TRAFFIC TECHNICAL MEMORANDUM

for

Soapstone Connector
Environmental Assessment

Fairfax County Project No. 2G40-078

February 3, 2017

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SECTION 1
INTRODUCTION

1.1 PROJECT BACKGROUND & LOCATION

The Fairfax County Department of Transportation (FCDOT), in cooperation with the Virginia Department of Transportation (VDOT) and the Federal Highway Administration (FHWA), is preparing an Environmental Assessment (EA) for the Soapstone Connector. The Soapstone Connector is a new roadway, approximately one-half mile long, between Sunrise Valley Drive and Sunset Hills Road in Fairfax County (Reston), Virginia. The project is located just west of the new Wiehle-Reston East Metrorail Station and would include a new crossing over the Dulles Corridor, which includes VA Route 267 (Dulles Toll Road (DTR)), the Dulles International Airport Access Highway (DIAAH), and the Silver Line of the Metrorail system, as shown in **Figure 1-1**.

1.2 SUMMARY OF EXISTING TRANSPORTATION CONDITIONS

Roadway Network. The current roadway network in the study area includes two crossings of the Dulles Corridor on either side of the Wiehle-Reston East Metrorail Station, at Reston Parkway (Route 602) to the west and Wiehle Avenue (Route 828) to the east. Direct access to the Metrorail station, which opened in July 2014, is provided by way of Wiehle Avenue. Traffic traveling within the study area, traveling to and from the Metrorail station, and entering and exiting the Dulles Toll Road all compete for the same road space on these two roadways. Sunrise Valley Drive and Sunset Hills Road serve east-west travel to the south and north of the Dulles Corridor, respectively.

Multimodal Connectivity. There are currently no designated bike lanes on Wiehle Avenue in either the northbound or southbound direction. Wiehle Avenue, along with Sunrise Valley Drive, Sunset Hills Road, and portions of Reston Parkway, is designated as a "Less Preferred Street and Road" for bicycle travel on the Fairfax County Bike Map.[1] A sidewalk on the west side of Wiehle Avenue connects with a walkway on Sunrise Valley Drive to the south and Sunset Hills Road to the north. There are no pedestrian facilities on the east side of Wiehle Avenue between these two endpoints.

The Wiehle-Reston East Metrorail Station includes entrances via pedestrian bridges on both sides of the Dulles Corridor. Fifteen bicycle racks are located on both the north and south sides; there is also a secure reserved bike room. The Wiehle-Reston East Station Bike Room is Fairfax County's first enclosed, secure bicycle parking facility with a capacity for more than 200 bicycles. There are bus drop-off/pick-up locations on either side of the Dulles Corridor, with Kiss & Ride facilities on the north side only. Wiehle Avenue currently serves as the only access to the Metrorail station for buses; these buses experience the same congestion and delays on Wiehle Avenue as other users of the roadway.

Accessibility and Mobility. The transportation network around the Wiehle-Reston East Metrorail Station is comprised primarily of major roadways (i.e., Wiehle Avenue, Sunset Hills Road, and Sunrise Valley Drive) and much smaller streets and driveways that provide access to individual buildings and developments. Consequently, most vehicles traveling in the area must use one of the major congested routes or intersections.

[1] http://www.fairfaxcounty.gov/fcdot/bike/bikemap/

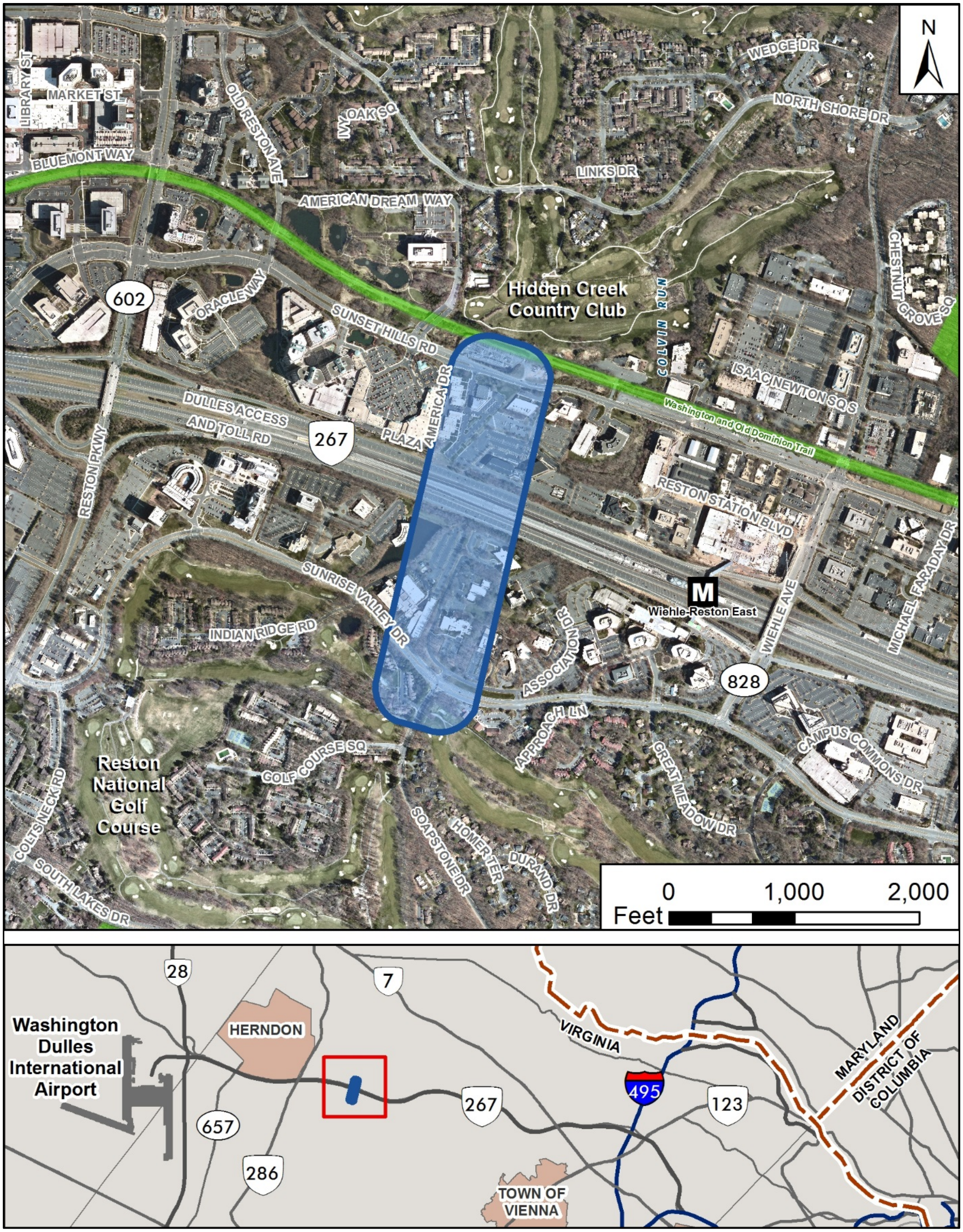


Figure 1-1. Project Location

The Wiehle-Reston East Metrorail Station includes a 2,300-space covered parking garage north of the Dulles Corridor; an additional 1,000 non-metro spaces are also provided at this location. The heavy traffic exiting the parking garage by way of Reston Station Boulevard during the PM peak period creates weaving conditions on all travel lanes on the southbound segment of Wiehle Avenue between Sunset Hills Road and the Dulles Toll Road. As documented in the April 2008 *Wiehle Avenue/Reston Parkway Station Access Management Plans* study, most vehicles turning right when they exit the Metrorail station are not destined to the westbound Dulles Toll Road; therefore, they must move over at least one lane once they turn onto Wiehle Avenue, weaving with vehicles on southbound Wiehle Avenue destined for the westbound exit ramp, as shown in **Figure 1-2**. If a vehicle exiting the Metrorail station entrance is destined to the eastbound Dulles Toll Road ramp, they must weave across four lanes to enter into the left-turn bays. The situation is exacerbated by the short distance (320 feet) between the Wiehle-Reston East Metrorail Station access and the intersection with the westbound ramps; in addition, there is only an additional 500 feet between the westbound and eastbound ramps on Wiehle Avenue. Combined with the overall high traffic volumes, much of the delay is caused by vehicles forcing their way across travel lanes over this short distance in order to reach their desired lane.

The other bottlenecks along Wiehle Avenue are at the intersections with Sunset Hills Road and Sunrise Valley Drive. The lack of turn lanes for the heavy movements adds to the delays at these locations.

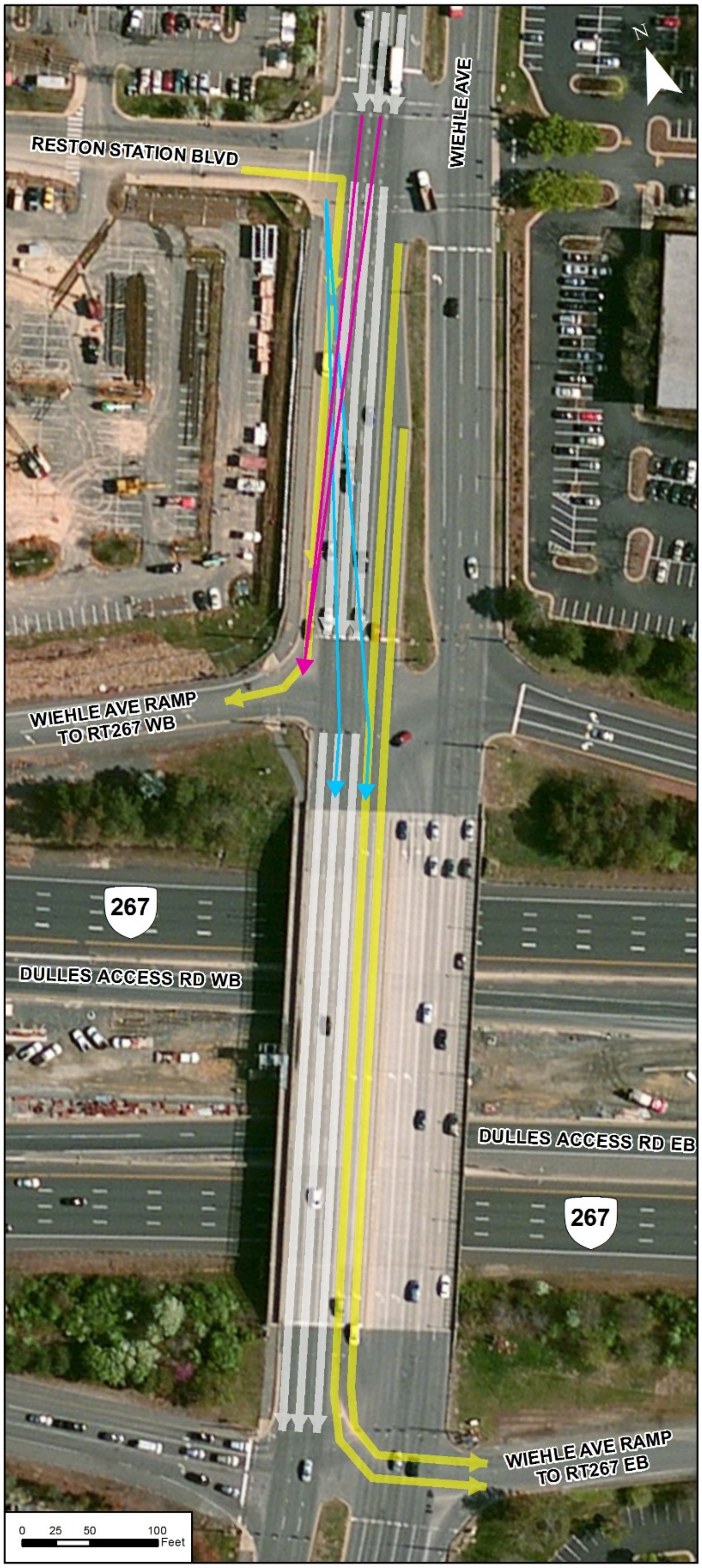
1.3 PURPOSE & ORGANIZATION OF THIS REPORT

