Manual
SUP Buffer Width (from FC)	Ft.	8	VDOT RDM App. A(1)

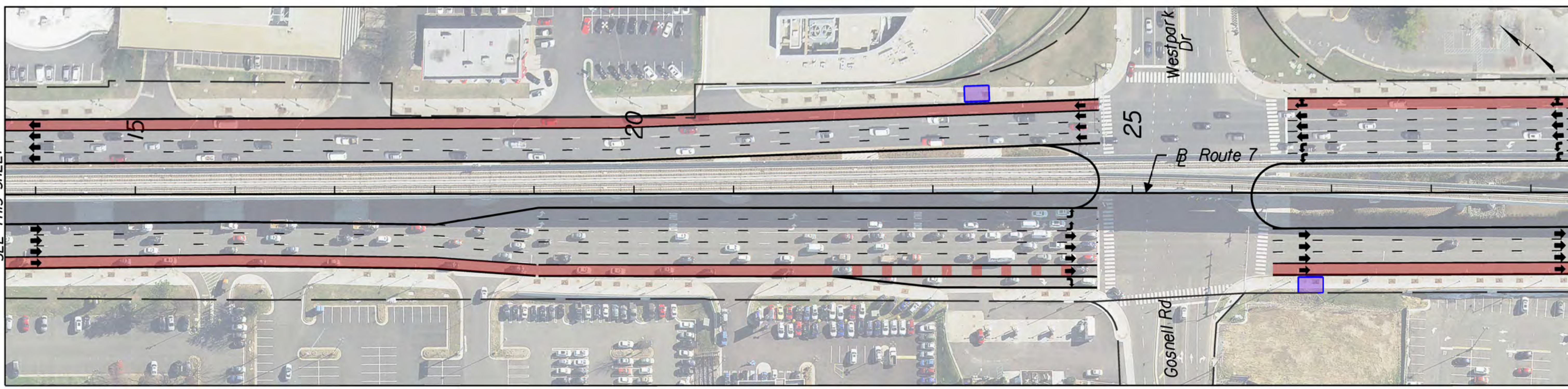
Design Element	Unit	Criteria	Source
SUP Rear Bench Width	Ft.	3	Fairfax County Public Facilities Manual

Figure C 2 Design Speed



Appendix D: Concept Layouts





Notes:

1. Non-revenue turn around BRT to utilize Tyco Road and Spring Hill Road to turn around.
2. Utilize existing bus facilities at station.

SCALE

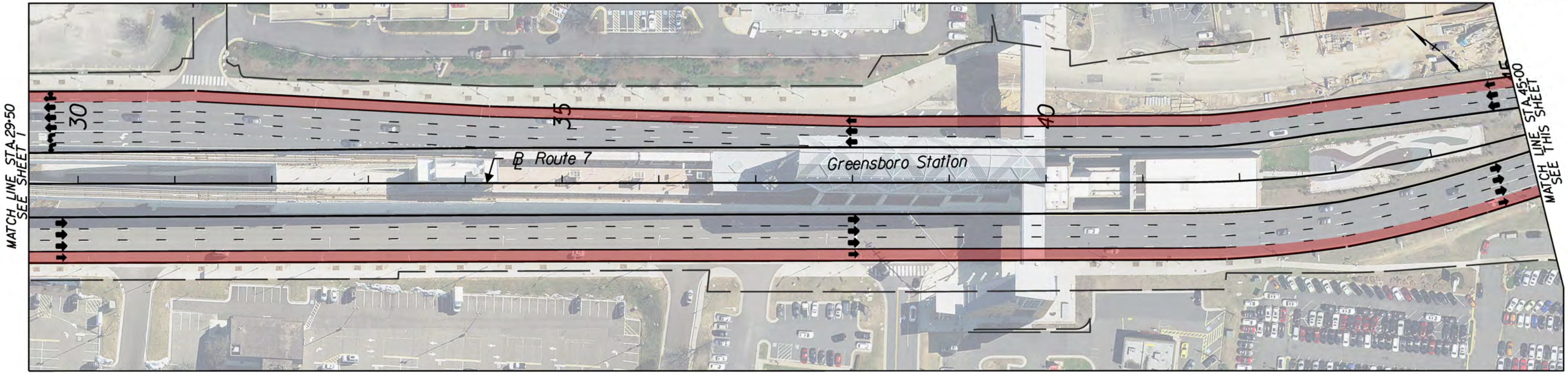
0 100' 200'

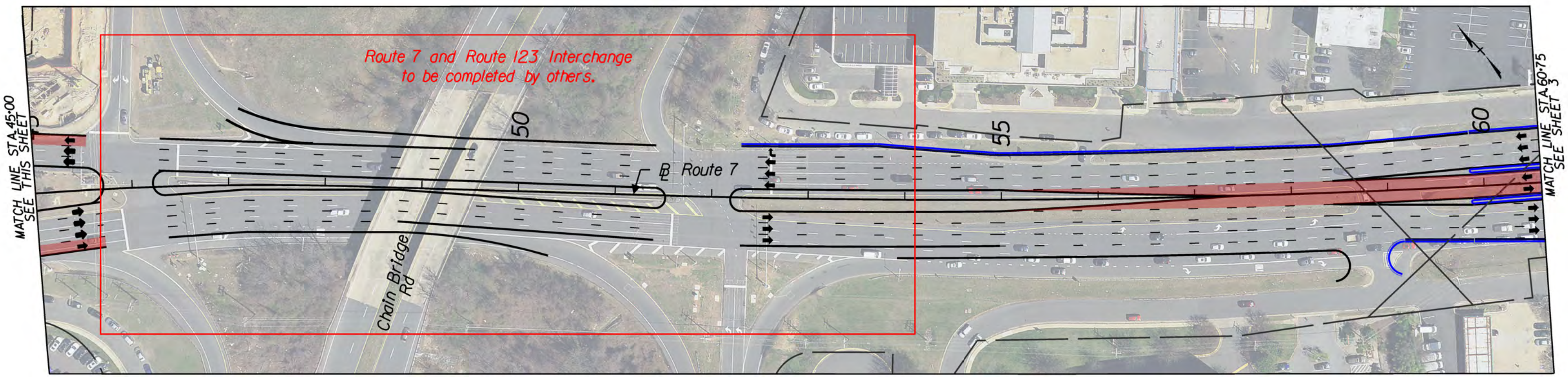
Envision Route 7 - September 2019

Conceptual Design -- For Information Only

Legend:

- Designated Bus Lane
- BAT Lane
- Sidewalk
- Existing ROW
- BRT Station
- Buffer Space
- Lane Configuration
- Proposed ROW





Legend:

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	BAT Lane		Buffer Space
	Sidewalk		Lane Configuration
	Existing ROW		Proposed ROW

SCALE
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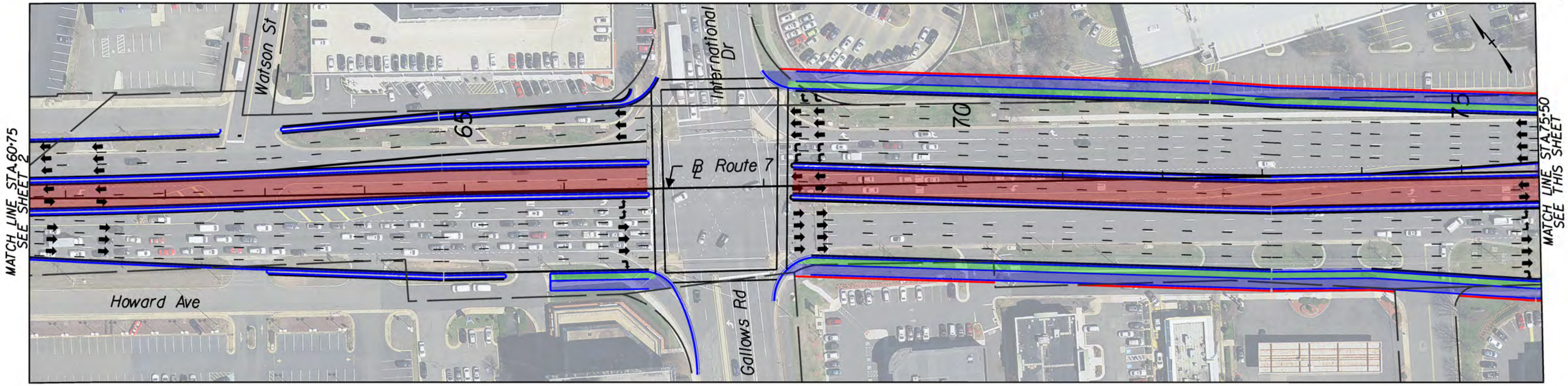
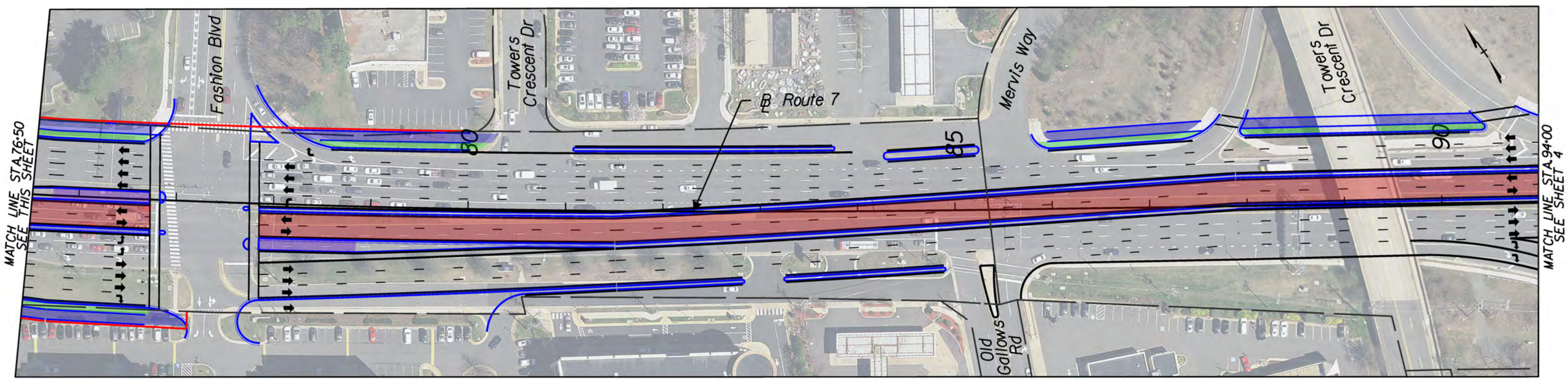
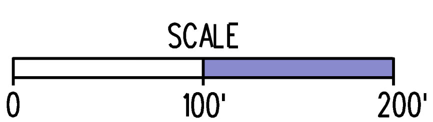
Envision Route 7 - September 2019
Conceptual Design -- For Information Only







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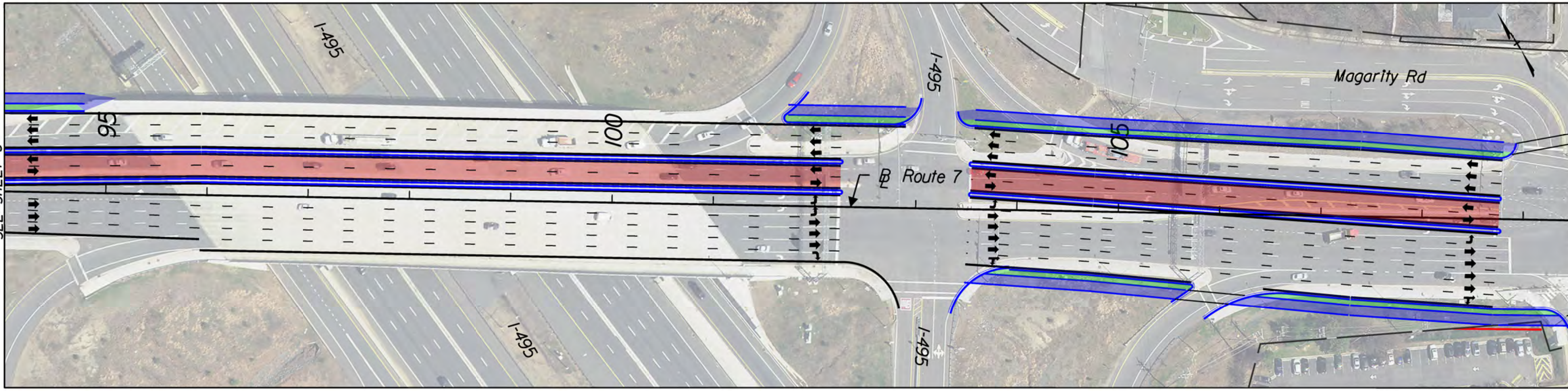
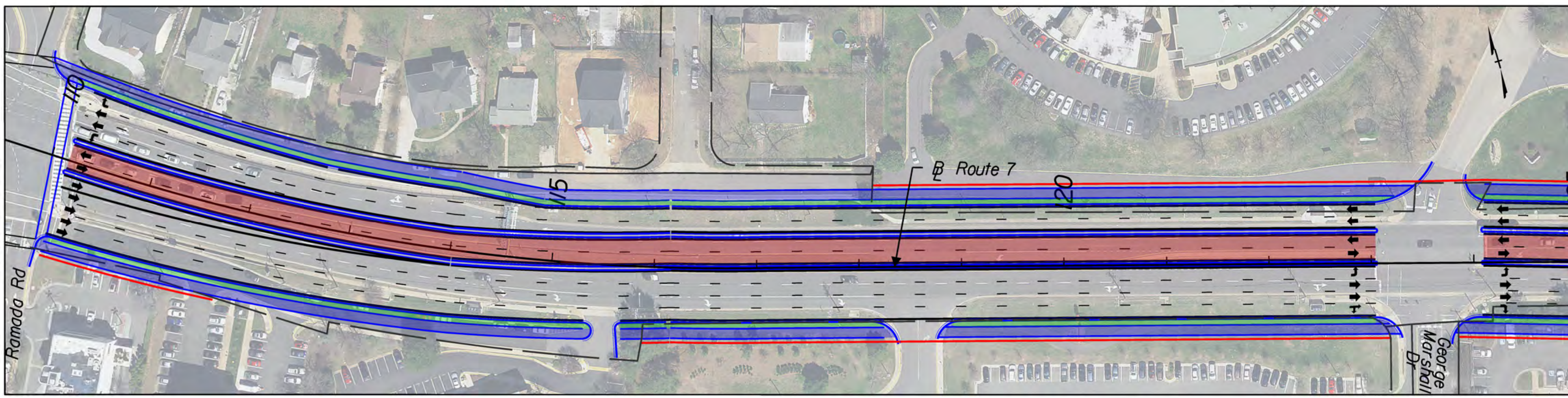
Legend:

Designated Bus Lane	BRT Station
BAT Lane	Buffer Space
Sidewalk	Lane Configuration
Existing ROW	Proposed ROW





SCALE

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Envision Route 7 - September 2019

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Legend:

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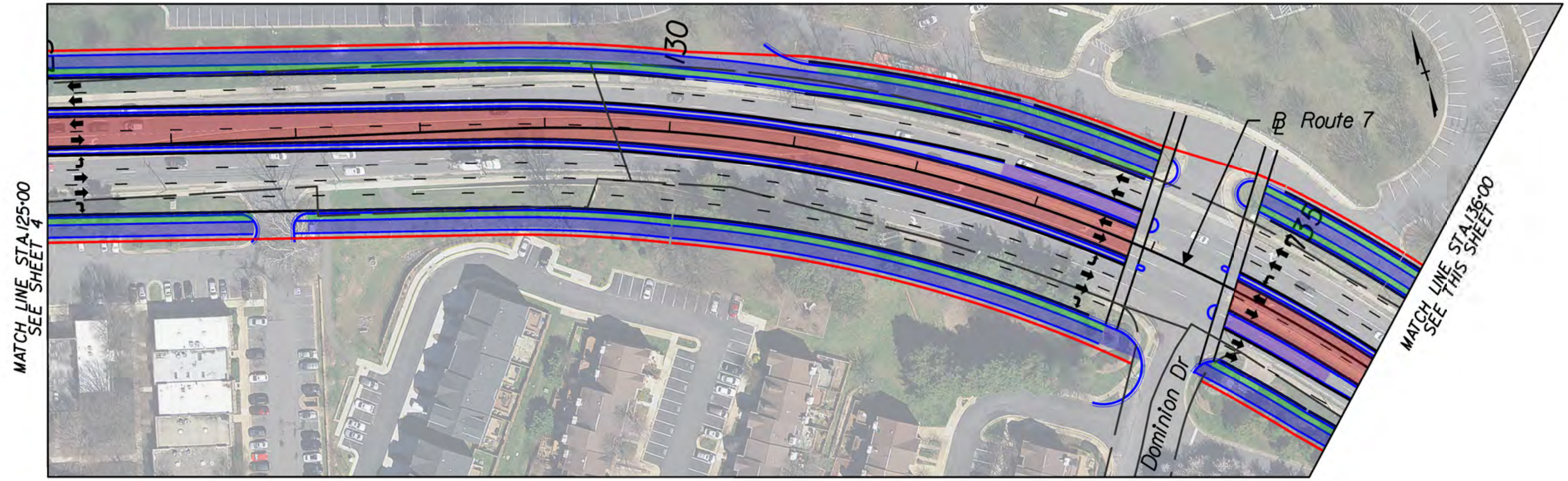

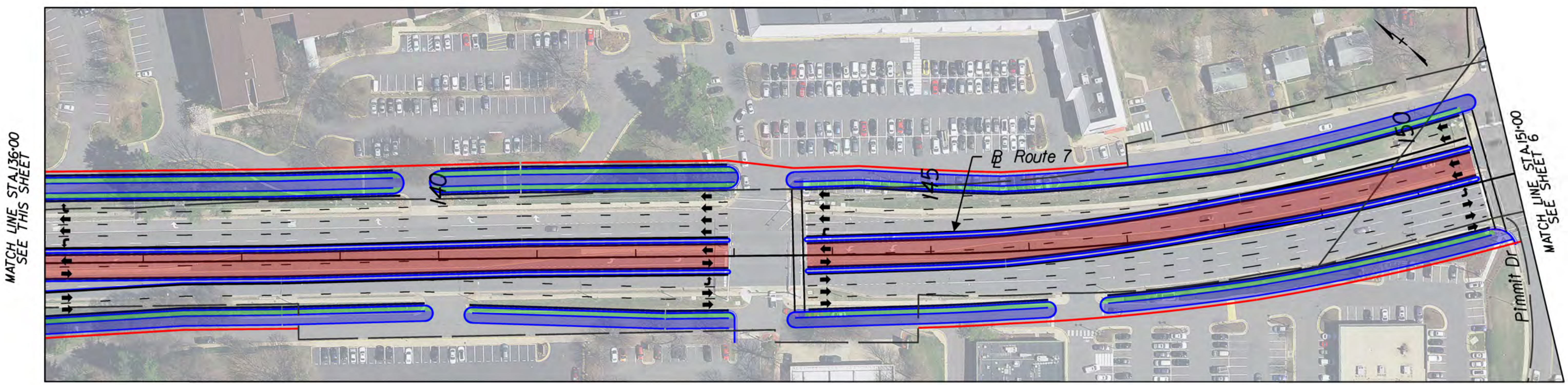

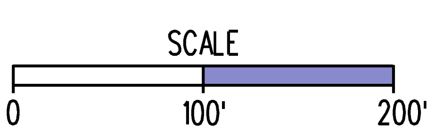

Envision Route 7 - September 2019
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Legend:

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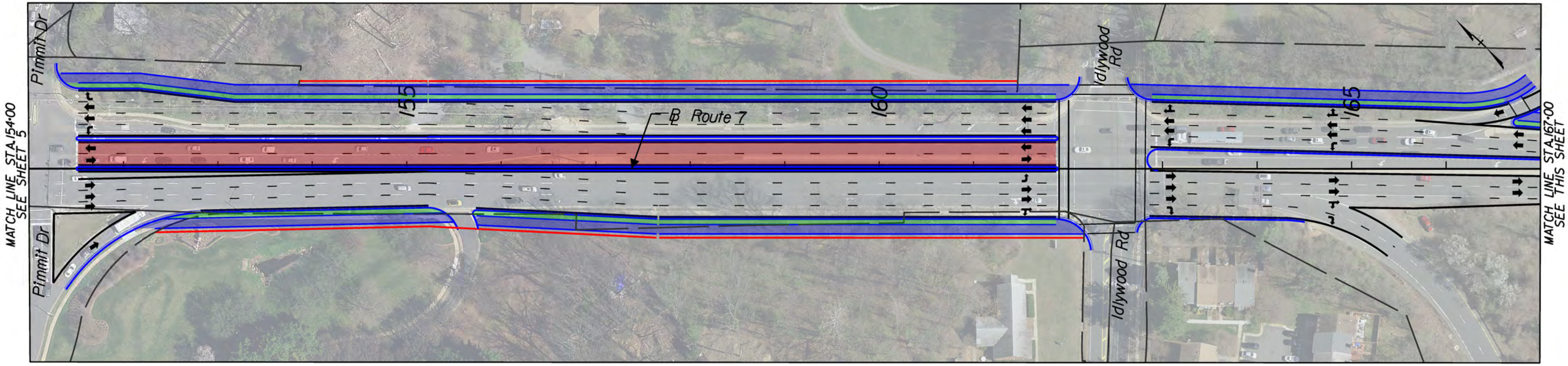

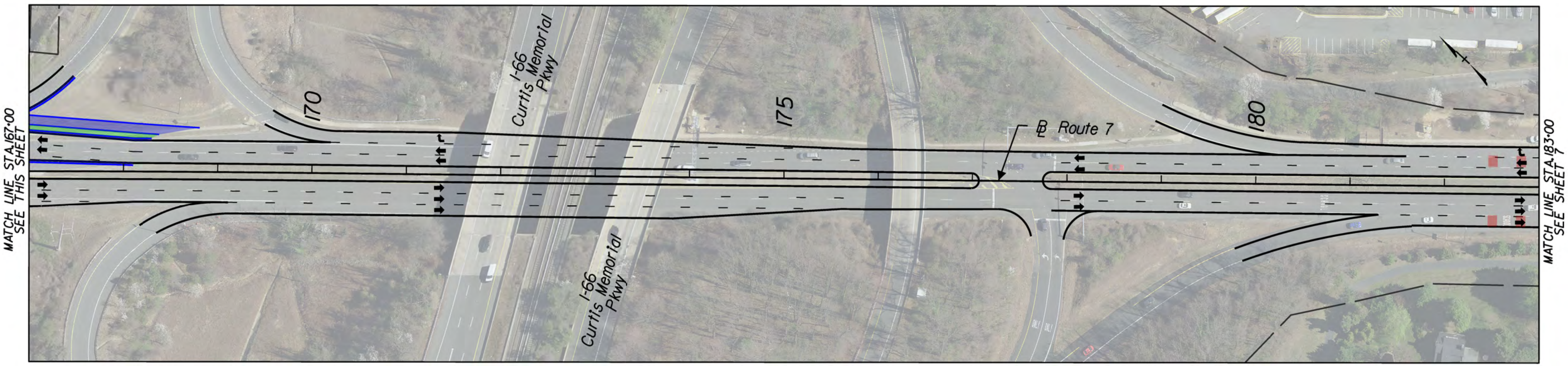

SCALE

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Envision Route 7 - September 2019

Conceptual Design -- For Information Only

Legend:

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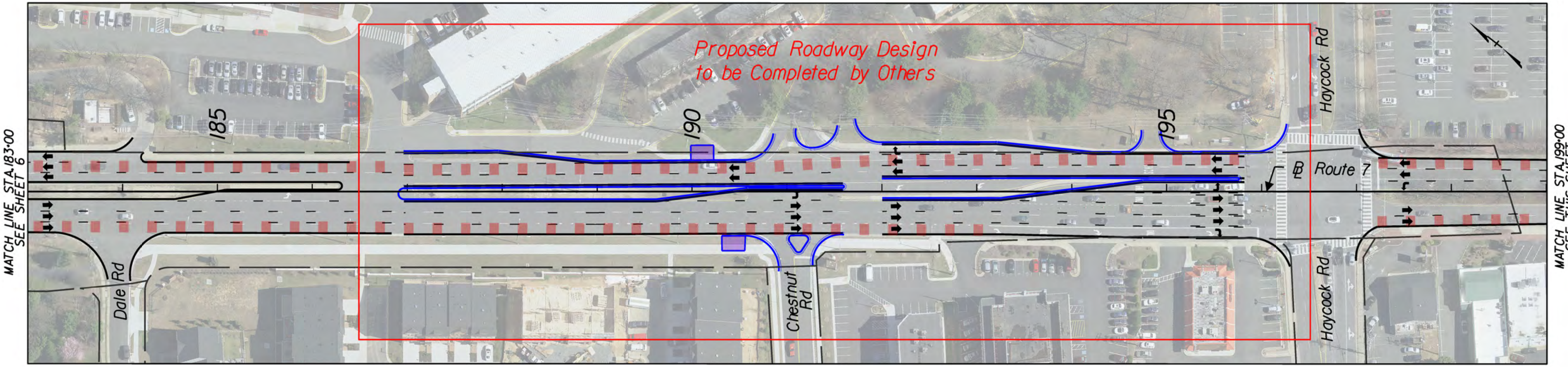