The primary purpose of the transportation analyses contained in this technical report is to support the EA and the decisions to be made regarding potential improvements. This includes providing data and analysis to assist in identifying transportation needs; supporting the development of alternatives; and generating measures of effectiveness to allow for comparative analysis of the alternatives (including the No Build Alternative). All analyses were performed at a level of detail appropriate to support a National Environmental Policy Act (NEPA) document; the analyses are not intended to include the details typically required for traffic operations studies, interchange justification reports, or similar types of documents.

This technical report documents the traffic forecasting and operations analyses that were performed in support of the EA for the Soapstone Connector, including existing (2015) baseline conditions and design year (2046) No Build and Build conditions.

The traffic analysis study area includes and extends beyond the project location of the EA to ensure that any effects on traffic due to the project are accounted for. The traffic analysis area for operational analyses was defined as Reston Parkway, Wiehle Avenue, Sunrise Valley Drive, and Sunset Hills Road. Additionally, high-level analyses were conducted on connecting roadways to the traffic analysis area, as needed.

The methodology and assumptions used in the analyses are presented in Section 2. The results and findings of the operational analyses are included in Section 3 and supporting environmental traffic data are presented in Section 4.



320 FEET

500 FEET

Figure 1-2. Illustration of Weaving on Wiehle Avenue with Metrorail Station Egress

SECTION 2
METHODOLOGIES AND ASSUMPTIONS

This section describes the project protocol (methodologies and assumptions) used for the collection and processing of traffic data, the development of traffic forecasts, and the analysis of intersection operations.

2.1 DATA SOURCES

The source data for the Soapstone Connector traffic analyses included traffic data files provided by VDOT and Fairfax County, as well as intersection turning movement counts and 48-hour machine counts that were conducted on Reston Parkway, Wiehle Avenue, Sunrise Valley Drive, and Sunset Hills Road, as described below.

2.1.1 Data Provided By Others

Data from VDOT. Synchro networks for the AM and PM peak periods were provided by VDOT on May 26, 2015. The VDOT-provided files were opened in the software Trafficware Synchro (Version 9) and project-related data were manually entered (refer to Section 2.3 for details on input parameters for both existing and horizon year analyses within Synchro). As noted in Section 2.3, the VDOT-provided files covered a wider geographic area than the Soapstone Connector traffic analysis study area; operational analysis for the intersections included in the area within the analysis files outside of this study's analysis area are not relevant to nor reported in this study.

Data from Fairfax County. For use in the Soapstone Connector analyses, Fairfax County provided the *Reston Network Analysis Data Collection Memo* (August 15, 2015) and its associated AM and PM VISUM output files, as well as available traffic count data within the traffic analysis study area. The Reston Network Analysis[2], initiated to assess long-range transportation conditions in the Reston Transit Station Areas (TSAs) in 2030 and 2050, is currently evaluating the conceptual grid of streets in the Reston TSAs, which includes the Soapstone Connector. In the immediate vicinity of the Soapstone Connector, the grid of streets includes an extension of Reston Station Boulevard to the Connector. Refer to the *Alternatives Technical Memorandum* for full details.

Traffic data for the Dulles International Airport Access Highway was also received from Dewberry on behalf of the Metropolitan Washington Airports Authority.

2.1.2 Data Collection Program

The data collection program for the Soapstone Connector analysis, conducted in May 2015, included both intersection turning movement counts and roadway segment counts. These counts, which are described in this section, covered key locations within the traffic analysis area on Reston Parkway, Wiehle Avenue, Sunrise Valley Drive, and Sunset Hills Road. The count data are provided in **Attachment A**.

[2] http://www.fairfaxcounty.gov/fcdot/restonnetworkanalysis/

Note that the intersection turning movement counts were collected at all signalized intersections on the four primary roadways within the traffic analysis study area, i.e., the 14 "study area intersections" listed further below.

Intersection Turning Movement Counts. Intersection turning movement counts (TMCs) were conducted in 15-minute increments covering the hours of 6:00 to 9:00 a.m. and 3:00 to 6:00 p.m. at each location on either Tuesday May 13, 2015 or Wednesday May 14, 2015 during fair weather conditions. All motor vehicles were reported as a single volume for each movement (i.e., the sum of all cars, trucks, and buses), with pedestrian and bicycle movements reported separately. Additionally, field-verified details on signal timing/phasing, geometrics (including lane widths, parking locations, etc.), and general observations were collected during the counts. TMCs were performed at the following 14 study area intersections:

- Sunset Hills Road & Reston Parkway
- Sunset Hills Road & Oracle Way / Old Reston Avenue
- Sunset Hills Road & Plaza America Drive (signalized entrance/exit to plaza roundabout)
- Sunset Hills Road & Plaza America Drive / American Dream Way
- Sunset Hills Road & Isaac Newton Square W / Metro Center Drive
- Wiehle Avenue & Sunset Hills Road
- Wiehle Avenue& Reston Station Blvd
- Wiehle Avenue & WB Dulles Toll Road Ramps
- Wiehle Avenue & EB Dulles Toll Road Ramps
- Wiehle Avenue & Sunrise Valley Drive
- Sunrise Valley Drive & Soapstone Drive / Association Drive
- Sunrise Valley Drive at signalized intersection with Sheraton Plaza entrance/exit
- Sunrise Valley Drive & Colts Neck Road
- Sunrise Valley Drive & Reston Parkway

Intersection operations were analyzed at all intersection count locations, which are shown in Figure 3-1 in Section 3.

Machine Counts. Continuous 48-hour count data was collected on Tuesday May 13, 2015 through Wednesday May 14, 2015 at the following four locations within the traffic analysis study area:

- Sunset Hills Road between American Dream Way and Wiehle Avenue
- Sunrise Valley Drive between Soapstone Drive and Wiehle Avenue
- Wiehle Avenue between Sunrise Valley Drive and EB Dulles Toll Road Ramps
- Reston Parkway between Sunrise Valley Drive and EB Dulles Toll Road Ramps

The data was collected in 15-minute increments and included volume and Federal Highway Administration (FHWA) vehicle classification data by direction. The locations for the counts are shown in Figure 3-1 in Section 3.

Data Processing. From the intersection turning movement counts, the single highest (peak) hour (defined as the highest four consecutive 15-minute periods) was extracted for each study intersection for the AM and PM; for all study intersections, the start of the AM peak period was identified as 8AM and the start of the PM peak period fluctuated between 4:45PM and 5:15PM.

The raw count data for each peak period was reviewed for reasonableness and any anomalies were accounted for as necessary (such as removing movements that are not allowed for typical vehicle traffic). The peak hour turning movement count volumes for each intersection were entered into a spreadsheet-based schematic study area network, and entering/exiting volumes at adjacent intersections were compared. Given the urban nature of the neighborhood, most adjacent intersections have intermediary access points including driveways or small side-streets or alleys; this allows vehicles to enter/exit the network without being captured by the data collection effort. Accordingly, total volumes entering/exiting adjacent intersections with known intermediary access points that were generally within 10% tolerance were assumed to be reasonable and no manual adjustments to "smooth" volumes between intersections were determined to be needed. Note for the same peak traffic hour within each three-hour period, the volumes of pedestrians and bicycles were totaled. In addition, for existing year data processing, count data was not rounded for the analysis.

2.2 TRAVEL DEMAND FORECASTS

Future year traffic forecasts were developed for this study to support comparative analyses between the No Build and Build Alternatives. The forecasts were based on project-specific modeling based on the framework of the Metropolitan Washington Council of Governments' (MWCOG) regional travel demand model. The project-specific modeling included the development of a sketch-level[3] travel demand model focused on the study area. Since the primary purpose of the model was to identify changes in traffic patterns based on the construction of the proposed Soapstone Connector, the two primary inputs to the sketch-level modeling was the roadway network (coded with both No Build and Build conditions) and vehicle trip tables.

The MWCOG model, Version 2.3.57A, with Round 8.4 Cooperative Forecast land use was obtained from MWCOG on January 27, 2016; this model served as the basis for developing the trip tables for use in the sketch-level model. The MWCOG model was run for the years 2015, 2020, and 2040 with the standard model structure. The assignment step of the final model iteration was then re-run in order to extract subarea trip table information. The subarea trip tables were extracted for an area that was bounded by Route 606 (Baron Cameron Avenue), Route 674 (Hunter Mill Road), Route 673 (Lawyers Road), Route 669 (Stuart Mill Road), Route 665 (Fox Mill Road), and Route 286 (Fairfax County Parkway).

Subarea Model Network

The existing roadway network was built to include substantial detail within the study area in order to replicate travel at a localized level (reflecting detail such as driveway locations, number of access points to parcels, etc.). The network from the MWCOG model was used as a starting point, and then additional roadways were added, particularly local roads that are below the scale of the MWCOG model network. Additionally, intersection junctions were added to the network to introduce delay at intersections[4]; the signals were coded with adaptive timing such that green time would be allocated based on traffic volumes from the assignment. The level of detail of the original MWCOG model network within the subarea is shown in **Figure 2-1**. Comparatively, the refined network as used for this study, shown in **Figure 2-2**, has additional roads and smaller zones, more closely representing the existing roadway network.

[3] The model is considered sketch-level as it includes primarily just the traffic assignment step of the traditional four-step model process.
[4] The MWCOG model network does not include junction modeling and instead only utilizes link-based delays.

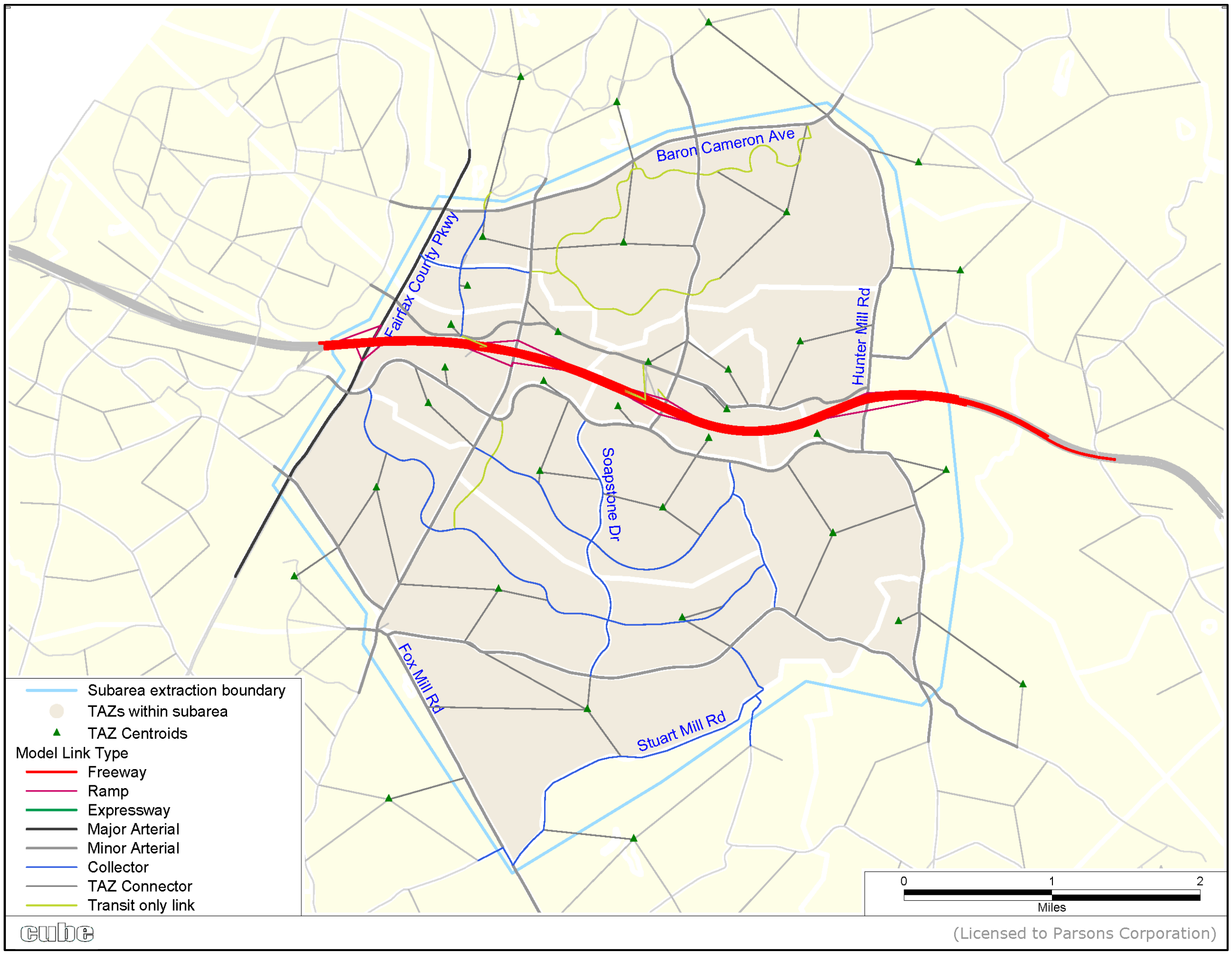


Figure 2-1. Original MWCOG Model Network within Subarea

The future year roadway network was created using the refined existing network, with the addition of projects within the study area that are programmed in the National Capital Region's 2015 Financially Constrained Long-Range Transportation Plans (CLRP), adopted by the Transportation Planning Board (TPB) in October 2015. Projects included in VDOT's Six-Year Improvement Program (SYIP) were also assumed to be completed. The following projects were included in the future year roadway network:

- Dulles Airport Access Road – Widen from 4 to 6 lanes from Dulles Airport to VA 123
- VA 286 Fairfax County Pkwy HOV – Convert from 6 to 4+2 from Dulles Toll Road to Sunrise Valley Drive
- VA 286 Fairfax County Pkwy HOV – Widen from 4 to 4+2 from Sunrise Valley Drive to West Ox Road
- Collector-Distributor Rd EB – New 2 lane road from Wiehle Avenue to Spring Hill Road
- Collector-Distributor Rd WB – New 2 lane road from Spring Hill Road to Wiehle Avenue
- East Elden Street – Widen from 4 to 6 lanes from Monroe Street to Fairfax County Parkway
- Spring Street – Widen from 4 to 6 lanes from Herndon Parkway to Fairfax County Parkway
- Route 602 Reston Pkwy – Widen from 4 to 6 lanes from Sunrise Valley Drive to Baron Cameron Avenue

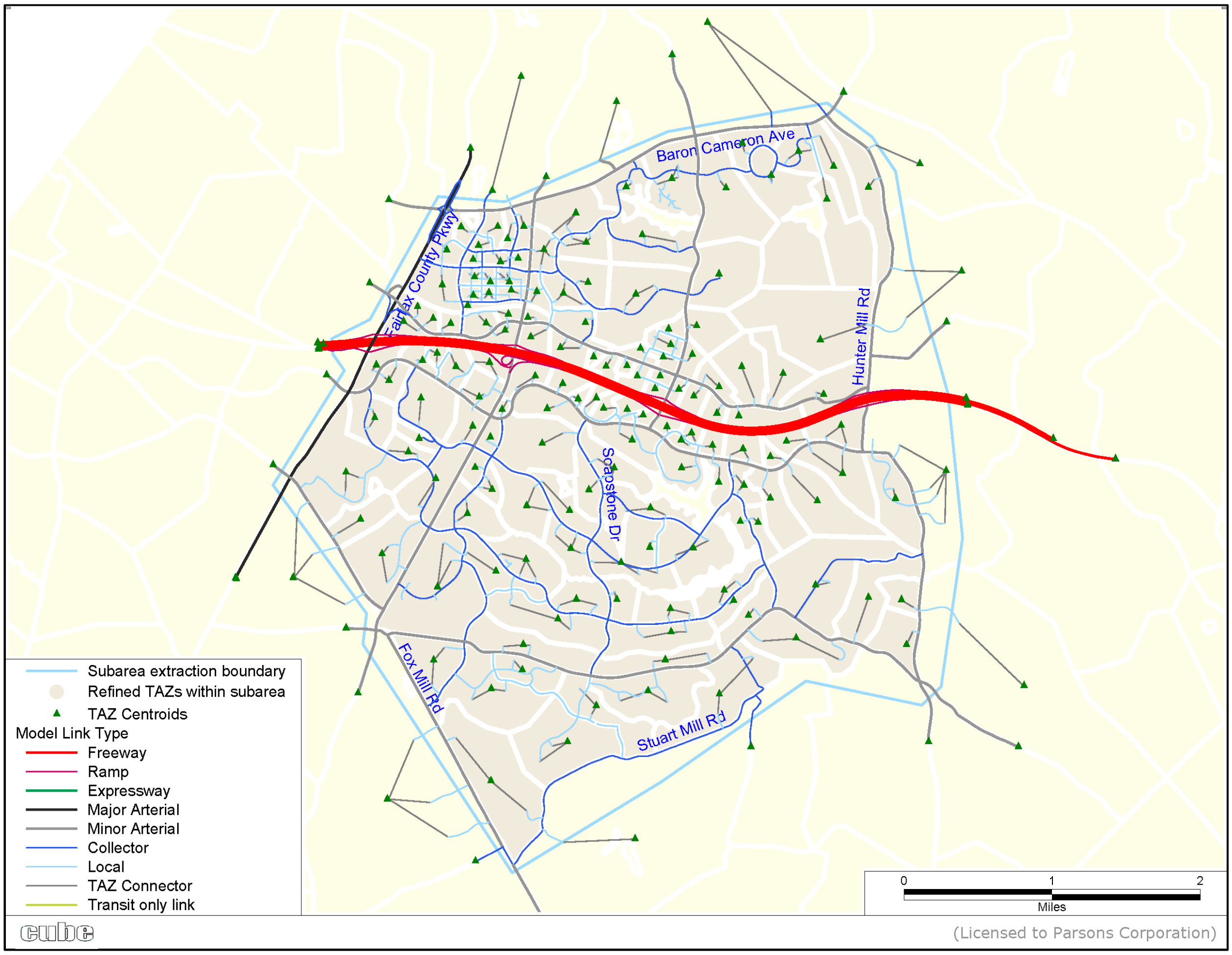


Figure 2-2. Refined Roadway Network within Subarea

A separate Build scenario network was created by adding in the Soapstone Connector as a two-lane minor arterial roadway between Sunset Hills Road and Sunrise Valley Drive with two intermediate intersections providing access to adjacent land uses.

Subarea Zone Structure

In conjunction with the addition of network detail and planned projects, the zone system of the network was modified to create smaller subzones to better capture travel at the local scale. The refined zone structure used for this model is shown in **Figure 2-3**. The zone structure originates with the MWCOG model's zones. These "parent" zones were first subdivided based on the subzone structure utilized for other modeling in Fairfax County for the Reston Network Analysis[5], then subdivided further based on logical boundaries. Each subzone generally consisted of a cluster of land use (e.g. homes or commercial buildings) that share a common access point (e.g. local road or parking lot) to the rest of the greater network area.