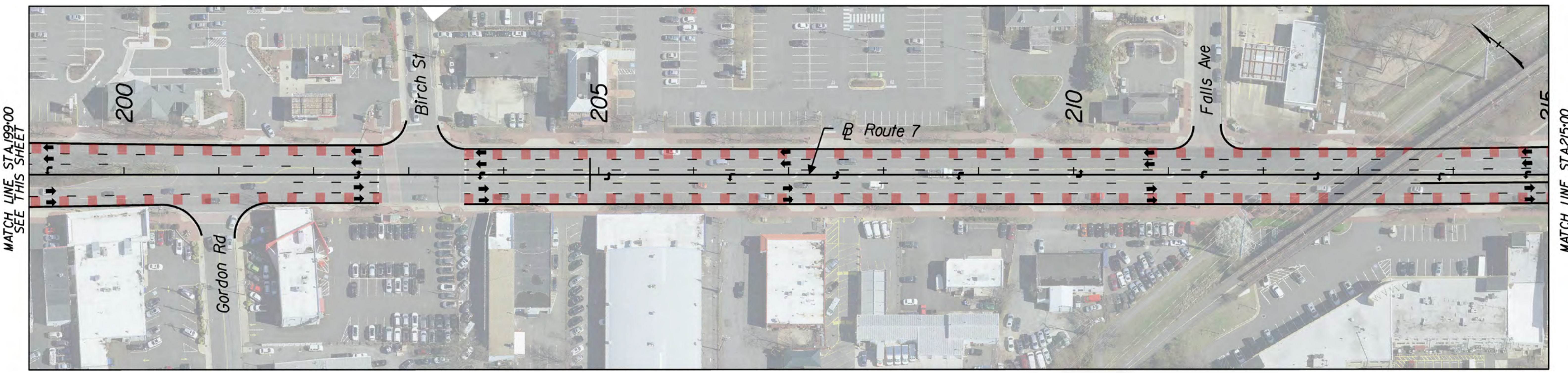

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Envision Route 7 - September 2019
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Legend:

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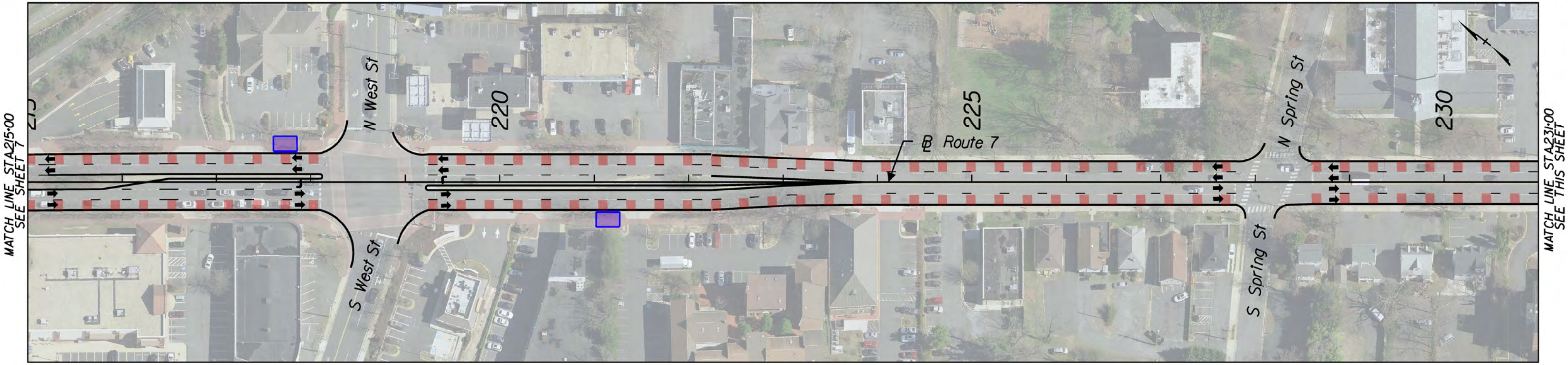
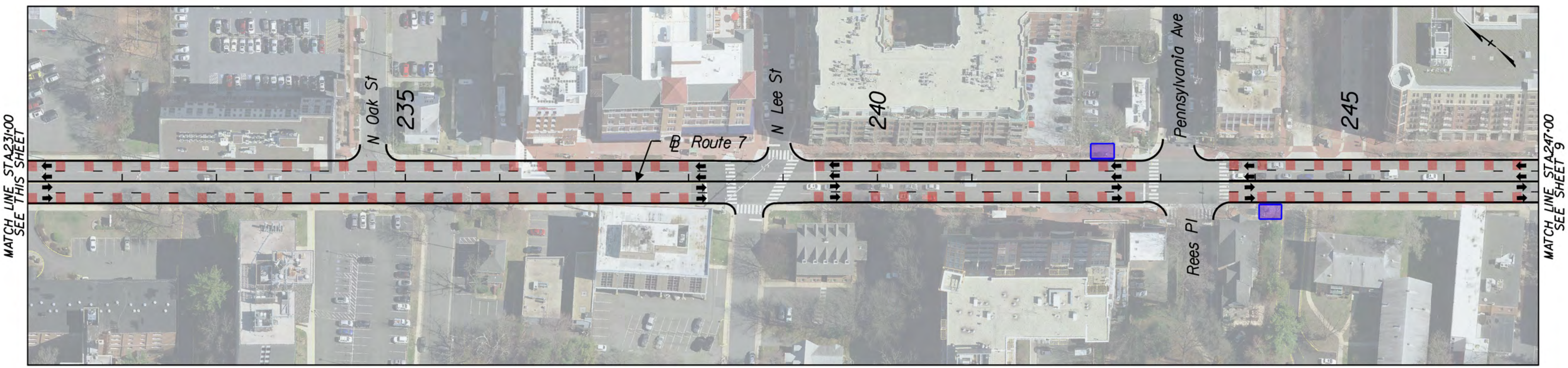
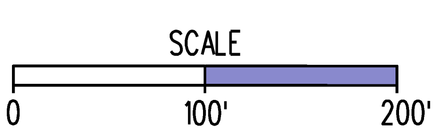
	BAT Lane		Buffer Space
	Sidewalk		Lane Configuration
	Existing ROW		Proposed ROW







Envision Route 7 - September 2019
Conceptual Design -- For Information Only

Legend:

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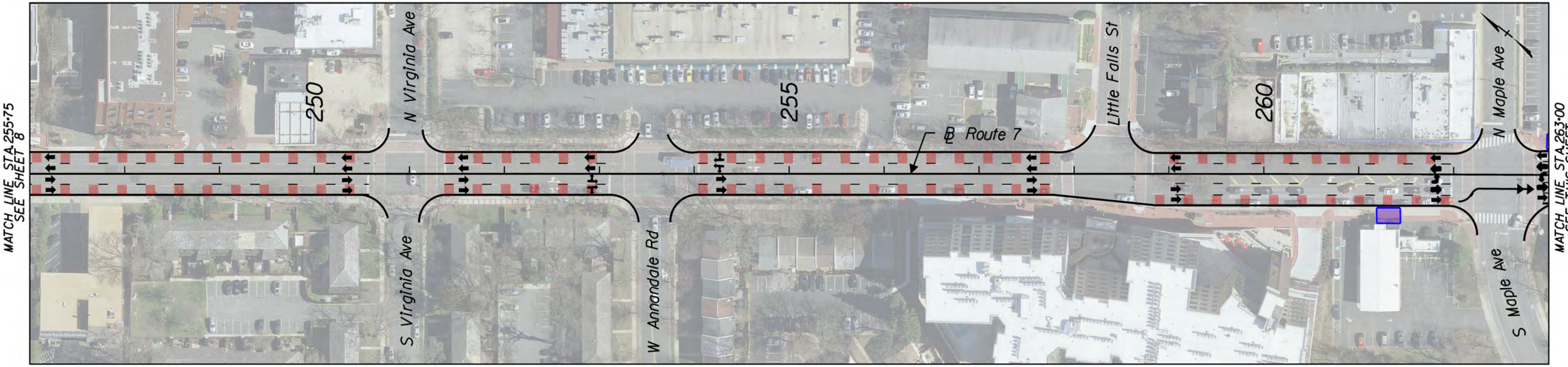
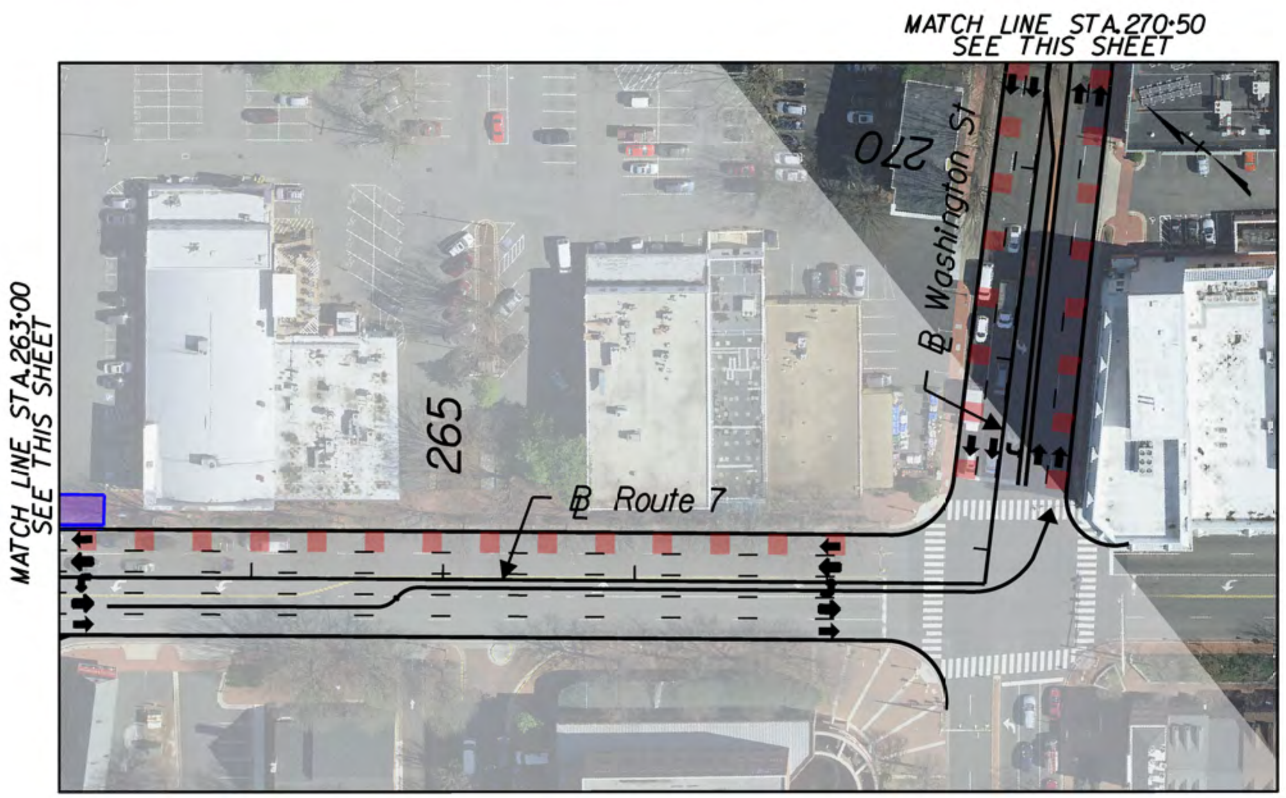
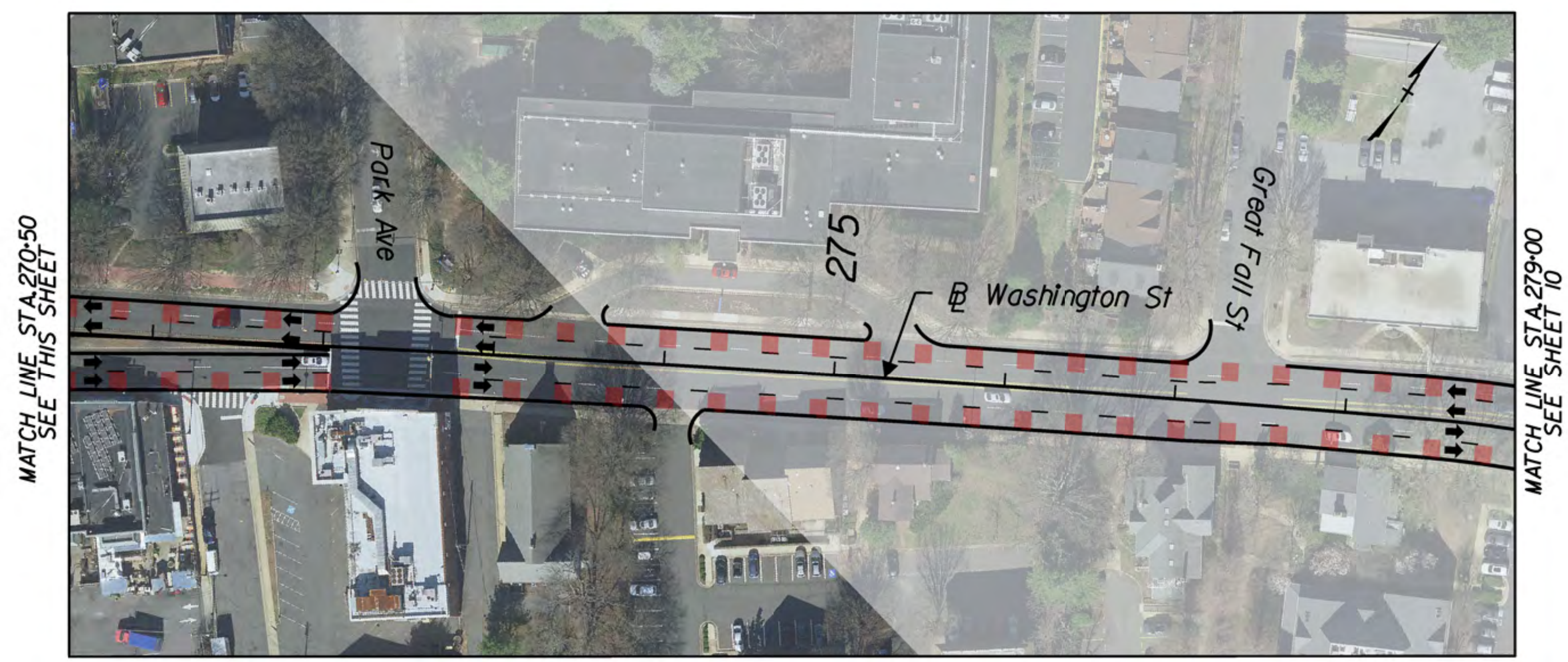




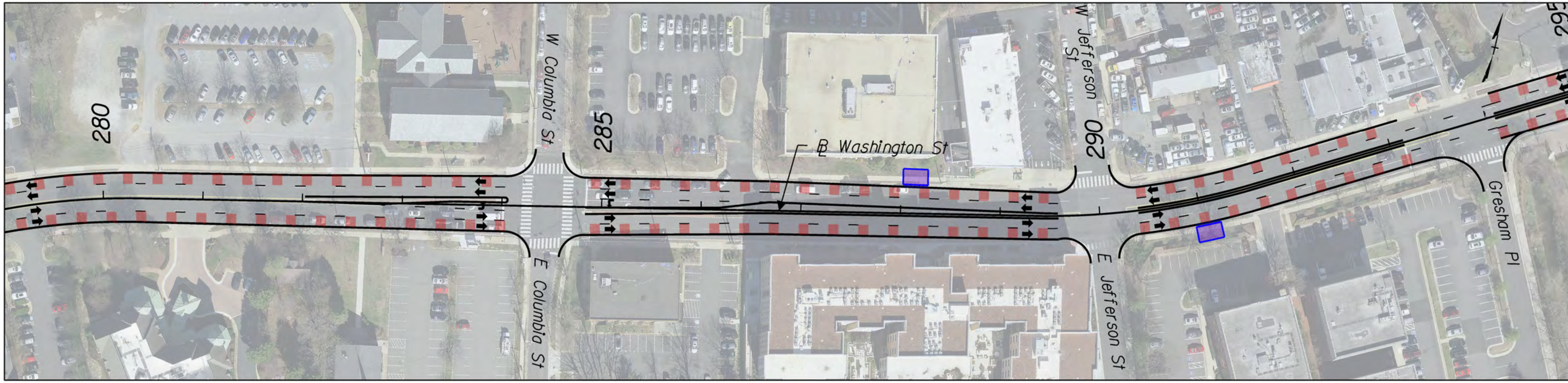


Legend:

Designated Bus Lane	BRT Station
BAT Lane	Buffer Space
Sidewalk	Lane Configuration
Existing ROW	Proposed ROW

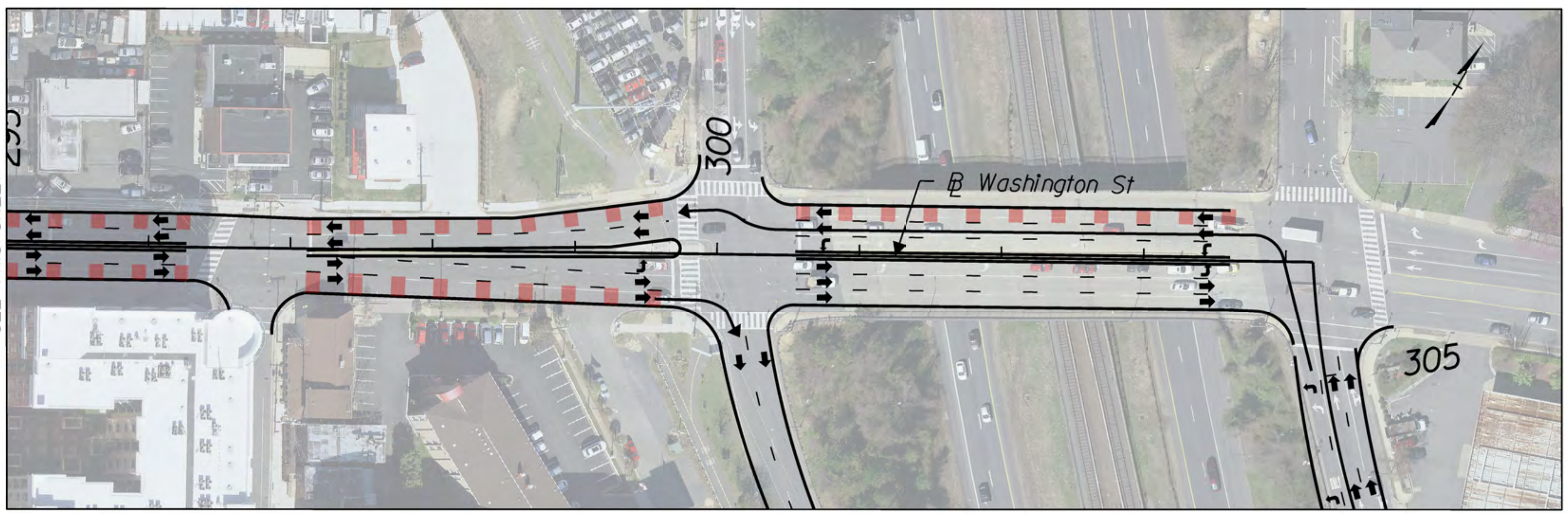
SCALE
0 100' 200'

MATCH LINE STA.279+00
SEE SHEET 9



MATCH LINE STA.295+00
SEE THIS SHEET

MATCH LINE STA.295+00
SEE THIS SHEET



MATCH LINE STA.306+00
SEE SHEET 11

SCALE
0 100' 200'

Envision Route 7 - September 2019
Conceptual Design -- For Information Only

Legend:

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- BAT Lane
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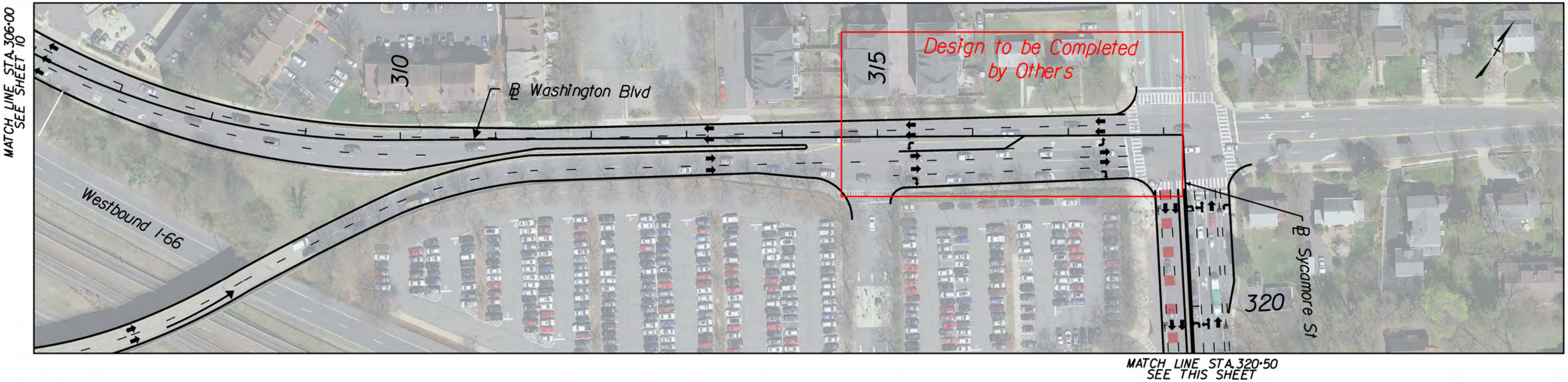

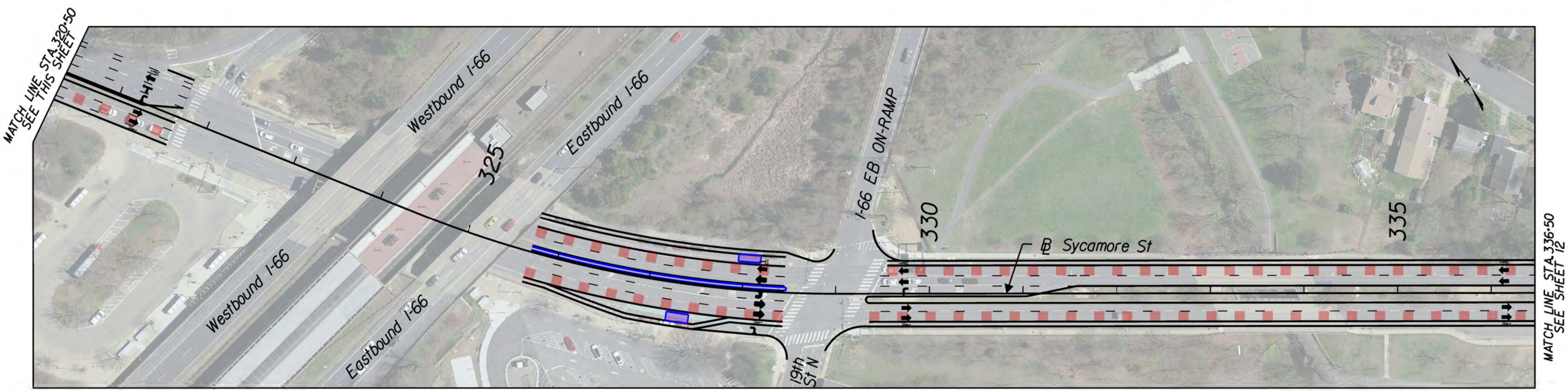

SCALE

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Envision Route 7 - September 2019
Conceptual Design -- For Information Only

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	Sidewalk		Lane Configuration
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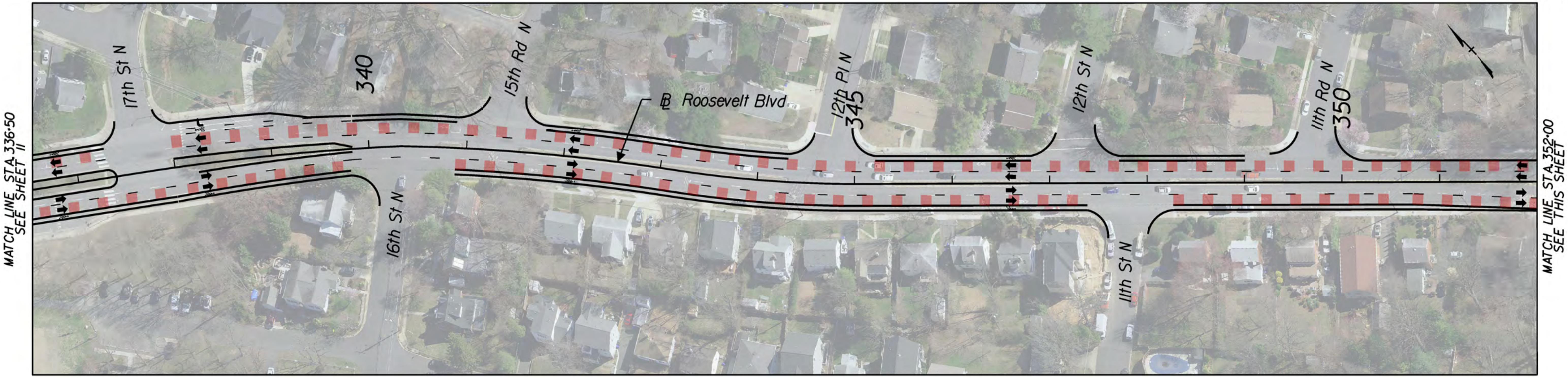

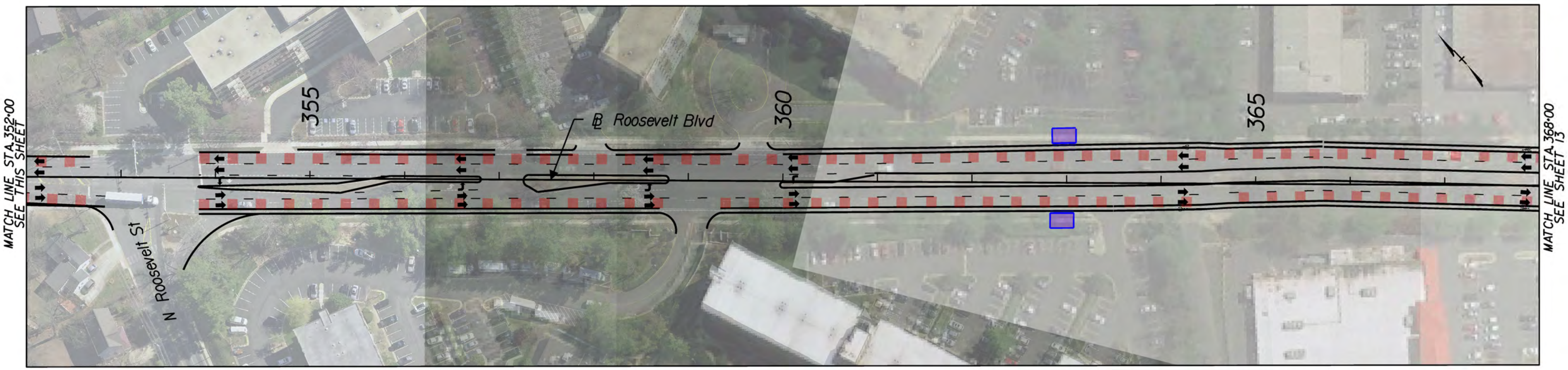

Legend:

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SCALE
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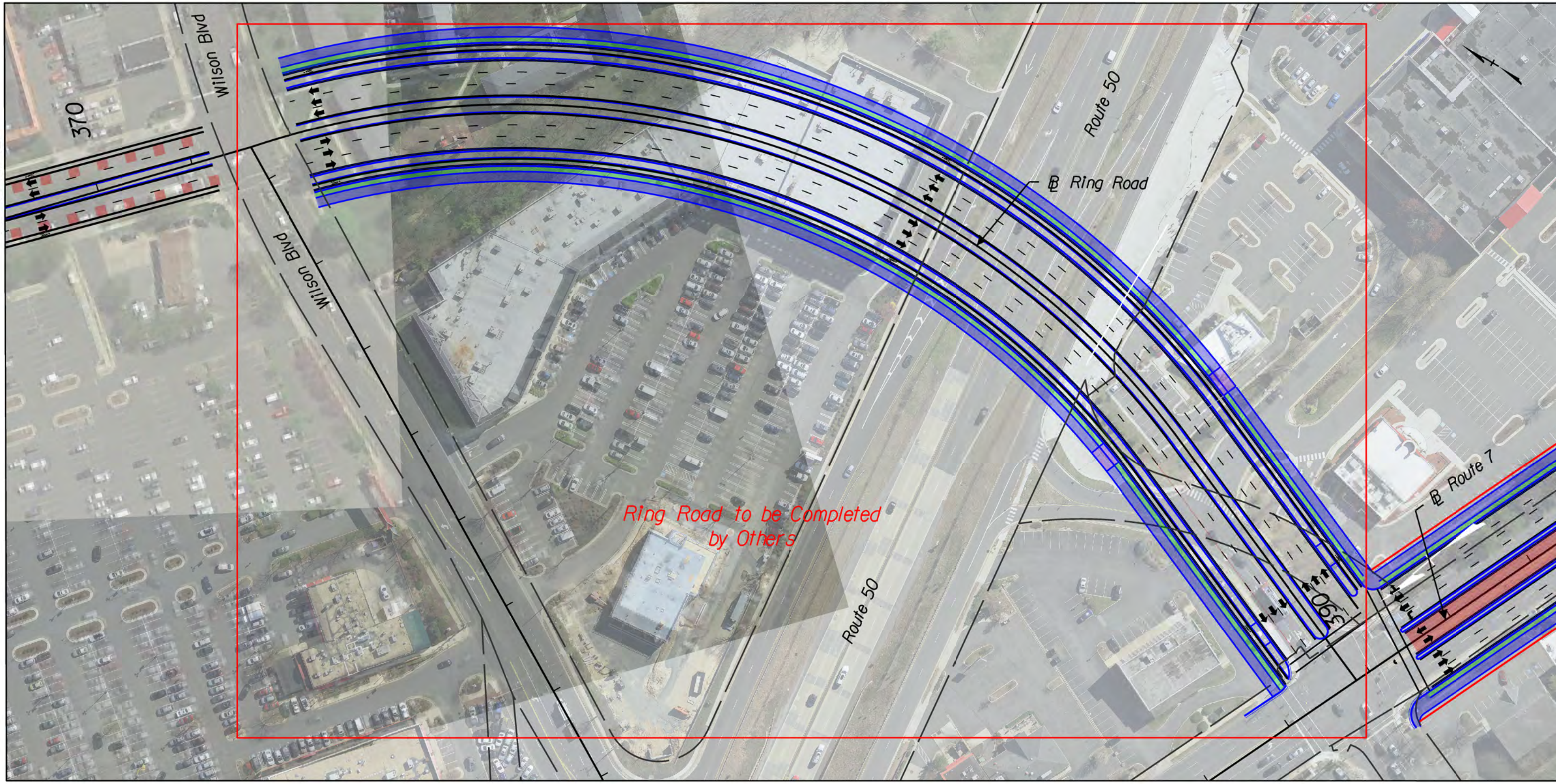
Envision Route 7 - September 2019
Conceptual Design -- For Information Only



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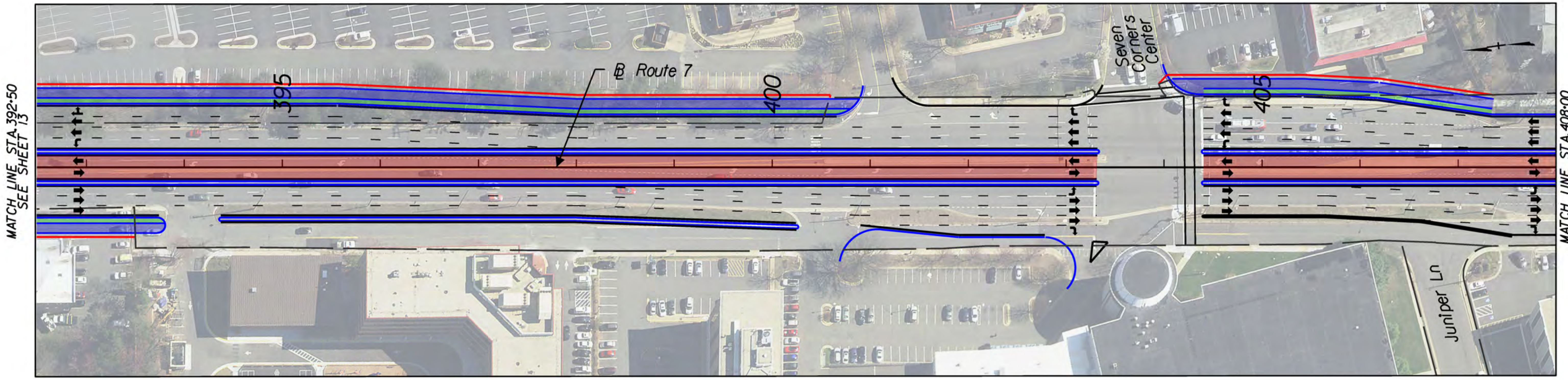

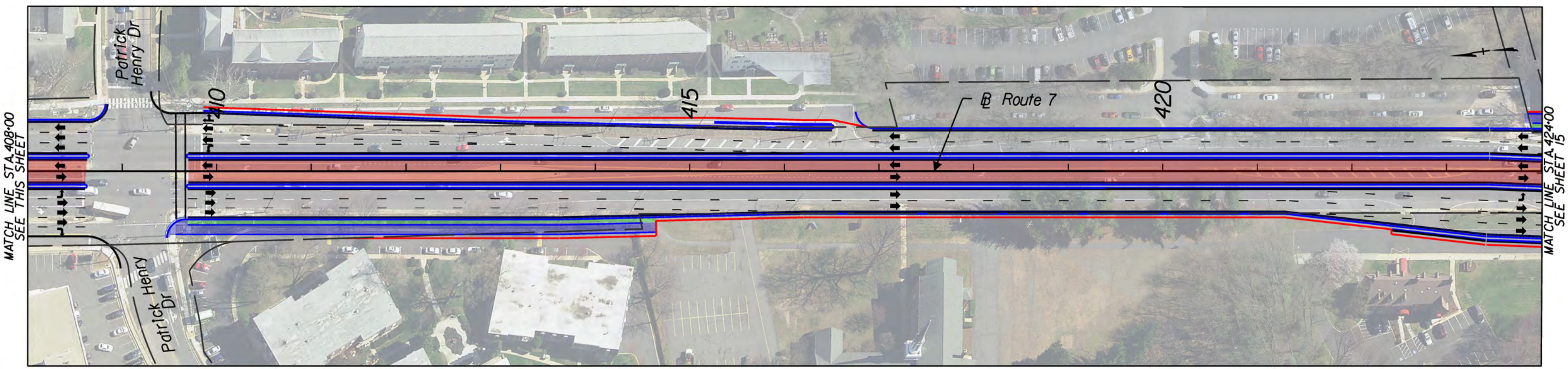

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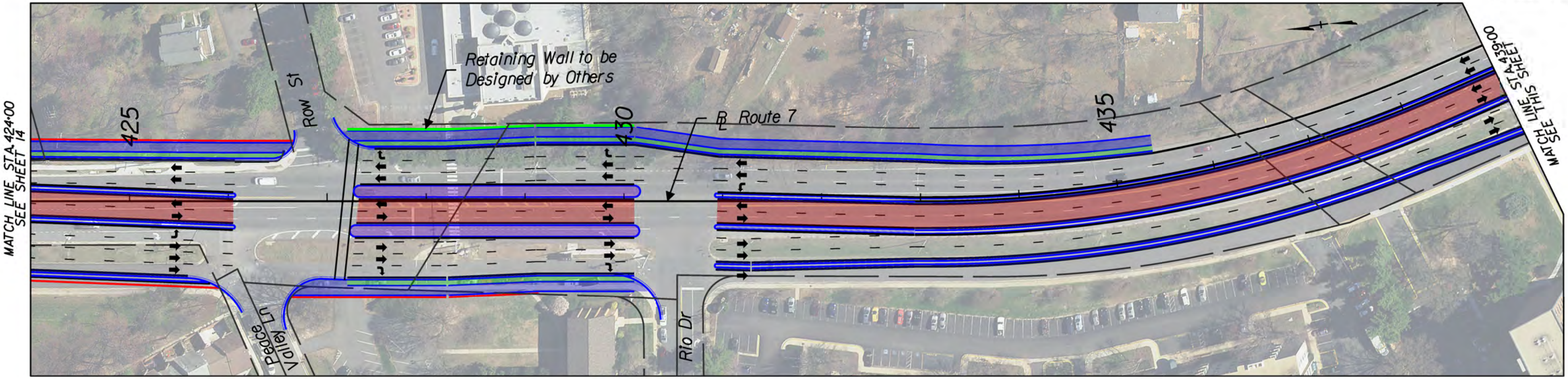

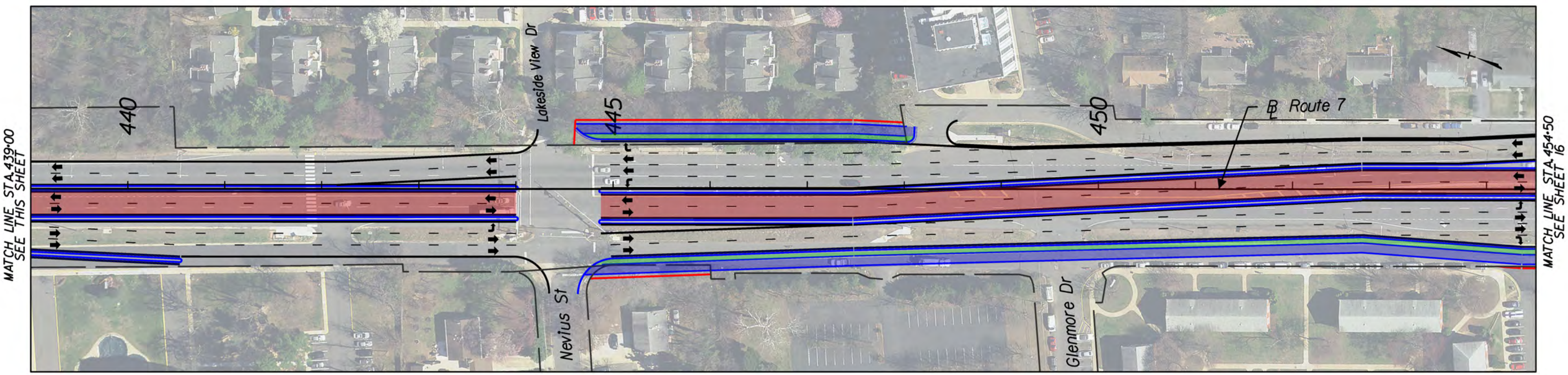

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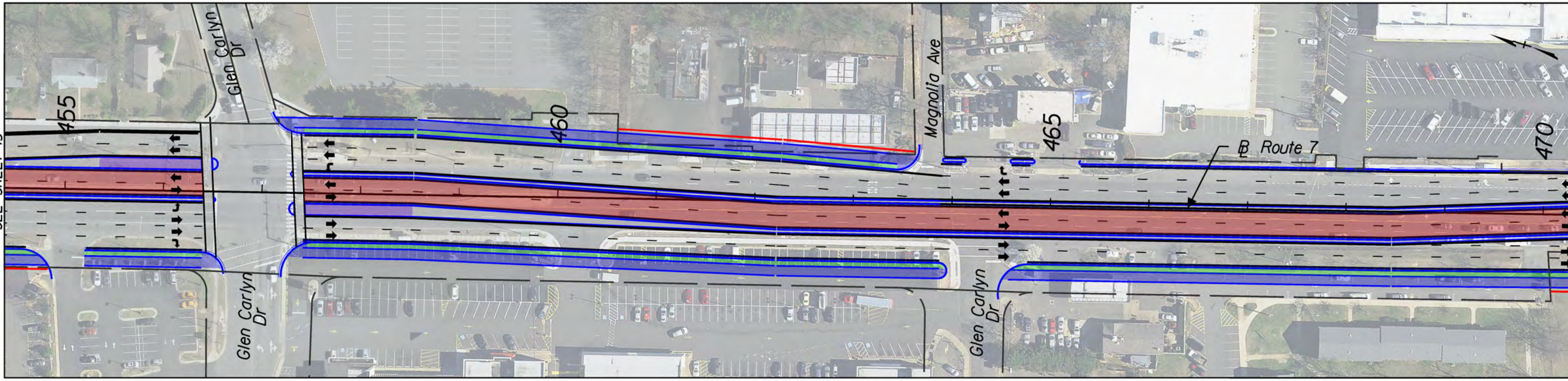

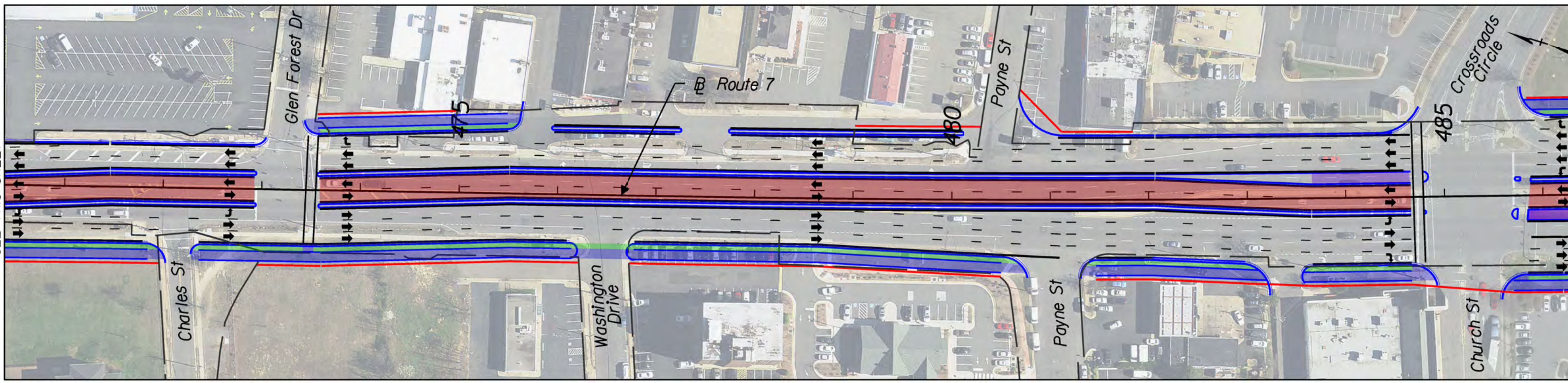

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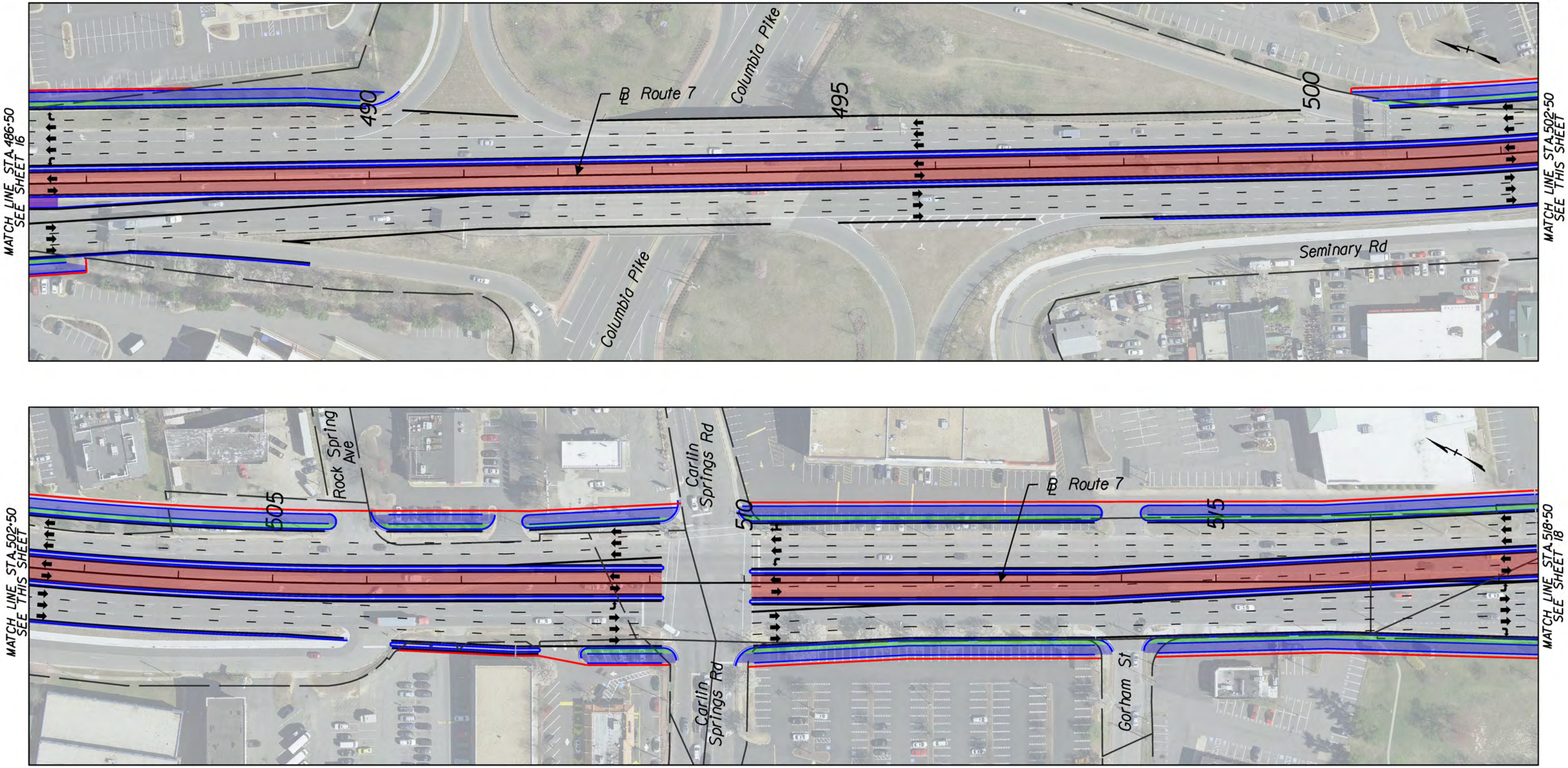

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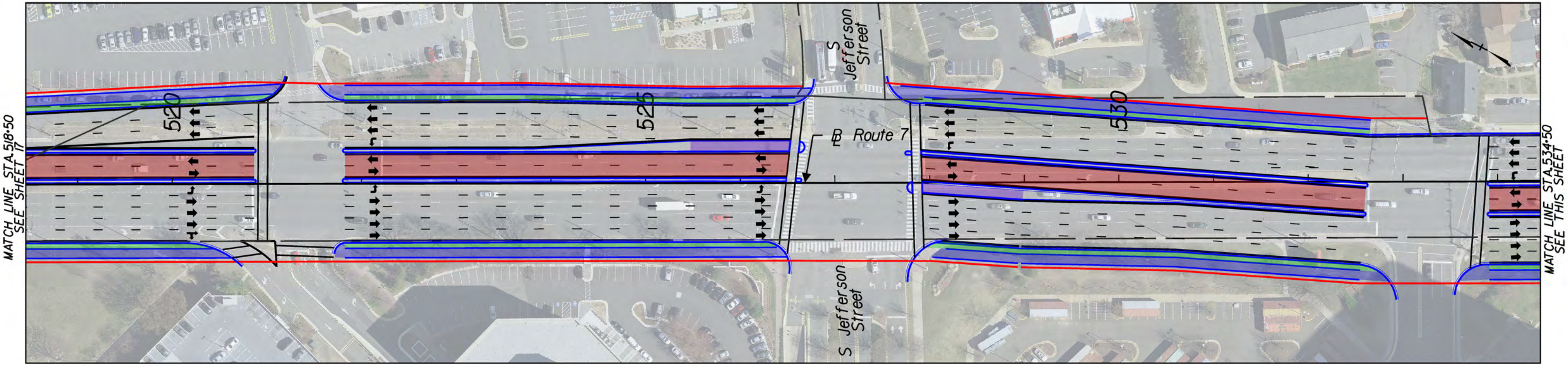

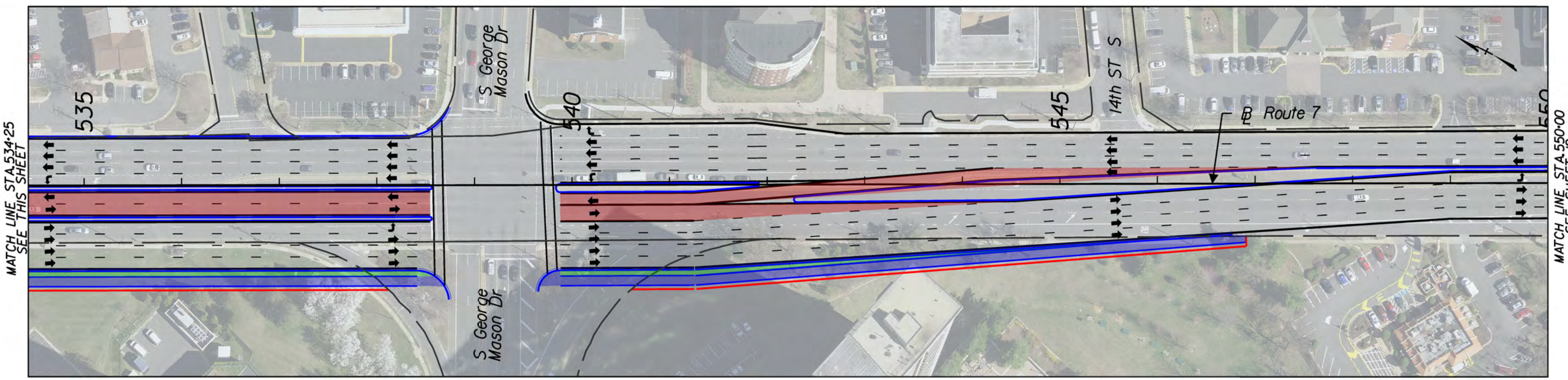

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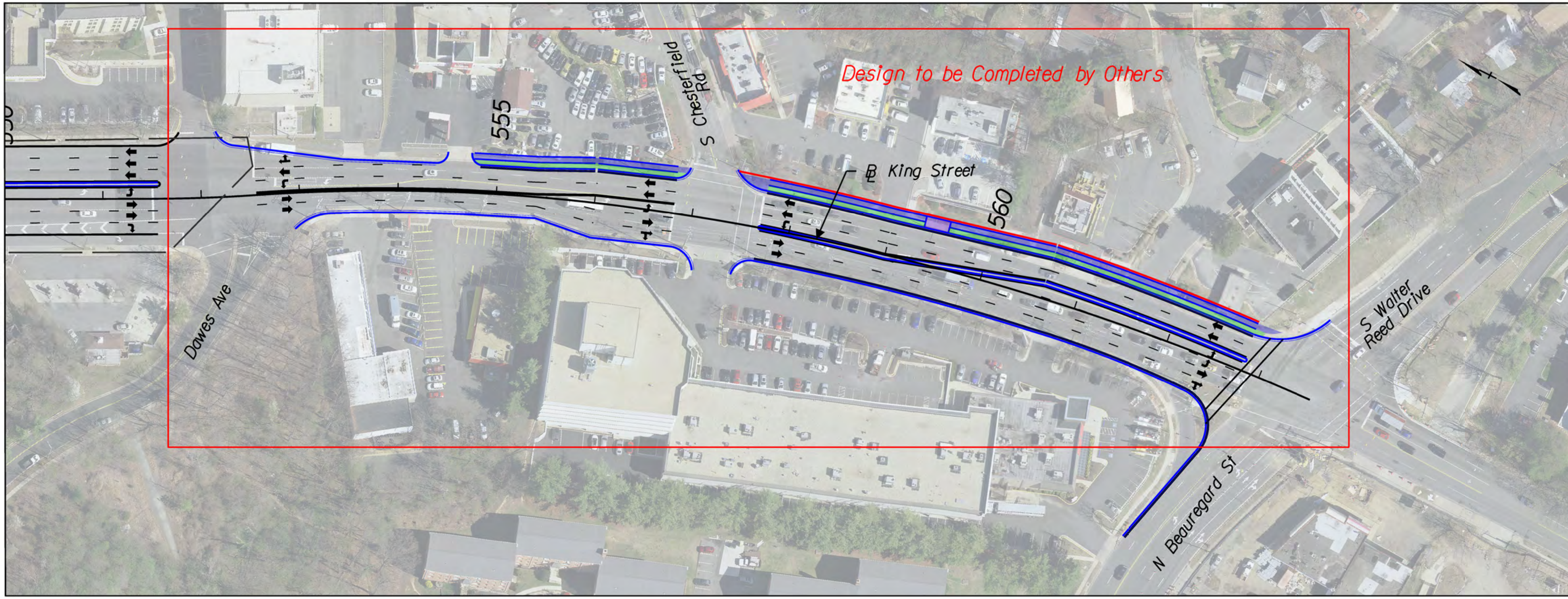

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Appendix E: Preliminary Capital Cost

- Appendix E Part II: Detail of Cost Estimates

Appendix E: Estimated Capital Cost

A capitol cost estimate for the Route 7 BRT Project was created using conceptual layouts for the corridor. This estimate will assume there will be one construction contract. The estimate will be in conformance with the Federal Transit Administration's (FTA) Standard Cost Categories (SCC) format. Construction cost estimate details are provided in the Appendix E Part 2.