[5] The Reston Network Analysis is assessing long-range transportation conditions in the Reston Transit Station Areas (TSAs) in 2030 and 2050. The study is currently evaluating the conceptual grid of streets in the Reston TSAs, which includes the Soapstone Connector. http://www.fairfaxcounty.gov/fcdot/restonnetworkanalysis/

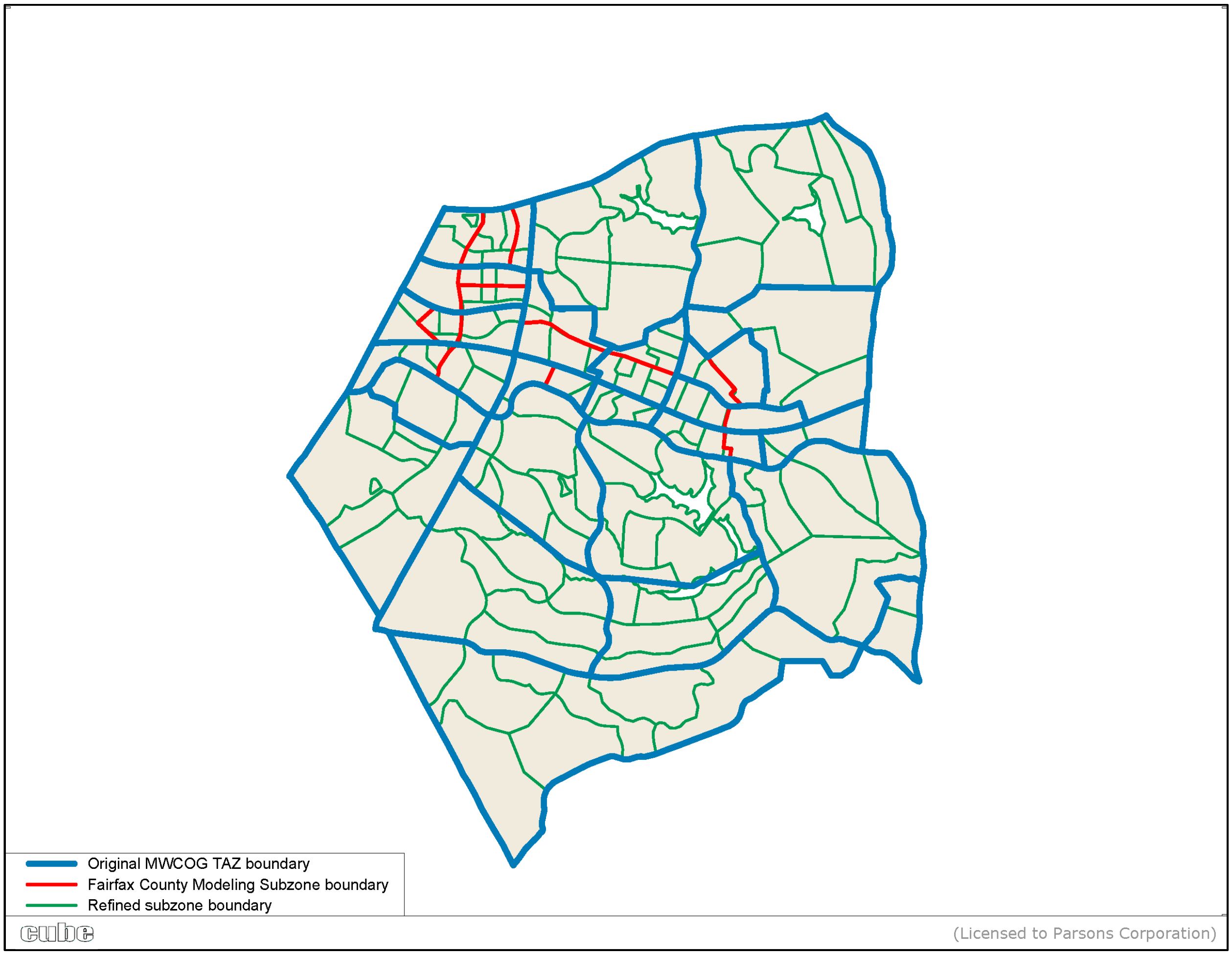


Figure 2-3. Refined Zone Structure within Subarea

Existing Trip Table Development

As noted above, trip tables, which represent vehicle trips between zones, are a key input to the sketch-level model. As with the roadway network, the starting point for the development of the study-specific trip tables was the MWCOG model.

To develop the trip tables, all steps of the MWCOG model were run in full. Vehicle trip tables were then extracted near the Soapstone Connector study area vicinity. The first modification to the trip tables was to reallocate trips from the larger zone structure of the MWCOG model to the small, localized zone structure created to relate to the detailed roadway network described above. The trips were reallocated based on the ratio of land use intensity within the subzone relative to the land use intensity of the entire "parent" zone. Estimates of residential and non-residential square footage were gleaned from aerial imagery and checked for reasonableness with County staff. The ratios of the individual "child" subzones to parent "zones" were then applied to the trip table extracted from the MWCOG model; this was done equally for trip origins and destinations. Note that, using this process, no separate trip generation was performed to account for changes in origin and destination patterns. In addition, the "external" zones of the trip table extracted from the MWCOG model represent the actual roadways at the periphery of the subarea, so for these zones, there was no reallocation/subdividing of trips, but instead the trips were scaled to traffic count data[6].

The trip tables resulting from the process described in the previous paragraph then served as input to a matrix re-estimation process. The matrix re-estimation process modifies a trip table by adjusting zone to zone data such that when the modified trip data is assigned to the network, the assignments more closely match traffic count data. The matrix re-estimation was performed using the Cube Analyst Drive software, using the existing year subdivided trip tables described above combined with the traffic count data described in Section 2.

Future Year Trip Table Development

Future year trips tables were developed using the refined existing year trip table along with data from the original MWCOG model. The year 2040 trip table extracted from the MWCOG model was subdivided and the trips reallocated to the subzone structure in the same fashion as the 2015 trip table, but the matrix re-estimation was not performed. Instead, the subdivided trip tables for 2040 and 2015 were used to calculate growth factors (extrapolated to the year 2046). The growth factors were applied to the zone totals of the refined 2015 trip table, resulting in origin and destination totals for zones for the year 2046. The refined 2015 trip table was then “rebalanced” with the 2046 zone totals as target values. The rebalancing was completed by means of a Fratar iterative balancing technique, essentially creating a trip table with future year trip totals that accounts for the trip patterns from the refined existing year trip table.

Traffic Assignment

Highway traffic assignment was performed with the modified existing and future year trip tables and detailed roadway networks to determine daily traffic volumes in the study area. The assignment was performed using scripts similar to those used in the MWCOG model, implementing a multiple user-class equilibrium assignment, with four time periods (AM, midday, PM, and nighttime). The scripts were modified to reduce the maximum number of user equilibrium iterations (to expedite run times) and to eliminate the two-step HOV assignment process for the AM and PM peak periods.

The same year 2046 trip tables were used for the No Build and Build scenarios.

Daily Forecasts

The results of the traffic assignment are four separate loaded networks (one for each time period) which were summed to produce daily traffic estimates. Due to the matrix re-estimation procedure used to adjust trip tables to more closely match traffic counts, post-processing of the assigned traffic volume was not performed and instead the traffic estimates were assumed directly from the model results within the study area.

Peak Hour Intersection Forecasts

Peak hour intersection turning movement estimates were derived from existing count data combined with the traffic assignments from the model for the existing and forecast year conditions. First, forecast link volumes were calculated for each intersection approach, then individual turning

[6] The traffic data used was annual average weekday traffic (AAWDT) estimates from VDOT’s jurisdictional count books.

movements were calculated using an iterative balancing technique based on the counted turning movement count. To develop the forecast link volumes, a k-factor was calculated for each intersection approach leg as the ratio of the AM or PM peak hour volume to the daily volume. The peak hour volume was taken as the sum of the intersection turning movement counts as collected in the field, while the daily volume was assumed to be the volume directly from the existing year model assignment. The k-factors were applied to the future daily volume from the model assignment to obtain future peak hour link volume.

The individual turning movements were developed using the Fratar iterative balancing technique[7] based on the estimated volumes of the approach links to each intersection. The iterative balance was seeded with data representing the expected pattern of turns at the intersection. At most locations, this was the data collected in the TMCs, but for the two intersections associated with the Soapstone Connector, seed values were taken from the turn movements produced by the model's traffic assignment. As each of the volumes were estimated for each intersection independently, additional adjustments were made to smooth traffic volumes between adjacent intersections.

2.3 OPERATIONAL ANALYSIS PROTOCOLS

All operational analyses in support of this project used the methods outlined in the standard 2010 Highway Capacity Manual (HCM) methodologies as implemented in the Trafficware Synchro software (Version 9). HCM is the industry-standard analysis methodology that provides measures of effectiveness that serve as a common comparison tool and benchmark for assessing the extent to which operations and levels of delay are acceptable to a community. The HCM methodology is largely based on analysis of individual locations (such as intersections) independently of each other. For this study, the methodologies were used to allow for comparing traffic operations with and without construction of the Soapstone Connector using the measures of effectiveness of delay and level of service (LOS) as comparison metrics. LOS is a measure of traffic operating conditions based generally on a comparison of peak hour volumes (representing travel demand) to available capacity (i.e., roadway supply). Signalized intersection LOS is stated in terms of average control delay per vehicle, which characterizes the increase in travel time that a vehicle experiences due to the traffic signal control variables (such as signal cycle length and phasing) as well as progression of traffic volumes through the intersection. **Table 2-1** summarizes the ranges of delay associated with intersection level of service for signalized intersections, and the Synchro input parameters used in the analysis are discussed in the following section.

Within the study area, which lies within the Wiehle-Reston East TSA, LOS E or better is assumed to be acceptable. As described in the Memorandum of Understanding (MOU) between VDOT and Fairfax County regarding the LOS standard for multimodal mixed use areas, LOS E has been established as the standard in order to balance the mobility needs of bicyclists, pedestrians, transit users, and vehicles (see **Attachment B**). This approach aims to minimize the width of roadways in order to maintain a walkable environment and support the implementation of the grid of streets, which is typical of urban areas and improves mobility for all modes of transportation. Additional information on the grid of streets is provided in Section 3.2.

[7] A spreadsheet-based process with ten matrix balancing iterations to establish and adjust the turning proportions to ensure traffic entering and exiting each intersection accurately sums to the forecasted future link volumes.

Table 2-1. Level of Service – Signalized Intersections (*per HCM*)

Level of Service	Signalized Intersections Control Delay Per Vehicle (sec/veh)
A	<= 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

2.3.1 Synchro Input Parameters

As previously stated, AM and PM peak period Synchro files were provided by VDOT for use in the Soapstone Connector analyses. The VDOT-provided files covered a larger area than needed for this project; the Synchro files were used for the portion of the network that relates to the traffic analysis study area (i.e., the 14 study area intersections). While Synchro is designed to provide and analyze operations at a level of detail to support traffic engineering applications, including supporting signal design, it is also useful for planning studies and NEPA documents that seek to provide comparative evaluations of operations across No Build and Build Alternatives at a higher level to support decision-making for the environmental process.

Existing Conditions (2015). The following input data were manually updated in the VDOT-provided AM and PM Synchro files:

- Traffic Volume (vehicles per hour), by turning movement
- Conflicting Pedestrian Volume (number per hour), by turning movement
- Peak Hour Factor
- Percentage Heavy Vehicles

The updated data for the above four input parameters were calculated from the traffic count program data that was collected in May 2015 (refer to Section 2.1.2). The vehicle and pedestrian volumes, as well as the peak hour factor (total per intersection per peak period), were calculated from the intersection turning movement counts. The percentage heavy vehicles was calculated from the 48-hour machine count data, and the entered volume was the sum of the heavy and medium trucks counted.

For the existing conditions analysis, the signal timings from the Synchro files received from VDOT were retained (see Section 2.1.1), and no signal phases were added or removed.

While no modifications were made to the VDOT-provided Synchro network files, physical geometries (i.e., number of lanes, lane configuration (exclusive/shared movements), lane widths, parking and bicycle lanes, etc.) as well as signal timing and phasing data were reviewed against the field-collected conditions report that was collected during the data collection program for reasonableness.

Design Year Conditions (2046). The Synchro files used to analyze the intersections under existing conditions were updated to reflect the future forecasted volumes. The turning movement volumes were updated to reflect the No Build or Build conditions as appropriate and pedestrian volumes were adjusted by scaling the existing volumes per the overall intersection vehicular volume growth. Other input parameters, such as the peak hour factor and heavy vehicle percentages, were kept the same as existing conditions.

For the Build scenario, additional turn lanes were provided at the intersections with the Soapstone Connector to accommodate the new or increased turning movement volumes, with the maximum number of lanes constrained to the downstream receiving conditions. This reflects the assumption that the design of the Soapstone Connector intersection configurations would accommodate the demands of turning traffic to the extent possible. The number of lanes by approach and movement for these intersections are shown in **Table 2-2** for the No Build and Build conditions.

Table 2-2. Soapstone Connector Intersection Configurations

<table>
<tr><th rowspan="2">Approach</th><th rowspan="2">Movement</th><th colspan="2">Soapstone Connector at Sunset Hills Road</th><th colspan="2">Soapstone Connector/Drive at Sunrise Valley Drive</th></tr>
<tr><th>No Build</th><th>Build</th><th>No Build</th><th>Build</th></tr>
<tr><td rowspan="3">EB</td><td>Left (L)</td><td>-</td><td>-</td><td>1</td><td>1</td></tr>
<tr><td>Through (T)</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Right (R)</td><td>-</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td rowspan="3">WB</td><td>Left (L)</td><td>-</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Through (T)</td><td>2</td><td>2</td><td rowspan="2">1 T, 1 T+R</td><td>2</td></tr>
<tr><td>Right (R)</td><td>-</td><td>-</td><td>1</td></tr>
<tr><td rowspan="3">NB</td><td>Left (L)</td><td>-</td><td>2</td><td rowspan="2">1 T+L</td><td>1</td></tr>
<tr><td>Through (T)</td><td>-</td><td>-</td><td>1</td></tr>
<tr><td>Right (R)</td><td>-</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td rowspan="3">SB</td><td>Left (L)</td><td>-</td><td>-</td><td>1</td><td>2</td></tr>
<tr><td>Through (T)</td><td>-</td><td>-</td><td rowspan="2">1 T+R</td><td>1</td></tr>
<tr><td>Right (R)</td><td>-</td><td>-</td><td>1</td></tr>
</table>

With updated volumes, the intersection timings were optimized to estimate operations under the anticipated conditions. In addition, the phase splits, overall cycle times, and intersection offsets were optimized, with a network optimization of the cycle length in order to allow for common cycle lengths at adjacent intersections along the corridors.

Reporting. The "Lanes, Volumes, Timings" report was exported from the Synchro software to create a full summary of operations at all intersections in the traffic analysis study area for all conditions. The Synchro-reported Intersection LOS and associated Control Delay for each study area intersection are included in **Attachment C.**

SECTION 3
OPERATIONAL ANALYSIS RESULTS & FINDINGS

This section summarizes the results of the existing (2015) and design year (2046) traffic forecasting and operational analyses that were conducted for the Soapstone Connector, per the methodology described in Section 2. Due to the similarities between the two alternatives for the Soapstone Connector, and the fact that they are functionally equivalent for the purposes of traffic operations and analysis, the results are presented for a single Build Alternative. Refer to **Attachment A** for count data and **Attachment C** for the operational analysis results.

3.1 EXISTING AND FORECAST DAILY TRAFFIC VOLUMES

The daily volumes on the north-south roadways within the study area (Reston Parkway, Wiehle Avenue, and Soapstone Connector in the Build Alternative) in existing year 2015 and forecast year 2046 are summarized in **Table 3-1**.

Table 3-1. Existing (2015) and Forecast (2046) Daily Volumes

		Daily Volume (NB + SB) (vehicles per day)						
		2015	2046		No Build vs Existing		Build vs No Build	
		Existing	No Build	Build	Growth	%	Difference	%
Reston Parkway	North of DTR	51,300	68,000	62,000	16,700	33%	-6,000	-10%
	South of DTR	43,700	63,800	57,300	20,100	46%	-6,500	-11%
Soapstone Connector	North of DTR	-	-	18,100	-	-	18,100	-
	South of DTR	-	-	18,300	-	-	18,300	-
Wiehle Avenue	North of DTR	36,900	46,800	37,400	9,900	27%	-9,400	-25%
	South of DTR	34,900	38,500	29,500	3,600	10%	-9,000	-31%

Key findings from the review of daily forecasts include the following:

- Approximately 18,000 vehicles per day (vpd) are projected to use the Soapstone Connector in 2046.
- On Wiehle Avenue north of the DTR, the 2046 No Build forecast of 46,800 vpd decreases to 37,400 vpd (which is similar to the existing volume) when the Soapstone Connector is added to the roadway network. In other words, north of the DTR, the volume on Wiehle Avenue grows by about 10,000 vpd between 2015 and 2046, and nearly all of that is absorbed by the Soapstone Connector under build conditions.
- There is less growth on Wiehle Avenue south of the DTR than north, which leads to lower volumes under the build condition than existing year (year 2015, 2046 No Build, and 2046 Build volumes are 34,900, 38,500, and 29,500 vpd, respectively).
- On Reston Parkway, there is also a reduction in traffic in 2046 with the addition of the Soapstone Connector, but the difference from the No Build condition is somewhat lower (both overall volume and in percentage terms) than the difference between the Build and No Build volume on Wiehle Avenue.

3.2 INTERSECTION OPERATIONS

The existing (2015) peak hour volumes and associated LOS are shown in **Figure 3-1**[8]**.** A summary of the intersection LOS is also provided in **Table 3-2**. As shown in the table, the two Reston Parkway intersections in the traffic analysis study area operate at LOS E or worse during both peak hours under existing conditions, with average delay ranging from 60 to 80 seconds. The Wiehle Avenue intersections with Sunset Hills Road and Sunrise Valley Drive operate at LOS D or worse, with delay ranging from 40 to 60 seconds. Congestion at these intersections acts as a constraint to traffic mobility within the area surrounding the station.

Table 3-2. Intersection Operations – 2015 Existing Conditions

Intersection No.	Intersection Name	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1	Sunset Hills Rd at Reston Parkway	63.2	E	57.6	E
2	Sunset Hills Rd at Oracle Way & Old Reston Ave	27.3	C	27.6	C
3	Sunset Hills Rd at Plaza America Dr	5.5	A	11.8	B
4	Sunset Hills Rd at American Dream Way	23.1	C	33.2	C
5	Sunset Hills Rd at Isaac Newton Sq & Metro Ctr Dr	17.0	B	28.8	C
6	Wiehle Ave at Sunset Hills Road	43.7	D	58.4	E
7	Wiehle Ave at Reston Station Blvd	19.4	B	32.0	C
8	Wiehle Ave at WB DTR Ramps	20.0	C	20.8	C
9	Wiehle Ave EB DTR Ramps	29.4	C	19.4	B
10	Wiehle Avenue at Sunrise Valley Drive	50.4	D	50.6	D
11	Sunrise Valley Dr at Soapstone Dr	18.4	B	16.6	B
12	Sunrise Valley Drive at Sheraton Plaza	9.7	A	11.3	B
13	Sunrise Valley Dr at Colts Neck Road	26.0	C	11.1	B
14	Sunrise Valley Drive at Reston Pkwy	66.0	E	82.0	F

As shown in **Figures 3-2 and 3-3** and summarized in **Table 3-3** (delay and LOS by approach is shown in **Table 3-4** at the end of the section), levels of service at the four aforementioned intersections will deteriorate by 2046 under the No Build condition. Operations will worsen by 2046 at these four intersections under the Build condition as well, albeit to a lesser extent with the construction of the Soapstone Connector.

An element of the purpose of the Soapstone Connector project is to reduce traffic congestion and delay along Wiehle Avenue and within the traffic analysis area. The results shown in Table 3-3 allow for the assessment of the project's effect on numerous intersections within the defined project area and allow for a comparison between the 2046 No Build and Build conditions in the NEPA document to support decision-making regarding the Soapstone Connector. As shown in the table, delays at intersections #6 through #10 on Wiehle Avenue (shown in bold font), are anticipated to be lower in the Build condition with the addition of the Soapstone Connector (compared to the No Build condition).

[8] Existing daily volumes shown in Figure 3-1 for Reston Parkway and Wiehle Avenue were compiled from the 48-hour classification counts and differ slightly from existing daily volumes reported in Table 3-1 as the latter were derived from the travel demand model to allow for a relative comparison with daily volumes derived from the model for 2046.

At the intersections of the Soapstone Connector with Sunset Hills Road and Sunrise Valley Drive, the new approaches were assumed to have an appropriate number of turn lanes to be consistent with the number of receiving lanes, and the configuration of existing approaches was modified as needed to accommodate turn movements to the new roadway (details on lane configuration are provided in Section 2.3.1). Based on the assumed configurations, the intersection with Sunset Hills Road is projected to operate at LOS C in both the AM and PM peak hours. At the intersection with Sunrise Valley Drive, delay is higher, with a resulting LOS F during both peak hours; however, additional adjustments can be made during the design stage of the project to improve operations.