OVERVIEW

Conceptual layouts for the Envision Route 7 Bus Rapid Transit (BRT) corridor have been created from end to end. The first step in assessing the estimated cost of the project is to identify the parameters to which the project will be designed. Parameters providing design direction regarding lane width, turn radius, sidewalk width, and other elements will be identified. The intent of this document is to identify the design parameters and establish a basis of design, inclusive of agency staff, agency stakeholders and consultants, and to agree on the parameters so that the design can be advanced in a way that minimizes the need to adjust the design once underway. The document is divided into roadway and station design parameters.

This project consists of reconfiguring streets and some adjacent properties to accommodate exclusive median and curb lane BRT runningway and enhanced bus stations. The improvements will occur generally on Route 7, between Mark Center in Alexandria, Virginia and the Spring Hill Metrorail Station in Tysons, Virginia (Fairfax County).

CAPITAL COST METHODOLOGY

The capital costs for the project were developed in a parametric process based upon quantities and unit rates from similar BRT projects for this scope of work. Quantities for each of the items were developed using the Conceptual Layout plans prepared for the corridor. Items are assigned to a Federal Transportation Agency (FTA) Standard Cost Categories (SCC) code.

A ROW analysis was completed to assess additional property needed for the expanded roadway segments to accommodate the BRT runningway and facilities on the Envision Route 7 corridor. The ROW analysis was done by overlaying the Conceptual Layout drawings over parcel data for Fairfax and Arlington Counties, and the City of Falls Church. The specific ROW needed was identified by performing a GIS analysis: where the concept design layer intersected the parcel layer, parcels were selected, and the percentage of property intersecting the design layer was quantified.

ROW takings by parcel were then used to determine ROW acquisition costs. ROW cost estimates are based on average local per acre value (categorized by use) and factored to the required take area. The ROW costs also include the fee acquisition of permanent and temporary easements, relocation costs, legal fees, business damages and other miscellaneous costs.

CONTINGENCIES

In accordance with the FTA SCC, there are two levels of contingencies; Allocated and Unallocated. The Allocated Contingency will be included for each SCC cost category to address risk, scope and quantity definition relative to the level of design. This allocated contingency amount is based on each of the estimate items per their respective costs and a level of certainty and judgment based on the estimate and design progress detail. For this estimate, lower risk line items, such as concrete and asphalt pavement, have an allocated contingency of 15%, while higher risk line items related to utility work have a higher allocated contingency of 30%. Allocated contingencies for right-of-way acquisition are the highest at 40%.

To account for the current labor and construction market in the Washington, D.C. metropolitan area, the cost estimate is presented as a range from Low to High. For the low-range estimate, the allocated contingencies described above were applied to each line item. For the high-range estimate, the allocated contingencies were doubled.

Each SCC item total will be applied its specific allocated contingency and then the contingencies will be totaled for the total contingency as per the FTA SCC format. The contingency levels will generally decrease with design progression due to increased detail. The amount of contingency depends on the complexity of any item as well as the stage of engineering completion.

The unallocated contingency will be applied to the total project costs as per FTA SCC guidelines. This contingency is designed to represent the costs of changes in scope, uncertainty in the present design, including political events, labor strife, weather, variable commodity pricing, unfavorable market conditions, bid risk, changed conditions, etc. that occur during construction for all SCC line items.

INFLATION

The Year of Expenditure is determined by applying an inflation rate to the base year capital cost. The base year will be 2019. For this project, the inflation rate of 3.5 percent is proposed to use based on recent “Construction Cost Index” (CCI) by Engineering News Record (ENR). This inflation rate will be included in the FTA SCC Inflation worksheet to calculate the project escalation. The current project schedule and its tentative completion date of the end of 2030 will be the basis for this escalation calculation.

DESCRIPTION OF STANDARD COST CATEGORIES

The capital cost estimates in the FTA format use the SCC guideway categories. These categories will include all the foundational construction elements up to and including the pavement, bike lanes, line striping, curbs, etc.

Guideway (SCC 10.0)

Guideway elements are portions of the transit system that can be assigned costs at a fairly aggregate level with a certain level of accuracy. Guideway costs through the stations will be included in the Guideway category. Maintenance of Traffic and Sediment and Erosion costs will be included in the SCC 40.08 section. Generally, each of the guideway cost estimates includes work identified in the SCC Definitions.

Stations, Stops, Terminals, Intermodal (SCC 20.0)

The capital cost estimates in the FTA format will use one of the SCC sub-categories:

- At-Grade Platform.

Station sitework associated with parking, bus, kiss-and-ride and access will be included in 40.06 and 40.07. Generally, all the station cost estimates consist of the following:

- Platforms;
- Site work, including excavation and foundations;
- Grading, borrow fill, and soil stabilization;
- Concrete footings, walls, platform slab and roof;
- Architectural finishes of all station elements; i.e., platform, canopies/weather protection;
- Allowance for signs, and other furnishings;
- Lighting, electrical, and CCTV estimates;
- Fare collection is in SCC 50.06; and
- Parking lots and landscape is in SCC 40.06 and 40.07.

Support Facilities; Yard, Shops, Administration Buildings (SCC 30.00)

This cost category will include site development, parking, storm water management, site excavation, landscaping, personnel facilities, vehicle storage and maintenance buildings, charging systems, storage of bus vehicles, maintenance of way facilities, and shop equipment.

Communications for the shop area will be included in this item.

This estimate will assume existing yards or shops are generally adequate for the expansion.

Sitework & Special Conditions (SCC 40.00)

The capital cost estimates in the FTA format use eight of the SCC sub-categories. Special conditions include items that cannot be adequately represented by a typical section because of complexity, uncertain alignment, special site conditions, or other unique circumstances. Special condition elements include:

- Demolition, Clearing, Earthwork – In the rearrangement of individual cost elements from the categories of the FTA standard cost categories, some of these cost elements remain with guideways and station categories. This cost element will include the cost for the demolition of special features such as buildings (if not included as part of right-of-way), large structures (bridges or retaining walls), or other existing unusual features. Project clearing and grubbing not included in the stations, yard or the guideway is included in this item.
- Site Utilities Relocation – One of the cost elements within this cost category will be the relocation of existing utilities within the guideway corridor. These relocations will include both public and private utilities, subject to any agreements that may apply to franchised utilities that exist within public rights-of-way. The power duct banks and connections to each of the stations, and the yard will be included in this item. Stormwater Management costs are included in this category except for the Yard and Shop areas.
- Hazardous Material, Contaminated Soil Removal/Mitigation, and Ground Water Treatments – Hazardous material, contaminated soil mitigation and ground water treatment costs will be in this section.
- Environmental Mitigation, e.g. Wetlands, Historic/Archeological, Parks – Special environmental mitigation costs, such as wetlands mitigation, noise or vibration control, and related items will be included in this category.
- Site Structures Including Retaining Walls, Sound Walls – Included with this category will be Retaining Walls, Sound Walls, etc. (except for sound walls incorporated into the guideway structures) - Major structures, such as retaining walls that are not included in the guideway, station or yard costs, will be included in this category.
- Pedestrian/Bike Access and Accommodation, Landscaping – This item includes landscaping and bike accommodations for this project.
- Automobile, Bus, Van Accessways Including Roads, Parking Lots – This item includes existing pavement removal/replacement/modification adjacent to the guideway and at the stations, new sidewalks, ADA ramps, existing curb tie-ins, etc.
- Temporary Facilities and Other Indirect Costs During Construction –
    - The project will assume no overtime is required as per the project schedule. Any overtime that may be required will be included as the schedule is refined.
    - This item includes the costs to relocate any parking area or other existing facilities not included in the Right-of-Way (ROW) cost category to allow construction of the project.
    - Indirect costs not included in the pay item unit prices including mobilization & demobilization, on-site contractor project management, construction support, and construction support staff. These costs will be based on project duration and crew-based costs.
    - Profit is included in their respective SCC line items.
    - Maintenance and Protection of Traffic (MPT) will be included in this item.

Systems (SCC 50.00)

The capital cost estimates in the FTA format use the SCC system sub-categories. These categories are:

Communications

The communications system provides the necessary subsystems to support the total operational requirements of the BRT Corridor. The communications system costs will provide for the following subsystems and/or functions:

- Supervisory and control and data acquisition subsystems (SCADA) to enable the remote monitoring and control of vehicle/train operations, and station support facilities from Pitt Tower;
- Communications subsystems consisting of two-way radio, public address (PA), closed circuit television (CCTV) surveillance equipment, PABX (digital switch) telephone equipment, and variable message signs (VMS) and as specified in the preliminary design;
- Interface to the fare collection and ticket vending equipment; and
- Equipment for the hearing-impaired, reader boards, and associated wiring, as well as an allowance for testing, training, and startup will be included in the unit costs for the communications elements.

Revenue Collection

Costs for elements in this category cover the fare collection equipment at the BRT Corridor stations. The number of fare collection units at each station will be based on the projected passenger volumes during peak hours. The unit cost for fare collection will include all equipment costs, and installation costs. The hardware will include provisions for fare vending facilities and access for people with disabilities. The unit costs will include an allowance for testing, training, and startup for the contractor personnel.

No future ridership expansion fare collection costs will be included in this estimate.

Right-of-Way, Land, Existing Improvements (SCC 60.00)

This cost category covers all land acquisition and acquisition-related costs required to obtain various real property needed for the construction, operation, and maintenance of the different alignments.

The right-of-way costs will include the fee acquisition of permanent and temporary easements, relocation costs, legal fees, business damages and other miscellaneous costs. Right-of-way cost estimates will be based on present evaluations or negotiations or if necessary, average local per acre value with factors for the above costs of the properties being considered.

Vehicles (SCC 70.00)

The costs for revenue vehicles (buses and bus modifications) are not included for this capital cost estimate.

Professional Services (SCC 80.0)

The soft costs in the FTA format use ten of the SCC sub-categories. These allowances are computed by applying a percentage to the total construction cost estimated for each cost category (excluding right-of-way and vehicles) or as otherwise described. Table E 1 provides a list of the percentage multipliers that will be applied to the total construction costs to cover these items:

Table E 1 Professional Services Percentages

Soft Costs	Percentage for BRT
Project Development	5.00%
Engineering	7.00%
Project Management for Force Account and Administration	5.00%
Construction Administration & Management	8.00%
Professional Liability and Other Non-Construction Insurance	1.50%
Legal; Permits; Review Fees by Other Agencies, Cities, Etc.	1.00%
Surveys, Testing, Investigation, Inspection	1.00%
Start-Up (Safety Certification and Activation)	0.50%
Total Soft Costs	**30.00%**

*Includes only the training and start-up for the agency personnel. Contractor related costs are included in their respective line item estimates.

Soft cost categories include the following:

- Project Development – This cost will include preliminary engineering up to final funding.
- Engineering – This cost will include final design including design services during construction.
- Project Management for Design and Construction – An estimated Professional Services percentage will be used for Route 7 PM staff for administration and force account work.
- Construction Administration & Management – This sub-category will cover the costs of construction administration of the following:

- Consultant that provides construction management services (CM)
- Professional Liability and Other Non-Construction Insurance – Project insurance includes all premium costs to provide “wrap-up” insurance coverage through a Contractor Controlled Insurance Program (CCIP). This category will include professional liability, comprehensive general liability, builder’s risk, worker’s compensation and employer’s liability, construction equipment loss or damage, and automobile insurance.
- Legal; Permits; Review Fees by Other Agencies, Cities, etc. – Includes legal fees (except real estate legal fees), permitting fees, and review fees by other entities.
- Surveys, Testing, Investigation, Inspection – This item includes independent testing, third party surveying during construction to confirm progressed work, investigations of contractor claims or differing site conditions, and special inspections required by Route 7, or the local building authorities.
- Start-Up – This sub-category will include the costs in training transit personnel and testing of the new systems. This includes safety certification and activation.

SUMMARY

A summary of the ROM cost estimates for the conceptual design is seen in Table E 2 below. Construction cost estimate details are provided in the Appendix E Part 2.

Table E 2 Rough Order of Magnitude Cost Estimate Summary

	Base Year (2019)		**Year of Expenditure (2030**	
	Low-End	**High-End**	**Low-End**	**High-End**
Construction Subtotal Allocated Contingencies	$206.5 M	$230.0 M	$261.7 M	$291.1 M
ROW Acquisition + Allocated Contingencies	$32.6 M	$41.9 M	$43.5 M	$55.9 M
Professional Services (30%)	$59.9 M	$66.7 M	$77.8 M	$86.7 M
Unallocated Contingencies (15%)	$44.9 M	$50.8 M	$64.5 M	$73.1 M
Total	**$343.9 M**	**$389.4 M**	**$447.5 M**	**$506.8 M**

Table A-1. Recommended Contingency by Estimating Stage

Estimate Stage	Probable Accuracy[1]	Design Stage	Purpose	Information Available	Estimate Methods	Contingency Guideline
Order of Magnitude (conceptual)	50% - 30%	Preliminary	Evaluation of projects or alternatives	100-scale alignment, facility descriptions, sketches, study reports	*Parametric* – Cost of a similar facility is adjusted to represent the new facility. Includes costing by SF, LF, or CF. *Model* – A typical design is used to develop quantities and costs for elements.	20% or higher
Preliminary (budget)	15% - 30%	Preliminary Design Report (25%)	Establish Control Budget	40-scale alignment, facility descriptions, sketches, study reports, cross sections, profiles, elevations, geotechnical data, staging plans, schedule, definition of temporary work	Quantity development of major commodities, pricing by database, manuals, quotes, bid results, or experience which may be adjusted for the conditions of the specific package. Rough estimates or allowances developed for immeasurable items.	10% - 20%
Definitive	15% - 5%	75% to 100% complete	Detailed Control Budget, Cost Control, and Reporting	Progress Plans and Specifications, working construction schedule	Takeoff of quantities from plans, representative pricing by database, manuals, quotes, bid results, or experience adjusted for the conditions of the specific package. Crewed approach to labor and equipment, percent approach to general conditions, overhead and profit, contingency, and escalation. Some allowances carried for immeasurable items.	5% - 15%
Detailed (engineer's estimate)	± 5%	PS&E	Check Estimate for Bids, Commit Funds	Complete Plans and Specifications for Bidding, Detailed Construction Schedule, Contract Terms and Conditions	Detailed takeoff of all measurable items, detailed review of specifications, detailed pricing including price quotes, crewed approach to labor and equipment, detailed estimate of general conditions, overhead & profit, and escalation. Consideration of construction schedule, work restrictions, shift requirements, and risk.	0% - 10%

[1] Probable Accuracy as stated by the Association for the Advancement of Cost Engineering International (AACE)

M A I N W O R K S H E E T - B U I L D A L T E R N A T I V E

(Rev.21, June 2019)

NVTC	Today's Date
Envision Route 7	Yr of Base Year $ 2019
ROM Estimate - Low End	Yr of Revenue Ops 2030

	Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)	Base Year Dollars Unit Cost (X000)	Base Year Dollars Percentage of Construction Cost	Base Year Dollars Percentage of Total Project Cost	YOE Dollars Total (X000)
10 GUIDEWAY & TRACK ELEMENTS (route miles)	**0.00**	48,700	7,305	**56,005**		**27%**	**16%**	**60,200**
10.01 Guideway: At-grade exclusive right-of-way		0	0	0				0
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)		48,700	7,305	56,005				60,200
10.03 Guideway: At-grade in mixed traffic		0	0	0				0
10.04 Guideway: Aerial structure		0	0	0				0
10.05 Guideway: Built-up fill		0	0	0				0
10.06 Guideway: Underground cut & cover		0	0	0				0
10.07 Guideway: Underground tunnel		0	0	0				0
10.08 Guideway: Retained cut or fill		0	0	0				0
10.09 Track: Direct fixation		0	0	0				0
10.10 Track: Embedded		0	0	0				0
10.11 Track: Ballasted		0	0	0				0
10.12 Track: Special (switches, turnouts)		0	0	0				0
10.13 Track: Vibration and noise dampening		0	0	0				0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	**0**	3,523	528	**4,051**		**2%**	**1%**	**5,424**
20.01 At-grade station, stop, shelter, mall, terminal, platform		3,523	528	4,051				5,424
20.02 Aerial station, stop, shelter, mall, terminal, platform		0	0	0				0
20.03 Underground station, stop, shelter, mall, terminal, platform		0	0	0				0
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		0	0	0				0
20.05 Joint development		0	0	0				0
20.06 Automobile parking multi-story structure		0	0	0				0
20.07 Elevators, escalators		0	0	0				0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0.00	0	0	**0**		**0%**	**0%**	**0**
30.01 Administration Building: Office, sales, storage, revenue counting		0	0	0				#DIV/0!
30.02 Light Maintenance Facility		0	0	0				#DIV/0!
30.03 Heavy Maintenance Facility		0	0	0				#DIV/0!
30.04 Storage or Maintenance of Way Building		0	0	0				#DIV/0!
30.05 Yard and Yard Track		0	0	0				#DIV/0!
40 SITEWORK & SPECIAL CONDITIONS	0.00	74,540	42,241	**116,781**		**57%**	**34%**	**155,877**
40.01 Demolition, Clearing, Earthwork		211	63	274				366
40.02 Site Utilities, Utility Relocation		8,615	2,585	11,200				14,949
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments		100	15	115				154
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks		0	0	0				0
40.05 Site structures including retaining walls, sound walls		29,736	34,196	63,932				85,336
40.06 Pedestrian / bike access and accommodation, landscaping		6,519	978	7,497				10,007
40.07 Automobile, bus, van accessways including roads, parking lots		0	0	0				0
40.08 Temporary Facilities and other indirect costs during construction		29,359	4,404	33,763				45,066
50 SYSTEMS	0.00	26,634	3,083	**29,717**		**14%**	**9%**	**40,205**
50.01 Train control and signals		0	0	0				0
50.02 Traffic signals and crossing protection		18,667	2,800	21,467				29,044
50.03 Traction power supply: substations		0	0	0				0
50.04 Traction power distribution: catenary and third rail		0	0	0				0
50.05 Communications		1,554	233	1,787				2,418
50.06 Fare collection system and equipment		6,248	25	6,273				8,487
50.07 Central Control		165	25	190				257
Construction Subtotal (10 - 50)	0.00	153,397	53,157	**206,554**		**100%**	**60%**	**261,707**
60 ROW, LAND, EXISTING IMPROVEMENTS	0.00	23,262	9,305	**32,566**			**9%**	**43,464**
60.01 Purchase or lease of real estate		23,262	9,305	32,566				43,464
60.02 Relocation of existing households and businesses		0	0	0				0
70 VEHICLES (number)	**0**	0	0	**0**			**0%**	**0**
70.01 Light Rail		0	0	0				#DIV/0!
70.02 Heavy Rail		0	0	0				#DIV/0!
70.03 Commuter Rail		0	0	0				#DIV/0!
70.04 Bus		0	0	0				#DIV/0!
70.05 Other		0	0	0				#DIV/0!
70.06 Non-revenue vehicles		0	0	0				#DIV/0!
70.07 Spare parts		0	0	0				#DIV/0!
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	0.00	59,901	0	**59,901**		**29%**	**17%**	**77,832**
80.01 Project Development	5.00%	10,328	0	10,328	**$206,554**			13,419
80.02 Engineering (not applicable to Small Starts)	7.00%	14,459	0	14,459	**$206,554**			18,787
80.03 Project Management for Design and Construction	5.00%	10,328	0	10,328	**$206,554**			13,419
80.04 Construction Administration & Management	8.00%	16,524	0	16,524	**$206,554**			21,471
80.05 Professional Liability and other Non-Construction Insurance	1.50%	3,098	0	3,098	**$206,554**			4,026
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.	1.00%	2,066	0	2,066	**$206,554**			2,684
80.07 Surveys, Testing, Investigation, Inspection	1.00%	2,066	0	2,066	**$206,554**			2,684
80.08 Start up	0.50%	1,033	0	1,033	**$206,554**			1,342
Subtotal (10 - 80)	0.00	236,559	62,462	**299,021**			**87%**	**383,003**
90 UNALLOCATED CONTINGENCY				**44,853**			**13%**	**64,540**
Subtotal (10 - 90)	0.00			**343,874**			**100%**	**447,543**
100 FINANCE CHARGES				**0**			**0%**	**0**
Total Project Cost (10 - 100)	0.00			**343,874**			**100%**	**447,543**
Allocated Contingency as % of Base Yr Dollars w/o Contingency				26.40%				
Unallocated Contingency as % of Base Yr Dollars w/o Contingency				18.96%				
Total Contingency as % of Base Yr Dollars w/o Contingency				45.36%				
Unallocated Contingency as % of Subtotal (10 - 80)				15.00%				

I N F L A T I O N   W O R K S H E E T

(Rev.21, June 2019)

NVTC

Today's Date

Envision Route 7

Yr of Base Year $ 2019

ROM Estimate - Low End

Yr of Revenue Ops 2030

BASE YEAR DOLLARS (X$000)	Base Yr Dollars	Double-Check Total	2007	2008	2009	2010	2011	2012	2013	2014
10 GUIDEWAY & TRACK ELEMENTS (route miles)	56,005	44,804	0	0	0	0	0	0	0	0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	4,051	4,051	0	0	0	0	0	0	0	0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0	0	0	0	0	0	0	0	0	0
40 SITEWORK & SPECIAL CONDITIONS	116,781	116,781	0	0	0	0	0	0	0	0
50 SYSTEMS	29,717	29,717	0	0	0	0	0	0	0	0
60 ROW, LAND, EXISTING IMPROVEMENTS	32,566	32,566	0	0	0	0	0	0	0	0
70 VEHICLES (number)	0	0	0	0	0	0	0	0	0	0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	59,901	59,901	0	0	0	0	0	0	0	0
90 UNALLOCATED CONTINGENCY	44,853	44,853	0	0	0	0	0	0	0	0
100 FINANCE CHARGES	0	0	0	0	0	0	0	0	0	0
Total Project Cost (10 - 100)	343,874	332,673	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Inflation Rate		0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Compounded Inflation Factor		1.497	1.446	1.397	1.350	1.304	1.260	1.217	1.176

YEAR OF EXPENDITURE DOLLARS (X$000)	YOE Dollars		2007	2008	2009	2010	2011	2012	2013	2014
10 GUIDEWAY & TRACK ELEMENTS (route miles)	60,200									
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	5,424									
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0									
40 SITEWORK & SPECIAL CONDITIONS	155,877									
50 SYSTEMS	40,205									
60 ROW, LAND, EXISTING IMPROVEMENTS	43,464									
70 VEHICLES (number)	0									
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	77,832									
90 UNALLOCATED CONTINGENCY	64,540									
100 FINANCE CHARGES	0									
Total Project Cost (10 - 100)	447,543		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Insert comments, notes, etc.

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0	0	0	0	0	0	0	0	0	0	0	0	11,201	22,402	11,201	0
0	0	0	0	0	0	0	0	0	0	0	0	810	2,836	405	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	11,678	35,034	35,034	35,034	0
0	0	0	0	0	0	0	0	0	0	0	0	5,943	11,887	11,887	0
0	0	0	0	0	0	0	0	0	0	0	1,628	11,398	11,398	8,142	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	11,980	11,980	11,980	11,980	11,980	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44,853
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11,980**	**25,286**	**76,367**	**95,537**	**78,649**	**44,853**

0.035	0.035	0.035	0.030	0.030	0.030	0.030	0.030	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
1.136	1.098	1.061	1.030	1.000	1.030	1.061	1.093	1.131	1.171	1.212	1.254	1.298	1.343	1.390	1.439

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
			0	0	0	0	0	0	0	0	0	14,537	30,091	15,572	0
			0	0	0	0	0	0	0	0	0	1,052	3,809	563	0
			0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	14,643	45,468	47,059	48,706	0
			0	0	0	0	0	0	0	0	0	7,713	15,967	16,525	0
			0	0	0	0	0	0	0	0	2,042	14,793	15,311	11,319	0
			0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	14,514	15,022	15,548	16,092	16,655	0
			0	0	0	0	0	0	0	0	0	0	0	0	64,540
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14,514**	**31,707**	**99,111**	**128,329**	**109,342**	**64,540**

ROM COST ESTIMATE							
SCC Code	Description	Quantity	UOM	Unit Cost	Total Cost	Allocated Contingency	Total Allocated Contingency
10.02	Site Preparation	1	LS		$432,000.00	15.00%	$64,800.00
10.02	Clearing and Grubbing	1	LS		$50,000.00	15.00%	$7,500.00
10.02	Temporary Support of Existing Utilities	1	LS		$485,000.00	15.00%	$72,750.00
10.02	Full Depth Excavation and Demolition	1	LS		$8,407,000.00	15.00%	$1,261,050.00
10.02	Miscellaneous Earthwork	1	LS		$721,000.00	15.00%	$108,150.00
10.02	Geotextiles	1	LS		$631,000.00	15.00%	$94,650.00
10.02	Subbases and Aggregates	1	LS		$4,461,000.00	15.00%	$669,150.00
10.02	Asphalt Pavement	1	LS		$3,990,000.00	15.00%	$598,500.00
10.02	Concrete Pavement and Medians	1	LS		$20,001,000.00	15.00%	$3,000,150.00
10.02	Concrete Curbs	1	LS		$1,176,000.00	15.00%	$176,400.00
10.02	Impermeable Membrane	1	LS		$317,000.00	15.00%	$47,550.00
10.02	Miscellaneous Concrete	1	LS		$131,000.00	15.00%	$19,650.00
10.02	Pavement Markings	1	LS		$5,085,000.00	15.00%	$762,750.00
10.02	Roadway Signage	1	LS		$593,000.00	15.00%	$88,950.00
10.02	Roadway Lighting	1	LS		$2,220,000.00	15.00%	$333,000.00
20.01	Bus Shelters	1	LS		$3,523,000.00	15.00%	$528,450.00
40.01	Erosion and Sedimentation Control	1	LS		$211,000.00	30.00%	$63,300.00
40.02	Storm Drainage	1	LS		$7,039,000.00	30.00%	$2,111,700.00
40.02	Fire Hydrants	1	LS		$510,000.00	30.00%	$153,000.00
40.02	Utility Demolition and Adjustments	1	LS		$1,066,000.00	30.00%	$319,800.00
40.03	Water Pollution Control	1	LS		$100,000.00	15.00%	$15,000.00
40.05	Site Structures including retaining walls, sound walls	1	LS		$29,735,867.53	15.00%	$4,460,380.13
40.06	Concrete Sidewalks	1	LS		$2,463,000.00	15.00%	$369,450.00
40.06	Landscaping/ Site Improvements	1	LS		$4,056,000.00	15.00%	$608,400.00
40.08	Maintenance and Protection of Traffic	1	LS		$12,865,000.00	15.00%	$1,929,750.00
40.08	Contractor General Conditions	1	LS		$12,225,000.00	15.00%	$1,833,750.00
40.08	Quality Control Management	1	LS		$3,676,000.00	15.00%	$551,400.00
40.08	Construction Monitoring Program	1	LS		$593,000.00	15.00%	$88,950.00
50.02	Traffic Signals and Crossing Protection	1	LS		$18,667,000.00	15.00%	$2,800,050.00
50.05	Communication/Security Systems	1	LS		$1,554,000.00	15.00%	$233,100.00
50.06	Ticket Validation	1	LS		$6,248,000.00	15.00%	$937,200.00
50.07	Communication/Security Systems, Cental Control	1	LS		$165,000.00	15.00%	$24,750.00
60.01	Right of Way Acquisition	1	LS		$23,261,665.05	40.00%	$9,304,666.02
70.04	Bus Fleet, EXCLUDED	1	LS		$0.00	0.00%	$0.00

M A I N W O R K S H E E T - B U I L D A L T E R N A T I V E

(Rev.21, June 2019)

NVTC	Today's Date	
Envision Route 7	Yr of Base Year $	2019
ROM Estimate - High End	Yr of Revenue Ops	2030

	Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)	Base Year Dollars Unit Cost (X000)	Base Year Dollars Percentage of Construction Cost	Base Year Dollars Percentage of Total Project Cost	YOE Dollars Total (X000)
10 GUIDEWAY & TRACK ELEMENTS (route miles)	**0.00**	48,700	14,610	**63,310**		**28%**	**16%**	**68,053**
10.01 Guideway: At-grade exclusive right-of-way		0	0	0				0
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)		48,700	14,610	63,310				68,053
10.03 Guideway: At-grade in mixed traffic		0	0	0				0
10.04 Guideway: Aerial structure		0	0	0				0
10.05 Guideway: Built-up fill		0	0	0				0
10.06 Guideway: Underground cut & cover		0	0	0				0
10.07 Guideway: Underground tunnel		0	0	0				0
10.08 Guideway: Retained cut or fill		0	0	0				0
10.09 Track: Direct fixation		0	0	0				0
10.10 Track: Embedded		0	0	0				0
10.11 Track: Ballasted		0	0	0				0
10.12 Track: Special (switches, turnouts)		0	0	0				0
10.13 Track: Vibration and noise dampening		0	0	0				0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	**0**	3,523	1,057	**4,580**		**2%**	**1%**	**6,132**
20.01 At-grade station, stop, shelter, mall, terminal, platform		3,523	1,057	4,580				6,132
20.02 Aerial station, stop, shelter, mall, terminal, platform		0	0	0				0
20.03 Underground station, stop, shelter, mall, terminal, platform		0	0	0				0
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		0	0	0				0
20.05 Joint development		0	0	0				0
20.06 Automobile parking multi-story structure		0	0	0				0
20.07 Elevators, escalators		0	0	0				0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0.00	0	0	**0**		**0%**	**0%**	**0**
30.01 Administration Building: Office, sales, storage, revenue counting		0	0	0				#DIV/0!
30.02 Light Maintenance Facility		0	0	0				#DIV/0!
30.03 Heavy Maintenance Facility		0	0	0				#DIV/0!
30.04 Storage or Maintenance of Way Building		0	0	0				#DIV/0!
30.05 Yard and Yard Track		0	0	0				#DIV/0!
40 SITEWORK & SPECIAL CONDITIONS	0.00	74,540	54,746	**129,285**		**56%**	**33%**	**172,569**
40.01 Demolition, Clearing, Earthwork		211	127	338				451
40.02 Site Utilities, Utility Relocation		8,615	5,169	13,784				18,399
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments		100	30	130				174
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks		0	0	0				0
40.05 Site structures including retaining walls, sound walls		29,736	38,657	68,392				91,289
40.06 Pedestrian / bike access and accommodation, landscaping		6,519	1,956	8,475				11,312
40.07 Automobile, bus, van accessways including roads, parking lots		0	0	0				0
40.08 Temporary Facilities and other indirect costs during construction		29,359	8,808	38,167				50,944
50 SYSTEMS	0.00	26,634	6,165	**32,799**		**14%**	**8%**	**44,376**
50.01 Train control and signals		0	0	0				0
50.02 Traffic signals and crossing protection		18,667	5,600	24,267				32,832
50.03 Traction power supply: substations		0	0	0				0
50.04 Traction power distribution: catenary and third rail		0	0	0				0
50.05 Communications		1,554	466	2,020				2,733
50.06 Fare collection system and equipment		6,248	50	6,298				8,520
50.07 Central Control		165	50	215				290
Construction Subtotal (10 - 50)	0.00	153,397	76,578	**229,975**		**100%**	**59%**	**291,129**
60 ROW, LAND, EXISTING IMPROVEMENTS	0.00	23,262	18,609	**41,871**			**11%**	**55,882**
60.01 Purchase or lease of real estate		23,262	18,609	41,871				55,882
60.02 Relocation of existing households and businesses		0	0	0				0
70 VEHICLES (number)	**0**	0	0	**0**			**0%**	**0**
70.01 Light Rail		0	0	0				#DIV/0!
70.02 Heavy Rail		0	0	0				#DIV/0!
70.03 Commuter Rail		0	0	0				#DIV/0!
70.04 Bus		0	0	0				#DIV/0!
70.05 Other		0	0	0				#DIV/0!
70.06 Non-revenue vehicles		0	0	0				#DIV/0!
70.07 Spare parts		0	0	0				#DIV/0!
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	0.00	66,693	0	**66,693**		**29%**	**17%**	**86,657**
80.01 Project Development	5.00%	11,499	0	11,499	**$229,975**			14,941
80.02 Engineering (not applicable to Small Starts)	7.00%	16,098	0	16,098	**$229,975**			20,917
80.03 Project Management for Design and Construction	5.00%	11,499	0	11,499	**$229,975**			14,941
80.04 Construction Administration & Management	8.00%	18,398	0	18,398	**$229,975**			23,905
80.05 Professional Liability and other Non-Construction Insurance	1.50%	3,450	0	3,450	**$229,975**			4,482
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.	1.00%	2,300	0	2,300	**$229,975**			2,988
80.07 Surveys, Testing, Investigation, Inspection	1.00%	2,300	0	2,300	**$229,975**			2,988
80.08 Start up	0.50%	1,150	0	1,150	**$229,975**			1,494
Subtotal (10 - 80)	0.00	243,351	95,187	**338,538**			**87%**	**433,669**
90 UNALLOCATED CONTINGENCY				**50,781**			**13%**	**73,069**
Subtotal (10 - 90)	0.00			**389,319**			**100%**	**506,738**
100 FINANCE CHARGES				**0**			**0%**	**0**
Total Project Cost (10 - 100)	0.00			**389,319**			**100%**	**506,738**
Allocated Contingency as % of Base Yr Dollars w/o Contingency				39.12%				
Unallocated Contingency as % of Base Yr Dollars w/o Contingency				20.87%				
Total Contingency as % of Base Yr Dollars w/o Contingency				59.98%				
Unallocated Contingency as % of Subtotal (10 - 80)				15.00%				

I N F L A T I O N   W O R K S H E E T

(Rev.21, June 2019)

NVTC

Envision Route 7

ROM Estimate - High End

Today's Date

Yr of Base Year $ 2019

Yr of Revenue Ops 2030

BASE YEAR DOLLARS (X$000)	Base Yr Dollars	Double-Check Total	2007	2008	2009	2010	2011	2012	2013	2014
10 GUIDEWAY & TRACK ELEMENTS (route miles)	63,310	50,648	0	0	0	0	0	0	0	0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	4,580	4,580	0	0	0	0	0	0	0	0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0	0	0	0	0	0	0	0	0	0
40 SITEWORK & SPECIAL CONDITIONS	129,285	129,285	0	0	0	0	0	0	0	0
50 SYSTEMS	32,799	32,799	0	0	0	0	0	0	0	0
60 ROW, LAND, EXISTING IMPROVEMENTS	41,871	41,871	0	0	0	0	0	0	0	0
70 VEHICLES (number)	0	0	0	0	0	0	0	0	0	0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	66,693	66,693	0	0	0	0	0	0	0	0
90 UNALLOCATED CONTINGENCY	50,781	50,781	0	0	0	0	0	0	0	0
100 FINANCE CHARGES	0	0	0	0	0	0	0	0	0	0
Total Project Cost (10 - 100)	389,319	376,657	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Inflation Rate		0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Compounded Inflation Factor		1.497	1.446	1.397	1.350	1.304	1.260	1.217	1.176

YEAR OF EXPENDITURE DOLLARS (X$000)	YOE Dollars		2007	2008	2009	2010	2011	2012	2013	2014
10 GUIDEWAY & TRACK ELEMENTS (route miles)	68,053									
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	6,132									
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0									
40 SITEWORK & SPECIAL CONDITIONS	172,569									
50 SYSTEMS	44,376									
60 ROW, LAND, EXISTING IMPROVEMENTS	55,882									
70 VEHICLES (number)	0									
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	86,657									
90 UNALLOCATED CONTINGENCY	73,069									
100 FINANCE CHARGES	0									
Total Project Cost (10 - 100)	506,738		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Insert comments, notes, etc.

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
0	0	0	0	0	0	0	0	0	0	0	0	12,662	25,324	12,662	0
0	0	0	0	0	0	0	0	0	0	0	0	916	3,206	458	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	12,929	38,786	38,786	38,786	0
0	0	0	0	0	0	0	0	0	0	0	0	6,560	13,120	13,120	0
0	0	0	0	0	0	0	0	0	0	0	2,094	14,655	14,655	10,468	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	13,339	13,339	13,339	13,339	13,339	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50,781
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13,339**	**28,361**	**86,917**	**108,429**	**88,832**	**50,781**

0.035	0.035	0.035	0.030	0.030	0.030	0.030	0.030	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
1.136	1.098	1.061	1.030	1.000	1.030	1.061	1.093	1.131	1.171	1.212	1.254	1.298	1.343	1.390	1.439

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
			0	0	0	0	0	0	0	0	0	16,433	34,016	17,603	0
			0	0	0	0	0	0	0	0	0	1,189	4,306	637	0
			0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	16,211	50,337	52,098	53,922	0
			0	0	0	0	0	0	0	0	0	8,513	17,623	18,240	0
			0	0	0	0	0	0	0	0	2,625	19,019	19,685	14,553	0
			0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	16,160	16,726	17,311	17,917	18,544	0
			0	0	0	0	0	0	0	0	0	0	0	0	73,069
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16,160**	**35,562**	**112,802**	**145,646**	**123,499**	**73,069**

ROM COST ESTIMATE							
SCC Code	Description	Quantity	UOM	Unit Cost	Total Cost	Allocated Contingency	Total Allocated Contingency
10.02	Site Preparation	1	LS		$432,000.00	30.00%	$129,600.00
10.02	Clearing and Grubbing	1	LS		$50,000.00	30.00%	$15,000.00
10.02	Temporary Support of Existing Utilities	1	LS		$485,000.00	30.00%	$145,500.00
10.02	Full Depth Excavation and Demolition	1	LS		$8,407,000.00	30.00%	$2,522,100.00
10.02	Miscellaneous Earthwork	1	LS		$721,000.00	30.00%	$216,300.00
10.02	Geotextiles	1	LS		$631,000.00	30.00%	$189,300.00
10.02	Subbases and Aggregates	1	LS		$4,461,000.00	30.00%	$1,338,300.00
10.02	Asphalt Pavement	1	LS		$3,990,000.00	30.00%	$1,197,000.00
10.02	Concrete Pavement and Medians	1	LS		$20,001,000.00	30.00%	$6,000,300.00
10.02	Concrete Curbs	1	LS		$1,176,000.00	30.00%	$352,800.00
10.02	Impermeable Membrane	1	LS		$317,000.00	30.00%	$95,100.00
10.02	Miscellaneous Concrete	1	LS		$131,000.00	30.00%	$39,300.00
10.02	Pavement Markings	1	LS		$5,085,000.00	30.00%	$1,525,500.00
10.02	Roadway Signage	1	LS		$593,000.00	30.00%	$177,900.00
10.02	Roadway Lighting	1	LS		$2,220,000.00	30.00%	$666,000.00
20.01	Bus Shelters	1	LS		$3,523,000.00	30.00%	$1,056,900.00
40.01	Erosion and Sedimentation Control	1	LS		$211,000.00	60.00%	$126,600.00
40.02	Storm Drainage	1	LS		$7,039,000.00	60.00%	$4,223,400.00
40.02	Fire Hydrants	1	LS		$510,000.00	60.00%	$306,000.00
40.02	Utility Demolition and Adjustments	1	LS		$1,066,000.00	60.00%	$639,600.00
40.03	Water Pollution Control	1	LS		$100,000.00	30.00%	$30,000.00
40.05	Site Structures including retaining walls, sound walls	1	LS		$29,735,867.53	30.00%	$8,920,760.26
40.06	Concrete Sidewalks	1	LS		$2,463,000.00	30.00%	$738,900.00
40.06	Landscaping/ Site Improvements	1	LS		$4,056,000.00	30.00%	$1,216,800.00
40.08	Maintenance and Protection of Traffic	1	LS		$12,865,000.00	30.00%	$3,859,500.00
40.08	Contractor General Conditions	1	LS		$12,225,000.00	30.00%	$3,667,500.00
40.08	Quality Control Management	1	LS		$3,676,000.00	30.00%	$1,102,800.00
40.08	Construction Monitoring Program	1	LS		$593,000.00	30.00%	$177,900.00
50.02	Traffic Signals and Crossing Protection	1	LS		$18,667,000.00	30.00%	$5,600,100.00
50.05	Communication/Security Systems	1	LS		$1,554,000.00	30.00%	$466,200.00
50.06	Ticket Validation	1	LS		$6,248,000.00	30.00%	$1,874,400.00
50.07	Communication/Security Systems, Cental Control	1	LS		$165,000.00	30.00%	$49,500.00
60.01	Right of Way Acquisition	1	LS		$23,261,665.05	80.00%	$18,609,332.04
70.04	Bus Fleet, EXCLUDED	1	LS		$0.00	0.00%	$0.00

QUANTITY TAKEOFF - NEW ROADWAY								
LOCATION	STA	TO	STA	# OF LANES	LANE WIDTH (ft)	LENGTH (ft)	TOTAL LENGTH (ft)	AREA (sf)
LT	55+00		63+00	1	12	800	800	9600
MED	56+00		67+00	2	12	1100	2200	26400
RT	62+00		67+00	1	12	500	500	6000
LT	63+00		67+00	2	12	400	800	9600
RT	68+00		77+00	2	12	900	1800	21600
LT	68+00		73+00	2	12	500	1000	12000
MED	68+00		75+50	1	12	750	750	9000
RT	68+00		77+00	2	12	900	1800	21600
MED	78+50		88+00	1	12	950	950	11400
RT	78+50		85+00	2	12	650	1300	15600
LT	88+00		90+50	2	12	250	500	6000
LT	101+50		102+00	2	11	50	100	1100
LT	103+50		108+75	2	11	525	1050	11550
RT	103+50		108+75	1	11	525	525	5775
LT	110+00		123+00	1	12	1300	1300	15600
MED	110+00		118+00	1	12	800	800	9600
RT	110+00		115+50	2	12	550	1100	13200
RT	115+75		118+25	1	12	250	250	3000
LT	118+00		123+25	1	12	525	525	6300
RT	118+00		123+25	2	12	525	1050	12600
LT	124+00		134+00	1	12	1000	1000	12000
RT	124+00		134+00	2	12	1000	2000	24000
MED	126+00		134+00	1	12	800	800	9600
LT	134+50		143+00	1	12	850	850	10200
MED	134+50		143+00	1	12	850	850	10200
RT	134+50		143+00	2	12	850	1700	20400
LT	143+75		150+50	2	12	675	1350	16200
MED	143+75		150+50	1	12	675	675	8100
RT	143+75		146+25	1	12	250	250	3000
LT	151+50		162+00	3	12	1050	3150	37800
MED	156+00		162+00	1	12	600	600	7200
LT	163+00		166+00	1	12	300	300	3600
RING ROAD				6	12	1220	7320	87840
LT	391+50		398+00	2	12	650	1300	15600
RT	391+50		396+00	1	12	450	450	5400
RT	394+25		400+25	1	12	600	600	7200
LT	398+00		401+00	1	12	300	300	3600
LT	404+25		406+25	1	11	200	200	2200
MED	404+25		408+50	1	12	425	425	5100
LT	409+75		416+50	1	11	675	675	7425
MED	409+75		413+75	1	12	400	400	4800
RT	409+75		414+50	1	10	475	475	4750
LT	416+75		426+00	1	12	925	925	11100

QUANTITY TAKEOFF - NEW ROADWAY								
LOCATION	**STA**	**TO**	**STA**	**# OF LANES**	**LANE WIDTH (ft)**	**LENGTH (ft)**	**TOTAL LENGTH (ft)**	**AREA (sf)**
RT	421+50		426+00	2	12	450	900	10800
LT	427+25		431+00	1	12	375	375	4500
RT	431+00		444+00	2	12	1300	2600	31200
LT	445+00		448+00	1	12	300	300	3600
RT	445+00		453+00	1	12	800	800	9600
LT	450+00		456+50	1	12	650	650	7800
RT	450+00		456+50	1	12	650	650	7800
LT	457+50		463+00	2	12	550	1100	13200
RT	457+50		475+00	2	12	1750	3500	42000
LT	473+50		483+00	2	12	950	1900	22800
MED	482+00		484+75	1	12	275	275	3300
LT	486+00		490+00	2	12	400	800	9600
MED	486+00		490+00	1	12	400	400	4800
MED	495+00		509+00	1	12	1400	1400	16800
LT	501+00		509+00	1	12	800	800	9600
RT	506+00		509+01	1	12	301	301	3612
LT	510+00		521+00	1	12	1100	1100	13200
MED	510+00		521+00	1	12	1100	1100	13200
RT	510+00		517+00	1	12	700	700	8400
LT	522+00		526+50	2	12	450	900	10800
LT	528+00		531+00	1	12	300	300	3600
MED	529+00		532+00	1	12	300	300	3600
RT	528+00		533+00	1	12	500	500	6000
RT	534+00		538+50	2	12	450	900	10800
RT	540+00		543+00	2	12	300	600	7200

Total New Roadway= 68846 FT

QUANTITY TAKEOFF - CURB					
DIRECTION	**SIDE**	**STA**	**TO**	**STA**	**LENGTH (ft)**
NB	LT	0+00		2+75	275
NB	RT	0+00		2+75	275
SB	LT	0+00		2+75	275
SB	RT	0+00		2+75	275
NB	LT	5+00		24+50	1950
NB	RT	5+00		24+50	2125
SB	LT	5+00		24+50	2150
SB	RT	5+00		24+50	2213
NB	LT	26+50		45+50	1900
NB	RT	26+50		45+50	1975
SB	LT	26+50		45+50	1975
SB	RT	26+50		45+50	1900
NB	LT	46+00		51+50	550
NB	RT	46+00		51+50	590
SB	LT	46+00		51+50	590
SB	RT	46+00		51+50	550
NB	LT	52+25		62+50	1025
SB	RT	59+00		63+00	500
SB	RT	65+75		66+25	222
NB	LT	68+00		77+00	933
SB	RT	68+00		77+00	953
NB	LT	78+00		80+25	250
SB	RT	78+00		82+75	860
NB	LT	85+75		87+75	215
SB	RT	85+50		95+00	1100
NB	LT	88+00		90+50	325
NB	LT	91+00		95+00	400
SB	RT	101+25		103+00	175
NB	LT	101+50		103+00	200
NB	LT	103+50		109+00	571
SB	RT	103+50		105+50	290
SB	RT	106+00		109+50	385
NB	LT	110+00		123+50	1400
SB	RT	110+00		115+50	750
SB	RT	115+50		118+25	330
SB	RT	118+75		123+25	478
NB	LT	124+00		134+00	1400
SB	RT	124+00		126+75	321
SB	RT	127+00		134+50	787
NB	LT	134+50		139+75	1074
SB	RT	134+50		140+00	1053
NB	LT	140+00		143+00	650
SB	RT	140+00		143+00	580
NB	LT	143+75		150+50	1445

QUANTITY TAKEOFF - CURB					
DIRECTION	SIDE	STA	TO	STA	LENGTH (ft)
SB	RT	143+75		146+25	565
SB	RT	146+75		150+50	873
NB	LT	151+75		162+00	1115
SB	RT	151+75		155+50	454
SB	RT	155+75		162+00	690
NB	LT	162+75		167+00	450
SB	RT	162+75		165+50	290
SB	RT	165+00		169+00	415
NB	LT	166+75		170+00	521
SB	RT	168+50		177+75	945
NB	LT	169+50		179+00	1000
SB	RT	178+00		181+00	400
NB	LT	179+00		184+00	522
SB	RT	180+00		184+00	430
SB	RT	184+00		190+75	760
NB	LT	184+25		186+50	230
NB	LT	187+00		191+00	405
NB	LT	192+00		192+25	71
SB	RT	192+00		196+25	540
NB	LT	193+00		194+75	331
NB	LT	195+00		196+25	163
NB	LT	197+00		203+00	640
SB	RT	197+00		200+90	420
SB	RT	201+00		202+50	175
NB	LT	203+25		209+25	615
SB	RT	203+75		218+50	1530
NB	LT	210+00		211+50	155
NB	LT	211+75		218+50	720
NB	LT	219+00		228+00	943
SB	RT	219+00		228+00	940
SB	RT	228+25		238+50	1045
NB	LT	228+50		234+50	690
NB	RT	234+75		238+80	425
SB	RT	238+50		243+00	445
NB	LT	239+00		243+00	420
NB	LT	243+25		250+75	767
SB	RT	243+75		250+75	725
NB	LT	251+00		253+50	250
SB	RT	251+00		253+50	250
NB	LT	253+75		258+25	472
SB	RT	253+75		262+25	885
NB	LT	258+50		262+25	408
NB	LT	262+75		272+25	940
SB	RT	262+75		267+75	545

QUANTITY TAKEOFF - CURB					
DIRECTION	**SIDE**	**STA**	**TO**	**STA**	**LENGTH (ft)**
EB	RT	268+00		274+00	620
WB	LT	272+50		273+25	96
WB	LT	273+75		275+25	178
EB	RT	274+25		284+25	1035
WB	LT	275+50		277+25	205
WB	LT	277+75		284+25	693
WB	LT	284+75		289+75	550
EB	RT	248+75		290+00	260
WB	LT	290+00		300+00	1000
EB	RT	290+00		293+75	410
EB	RT	294+00		296+50	310
EB	RT	297+00		314+75	3550
WB	LT	300+50		303+75	340
EB	RT	300+50		314+25	1375
NB	LT	304+75		317+75	1350
SB	RT	315+00		321+75	675
NB	LT	325+75		329+00	325
SB	RT	325+75		328+50	300
SB	RT	329+00		340+00	1150
NB	LT	329+50		337+50	850
NB	LT	338+00		341+25	360
SB	RT	341+00		347+50	690
NB	LT	345+00		347+00	240
NB	LT	347+50		349+50	225
SB	RT	348+00		353+00	550
NB	LT	354+00		358+00	400
SB	RT	353+50		359+00	625
NB	LT	358+00		359+75	175
SB	RT	359+00		371+00	1200
NB	LT	360+00		371+00	1210
NB	LT	390+00		401+00	1100
SB	RT	390+00		394+00	405
SB	RT	400+50		403+00	302
NB	LT	404+00		408+75	475
SB	RT	404+50		411+00	650
SB	RT	409+50		426+00	1700
NB	LT	409+25		416+50	865
NB	LT	419+75		426+75	1120
SB	RT	426+75		430+50	463
NB	LT	427+00		444+25	1742
SB	RT	431+00		444+50	1400
NB	LT	444+75		448+00	365
SB	RT	444+75		455+00	1063
NB	LT	448+00		456+25	825

QUANTITY TAKEOFF - CURB					
DIRECTION	**SIDE**	**STA**	**TO**	**STA**	**LENGTH (ft)**
SB	RT	455+25		456+50	150
NB	LT	457+00		463+75	725
SB	RT	457+00		464+00	1500
SB	RT	464+50		472+00	750
NB	LT	465+25		473+00	800
SB	RT	472+25		476+00	475
NB	LT	473+50		475+75	250
SB	RT	476+75		480+50	425
NB	LT	480+75		484+75	500
SB	RT	481+00		483+25	275
SB	RT	483+50		485+00	200
NB	LT	485+75		490+25	500
SB	RT	485+50		489+50	400
SB	RT	489+00		494+25	550
NB	LT	490+25		491+75	150
NB	LT	492+25		500+00	775
SB	RT	495+00		497+00	200
SB	RT	497+75		506+00	825
NB	LT	500+75		505+75	525
NB	LT	506+00		507+25	175
NB	LT	507+75		509+25	175
SB	RT	508+25		509+25	150
NB	LT	510+00		513+75	750
SB	RT	510+00		514+00	450
NB	LT	514+00		521+25	775
SB	RT	514+00		521+00	700
NB	LT	521+75		526+00	475
SB	RT	522+00		526+50	500
NB	LT	527+75		538+75	1200
SB	RT	527+75		533+00	625
SB	RT	533+75		539+00	625
NB	LT	539+75		545+25	575
SB	RT	539+75		551+50	1175
NB	LT	546+00		552+00	650
NB	LT	552+25		554+50	275
SB	RT	553+00		557+00	500
NB	LT	554+75		557+00	275
NB	LT	557+25		563+75	700
SB	RT	557+25		563+00	700