Table 3-3. Intersection Operations – 2046 No Build and Build Conditions

Intersection No.	Intersection Name	2046 No Build Conditions				2046 Build Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Reston Pkwy at Sunset Hills Rd	86.9	F	103.4	F	82.7	F	93.2	F
2	Sunset Hills Rd at Oracle Way & Old Reston Ave	41.7	D	50.0	D	63.7	E	41.3	D
3	Sunset Hills Rd at Plaza America Dr	5.6	A	12.4	B	6.5	A	12.7	B
4	Sunset Hills Rd at American Dream Way	25.3	C	41.8	D	25.2	C	52.9	D
NEW	Sunset Hills Rd at Soapstone Connector	-	-	-	-	28.5	C	20.9	C
5	Sunset Hills Rd at Isaac Newton Sq & Metro Ctr Dr	116.5	F	191.3	F	53.9	D	97.6	F
6	**Wiehle Ave at Sunset Hills Road**	**79.2**	**E**	**101.3**	**F**	**64.2**	**E**	**75.7**	**E**
7	**Wiehle Ave at Reston Station Blvd**	**30.5**	**C**	**74.8**	**E**	**24.5**	**C**	**46.9**	**E**
8	**Wiehle Ave at WB DTR Ramps**	**29.3**	**C**	**41.2**	**D**	**22.9**	**C**	**50.9**	**D**
9	**Wiehle Ave EB DTR Ramps**	**39.5**	**D**	**22.7**	**C**	**26.1**	**C**	**22.4**	**C**
10	**Wiehle Avenue at Sunrise Valley Drive**	**62.6**	**E**	**65.1**	**E**	**39.6**	**D**	**46.4**	**D**
11	Sunrise Valley Dr at Soapstone Dr	26.6	C	29.0	C	83.5	F	88.0	F
12	Sunrise Valley Drive at Sheraton Plaza	3.9	A	8.8	A	6.3	A	8.6	A
13	Sunrise Valley Dr at Colts Neck Road	46.0	D	30.7	C	33.1	C	25.8	C
14	Sunrise Valley Drive at Reston Pkwy	105.6	F	144.7	F	95.1	F	123.4	F

Overall, it can be expected that once the Soapstone Connector is in place, travel patterns and route choice will change within the study area, and volumes are likely to fluctuate for a short period of time. Once equilibrium in the system is reached, further studies may be required and localized improvements implemented to improve traffic operations and levels of service at some of these locations. Extension of turn bays or provision of turn lanes may result in increases in pavement at intersections; depending on final design, these may require minor amounts of additional right of way.

An analysis of the potential increase in traffic volumes along Soapstone Drive was completed in response to concerns by some that the addition of the Soapstone Connector would result in a substantial increase in volumes on Soapstone Drive south of Sunrise Valley Drive. The forecast modeling performed for this study indicates that the Soapstone Connector could add 2,400 vpd to Soapstone Drive just south of Sunrise Valley Drive (from 12,400 vpd in the No Build condition to 14,800 vpd in the Build condition). The difference in volumes on Soapstone Drive between the

No Build and Build conditions decreases as distance increases from the Soapstone Connector south on Soapstone Drive (additional details on this analysis are included in **Attachment D)**.

While details such as signal timings, phasing schemes, and number of turn lanes and bay lengths are required inputs to the analysis, these types of operational decisions in the future would be based on a wide range of issues within the area, including the full range of transportation improvement projects being considered within the Reston area. For example, in a separate but parallel study, the Reston Network Analysis is taking a long-range look at the transportation conditions in the Reston Transit Station Areas (TSAs) in 2030 and 2050. The Network Analysis is evaluating the conceptual grid of streets in the Reston TSAs that was adopted in the Reston Transit Station Areas Comprehensive Plan Amendment, which includes the Soapstone Connector. In the immediate vicinity of the Soapstone Connector, the grid of streets includes an extension of Reston Station Boulevard to the Connector. From a connectivity perspective, this extension would provide a direct connection to the kiss-and-ride area, the parking garage for the Wiehle-Reston East Metrorail Station, and future development in the vicinity of the station.

The Network Analysis takes into account ongoing planning efforts by Fairfax County and others that will impact the future of the transportation network in the Reston TSAs. It takes into account the future demand for travel associated with the development around the three Reston Metrorail Stations. The analysis will identify the roadway features that are necessary to support acceptable traffic conditions and a walkable and bikeable environment in the TSAs. The end result will be a street network that is cost-effective and requires the minimum right of way, with the least impacts to adjacent properties while addressing the future travel demand. It will take into consideration the provisions of the Reston Phase I Master Plan. The study has identified mitigation measures needed to achieve LOS E in the TSAs, including new signals and turn lanes at new intersections. It will begin looking at locations where LOS E could not be achieved through these mitigation measures. The study is scheduled to be complete by late 2016.