QUANTITY TAKEOFF - MEDIAN						
SIDE	STA	TO	STA	LENGTH (ft)	TOTAL (ft)	AREA (sf)
LT/RT	60+00		66+75	675	1350	5400
LT/RT	69+25		77+75	850	1700	6800
LT/RT	78+00		102+25	2425	4850	19400
LT	81+00		84+00	300		1200
RT	83+00		85+00	200		800
LT	84+00		85+25	125		500
LT/RT	103+50		108+75	525	1050	4200
LT/RT	110+00		123+00	1300	2600	10400
LT/RT	124+00		134+00	1000	2000	8000
LT/RT	134+50		143+00	850	1700	6800
LT/RT	143+75		150+50	675	1350	5400
LT/RT	151+75		162+00	1025	2050	8200
MED	163+00		177+00	1400		19600
MED	177+75		186+00	825		11550
MED	187+00		191+25	425		5950
MED	192+00		196+00	400		5600
MED	214+00		218+00	400		5600
MED	219+00		224+00	500		7000
MED	263+00		265+00	200		2800
MED	268+50		272+00	350		4900
MED	282+00		284+00	200		2800
MED	285+00		289+50	450		6300
MED	290+00		293+00	300		4200
MED	294+00		296+00	200		2800
MED	297+00		300+00	300		4200
MED	300+50		303+50	300		4200
MED	319+00		322+00	300		4200
MED	325+75		328+50	275		3850
MED	329+25		337+25	800		11200
MED	348+00		340+00	-800		-11200
MED	354+00		357+00	300		4200
MED	357+25		357+75	50		700
MED	360+00		363+50	350		4900
MED	364+50		371+00	650		9100
LT/RT	390+50		403+25	1275	2550	10200
LT/RT	404+50		408+50	400	800	3200
LT/RT	409+75		426+00	1625	3250	13000
LT/RT	427+00		430+00	300	600	2400
LT/RT	431+00		444+00	1300	2600	10400
LT/RT	445+00		456+25	1125	2250	9000
LT/RT	457+50		473+00	1550	3100	12400
LT/RT	473+50		484+75	1125	2250	9000
LT/RT	484+75		509+00	2425	4850	19400
LT/RT	510+00		521+00	1100	2200	8800

QUANTITY TAKEOFF - MEDIAN						
SIDE	**STA**	**TO**	**STA**	**LENGTH (ft)**	**TOTAL (ft)**	**AREA (sf)**
LT/RT	522+00		526+50	450	900	3600
LT/RT	528+00		532+50	450	900	3600
LT/RT	534+00		538+50		900	3600
MED	540+00		551+50	1150		16100
MED	552+50		557+00	450		6300
MED	558+00		563+00	500		7000

Total Median Area= 329550

QUANTITY TAKEOFF - SIDEWALK						
SIDE	STA	TO	STA	LENGTH (ft)	WIDTH (ft)	AREA (sf)
RT	66+00		67+00	100	10	1000
LT	68+00		77+00	900	10	9000
RT	68+00		77+00	900	10	9000
LT	78+00		80+25	225	10	2250
LT	86+00		87+75	175	10	1750
LT	87+00		95+00	800	10	8000
LT	101+75		103+00	125	10	1250
LT	103+50		108+50	500	10	5000
RT	103+00		105+50	250	10	2500
RT	106+00		109+50	350	10	3500
LT	110+00		123+00	1300	10	13000
RT	100+00		115+25	1525	10	15250
RT	115+50		118+25	275	10	2750
RT	119+00		123+00	400	10	4000
LT	124+00		134+00	1000	10	10000
RT	124+00		126+50	250	10	2500
RT	127+00		134+00	700	10	7000
LT	134+50		139+50	500	10	5000
RT	135+00		140+00	500	10	5000
LT	140+00		143+00	300	10	3000
RT	140+00		143+00	300	10	3000
LT	143+75		151+00	725	10	7250
RT	143+75		146+00	225	10	2250
RT	146+50		151+00	450	10	4500
LT	151+50		162+00	1050	10	10500
RT	152+50		155+50	300	10	3000
RT	155+75		162+00	625	10	6250
LT	162+75		167+00	425	10	4250
LT	166+75		169+00	225	10	2250
LT	391+00		401+00	1000	10	10000
RT	391+00		394+00	300	10	3000
RT	409+75		414+75	500	10	5000
LT	424+00		426+75	275	10	2750
RT	426+50		430+50	400	10	4000
LT	427+00		435+50	850	10	8500
LT	444+75		448+00	325	10	3250
RT	444+75		455+00	1025	10	10250
RT	455+00		446+50	-850	10	-8500
LT	457+00		463+75	675	10	6750
RT	457+00		464+00	700	10	7000
RT	464+50		472+00	750	10	7500
RT	472+50		476+00	350	10	3500
LT	473+50		475+75	225	10	2250
RT	476+50		481+00	450	10	4500

QUANTITY TAKEOFF - SIDEWALK						
SIDE	STA	TO	STA	LENGTH (ft)	WIDTH (ft)	AREA (sf)
RT	481+00		483+00	200	10	2000
RT	483+50		485+00	150	10	1500
LT	484+00		490+00	600	10	6000
RT	484+00		487+00	300	10	3000
LT	500+25		505+50	525	10	5250
LT	506+00		507+50	150	10	1500
LT	507+75		509+25	150	10	1500
RT	508+25		509+25	100	10	1000
LT	510+00		513+75	375	10	3750
RT	510+00		514+00	400	10	4000
LT	514+25		521+00	675	10	6750
RT	514+00		521+00	700	10	7000
LT	521+75		526+75	500	10	5000
RT	522+00		526+50	450	10	4500
LT	527+75		532+50	475	10	4750
RT	528+00		533+00	500	10	5000
RT	533+50		539+00	550	10	5500
RT	539+75		547+00	725	10	7250
LT	554+75		557+00	225	10	2250
LT	557+50		563+00	550	10	5500

Total Sidewalk Area= 228500

AECOM

Made: JWG
Date:
CHKD: ________
Date: ________

QUANTITIES

Item: Concrete
Unit: CY

Concrete

Location	Number	Length [FT]	Width [FT]	Height [FT]	Area [SF]	Volume [CY]
Both directions*	1	27750.00			13.563	13939.24
						13939.24

*Asume retaining wall is 25% of the entire project lenth for both directions.

Rebar

Location	Volume of Concrete [CY]	Weight [LB]
Both directions	13939.24	2090885.42
		2090885.42

Fencing

Location	Number	Length [LNFT]	Width [FT]	Height [FT]	Area [SF]	Length [LNFT]
Both directions	1	27720.00				27720.00
						27720.00

ROW Acquisition Estimate

Property Type	Juris	Parcel ID	Parcel Owner	Property Address
Commercial	FFX	0294 01 0035 A	Tysons Corner Property Holdings	1911 Chain Bridge Rd
Commercial	FFX	0392 01 0001A	Tysons Corner Property LLC	1861 International Dr
Commercial	FFX	0392 01 0004	Tysons Corner Holding LLC	8034 Leesburg Pike
Commercial	FFX	0392 01 0042	Tysons LLC	7787 Leesburg Pike
Commercial	FFX	0392 01 0047	7777 Leesburg Pike LLC	7777 Leesburg Pke
Commercial	FFX	0392 01 0048	School Board of Fairfax County	7731 Leesburg Pike
Commercial	FFX	0392 01 0057	7700-04 Leesburg Pike Assn	7700 Leesburg Pike
Commercial	FFX	0392 02 0039	T & H One LLC	8201 Leesburg Pike
Commercial	FFX	0392 02 0050 A	8117 Leesburg Pike Assn	8117 Leesburg Pike
Commercial	FFX	0392 02 0054	Tyco Assoc Joint venture	8111 Leesburg Pike
Commercial	FFX	0392 02 0056 A	PMIG 1011 LLC	8103 Leesburg Pike
Commercial	FFX	0392 02 0106	Fairfax Square LLC	1920 Aline Ave
Commercial	FFX	0392 04 0031	Lilianne and Sons LLC	8032 Leesburg Pike
Commercial	FFX	0392 22 A	Tysons Office Park Assn	Leesburg Pike
Commercial	FFX	0401 01 0033	Federal Realty	7451 Patterson Rd.
Commercial	FFX	0401 01 0037	Board of Supervisors Fairfax Co.	7550 Leesburg Pike
Commercial	FFX	0401 01 0039	TNREF III 7600 Leesburg Pike LLC	7600 A Leesburg Pike
Commercial	FFX	0403 01 0001 B	Federal Realty Investment Trust	7501 Leesburg
Commercial	FFX	0513 01 0025	Christian First Falls Church	6165 Leesburg Pike
Commercial	FFX	0513 13 0001	Brent Court Properties LLC	6299 Leesburg Pike
Commercial	FFX	0513 13 0003	North Hudson Commercial	6269 Leesburg Pike
Commercial	FFX	0513 13 0004	North Hudson Commercial	N/A
Commercial	FFX	0513 16A 0006	Arlington Fairfax	6300 Leesburg Pike
Commercial	FFX	0611 01 0008	Church Of Christ of Falls Church	6149 Leesburg Pike
Commercial	FFX	0612 01 0007	PMIG 1010 LLC	6014 Leesburg Pike
Commercial	FFX	0612 01 0007 A	Samson Aaron	6020 Leesburg Pike
Commercial	FFX	0612 01 0027	Alta Enterprises 2 LLC	5894 Leesburg Pike
Commercial	FFX	0612 01 0041 B	Mount of Olives of Falls Church	5866 Leesburg Pike
Commercial	FFX	0612 01 0072 C	Rreef America Reit II Cor	5800 Crossroads Ctr.
Commercial	FFX	0612 17B 0003 B	JS Enterprises of Va LLC	5865 Leesburg Pike
Commercial	FFX	0612 17C 0006	Daff LLC	3401 Washington Dr.
Commercial	FFX	0612 18 0001 A	Baileys Crossroads LLC	3401 Charles St.
Commercial	FFX	0612 21 0005	Irvin Corp	5613 Leesburg Pike
Commercial	FFX	0612 21 0009	Irvin Corp	5603 Leesburg Pike
Commercial	FFX	0612 22 0001	Mount Olympus Inc	5616 Leesburg Pike
Commercial	FFX	0612 43 0001B	R & J Baileys LLC	5700 Leesburg Pike
Commercial	FFX	0612 43 0002	R & J Baileys LLC	5634 Leesburg Pike
Commercial	FFX	0621 01 0013	LP Corporation	5520 Leesburg Pike
Commercial	FFX	0621 01 0014	NABDTBAS Logan Smyth LLC	5508 Leesburg Pike
Commercial	FFX	0621 01 0016 E	Payne Brothers Properties LLC	3480 Jefferson Street S.
Commercial	FFX	0623 01 0011	Leesburg Pike Center LLC	3499 Jefferson Street S.
Commercial	FFX	0623 01 0028	Target Corp	5115 Leesburg Pike
Commercial	FFX	0623 01 0038 B	US Bank National Association Tr.	5275 Leesburg Pike
Commercial	FFX	0623 01 0041 D	US Bank National Association Tr	5107 Leesburg Pike
Commercial	FFX	0623 01 0041 D	B & C Baileys Family LLC	5519 Leesburg Pike
Commercial	FFX	0623 01 0041 E	US Bank National Association Tr	5107 Leesburg Pike
Commercial	FFX	0623 02 0044 A	B & C Baileys Family LLC	5519 Leesburg Pike
Commercial	FFX	0623 02 B	Lake Plaza Property Holding LLC	5521 Leesburg Pike
Commercial	FC	51-102-006	Falls Church Enterprises II LLC	400 N. Washington St.
Commercial	FC	51-105-006	Oshinsky Family LTD Partnership	134 W. Broad St.
Commercial	FC	51-130-003	Maminski Family Trust	500 W. Broad St.
Commercial	FC	51-216-076	Shreve William C Sr Tr First Union	1000 W. Broad St.
Commercial	FC	52-203-012	929 LLC	929 W. Broad St.
Commercial	FC	52-309-114	Burke & Herbert B & T Co	225 W. Broad St.
Commercial	FC	53-101-070	Falls Church Gateway	500 N. Washington St.
Commercial	FFX	6012 01 0025 A	Methodist Culmore Church	3400 Charles St.
Residential	FFX	0401 01 0034	Peach Orchard LP	2002 Peach Orchard Dr.
Residential	FFX	0403 01 0004	Fairfax Towers Financing	2251 Pimmit Dr.
Residential	FFX	0403 01 0078	Thomas, Larry W Tr	7400 Leesburg Pike
Residential	FFX	0403 01 0079	Vitoria Bachlan	7414 Leesburg Pike
Residential	FFX	0513 01 0021 A	Gibson Alan M Tr	6152 Leesburg Pike
Residential	FFX	0513 01 0025 A	Carriage Funeral Holdings Inc	6161 Leesburg Rd.
Residential	FFX	0513 16 0008	Phan Tuan M	6306 Buffalo Ridge Rd.
Residential	FFX	0513 18 J	Redevelopment and Housing Authority	3077 Patrick Henry Dr.
Residential	FFX	0612 07 0013	Luu Alphonse Tai Tr	3301 Nevius St.
Residential	FFX	0621 01 0012	Atlas Investment LLC	3512 Carlin Springs Rd.
Residential	FFX	0623 01 0012 B	Romanian Orthodox Church	5150 Leesburg Pike
Residential	FC	52-203-056	Master Record	101 Rowell Ct.
Residential	FC	52-302-249	Falls Park HOA	Rees Pl.
Residential	FC	53-218-014	Falls Church Owner LLC	501 Roosevelt Blvd.
Residential	FC	53-218-019	Washreit Roosevelt Towers LLC	500 Roosevelt Blvd.
Open and Abandoned	FFX	0403 01 0006	St. Pauls Lutheran Church	7413 Leesburg Pike
Open and Abandoned	FFX	0403 01 0007	St. Pauls Lutheran Church	7407 Leesburg Pike
Open and Abandoned	FFX	0403 01 0007A	St. Pauls Lutheran Church	7401 Leesburg Pike
Open and Abandoned	FFX	0513 01 0022	Dar Al Hijraha Islamic Center	6160 Leesburg Pike

Juris	Parcel ID	Parcel Owner	Property Address	EX Total Size (SF)	EX Total Size (Ac)	ROW Total Size (SF)
FFX	0294 01 0035 A	Tysons Corner Property Holdings	1911 Chain Bridge Rd	2,981,580	68.448	7,444
FFX	0392 01 0001A	Tysons Corner Property LLC	1861 International Dr	106,273	2.440	6,268
FFX	0392 01 0004	Tysons Corner Holding LLC	8034 Leesburg Pike	32,322	0.742	680
FFX	0392 01 0042	Tysons LLC	7787 Leesburg Pike	25,287	0.581	741
FFX	0392 01 0047	7777 Leesburg Pike LLC	7777 Leesburg Pke	172,076	3.950	87
FFX	0392 01 0048	School Board of Fairfax County	7731 Leesburg Pike	456,066	10.470	12,275
FFX	0392 01 0057	7700-04 Leesburg Pike Assn	7700 Leesburg Pike	293,063	6.728	13,194
FFX	0392 02 0039	T & H One LLC	8201 Leesburg Pike	204,414	4.693	2,621
FFX	0392 02 0050 A	8117 Leesburg Pike Assn	8117 Leesburg Pike	46,074	1.058	3,202
FFX	0392 02 0054	Tyco Assoc Joint venture	8111 Leesburg Pike	22,843	0.524	871
FFX	0392 02 0056 A	PMIG 1011 LLC	8103 Leesburg Pike	29,633	0.680	1,699
FFX	0392 02 0106	Fairfax Square LLC	1920 Aline Ave	461,057	10.584	5,097
FFX	0392 04 0031	Lilianne and Sons LLC	8032 Leesburg Pike	20,053	0.460	348
FFX	0392 22 A	Tysons Office Park Assn	Leesburg Pike	106,847	2.453	10,759
FFX	0401 01 0033	Federal Realty	7451 Patterson Rd.	178,552	4.099	5,227
FFX	0401 01 0037	Board of Supervisors Fairfax Co.	7550 Leesburg Pike	218,379	5.013	22,429
FFX	0401 01 0039	TNREF III 7600 Leesburg Pike LLC	7600 A Leesburg Pike	442,718	10.163	11,435
FFX	0403 01 0001 B	Federal Realty Investment Trust	7501 Leesburg	237,968	5.463	1,045
FFX	0513 01 0025	Christian First Falls Church	6165 Leesburg Pike	68,388	1.570	260
FFX	0513 13 0001	Brent Court Properties LLC	6299 Leesburg Pike	23,901	0.549	958
FFX	0513 13 0003	North Hudson Commercial	6269 Leesburg Pike	10,961	0.252	562
FFX	0513 13 0004	North Hudson Commercial	N/A	13,211	0.303	684
FFX	0513 16A 0006	Arlington Fairfax	6300 Leesburg Pike	974	0.022	958
FFX	0611 01 0008	Church Of Christ of Falls Church	6149 Leesburg Pike	113,792	2.612	2,962
FFX	0612 01 0007	PMIG 1010 LLC	6014 Leesburg Pike	22,318	0.512	9,703
FFX	0612 01 0007 A	Samson Aaron	6020 Leesburg Pike	16,220	0.372	915
FFX	0612 01 0027	Alta Enterprises 2 LLC	5894 Leesburg Pike	40,370	0.927	3,122
FFX	0612 01 0041 B	Mount of Olives of Falls Church	5866 Leesburg Pike	42,143	0.967	1,917
FFX	0612 01 0072 C	Rreef America Reit II Cor	5800 Crossroads Ctr.	1,092,627	25.083	5,140
FFX	0612 17B 0003 B	JS Enterprises of Va LLC	5865 Leesburg Pike	24,026	0.552	2,352
FFX	0612 17C 0006	Daff LLC	3401 Washington Dr.	29,759	0.683	4,526
FFX	0612 18 0001 A	Baileys Crossroads LLC	3401 Charles St.	102,984	2.364	1,675
FFX	0612 21 0005	Irvin Corp	5613 Leesburg Pike	39,751	0.913	2,743
FFX	0612 21 0009	Irvin Corp	5603 Leesburg Pike	20,023	0.460	3,537
FFX	0612 22 0001	Mount Olympus Inc	5616 Leesburg Pike	31,964	0.734	5,780
FFX	0612 43 0001B	R & J Baileys LLC	5700 Leesburg Pike	75,875	1.742	104
FFX	0612 43 0002	R & J Baileys LLC	5634 Leesburg Pike	47,204	1.084	4,382
FFX	0621 01 0013	LP Corporation	5520 Leesburg Pike	87,418	2.007	40,687
FFX	0621 01 0014	NABDTBAS Logan Smyth LLC	5508 Leesburg Pike	213,969	4.912	3,093
FFX	0621 01 0016 E	Payne Brothers Properties LLC	3480 Jefferson Street S.	1,018,144	23.373	13,504
FFX	0623 01 0011	Leesburg Pike Center LLC	3499 Jefferson Street S.	394,643	9.060	1,307
FFX	0623 01 0028	Target Corp	5115 Leesburg Pike	476,018	10.928	29,621
FFX	0623 01 0038 B	US Bank National Association Tr.	5275 Leesburg Pike	228,553	5.247	11,587
FFX	0623 01 0041 D	US Bank National Association Tr	5107 Leesburg Pike	159,715	3.667	16,553
FFX	0623 01 0041 D	B & C Baileys Family LLC	5519 Leesburg Pike	9,172	0.211	1,655
FFX	0623 01 0041 E	US Bank National Association Tr	5107 Leesburg Pike	241	0.006	261
FFX	0623 02 0044 A	B & C Baileys Family LLC	5519 Leesburg Pike	9,172	0.211	2,217
FFX	0623 02 B	Lake Plaza Property Holding LLC	5521 Leesburg Pike	69,320	1.591	7,619
FC	51-102-006	Falls Church Enterprises II LLC	400 N. Washington St.	79,715	1.83	636
FC	51-105-006	Oshinsky Family LTD Partnership	134 W. Broad St.	50,965	1.17	893
FC	51-130-003	Maminski Family Trust	500 W. Broad St.	10,019	0.23	632
FC	51-216-076	Shreve William C Sr Tr First Union	1000 W. Broad St.	28,750	0.66	1,324
FC	52-203-012	929 LLC	929 W. Broad St.	48,787	1.12	732
FC	52-309-114	Burke & Herbert B & T Co	225 W. Broad St.	27,878	0.64	1,228
FC	53-101-070	Falls Church Gateway	500 N. Washington St.	108,464	2.49	902
FFX	6012 01 0025 A	Methodist Culmore Church	3400 Charles St.	98,605	2.264	6,591
FFX	0401 01 0034	Peach Orchard LP	2002 Peach Orchard Dr.	657,033	15.083	14,414
FFX	0403 01 0004	Fairfax Towers Financing	2251 Pimmit Dr.	169,941	3.901	305
FFX	0403 01 0078	Thomas, Larry W Tr	7400 Leesburg Pike	22,796	0.523	2,443
FFX	0403 01 0079	Vitoria Bachlan	7414 Leesburg Pike	82,925	1.904	1,270
FFX	0513 01 0021 A	Gibson Alan M Tr	6152 Leesburg Pike	44,615	1.024	2,701
FFX	0513 01 0025 A	Carriage Funeral Holdings Inc	6161 Leesburg Rd.	71,373	1.638	12,763
FFX	0513 16 0008	Phan Tuan M	6306 Buffalo Ridge Rd.	11,250	0.258	710
FFX	0513 18 J	Redevelopment and Housing Authority	3077 Patrick Henry Dr.	55,972	1.285	17,228
FFX	0612 07 0013	Luu Alphonse Tai Tr	3301 Nevius St.	14,411	0.331	1,217
FFX	0621 01 0012	Atlas Investment LLC	3512 Carlin Springs Rd.	84,045	1.929	3,617
FFX	0623 01 0012 B	Romanian Orthodox Church	5150 Leesburg Pike	3,372	0.077	1,350
FC	52-203-056	Master Record	101 Rowell Ct.	73,181	1.68	479
FC	52-302-249	Falls Park HOA	Rees Pl.	235,224	5.40	423
FC	53-218-014	Falls Church Owner LLC	501 Roosevelt Blvd.	523,591	12.02	305
FC	53-218-019	Washreit Roosevelt Towers LLC	500 Roosevelt Blvd.	222,156	5.10	723
FFX	0403 01 0006	St. Pauls Lutheran Church	7413 Leesburg Pike	49,746	1.142	2,091
FFX	0403 01 0007	St. Pauls Lutheran Church	7407 Leesburg Pike	38,180	0.8765	2,831
FFX	0403 01 0007A	St. Pauls Lutheran Church	7401 Leesburg Pike	50,678	1.1634	6,142
FFX	0513 01 0022	Dar Al Hijraha Islamic Center	6160 Leesburg Pike	49,671	1.140	25,047

Juris	Parcel ID	Parcel Owner	Property Address	ROW Total Size (Ac)	Parcel % ROW Take
FFX	0294 01 0035 A	Tysons Corner Property Holdings	1911 Chain Bridge Rd	0.171	0.2%
FFX	0392 01 0001A	Tysons Corner Property LLC	1861 International Dr	0.144	5.9%
FFX	0392 01 0004	Tysons Corner Holding LLC	8034 Leesburg Pike	0.016	2.1%
FFX	0392 01 0042	Tysons LLC	7787 Leesburg Pike	0.017	2.9%
FFX	0392 01 0047	7777 Leesburg Pike LLC	7777 Leesburg Pke	0.002	0.1%
FFX	0392 01 0048	School Board of Fairfax County	7731 Leesburg Pike	0.282	2.7%
FFX	0392 01 0057	7700-04 Leesburg Pike Assn	7700 Leesburg Pike	0.303	4.5%
FFX	0392 02 0039	T & H One LLC	8201 Leesburg Pike	0.060	1.3%
FFX	0392 02 0050 A	8117 Leesburg Pike Assn	8117 Leesburg Pike	0.074	6.9%
FFX	0392 02 0054	Tyco Assoc Joint venture	8111 Leesburg Pike	0.020	3.8%
FFX	0392 02 0056 A	PMIG 1011 LLC	8103 Leesburg Pike	0.039	5.7%
FFX	0392 02 0106	Fairfax Square LLC	1920 Aline Ave	0.117	1.1%
FFX	0392 04 0031	Lilianne and Sons LLC	8032 Leesburg Pike	0.008	1.7%
FFX	0392 22 A	Tysons Office Park Assn	Leesburg Pike	0.247	10.1%
FFX	0401 01 0033	Federal Realty	7451 Patterson Rd.	0.120	2.9%
FFX	0401 01 0037	Board of Supervisors Fairfax Co.	7550 Leesburg Pike	0.515	10.3%
FFX	0401 01 0039	TNREF III 7600 Leesburg Pike LLC	7600 A Leesburg Pike	0.263	2.6%
FFX	0403 01 0001 B	Federal Realty Investment Trust	7501 Leesburg	0.024	0.4%
FFX	0513 01 0025	Christian First Falls Church	6165 Leesburg Pike	0.006	0.4%
FFX	0513 13 0001	Brent Court Properties LLC	6299 Leesburg Pike	0.022	4.0%
FFX	0513 13 0003	North Hudson Commercial	6269 Leesburg Pike	0.013	5.1%
FFX	0513 13 0004	North Hudson Commercial	N/A	0.016	5.2%
FFX	0513 16A 0006	Arlington Fairfax	6300 Leesburg Pike	0.022	98.4%
FFX	0611 01 0008	Church Of Christ of Falls Church	6149 Leesburg Pike	0.068	2.6%
FFX	0612 01 0007	PMIG 1010 LLC	6014 Leesburg Pike	0.223	43.5%
FFX	0612 01 0007 A	Samson Aaron	6020 Leesburg Pike	0.021	5.6%
FFX	0612 01 0027	Alta Enterprises 2 LLC	5894 Leesburg Pike	0.072	7.7%
FFX	0612 01 0041 B	Mount of Olives of Falls Church	5866 Leesburg Pike	0.044	4.5%
FFX	0612 01 0072 C	Rreef America Reit II Cor	5800 Crossroads Ctr.	0.118	0.5%
FFX	0612 17B 0003 B	JS Enterprises of Va LLC	5865 Leesburg Pike	0.054	9.8%
FFX	0612 17C 0006	Daff LLC	3401 Washington Dr.	0.104	15.2%
FFX	0612 18 0001 A	Baileys Crossroads LLC	3401 Charles St.	0.038	1.6%
FFX	0612 21 0005	Irvin Corp	5613 Leesburg Pike	0.063	6.9%
FFX	0612 21 0009	Irvin Corp	5603 Leesburg Pike	0.081	17.7%
FFX	0612 22 0001	Mount Olympus Inc	5616 Leesburg Pike	0.133	18.1%
FFX	0612 43 0001B	R & J Baileys LLC	5700 Leesburg Pike	0.002	0.1%
FFX	0612 43 0002	R & J Baileys LLC	5634 Leesburg Pike	0.101	9.3%
FFX	0621 01 0013	LP Corporation	5520 Leesburg Pike	0.934	46.5%
FFX	0621 01 0014	NABDTBAS Logan Smyth LLC	5508 Leesburg Pike	0.071	1.4%
FFX	0621 01 0016 E	Payne Brothers Properties LLC	3480 Jefferson Street S.	0.310	1.3%
FFX	0623 01 0011	Leesburg Pike Center LLC	3499 Jefferson Street S.	0.030	0.3%
FFX	0623 01 0028	Target Corp	5115 Leesburg Pike	0.680	6.2%
FFX	0623 01 0038 B	US Bank National Association Tr.	5275 Leesburg Pike	0.266	5.1%
FFX	0623 01 0041 D	US Bank National Association Tr	5107 Leesburg Pike	0.380	10.4%
FFX	0623 01 0041 D	B & C Baileys Family LLC	5519 Leesburg Pike	0.038	18.0%
FFX	0623 01 0041 E	US Bank National Association Tr	5107 Leesburg Pike	0.006	108.4%
FFX	0623 02 0044 A	B & C Baileys Family LLC	5519 Leesburg Pike	0.051	24.2%
FFX	0623 02 B	Lake Plaza Property Holding LLC	5521 Leesburg Pike	0.175	11.0%
FC	51-102-006	Falls Church Enterprises II LLC	400 N. Washington St.	0.015	0.8%
FC	51-105-006	Oshinsky Family LTD Partnership	134 W. Broad St.	0.021	1.8%
FC	51-130-003	Maminski Family Trust	500 W. Broad St.	0.015	6.3%
FC	51-216-076	Shreve William C Sr Tr First Union	1000 W. Broad St.	0.030	4.6%
FC	52-203-012	929 LLC	929 W. Broad St.	0.017	1.5%
FC	52-309-114	Burke & Herbert B & T Co	225 W. Broad St.	0.028	4.4%
FC	53-101-070	Falls Church Gateway	500 N. Washington St.	0.021	0.8%
FFX	6012 01 0025 A	Methodist Culmore Church	3400 Charles St.	0.151	6.7%
FFX	0401 01 0034	Peach Orchard LP	2002 Peach Orchard Dr.	0.331	2.2%
FFX	0403 01 0004	Fairfax Towers Financing	2251 Pimmit Dr.	0.007	0.2%
FFX	0403 01 0078	Thomas, Larry W Tr	7400 Leesburg Pike	0.056	10.7%
FFX	0403 01 0079	Vitoria Bachlan	7414 Leesburg Pike	0.029	1.5%
FFX	0513 01 0021 A	Gibson Alan M Tr	6152 Leesburg Pike	0.062	6.1%
FFX	0513 01 0025 A	Carriage Funeral Holdings Inc	6161 Leesburg Rd.	0.293	17.9%
FFX	0513 16 0008	Phan Tuan M	6306 Buffalo Ridge Rd.	0.016	6.3%
FFX	0513 18 J	Redevelopment and Housing Authority	3077 Patrick Henry Dr.	0.396	30.8%
FFX	0612 07 0013	Luu Alphonse Tai Tr	3301 Nevius St.	0.028	8.4%
FFX	0621 01 0012	Atlas Investment LLC	3512 Carlin Springs Rd.	0.083	4.3%
FFX	0623 01 0012 B	Romanian Orthodox Church	5150 Leesburg Pike	0.031	40.0%
FC	52-203-056	Master Record	101 Rowell Ct.	0.011	0.7%
FC	52-302-249	Falls Park HOA	Rees Pl.	0.010	0.2%
FC	53-218-014	Falls Church Owner LLC	501 Roosevelt Blvd.	0.007	0.1%
FC	53-218-019	Washreit Roosevelt Towers LLC	500 Roosevelt Blvd.	0.017	0.3%
FFX	0403 01 0006	St. Pauls Lutheran Church	7413 Leesburg Pike	0.048	4.2%
FFX	0403 01 0007	St. Pauls Lutheran Church	7407 Leesburg Pike	0.065	7.4%
FFX	0403 01 0007A	St. Pauls Lutheran Church	7401 Leesburg Pike	0.141	12.1%
FFX	0513 01 0022	Dar Al Hijraha Islamic Center	6160 Leesburg Pike	0.575	50.4%

Juris	Parcel ID	Parcel Owner	Property Address	Property Value	Property Value/SF
FFX	0294 01 0035 A	Tysons Corner Property Holdings	1911 Chain Bridge Rd	$169,267,730.00	$56.77
FFX	0392 01 0001A	Tysons Corner Property LLC	1861 International Dr	$9,762,500.00	$91.86
FFX	0392 01 0004	Tysons Corner Holding LLC	8034 Leesburg Pike	$2,112,960.00	$65.37
FFX	0392 01 0042	Tysons LLC	7787 Leesburg Pike	$1,770,090.00	$70.00
FFX	0392 01 0047	7777 Leesburg Pike LLC	7777 Leesburg Pke	$5,764,440.00	$33.50
FFX	0392 01 0048	School Board of Fairfax County	7731 Leesburg Pike	$10,281,000.00	$22.54
FFX	0392 01 0057	7700-04 Leesburg Pike Assn	7700 Leesburg Pike	$8,379,870.00	$28.59
FFX	0392 02 0039	T & H One LLC	8201 Leesburg Pike	$18,751,000.00	$91.73
FFX	0392 02 0050 A	8117 Leesburg Pike Assn	8117 Leesburg Pike	$4,146,660.00	$90.00
FFX	0392 02 0054	Tyco Assoc Joint venture	8111 Leesburg Pike	$2,055,870.00	$90.00
FFX	0392 02 0056 A	PMIG 1011 LLC	8103 Leesburg Pike	$2,666,970.00	$90.00
FFX	0392 02 0106	Fairfax Square LLC	1920 Aline Ave	$30,604,490.00	$66.38
FFX	0392 04 0031	Lilianne and Sons LLC	8032 Leesburg Pike	$1,804,770.00	$90.00
FFX	0392 22 A	Tysons Office Park Assn	Leesburg Pike	$7,479,290.00	$70.00
FFX	0401 01 0033	Federal Realty	7451 Patterson Rd.	$6,922,080.00	$38.77
FFX	0401 01 0037	Board of Supervisors Fairfax Co.	7550 Leesburg Pike	$1,616,000.00	$7.40
FFX	0401 01 0039	TNREF III 7600 Leesburg Pike LLC	7600 A Leesburg Pike	$17,708,720.00	$40.00
FFX	0403 01 0001 B	Federal Realty Investment Trust	7501 Leesburg	$9,518,720.00	$40.00
FFX	0513 01 0025	Christian First Falls Church	6165 Leesburg Pike	$1,171,000.00	$17.12
FFX	0513 13 0001	Brent Court Properties LLC	6299 Leesburg Pike	$956,040.00	$40.00
FFX	0513 13 0003	North Hudson Commercial	6269 Leesburg Pike	$438,400.00	$40.00
FFX	0513 13 0004	North Hudson Commercial	N/A	$924,770.00	$70.00
FFX	0513 16A 0006	Arlington Fairfax	6300 Leesburg Pike	$234,000.00	$240.25
FFX	0611 01 0008	Church Of Christ of Falls Church	6149 Leesburg Pike	$447,000.00	$3.93
FFX	0612 01 0007	PMIG 1010 LLC	6014 Leesburg Pike	$1,115,900.00	$50.00
FFX	0612 01 0007 A	Samson Aaron	6020 Leesburg Pike	$648,800.00	$40.00
FFX	0612 01 0027	Alta Enterprises 2 LLC	5894 Leesburg Pike	$1,523,830.00	$37.75
FFX	0612 01 0041 B	Mount of Olives of Falls Church	5866 Leesburg Pike	$1,685,720.00	$40.00
FFX	0612 01 0072 C	Rreef America Reit II Cor	5800 Crossroads Ctr.	$43,705,080.00	$40.00
FFX	0612 17B 0003 B	JS Enterprises of Va LLC	5865 Leesburg Pike	$1,201,300.00	$50.00
FFX	0612 17C 0006	Daff LLC	3401 Washington Dr.	$1,190,360.00	$40.00
FFX	0612 18 0001 A	Baileys Crossroads LLC	3401 Charles St.	$4,119,360.00	$40.00
FFX	0612 21 0005	Irvin Corp	5613 Leesburg Pike	$1,590,040.00	$40.00
FFX	0612 21 0009	Irvin Corp	5603 Leesburg Pike	$800,920.00	$40.00
FFX	0612 22 0001	Mount Olympus Inc	5616 Leesburg Pike	$1,278,560.00	$40.00
FFX	0612 43 0001B	R & J Baileys LLC	5700 Leesburg Pike	$1,517,500.00	$20.00
FFX	0612 43 0002	R & J Baileys LLC	5634 Leesburg Pike	$1,416,120.00	$30.00
FFX	0621 01 0013	LP Corporation	5520 Leesburg Pike	$3,496,720.00	$40.00
FFX	0621 01 0014	NABDTBAS Logan Smyth LLC	5508 Leesburg Pike	$8,559,560.00	$40.00
FFX	0621 01 0016 E	Payne Brothers Properties LLC	3480 Jefferson Street S.	$40,725,760.00	$40.00
FFX	0623 01 0011	Leesburg Pike Center LLC	3499 Jefferson Street S.	$15,785,720.00	$40.00
FFX	0623 01 0028	Target Corp	5115 Leesburg Pike	$19,040,720.00	$40.00
FFX	0623 01 0038 B	US Bank National Association Tr.	5275 Leesburg Pike	$9,908,800.00	$43.35
FFX	0623 01 0041 D	US Bank National Association Tr	5107 Leesburg Pike	$7,657,690.00	$47.95
FFX	0623 01 0041 D	B & C Baileys Family LLC	5519 Leesburg Pike	$275,160.00	$30.00
FFX	0623 01 0041 E	US Bank National Association Tr	5107 Leesburg Pike	$16,870.00	$70.00
FFX	0623 02 0044 A	B & C Baileys Family LLC	5519 Leesburg Pike	$275,160.00	$30.00
FFX	0623 02 B	Lake Plaza Property Holding LLC	5521 Leesburg Pike	$2,079,600.00	$30.00
FC	51-102-006	Falls Church Enterprises II LLC	400 N. Washington St.	$3,985,740.00	$50.00
FC	51-105-006	Oshinsky Family LTD Partnership	134 W. Broad St.	$2,548,260.00	$50.00
FC	51-130-003	Maminski Family Trust	500 W. Broad St.	$500,940.00	$50.00
FC	51-216-076	Shreve William C Sr Tr First Union	1000 W. Broad St.	$1,437,480.00	$50.00
FC	52-203-012	929 LLC	929 W. Broad St.	$2,439,360.00	$50.00
FC	52-309-114	Burke & Herbert B & T Co	225 W. Broad St.	$1,393,920.00	$50.00
FC	53-101-070	Falls Church Gateway	500 N. Washington St.	$5,423,220.00	$50.00
FFX	6012 01 0025 A	Methodist Culmore Church	3400 Charles St.	$411,000.00	$4.17
FFX	0401 01 0034	Peach Orchard LP	2002 Peach Orchard Dr.	$13,600,000.00	$20.70
FFX	0403 01 0004	Fairfax Towers Financing	2251 Pimmit Dr.	$13,280,000.00	$78.14
FFX	0403 01 0078	Thomas, Larry W Tr	7400 Leesburg Pike	$586,000.00	$25.71
FFX	0403 01 0079	Vitoria Bachlan	7414 Leesburg Pike	$486,000.00	$5.86
FFX	0513 01 0021 A	Gibson Alan M Tr	6152 Leesburg Pike	$305,000.00	$6.84
FFX	0513 01 0025 A	Carriage Funeral Holdings Inc	6161 Leesburg Rd.	$525,630.00	$7.36
FFX	0513 16 0008	Phan Tuan M	6306 Buffalo Ridge Rd.	$286,000.00	$25.42
FFX	0513 18 J	Redevelopment and Housing Authority	3077 Patrick Henry Dr.	$4,968,000.00	$88.76
FFX	0612 07 0013	Luu Alphonse Tai Tr	3301 Nevius St.	$230,000.00	$15.96
FFX	0621 01 0012	Atlas Investment LLC	3512 Carlin Springs Rd.	$4,202,250.00	$50.00
FFX	0623 01 0012 B	Romanian Orthodox Church	5150 Leesburg Pike	$103,000.00	$30.55
FC	52-203-056	Master Record	101 Rowell Ct.	$2,363,739.84	$32.30
FC	52-302-249	Falls Park HOA	Rees Pl.	$7,597,735.20	$32.30
FC	53-218-014	Falls Church Owner LLC	501 Roosevelt Blvd.	$16,911,995.76	$32.30
FC	53-218-019	Washreit Roosevelt Towers LLC	500 Roosevelt Blvd.	$7,175,638.80	$32.30
FFX	0403 01 0006	St. Pauls Lutheran Church	7413 Leesburg Pike	$384,000.00	$7.72
FFX	0403 01 0007	St. Pauls Lutheran Church	7407 Leesburg Pike	$337,000.00	$8.83
FFX	0403 01 0007A	St. Pauls Lutheran Church	7401 Leesburg Pike	$443,000.00	$8.74
FFX	0513 01 0022	Dar Al Hijraha Islamic Center	6160 Leesburg Pike	$433,000.00	$8.72

Juris	Parcel ID	Parcel Owner	Property Address	Subtotal ROW	Add Acquisition and Negotiations	Add Title Company and Title Search
FFX	0294 01 0035 A	Tysons Corner Property Holdings	1911 Chain Bridge Rd	$422,627.39	$500,813.45	$657,067.25
FFX	0392 01 0001A	Tysons Corner Property LLC	1861 International Dr	$575,820.03	$682,346.74	$895,238.92
FFX	0392 01 0004	Tysons Corner Holding LLC	8034 Leesburg Pike	$44,422.76	$52,640.97	$69,064.95
FFX	0392 01 0042	Tysons LLC	7787 Leesburg Pike	$51,836.40	$61,426.13	$80,591.09
FFX	0392 01 0047	7777 Leesburg Pike LLC	7777 Leesburg Pke	$2,918.47	$3,458.38	$4,537.40
FFX	0392 01 0048	School Board of Fairfax County	7731 Leesburg Pike	$276,717.43	$327,910.16	$430,218.13
FFX	0392 01 0057	7700-04 Leesburg Pike Assn	7700 Leesburg Pike	$377,279.70	$447,076.44	$586,564.29
FFX	0392 02 0039	T & H One LLC	8201 Leesburg Pike	$240,426.14	$284,904.97	$373,795.32
FFX	0392 02 0050 A	8117 Leesburg Pike Assn	8117 Leesburg Pike	$288,149.40	$341,457.04	$447,991.64
FFX	0392 02 0054	Tyco Assoc Joint venture	8111 Leesburg Pike	$78,408.00	$92,913.48	$121,902.49
FFX	0392 02 0056 A	PMIG 1011 LLC	8103 Leesburg Pike	$152,895.60	$181,181.29	$237,709.85
FFX	0392 02 0106	Fairfax Square LLC	1920 Aline Ave	$338,301.76	$400,887.59	$525,964.52
FFX	0392 04 0031	Lilianne and Sons LLC	8032 Leesburg Pike	$31,363.20	$37,165.39	$48,760.99
FFX	0392 22 A	Tysons Office Park Assn	Leesburg Pike	$753,152.40	$892,485.59	$1,170,941.10
FFX	0401 01 0033	Federal Realty	7451 Patterson Rd.	$202,647.39	$240,137.16	$315,059.95
FFX	0401 01 0037	Board of Supervisors Fairfax Co.	7550 Leesburg Pike	$165,974.19	$196,679.41	$258,043.39
FFX	0401 01 0039	TNREF III 7600 Leesburg Pike LLC	7600 A Leesburg Pike	$457,380.00	$541,995.30	$711,097.83
FFX	0403 01 0001 B	Federal Realty Investment Trust	7501 Leesburg	$41,817.60	$49,553.86	$65,014.66
FFX	0513 01 0025	Christian First Falls Church	6165 Leesburg Pike	$4,460.32	$5,285.48	$6,934.55
FFX	0513 13 0001	Brent Court Properties LLC	6299 Leesburg Pike	$38,332.80	$45,424.37	$59,596.77
FFX	0513 13 0003	North Hudson Commercial	6269 Leesburg Pike	$22,474.91	$26,632.77	$34,942.19
FFX	0513 13 0004	North Hudson Commercial	N/A	$47,872.44	$56,728.84	$74,428.24
FFX	0513 16A 0006	Arlington Fairfax	6300 Leesburg Pike	$230,232.94	$272,826.03	$357,947.75
FFX	0611 01 0008	Church Of Christ of Falls Church	6149 Leesburg Pike	$11,635.72	$13,788.33	$18,090.29
FFX	0612 01 0007	PMIG 1010 LLC	6014 Leesburg Pike	$485,149.50	$574,902.16	$754,271.63
FFX	0612 01 0007 A	Samson Aaron	6020 Leesburg Pike	$36,590.40	$43,359.62	$56,887.83
FFX	0612 01 0027	Alta Enterprises 2 LLC	5894 Leesburg Pike	$117,859.24	$139,663.20	$183,238.12
FFX	0612 01 0041 B	Mount of Olives of Falls Church	5866 Leesburg Pike	$76,665.60	$90,848.74	$119,193.54
FFX	0612 01 0072 C	Rreef America Reit II Cor	5800 Crossroads Ctr.	$205,603.20	$243,639.79	$319,655.41
FFX	0612 17B 0003 B	JS Enterprises of Va LLC	5865 Leesburg Pike	$117,590.22	$139,344.41	$182,819.87
FFX	0612 17C 0006	Daff LLC	3401 Washington Dr.	$181,035.36	$214,526.90	$281,459.29
FFX	0612 18 0001 A	Baileys Crossroads LLC	3401 Charles St.	$66,995.28	$79,389.41	$104,158.90
FFX	0612 21 0005	Irvin Corp	5613 Leesburg Pike	$109,736.35	$130,037.58	$170,609.30
FFX	0612 21 0009	Irvin Corp	5603 Leesburg Pike	$141,482.88	$167,657.21	$219,966.26
FFX	0612 22 0001	Mount Olympus Inc	5616 Leesburg Pike	$231,199.06	$273,970.88	$359,449.80
FFX	0612 43 0001B	R & J Baileys LLC	5700 Leesburg Pike	$2,070.80	$2,453.90	$3,219.51
FFX	0612 43 0002	R & J Baileys LLC	5634 Leesburg Pike	$131,451.01	$155,769.45	$204,369.52
FFX	0621 01 0013	LP Corporation	5520 Leesburg Pike	$1,627,488.72	$1,928,574.13	$2,530,289.26
FFX	0621 01 0014	NABDTBAS Logan Smyth LLC	5508 Leesburg Pike	$123,721.96	$146,610.53	$192,353.01
FFX	0621 01 0016 E	Payne Brothers Properties LLC	3480 Jefferson Street S.	$540,144.00	$640,070.64	$839,772.68
FFX	0623 01 0011	Leesburg Pike Center LLC	3499 Jefferson Street S.	$52,272.00	$61,942.32	$81,268.32
FFX	0623 01 0028	Target Corp	5115 Leesburg Pike	$1,184,832.00	$1,404,025.92	$1,842,082.01
FFX	0623 01 0038 B	US Bank National Association Tr.	5275 Leesburg Pike	$502,346.80	$595,280.96	$781,008.62
FFX	0623 01 0041 D	US Bank National Association Tr	5107 Leesburg Pike	$793,639.99	$940,463.39	$1,233,887.97
FFX	0623 01 0041 D	B & C Baileys Family LLC	5519 Leesburg Pike	$49,658.40	$58,845.20	$77,204.91
FFX	0623 01 0041 E	US Bank National Association Tr	5107 Leesburg Pike	$18,295.20	$21,679.81	$28,443.91
FFX	0623 02 0044 A	B & C Baileys Family LLC	5519 Leesburg Pike	$66,516.12	$78,821.60	$103,413.94
FFX	0623 02 B	Lake Plaza Property Holding LLC	5521 Leesburg Pike	$228,559.32	$270,842.79	$355,345.75
FC	51-102-006	Falls Church Enterprises II LLC	400 N. Washington St.	$31,798.80	$37,681.58	$49,438.23
FC	51-105-006	Oshinsky Family LTD Partnership	134 W. Broad St.	$44,649.00	$52,909.07	$69,416.69
FC	51-130-003	Maminski Family Trust	500 W. Broad St.	$31,581.00	$37,423.49	$49,099.61
FC	51-216-076	Shreve William C Sr Tr First Union	1000 W. Broad St.	$66,211.20	$78,460.27	$102,939.88
FC	52-203-012	929 LLC	929 W. Broad St.	$36,590.40	$43,359.62	$56,887.83
FC	52-309-114	Burke & Herbert B & T Co	225 W. Broad St.	$61,419.60	$72,782.23	$95,490.28
FC	53-101-070	Falls Church Gateway	500 N. Washington St.	$45,084.60	$53,425.25	$70,093.93
FFX	6012 01 0025 A	Methodist Culmore Church	3400 Charles St.	$27,470.52	$32,552.56	$42,708.96
FFX	0401 01 0034	Peach Orchard LP	2002 Peach Orchard Dr.	$298,357.13	$353,553.20	$463,861.80
FFX	0403 01 0004	Fairfax Towers Financing	2251 Pimmit Dr.	$23,827.90	$28,236.06	$37,045.72
FFX	0403 01 0078	Thomas, Larry W Tr	7400 Leesburg Pike	$62,811.20	$74,431.27	$97,653.83
FFX	0403 01 0079	Vitoria Bachlan	7414 Leesburg Pike	$7,440.34	$8,816.80	$11,567.65
FFX	0513 01 0021 A	Gibson Alan M Tr	6152 Leesburg Pike	$18,462.84	$21,878.47	$28,704.55
FFX	0513 01 0025 A	Carriage Funeral Holdings Inc	6161 Leesburg Rd.	$93,994.34	$111,383.29	$146,134.87
FFX	0513 16 0008	Phan Tuan M	6306 Buffalo Ridge Rd.	$18,050.49	$21,389.83	$28,063.46
FFX	0513 18 J	Redevelopment and Housing Authority	3077 Patrick Henry Dr.	$1,529,132.51	$1,812,022.02	$2,377,372.89
FFX	0612 07 0013	Luu Alphonse Tai Tr	3301 Nevius St.	$19,430.38	$23,025.00	$30,208.80
FFX	0621 01 0012	Atlas Investment LLC	3512 Carlin Springs Rd.	$180,861.12	$214,320.43	$281,188.40
FFX	0623 01 0012 B	Romanian Orthodox Church	5150 Leesburg Pike	$41,247.65	$48,878.47	$64,128.55
FC	52-203-056	Master Record	101 Rowell Ct.	$15,476.87	$18,340.09	$24,062.20
FC	52-302-249	Falls Park HOA	Rees Pl.	$13,647.78	$16,172.62	$21,218.48
FC	53-218-014	Falls Church Owner LLC	501 Roosevelt Blvd.	$9,848.92	$11,670.97	$15,312.31
FC	53-218-019	Washreit Roosevelt Towers LLC	500 Roosevelt Blvd.	$23,356.00	$27,676.86	$36,312.04
FFX	0403 01 0006	St. Pauls Lutheran Church	7413 Leesburg Pike	$16,140.11	$19,126.02	$25,093.34
FFX	0403 01 0007	St. Pauls Lutheran Church	7407 Leesburg Pike	$24,991.44	$29,614.86	$38,854.70
FFX	0403 01 0007A	St. Pauls Lutheran Church	7401 Leesburg Pike	$53,690.05	$63,622.71	$83,472.99
FFX	0513 01 0022	Dar Al Hijraha Islamic Center	6160 Leesburg Pike	$218,341.66	$258,734.87	$339,460.15