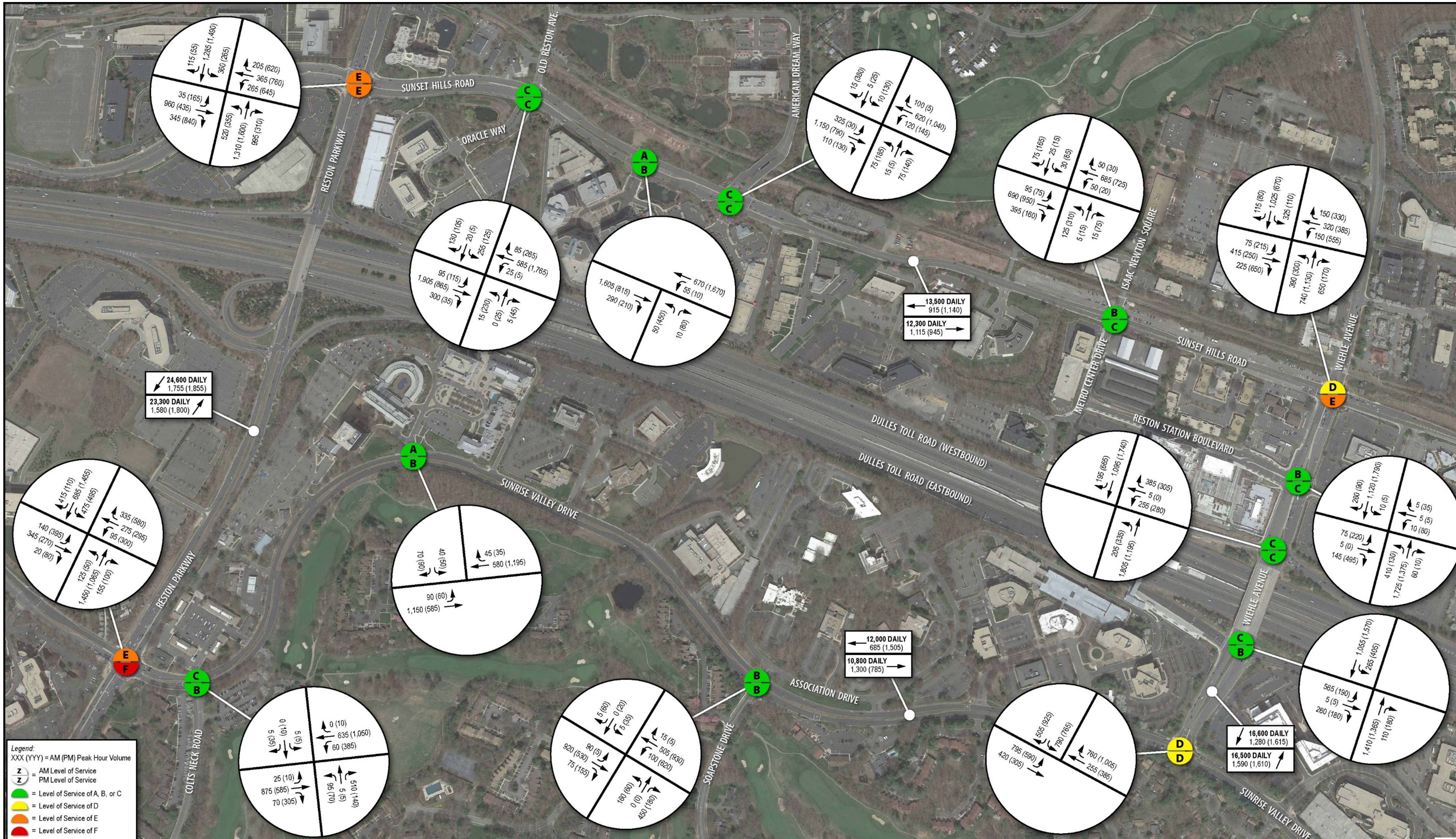


Figure 3-1. Existing Conditions (2015): Intersection Volumes and LOS

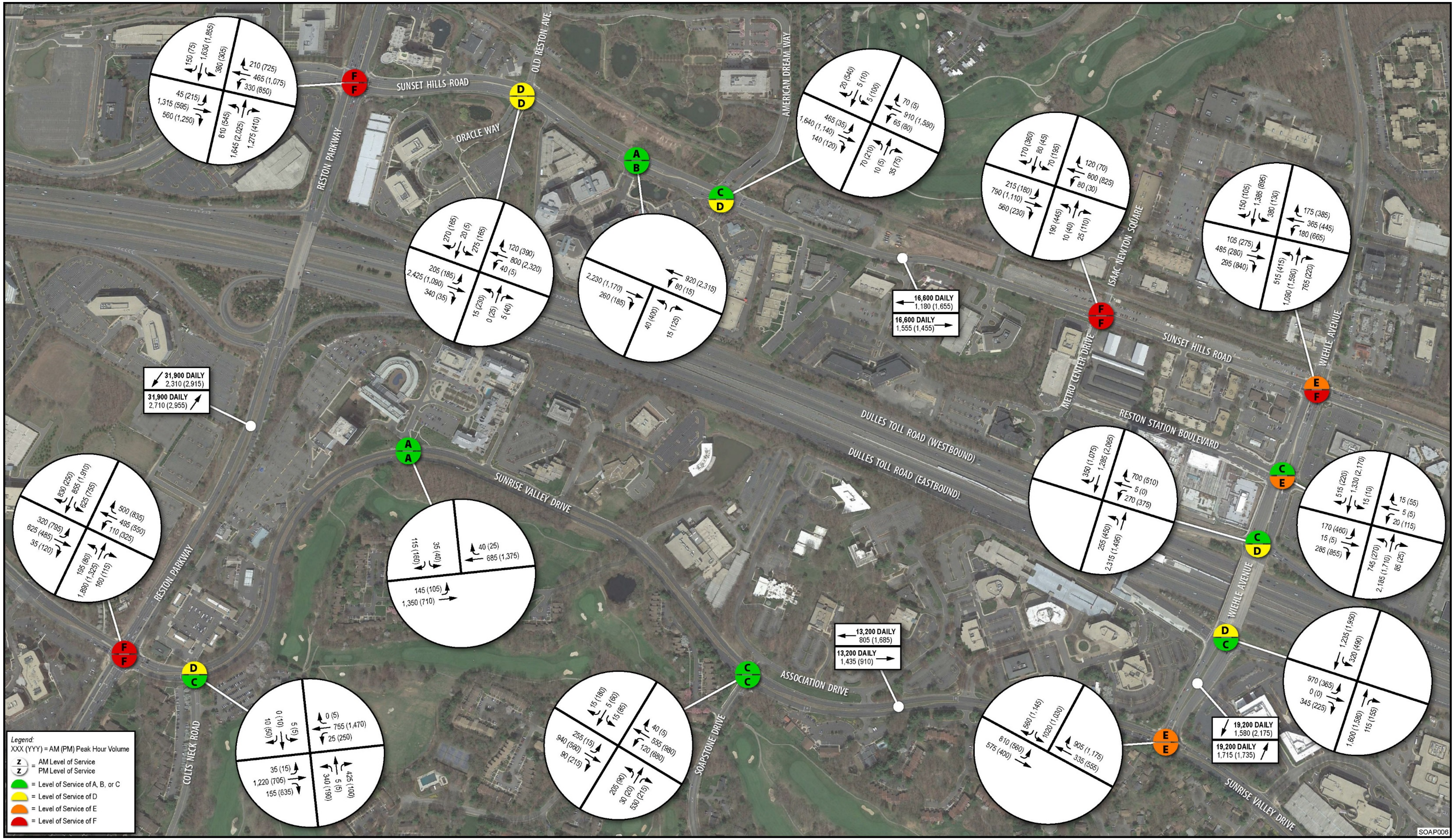


Figure 3-2. No Build Conditions (2046): Intersection Volumes and LOS

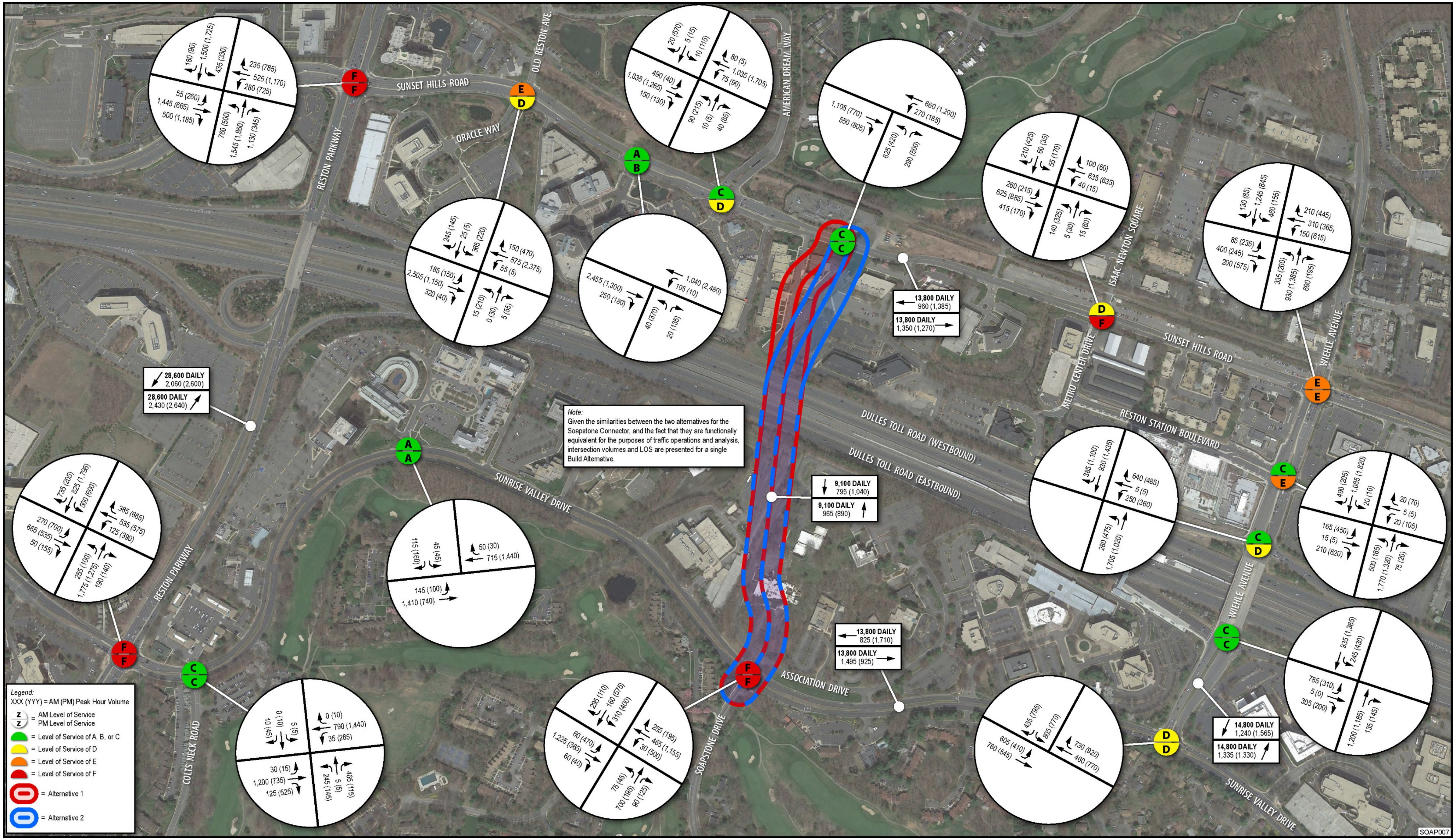


Figure 3-3. Build Conditions (2046): Intersection Volumes and LOS

Table 3-4. Intersection Operations by Approach – 2046 No Build and Build Conditions

Intersection No.	Intersection Name	Approach	Movement	2046 No Build Conditions												2046 Build Conditions											
				AM Peak Hour						PM Peak Hour						AM Peak Hour						PM Peak Hour					
				By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Reston Pkwy at Sunset Hills Rd	EB	Left	101.1	F	103.0	F	86.9	F	152.8	F	42.3	D	103.4	F	93.8	F	96.8	F	82.7	F	213.1	F	50.6	D	93.2	F
			Through	146.5	F					76.6	E					130.1	F					67.9	E				
			Right	0.8	A					7.1	A					0.7	A					5.2	A				
		WB	Left	182	F	84.6	F			224.4	F	115.8	F			176.3	F	73.0	E			189.8	F	108.3	F		
			Through	53.6	D					107.1	F					50.3	D					129.5	F				
			Right	0.2	A					1.2	A					0.2	A					1.4	A				
		NB	Left	187.9	F	70.6	E			237.3	F	115.9	F			169.7	F	68.5	E			194.4	F	96.1	F		
			Through	61.7	E					106.6	F					65.9	E					87.4	F				
			Right	7.5	A					0.5	A					3.9	A					0.4	A				
		SB	Left	112.2	F	101.8	F			226.1	F	128.1	F			108.5	F	97.3	F			183.2	F	112.7	F		
			Through	108.2	F					117.2	F					103.9	F					105	F				
			Right	5.1	A					0.3	A					14.8	B					2.3	A				
2	Sunset Hills Rd at Oracle Way & Old Reston Ave	EB	Left	12.6	B	23.5	C	41.7	D	274.2	F	53.2	D	50.0	D	12.4	B	27.2	C	63.7	E	177.7	F	33.6	C	41.3	D
			Through	26.8	C					17.3	B					31	C					15.9	B				
			Right	6.2	A					0.1	A					6.5	A					0.1	A				
		WB	Left	46.5	D	13.6	B			10.6	B	41.1	D			56.8	E	15.2	B			9	A	34.3	C		
			Through	13.8	B					47.1	D					14.5	B					40.2	D				
			Right	1.2	A					5.2	A					4.1	A					4.5	A				
		NB	Left	72.9	E	53.9	D			117.3	F	96.1	F			73.9	E	54.6	D			82.4	F	64.0	E		
			Through	-	-					53.6	D					-	-					51.5	E				
			Right	0.2	A					0.8	A					0.2	A					1.1	A				
		SB	Left	340.2	F	185.4	F			80.3	F	69.5	E			529.7	F	318.8	F			152.3	F	105.1	F		
			Through	38.5	D					59	E					34.1	C					36.1	D				
			Right	-	-					-	-					-	-					-	-				
3	Sunset Hills Rd at Plaza America Dr	EB	Left	-	-	3.4	A	5.6	A	-	-	4.4	A	12.4	B	-	-	4.1	A	6.5	A	-	-	6.0	A	12.7	B
			Through	3.4	A					4.4	A					4.1	A					6	A				
			Right	-	-					-	-					-	-					-	-				
		WB	Left	79	E	7.5	A			89.3	F	5.9	A			74	E	8.1	A			81.6	F	7.7	A		
			Through	1.2	A					5.4	A					1.4	A					7.4	A				
			Right	-	-					-	-					-	-					-	-				
		NB	Left	92.3	F	74.2	E			73.1	E	62.0	E			103.7	F	84.1	F			65.8	E	57.2	E		
			Through	-	-					-	-					-	-					-	-				
			Right	25.7	C					26.5	C					45.9	D					33.7	C				
		SB	Left	-	-	-	-			-	-	-	-			-	-	-	-			-	-	-	-		
			Through	-	-					-	-					-	-					-	-				
			Right	-	-					-	-					-	-					-	-				
4	Sunset Hills Rd at American Dream Way	EB	Left	96.7	F	23.0	C	25.3	C	71.9	E	10.7	B	41.8	D	93.8	F	22.8	C	25.2	C	60	E	12.2	B	52.9	D
			Through	3.8	A					9	A					5.3	A					10.8	B				
			Right	-	-					-	-					-	-					-	-				
		WB	Left	94.8	F	24.8	C			89.9	F	25.3	C			108.5	F	23.8	C			67.8	E	33.2	C		
			Through	21.7	C					22.2	C					19.3	B					31.4	C				
			Right	0.2	A					0	A					2.5	A					0	A				
		NB	Left	103.5	F	72.4	E			92.9	F	69.2	E			104.5	F	75.3	E			79.8	E	58.1	E		
			Through	103.7	F					92.4	F					104.6	F					79.9	E				
			Right	1.4	A					2	A					1.4	A					1.7	A				
		SB	Left	86	F	31.2	C			164.4	F	133.6	F			87.5	F	38.6	D			151.9	F	184.8	F		
			Through	89.6	F					83.7	F					89.6	F					75.3	E				
			Right	0.3	A					128.8	F					0.3	A					194.3	F				
NEW	Sunset Hills Rd at Soapstone Connector	EB	Left	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29.3	C	28.5	C	-	-	22.2	C	20.9	C
			Through	-	-					-	-					37	D					25.8	C				
			Right	-	-					-	-					13.9	B					18.7	B				
		WB	Left	-	-	-	-			-	-	-	-			58.4	E	23.7	C			26.3	C	17.8	B		
			Through	-	-					-	-					9.5	A					-	-				
			Right	-	-					-	-					-	-					16.5	B				
		NB	Left	-	-	-	-			-	-	-	-			43.5	D	32.1	C			21.1	C	23.3	C		
			Through	-	-					-	-					-	-					-	-				
			Right	-	-					-	-					7.6	A					25.1	C				
		SB	Left	-	-	-	-			-	-	-	-			-	-	-	-			-	-	-	-		
			Through	-	-					-	-					-	-					-	-				
			Right	-	-					-	-					-	-					-	-				