Juris	Parcel ID	Parcel Owner	Property Address	Total
FFX	0294 01 0035 A	Tysons Corner Property Holdings	1911 Chain Bridge Rd	$657,067.25
FFX	0392 01 0001A	Tysons Corner Property LLC	1861 International Dr	$895,238.92
FFX	0392 01 0004	Tysons Corner Holding LLC	8034 Leesburg Pike	$69,064.95
FFX	0392 01 0042	Tysons LLC	7787 Leesburg Pike	$80,591.09
FFX	0392 01 0047	7777 Leesburg Pike LLC	7777 Leesburg Pke	$4,537.40
FFX	0392 01 0048	School Board of Fairfax County	7731 Leesburg Pike	$430,218.13
FFX	0392 01 0057	7700-04 Leesburg Pike Assn	7700 Leesburg Pike	$586,564.29
FFX	0392 02 0039	T & H One LLC	8201 Leesburg Pike	$373,795.32
FFX	0392 02 0050 A	8117 Leesburg Pike Assn	8117 Leesburg Pike	$447,991.64
FFX	0392 02 0054	Tyco Assoc Joint venture	8111 Leesburg Pike	$121,902.49
FFX	0392 02 0056 A	PMIG 1011 LLC	8103 Leesburg Pike	$237,709.85
FFX	0392 02 0106	Fairfax Square LLC	1920 Aline Ave	$525,964.52
FFX	0392 04 0031	Lilianne and Sons LLC	8032 Leesburg Pike	$48,760.99
FFX	0392 22 A	Tysons Office Park Assn	Leesburg Pike	$1,170,941.10
FFX	0401 01 0033	Federal Realty	7451 Patterson Rd.	$315,059.95
FFX	0401 01 0037	Board of Supervisors Fairfax Co.	7550 Leesburg Pike	$258,043.39
FFX	0401 01 0039	TNREF III 7600 Leesburg Pike LLC	7600 A Leesburg Pike	$711,097.83
FFX	0403 01 0001 B	Federal Realty Investment Trust	7501 Leesburg	$65,014.66
FFX	0513 01 0025	Christian First Falls Church	6165 Leesburg Pike	$6,934.55
FFX	0513 13 0001	Brent Court Properties LLC	6299 Leesburg Pike	$59,596.77
FFX	0513 13 0003	North Hudson Commercial	6269 Leesburg Pike	$34,942.19
FFX	0513 13 0004	North Hudson Commercial	N/A	$74,428.24
FFX	0513 16A 0006	Arlington Fairfax	6300 Leesburg Pike	$357,947.75
FFX	0611 01 0008	Church Of Christ of Falls Church	6149 Leesburg Pike	$18,090.29
FFX	0612 01 0007	PMIG 1010 LLC	6014 Leesburg Pike	$754,271.63
FFX	0612 01 0007 A	Samson Aaron	6020 Leesburg Pike	$56,887.83
FFX	0612 01 0027	Alta Enterprises 2 LLC	5894 Leesburg Pike	$183,238.12
FFX	0612 01 0041 B	Mount of Olives of Falls Church	5866 Leesburg Pike	$119,193.54
FFX	0612 01 0072 C	Rreef America Reit II Cor	5800 Crossroads Ctr.	$319,655.41
FFX	0612 17B 0003 B	JS Enterprises of Va LLC	5865 Leesburg Pike	$182,819.87
FFX	0612 17C 0006	Daff LLC	3401 Washington Dr.	$281,459.29
FFX	0612 18 0001 A	Baileys Crossroads LLC	3401 Charles St.	$104,158.90
FFX	0612 21 0005	Irvin Corp	5613 Leesburg Pike	$170,609.30
FFX	0612 21 0009	Irvin Corp	5603 Leesburg Pike	$219,966.26
FFX	0612 22 0001	Mount Olympus Inc	5616 Leesburg Pike	$359,449.80
FFX	0612 43 0001B	R & J Baileys LLC	5700 Leesburg Pike	$3,219.51
FFX	0612 43 0002	R & J Baileys LLC	5634 Leesburg Pike	$204,369.52
FFX	0621 01 0013	LP Corporation	5520 Leesburg Pike	$2,530,289.26
FFX	0621 01 0014	NABDTBAS Logan Smyth LLC	5508 Leesburg Pike	$192,353.01
FFX	0621 01 0016 E	Payne Brothers Properties LLC	3480 Jefferson Street S.	$839,772.68
FFX	0623 01 0011	Leesburg Pike Center LLC	3499 Jefferson Street S.	$81,268.32
FFX	0623 01 0028	Target Corp	5115 Leesburg Pike	$1,842,082.01
FFX	0623 01 0038 B	US Bank National Association Tr.	5275 Leesburg Pike	$781,008.62
FFX	0623 01 0041 D	US Bank National Association Tr	5107 Leesburg Pike	$1,233,887.97
FFX	0623 01 0041 D	B & C Baileys Family LLC	5519 Leesburg Pike	$77,204.91
FFX	0623 01 0041 E	US Bank National Association Tr	5107 Leesburg Pike	$28,443.91
FFX	0623 02 0044 A	B & C Baileys Family LLC	5519 Leesburg Pike	$103,413.94
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FFX	0513 01 0021 A	Gibson Alan M Tr	6152 Leesburg Pike	$28,704.55
FFX	0513 01 0025 A	Carriage Funeral Holdings Inc	6161 Leesburg Rd.	$146,134.87
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FFX	0403 01 0007A	St. Pauls Lutheran Church	7401 Leesburg Pike	$83,472.99
FFX	0513 01 0022	Dar Al Hijraha Islamic Center	6160 Leesburg Pike	$339,460.15
				$23,261,665.05

Appendix F: Comment Matrix

Appendix F - Comment Matrix

NVTC Envision Route 7 Conceptual Design Engineering

Updated 10/31/2019

Response Codes: A=Comment will be Incorporated; B=Comment will be Incorporated as noted; C=Comment not understood, request clarification; D=Comment to be incorporated differently, see additional notes

Initial Commetns						
ID	**Version**	**Drawing/Location**	**Reviewer**	**Comment**	**Consultant Response (A, B, C, D)**	**Additional Comments**
1	Draft V1	Tysons	TAC	Route 7 is not considered for widening, but rather repurposing the outside lane for bus-only facilities	D	Noted
2	Draft V1	Tysons	TAC	Fairfax is considering alternatives in Spring Hill to add a loop for turnaround	D	Noted
3	Draft V1	Tysons	TAC	No Connector buses currently utilize Greensboro Station; Consider shifting Greensboro BRT stop northwest to Westpark Dr.	A	
4	Draft V1	Tysons	TAC	Fairfax says Boone Blvd. is being considered as a route for the BRT in the parallel Fairfax effort	D	Noted
5	Draft V1	Tysons	TAC	In the Fairfax effort, if the BRT service remains on route 7, it will loop back along Spring Hill	D	Noted
6	Draft V1	Tysons	TAC	Will need to work with the process for the 123 interchange to identify space for the BRT	D	Noted
7	Draft V1	Tysons	TAC	It is less necessary for the BRT to directly service Metrorail stations. However, it is important for the BRT to serve land uses in the surrounding area.	D	Noted
8	Draft V1	Spring Hill	FCDOT	Should reflect retention pond for stormwater under the station and Metro ROW.	A	
9	Draft V1	Fashion Blvd	TAC	Fairfax staff noted this location is consistent with their BRT effort	D	Noted
10	Draft V1	Fashion Blvd	TAC	Suggest taking more of the access roads to avoid additional ROW taking	A	
11	Draft V1	Fashion Blvd	FCDOT	Shift cross section south to take the service road.	A	
12	Draft V1	Peach Orchard Drive	TAC	This location will need a new signal as well as crosswalks	D	Noted
13	Draft V1	Peach Orchard Drive	TAC	This portion of the Route 7 corridor will be widened from 4 to 6 total lanes. It is assumed the widening will be used for the bus only lanes.	D	Noted
14	Draft V1	Peach Orchard Drive	TAC	Try and miss the residential areas	A	
15	Draft V1	Peach Orchard Drive	TAC	Shift the alignment down and away from the library	A	
16	Draft V1	Haycock Road	TAC	The station location is generally planned for the correct location consistent with the redevelopment plans; Residents have raised the issue of cut through traffic on Chestnut Street	D	Noted
17	Draft V1	Haycock Road	TAC	City of Falls Church will be provided the latest thinking of the developer for this section	B	Revised alignment and location of bus station to curb-abutted.
18	Draft V1	Haycock Road	TAC	City of Falls Church will need to get back to us on the potential to lose the right turn pocket	B	Revised alignment and location of bus station to curb-abutted.
19	Draft V1	Haycock Road	FCDOT	Staff has informed us that Sup. Smyth does not support left turns from Route 7 to Chestnut Street. Chestnut Street will be right-in right-out configuration.	B	Revised alignment and location of bus station to curb-abutted.
20	Draft V1	Haycock Road	FCDOT	Also, I believe there was discussion of having a light at Chestnut Street and Route 7 from VDOT.	B	Revised alignment and location of bus station to curb-abutted.
21	Draft V1	Haycock Road	FCDOT	Concern about BRT transition from median running to BAT lane between Chestnut Street and Haycock Rd within a 400' distance.	B	Revised alignment and location of bus station to curb-abutted.
22	Draft V1	Haycock Road	FCDOT	Possibly reach out to Falls Church regarding further ROW concerns.	B	Noted
23	Draft V1	West, Pennsylvania, Maple – Downtown Falls Church	TAC	The road will not be widened in this section but the existing curb lane would be repurposed into a BAT lane	D	Noted
24	Draft V1	West, Pennsylvania, Maple – Downtown Falls Church	TAC	The depth of the actual station is expected to be about 8'	D	Noted
25	Draft V1	West, Pennsylvania, Maple – Downtown Falls Church	TAC	None of the station locations have changed since the last meeting	D	Noted
26	Draft V1	West, Pennsylvania, Maple – Downtown Falls Church	TAC	As development occurs in Falls Church, station location can be adjusted around driveways	D	Noted

27	Draft V1	East Falls Church Area	TAC	There are already many plans and possible changes in the area; Adding station entrance Washington Blvd EB overpass; signal adjustments; potential for joint development on parking lot	D	Will document potential future station opportunities at new EFC Metrorail entrance in Final Report
28	Draft V1	East Falls Church Area	TAC	Parking is already oversubscribed at station	D	Noted
29	Draft V1	East Falls Church Area	TAC	There was concern about repurposing a lane on Sycamore to BAT; the follow-up traffic study will better address the ability to repurpose the lane	D	Noted
30	Draft V1	East Falls Church Area	TAC	There is also concern about using addition ROW on Sycamore for a new BRT station. It was noted that this would be the busiest BRT station on the line and would need space for boarding and alighting.	D	Noted
31	Draft V1	East Falls Church Area	TAC	There was discussion about the potential to split the line into north and south segments	D	Noted
32	Draft V1	East Falls Church Area	ARL - Hui Wang	Without traffic counts and analysis, how do we know if reducing a lane for that stretch is feasible? Some old counts from 2012 and the NB ADT at this location is almost 9000… If this is a pre-preliminary idea that will be studied and verified by a TIA, then it makes more sense.	D	Traffic Study will be required for the next phase of Preliminary Engineering. The BAT Lane is for Conceptual Purposes only at this point in the study. Final lane configurations will be confirmed with a traffic study and policy discussion.
33	Draft V1		ARL - Sarah Crawford	Is this conceptual lane configuration is to be applied to all of Sycamore? So, existing four lanes, with two lanes as BAT lanes?	D	Traffic Study will be required for the next phase of Preliminary Engineering. The BAT Lane is for Conceptual Purposes only at this point in the study. Final lane configurations will be confirmed with a traffic study and policy discussion.
34	Draft V1		ARL - Sarah Crawford	There are minor differences in the cross section at various points on Sycamore – how will they handle the bus stop/bike lane conflict where there are no bus pull-outs (bump-outs?)?	B	Design team will incorporate "floating bus stop" design at the stop location. Other conflict points along Sycamore Drive will be addressed on a case by case basis.
35	Draft V1		ARL - Kenex Sevilla	What are the lane configuration detail for Lee Highway or Washington Blvd?	D	BAT Lanes are proposed for the curb lanes. The BAT Lane is for Conceptual Purposes only at this point in the study. Final lane configurations will be confirmed with a traffic study and policy discussion.
36	Draft V1		ARL - Tim Roseboom	Bike lane goes from the right side to the left side of the South Bound BAT lane. Why not keep the bike lane on the right side to keep buffer zone between cyclist and vehicles?	B	Design team will incorporate "floating bus stop" design at the stop location. Other conflict points along Sycamore Drive will be addressed on a case by case basis.
37	Draft V1		ARL - Tim Roseboom	Please describe signage and lane markings for BAT lanes on Washington and Sycamore.		
38	Draft V1		ARL - Nicholas/Akram	Please consider and incorporate Arlington CIP projects for East Falls Church bus bay expansion and second entrance.	D	Will document potential future station opportunities at new EFC Metrorail entrance in Final Report
39	Draft V1		ARL - Joshua Nicholas	1. TEO-1: The northbound volumes during the AM peak at this intersection are over 1,000 vehicles per hour (see attached). A single through lane cannot handle anywhere near that volume without seriously degrading the intersection operations and effectively the operation of the buses/transit themselves. See ACG Attachment 1 and 2.	D	Traffic Study will be required for the next phase of Preliminary Engineering. The BAT Lane is for Conceptual Purposes only at this point in the study. Final lane configurations will be confirmed with a traffic study and policy discussion.
40	Draft V1		ARL - Joshua Nicholas	Why is the SB BRT curbside and the NB BRT is not? A station is shown just north of the I-66 of-ramp and the bus will need to cross bicycle and on-street parking to get to the station.	B	Design team will incorporate "floating bus stop" design at the stop location. Other conflict points along Sycamore Drive will be addressed on a case by case basis.
41	Draft V1		ARL - Joshua Nicholas	I am also interested in the section along Route 29. It would have been a good opportunity to work this into the signalization/rebuild of the interchange during the HOT lane project. Also, I'm not sure where a dedicated lane will fit on EB/NB Route 29.	D	BAT Lanes are proposed for the curb lanes. The BAT Lane is for Conceptual Purposes only at this point in the study. Final lane configurations will be confirmed with a traffic study and policy discussion.
42	Draft V1		ARL - Joshua Nicholas	BRT station on SB Sycamore St will impact taxis. Is an alternative location recommended for taxis?	D	An alternative location for taxis has not been recommended.
43	Draft V1		ARL - Ahmed Akram	2. TEO-2: Recommend a floating bus stop design to utilize existing parking on the NB approach. A few spots can be removed to provide a concrete island where passengers can be picked up and dropped off. This allows the bus to stay in lane and not have to perform a lateral shift to be curbside. This also adds a level of protection for cyclists. See ACG Attachment 2.	B	Design team will incorporate "floating bus stop" design at the stop location. Other conflict points along Sycamore Drive will be addressed on a case by case basis.
44	Draft V1		ARL - Ahmed Akram	3. TEO-3: Similar to the NB floating island, a similar design would be recommended with the SB approach. In this case, the existing taxi pick up and drop off should be relocated to the parking lot and that space should be used to provide a concrete island for passenger pick-up/drop-off so that the bus can stay in lane. A bypass should be incorporated to redirect cyclists behind the island to then be realigned with the bus before the right turn pocket opens. See ACG Attachment 2.	B	Design team will incorporate "floating bus stop" design at the stop location. Other conflict points along Sycamore Drive will be addressed on a case by case basis.
45	Draft V1		ARL - Ahmed Akram	TEO-4: Existing taxi stand should be relocated to the parking lot to prioritize transit and cyclist movements. See ACG Attachment 2.	D	An alternative location for taxis has not been recommended.
32	Draft V1	Seven Corners Area	TAC	One station would serve development in the vicinity of the Eden Center	D	Noted
33	Draft V1	Seven Corners Area	TAC	The second station would be located along the proposed Ring Road. The facility would build on the County proposed transit boulevard template for the station.	D	Noted

34	Draft V1	Seven Corners Area	FCDOT	We are currently writing a scope of work for the Seven Corners phasing study and please follow the recommendations laid out in the comprehensive plan in terms of alignment and station location.	D	Noted
35	Draft V1	Rio Drive	TAC	Generally, design the facility to utilize the access roads rather than utilize non-ROW	A	
36	Draft V1	Rio Drive	TAC	As the process advances into a traffic study, the need for various left turn lanes will be evaluated	D	Noted
37	Draft V1	Bailey's Crossroads Area	TAC	There also needs to be a discussion about speed limit and lane width in particular in this section where speed can be relatively high	D	Follow-up discussion needed
38	Draft V1	Bailey's Crossroads Area	TAC	VDOT is allowing 11' lanes for cost saving	D	Follow-up discussion needed
39	Draft V1	Bailey's Crossroads Area	TAC	Should we assume slower speed that would allow more narrow stations and reduce ROW needs	D	Follow-up discussion needed
40	Draft V1	Overall	FCDOT	Will need to have 10ft SUP on both sides (6-8ft buffer) the entire way, or two-way cycletracks on both sides (6.5ft buffer to traffic) where medium to high ped volumes are expected.	B	Design team will incorporate 10ft SUP on both sides with 6-8 ft buffer
41	Draft V1	Overall	FCDOT	Like on Richmond Highway, possibly look at the removal of dedicated right turn lanes and slip ramps, avoid double left turn lanes wherever possible, aim for a 35 mph design speed, and tighten up the turn radii as much as possible.	D	Follow-up discussion needed
42	Draft V1	Overall	FCDOT	Are you using the NACTO Transit Street Design Guide for reference?	B	Yes, NACTO Transit Street Design Guide is one of the reference documents being used.

Final Comments on Layout

ID	Version		Reviewer	Comment		Additional Comments
43	Draft Final		VDOT	Request study team provide detailed information/mapping as to locations of where design speeds are assumed and supporting data.		Will be provided
44	Draft Final		VDOT	Overall, data/analysis is needed in order to provide comment on lane assumptions throughout the corridor. If this is to follow in a subsequent phase of study/separate effort, concurrence with the current proposed configuration should not be assumed.		To be considered in subsequent phases of study.
45	Draft Final		VDOT	Note that Route 7 is an NHS Route, and as such all applicable restrictions apply. These will tend to be somewhat more stringent than those on other routes, and this will place some limitations on the ability of participating jurisdictions to waive criteria, even if they maintain and operate portions of the road.		Noted.
46	Draft Final		VDOT	All proposed lane shifts / transitions should be analyzed in sufficient detail to ensure feasibility before proceeding on the assumption that they're acceptable as shown. Transition lengths and locations both need to be evaluated.		To be considered in subsequent phases of study.
47	Draft Final		VDOT	It is recommended that the study team conduct AutoTurn analyses to confirm whether buses can stay in their lanes through transitions.		To be considered in subsequent phases of study.
48	Draft Final		VDOT	Workshop documentation indicates that 12 foot lanes have been assumed for BRT lanes thus far; further evaluation of typical sections is recommended for the entire roadway width at each location, including whether 11 foot lanes may be used for non-BRT lanes.		To be considered in subsequent phases of study.
49	Draft Final		VDOT	Access and access management should be given a great deal of attention during the next phase of analysis. In numerous locations, the current concept plans call for elimination of frontage roads. Consideration must be given as to how their function will be replaced.		To be considered in subsequent phases of study.
50	Draft Final		VDOT	Concur with suggestion from workshop to include alternative alignment that does not rely on construction of the "ring road." This project will be quite expensive and is competing with many other priorities for funding throughout Fairfax County. As a result, it may not be funded for the foreseeable future.		Noted.
51	Draft Final		VDOT	Based on the current concept plans, right of way and utilities impacts are very significant, especially between Route 123 and Idylwood Road and between the Seven Corners Ring Road and S. George Mason Drive. Request study team provide more detail on the underlying assumptions.		Documentation is provided in the final report. Refer to appendices as needed.
52	Draft Final		VDOT	In the portions of the corridor where widening is required, SWM will be required. As the study moves forward, these should be evaluated on a macro level, a SWM strategy for the corridor should be developed, and the resultant R/W needs should be considered and reflected on the concept plans.		Noted.

53	Draft Final		VDOT	R/W impacts, particularly those associated with changes in access, and utility relocations will be major cost components. As above, it would be helpful to know more about the current assumptions. Request study team provide copy of cost estimate in its entirety to allow more informed comments.		Documentation is provided in the final report. Refer to appendices as needed.
54	Draft Final		FCDOT	Our vision for the Route 7 corridor is a high capacity transit corridor with multimodal transportation system, which aligns with the goals of the Fairfax County Comprehensive Plan.		Agreed.
55	Draft Final		FCDOT	Please show access management where appropriate. Remove service drives -- I see this in some locations but cannot see where the access will be instead. How can we think outside the box to provide access and reducing extra pavement for cars so we can provide a better bike/ped facility?		Access management is important and will be addressed infuture phases of the project.
56	Draft Final		FCDOT	To tag on to Nicole's comments about number of lanes. This road is extremely wide. Can we demonstrate that BRT will provide sufficient person-throughput to drop a lane or two? At some locations, the crosswalks are 12 lanes wide, or with medians about 150 feet. This will take a pedestrian 43 seconds flashing don't walk plus walk time makes this a 50 second pedestrian phase. To get that on both sides in the case of split phasing, side streets will need 100 seconds. With a 3-minute cycle length, this is more than half the time for side streets. So widening can start to get counter-productive for moving traffic on the main line. With all that said:		The next phase of the project will assess traffic and determine where the cross-section can be minimized.
57	Draft Final		FCDOT	The scope needs to specify that pedestrians can cross Route 7 in one phase/stage with crosswalks on all four legs of all signalized intersections. Pedestrians will not be able to safely cross the existing cross section at unsignalized intersections on the east and west ends of the project, so we need to verify that signal spacing is appropriate and does not leave any missed connections. For instance, I see crosswalks at Dominion Dr, are you proposing adding a signal there? Doing so would be appropriate for pedestrians, as without it there would be 2,000 feet between the signals at George C Marshall and Trader Joe's, which is too far spaced for pedestrians.		The next phase of the project will assess traffic and determine where signalization may be necessary.
58	Draft Final		FCDOT	At unsignalized crosswalks in the center section, please add pedestrian refuge islands wherever possible. This is most easily accomplished where a left-turn lane is only warranted in one direction and a refuge can be placed in the "shadow" on the opposite side. We should demonstrate that any existing left-turn lanes are still warranted when proposing to keep them.		The next phase of the project will assess traffic and determine where turn lanes may be minimized. Future phases will also consider the need for pedestrian refuges.
59	Draft Final		FCDOT	Please add corridor-wide lighting and/or pedestrian lighting (two lights per crosswalk) to the scope.		Future phases of the project will address these issues.
60	Draft Final		FCDOT	There should be a continuing SUP or 2-way cycletrack (in activity centers) provided along the entire length of the project within Fairfax County. That includes the existing streetscape along Rt 7 in Tysons which currently does not accommodate cyclists. Connections to Service Drives and sidewalks are not acceptable.		A 10' shared use path on both sides of the street was included on Route 7 where it was necessary to adjust the pedestrian facilities. Future phases of the project will more substantively address pedestrian and bike facilties.
61	Draft Final		FCDOT	The SUPs should ideally be grade separated across highway ramps, at least on one side. Of particular concern is the southbound I-495 on-ramp.		Ramp terminals may need to be adjusted. Future phases of the project will address this issue.
62	Draft Final		FCDOT	Dual left turn lanes should be replaced with a single left turn lane and a pedestrian refuge along the entire corridor, unless a dual left is absolutely necessary. This was done along the entire Route 1 corridor as well.		The next phase of the project will assess traffic and determine where turn lanes may be minimized.
63	Draft Final		FCDOT	The road goes from 4 to 6 to 8 lanes and back - can this be a consistent 2-or 3 lanes? Drop lanes are confusing to drivers and make the road appear wider than necessary.		The next phase of the project will assess traffic and determine where the cross-section can be minimized.
64	Draft Final		FCDOT	Provide separate, clearly defined right turn lanes with (pedestrian) bump outs instead of continuous right turn lanes to visually narrow the corridor and shorten crossing distance for pedestrians at intersections. Or remove right turn lanes all-together, similar to Rt 1 design		The next phase of the project will assess traffic and determine where turn lanes may be minimized. Future phases will also consider the need for pedestrian treatments such as bulb-outs.
65	Draft Final		FCDOT	Provide pedestrian refuges opposite left turn lanes instead of striped out median		The next phase of the project will assess traffic and determine where turn lanes may be minimized. Future phases will also consider the need for pedestrian refuges.
66	Draft Final		FCDOT	Provide crosswalks on all four legs of each intersection.		In general, full crosswalks are desired at each intersection. However, some intersections may have some crossings removed. The next phase of the project will assess traffic and determine changes in crosswalks.

67	Draft Final			FCDOT	Some existing crosswalks are shown and some are not shown, though it doesn't look like they will be removed. Please include all proposed crosswalks, existing or new, in concept design.		In general, full crosswalks are desired at each intersection. However, some intersections may have some crossings removed. The next phase of the project will assess traffic and determine changes in crosswalks.
68	Draft Final			FCDOT	Ensure bike/ped connections to side streets are shown in the concept, to ensure they will be included in the scope (did not happen on Route 7 widening)		Future phases of the project will address these issues.
69	Draft Final			FCDOT	All curb ramps should accommodate bicycles in addition to ADA, and have flared sides (no vertical curbs)		Future phases of the project will address these issues.
70	Draft Final			City of Falls Church	1. Please confirm information about the stations in terms of dimensions and elevation above the sidewalk.		There is no station design at the moment. We understand that many of the locations where we think stations should be considered are in constrained locations. We also understand it is necessary to fit the station into the context of the City. That means that we may need to adjust each station to fit. Future phases of the project will work through the details of design to make sure the station fits the location.
71	Draft Final			City of Falls Church	2. Consider reconfiguring the curb lane for HOV and right turns.		The business access and turn (BAT) lanes allow for right turns. As the project advances, we will explore various options to provide for fast and reliable transit service that minimizes delay for vehicle travel. HOV is one of the options we would look to explore in future efforts.
72	Draft Final			City of Falls Church	3. Stations should be added or relocated closer to significant generators such as the Beyer property in the West End, the State Theatre and the Eden Center.		We are advancing station locations in close proximity to the major generators noted. As the process moves closer to design, final details around station location will be addressed as redevelopment patterns are better understood.
73	Draft Final			City of Falls Church	4. The plans show a BAT lane configuration for the entire BRT route through the City. What will happen at signalized intersections without left turn lanes? Will left turns be prohibited at all times or only during peak periods?		A detailed traffic analysis will be conducted in the next phase of the project. We would expect that process to identify how turn movements at intersections are addressed.
74	Draft Final			City of Falls Church	5. Can you provide bus ridership data for the number of riders that board and alight in the City, both currently and projected ridership with the BRT in place?		Ridership projections were completed in the Phase II process. Please refer to the following link: http://www.novatransit.org/uploads/studiesarchive/2017Envision%20RT7%20Report.pdf
75	Draft Final			City of Falls Church	6. Can you provide information as to what Fairfax County's plans are for Seven Corners?		Fairfax County has completed planning efforts for the Seven Corners area and we intend to route the BRT service through what their process has called the Ring Road connecting Route 7 to Roosevelt Boulevard. We are glad to facilitate a discussion with Fairfax County staff if more clarity is desired.