Intersection No.	Intersection Name	Approach	Movement	2046 No Build Conditions												2046 Build Conditions											
				AM Peak Hour						PM Peak Hour						AM Peak Hour						PM Peak Hour					
				By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
5	Sunset Hills Rd at Isaac Newton Sq & Metro Ctr Dr	EB	Left	-	-			116.5	F	-	-			191.3	F	-	-			53.9	D	-	-			97.6	F
			Through	194.1	F	194.1	F			323.1	F	323.1	F			75.2	E	75.2	E			150.1	F	150.1	F		
			Right	-	-					-	-					-	-					-	-				
		WB	Left	40.8	D					14.2	B					5.9	A					11.2	B				
			Through	4.6	A	7.5	A			13.8	B	13.8	B			5	A	5.0	A			13.6	B	13.6	B		
			Right	-	-					-	-					-	-					-	-				
		NB	Left	194.1	F					384.7	F					176.4	F					235.1	F				
			Through	19.9	B	166.9	F			11	B	290.7	F			20.8	C	157.0	F			11.2	B	186.5	F		
			Right	-	-					-	-					-	-					-	-				
		SB	Left	45.2	D					36.2	D					43.3	D					32.9	C				
			Through	40.8	D	41.8	D			31.3	D	32.9	C			33.1	C	34.8	C			26	C	27.9	C		
			Right	-	-					-	-					-	-					-	-				
6	Wiehle Ave at Sunset Hills Road	EB	Left	19.7	B			79.2	E	60.8	E			101.3	F	24.7	C			64.2	E	51	D			75.7	E
			Through	36.5	D	27.3	C			34.9	C	40.6	D			37.6	D	28.2	C			34.7	C	35.9	D		
			Right	9.5	A					36.9	D					8.1	A					25.8	C				
		WB	Left	131.7	F					215.3	F					85.1	F					155.8	F				
			Through	59.5	E	77.6	E			84.1	F	142.4	F			46.6	D	55.2	E			67.5	E	105.6	F		
			Right	-	-					-	-					-	-					-	-				
		NB	Left	93.3	F					94.6	F					75.1	E					92	F				
			Through	95.7	F	98.4	F			146.7	F	122.7	F			96.5	F	89.2	F			89.9	F	81.0	F		
			Right	105.6	F					2.5	A					86.2	F					3.7	A				
		SB	Left	112.3	F					241.4	F					81.8	F					174.4	F				
			Through	72	E	80.0	E			58.3	E	79.5	E			44.9	D	54.1	D			48.2	D	66.3	E		
			Right	-	-					-	-					-	-					-	-				
7	Wiehle Ave at Reston Station Blvd	EB	Left	343.1	F			30.5	C	260.1	F			74.8	E	235.8	F			24.5	C	133.6	F			46.9	E
			Through	64	E	138.4	F			108.4	F	129.3	F			92.6	F	114.4	F			84.5	F	77.4	E		
			Right	14.5	B					30.6	C					4.9	A					9.5	A				
		WB	Left	-	-					-	-					-	-					-	-				
			Through	53.6	D	53.6	D			81.5	F	81.5	F			46.4	D	46.4	D			79.2	E	79.2	E		
			Right	-	-					-	-					-	-					-	-				
		NB	Left	46.8	D					68.8	E					50.5	D					76.4	E				
			Through	12.1	B	20.7	C			26.5	C	32.2	C			10	A	18.6	B			22.3	C	28.2	C		
			Right	-	-					-	-					-	-					-	-				
		SB	Left	58.1	E					99.2	F					72.3	E					71.1	E				
			Through	21.2	C	18.5	B			87.4	F	80.0	F			10.5	B	10.4	B			46	D	41.8	D		
			Right	10.5	B					6	A					7.9	A					3.2	A				
8	Wiehle Ave at WB DTR Ramps	EB	Left	-	-			29.3	C	-	-			41.2	D	-	-			22.9	C	-	-			50.9	D
			Through	-	-	-	-			-	-	-	-			-	-	-	-			-	-	-	-		
			Right	-	-					-	-					-	-					-	-				
		WB	Left	42.2	D					88.5	F					37.7	D					91.4	F				
			Through	70.7	E	61.3	E			103.7	F	96.0	F			56.4	E	50.3	D			109.8	F	99.7	F		
			Right	64.5	E					96.3	F					52.6	D					98.2	F				
		NB	Left	100.3	F					74.4	E					39.4	D					88.9	F				
			Through	24.9	C	32.4	C			17.8	B	30.9	C			16.4	B	19.7	B			11.9	B	36.4	D		
			Right	-	-					-	-					-	-					-	-				
		SB	Left	-	-					-	-					-	-					-	-				
			Through	6.5	A	5.5	A			12.3	B	32.1	C			11.1	B	9.0	A			12.6	B	43.0	D		
			Right	1.8	A					70.2	E					3.9	A					82.3	F				
9	Wiehle Ave EB DTR Ramps	EB	Left	48.6	D			39.5	D	75	E			22.7	C	45.1	D			26.1	C	76.3	E			22.4	C
			Through	30.5	C	43.8	D			65.4	E	70.7	E			31.6	C	41.2	D			68.3	E	72.5	E		
			Right	30	C					63	E					31.3	C					65.6	E				
		WB	Left	-	-					-	-					-	-					-	-				
			Through	-	-	-	-			-	-	-	-			-	-	-	-			-	-	-	-		
			Right	-	-					-	-					-	-					-	-				
		NB	Left	-	-					-	-					-	-					-	-				
			Through	37.8	D	35.6	D			17.2	B	15.8	B			25.6	C	23.3	C			17.1	B	15.6	B		
			Right	5.1	A					1.7	A					3.2	A					2.7	A				
		SB	Left	90.4	F					51.8	D					30.1	C					32.5	C				
			Through	27	C	40.1	D			7	A	16.0	B			11.4	B	15.3	B			7.2	A	13.3	B		
			Right	-	-					-	-					-	-					-	-				

Intersection No.	Intersection Name	Approach	Movement	2046 No Build Conditions												2046 Build Conditions											
				AM Peak Hour						PM Peak Hour						AM Peak Hour						PM Peak Hour					
				By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection		By Movement		By Approach		By Intersection	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
			Left	99	F					105.4	F					67.2	E					91.5	F				
		EB	Through	23.6	C	67.7	E			17.2	B	68.6	E			28.1	C	45.4	D			16.2	B	48.5	D		
			Right	-	-					-	-					-	-					-	-				
			Left	-	-					-	-					-	-					-	-				
		WB	Through	61.5	E	81.0	F			91.8	F	84.9	F			69.5	E	44.5	D			108.4	F	65.6	E		
10	Wiehle Avenue at Sunrise Valley Drive		Right	88.3	F			62.6	E	81.7	F			65.1	E	28.8	C			39.6	D	29.9	C			46.4	D
			Left	-	-					-	-					-	-					-	-				
		NB	Through	-	-	-	-			-	-	-	-			-	-	-	-			-	-	-	-		
			Right	-	-					-	-					-	-					-	-				
			Left	66.5	E					79	E					43	D					41.3	D				
		SB	Through	-	-	43.6	D			-	-	47.8	D			-	-	28.5	C			-	-	24.4	C		
			Right	1.9	A					19.7	B					1.8	A					8	A				
			Left	21.9	C					15.1	B					33.9	C					147.7	F				
		EB	Through	18	B	17.6	B			40.5	D	30.7	C			96.5	F	89.4	F			49.5	D	100.0	F		
			Right	0.7	A					6.5	A					0.3	A					0.2	A				
			Left	24.5	C					37.7	D					39.5	D					34.4	C				
		WB	Through	29.2	C	28.4	C			13.4	B	23.3	C			47	D	32.8	C			108.8	F	79.2	E		
11	Sunrise Valley Dr at Soapstone Dr		Right	-	-			26.6	C	-	-			29.0	C	6.1	A			83.5	F	19	B			88.0	F
			Left	-	-					-	-					41.5	D					226.5	F				
		NB	Through	36.4	D	40.6	D			124.2	F	47.9	D			132.8	F	111.5	F			74.5	E	69.3	E		
			Right	42.4	D					8.7	A					4.5	A					5.1	A				
			Left	23.3	C					47.4	D					202.2	F					144.5	F				
		SB	Through	11.9	B	16.8	B			31.1	C	35.4	D			27.2	C	91.2	F			86.4	F	99.7	F		
			Right	-	-					-	-					9.3	A					6.8	A				
			Left	1.4	A					7.2	A					1.6	A					8.6	A				
		EB	Through	1.7	A	1.6	A			3.2	A	3.7	A			2.9	A	2.8	A			0.6	A	1.5	A		
			Right	-	-					-	-					-	-					-	-				
			Left	-	-					-	-					-	-					-	-				
		WB	Through	4.6	A	4.4	A			8.8	A	8.7	A			9.8	A	9.3	A			8.1	A	8.0	A		
12	Sunrise Valley Drive at Sheraton Plaza		Right	1.2	A			3.9	A	1.4	A			8.8	A	2.6	A			6.3	A	0	A			8.6	A
			Left	-	-					-	-					-	-					-	-				
		NB	Through	-	-	-	-			-	-	-	-			-	-	-	-			-	-	-	-		
			Right	-	-					-	-					-	-					-	-				
			Left	48.1	D					58.9	E					49.9	D					91.5	F				
		SB	Through	-	-	24.0	C			-	-	30.4	C			-	-	25.7	C			-	-	42.3	D		
			Right	16.7	B					23.3	C					16.4	B					28.6	C				
			Left	10.9	B					9.9	A					10.6	B					7.1	A				
		EB	Through	60.5	E	59.3	E			39.1	D	38.8	D			37.2	D	36.6	D			31.1	C	30.8	C		
			Right	-	-					-	-					-	-					-	-				
			Left	8.5	A					49	D					11.3	B					37.5	D				
		WB	Through	15.3	B	15.1	B			19.7	B	23.9	C			12.2	B	12.2	B			12.5	B	16.6	B		
13	Sunrise Valley Dr at Colts Neck Road		Right	-	-			46.0	D	-	-			30.7	C	-	-			33.1	C	-	-			25.8	C
			Left	-	-					-	-					-	-					-	-				
		NB	Through	74	E	53.9	D			55.3	E	36.9	D			45.7	D	51.1	D			101	F	61.9	E		
			Right	37.5	D					1	A					54	D					11.2	B				
			Left	-	-					-	-					-	-					-	-				
		SB	Through	0.1	A	0.1	A			13	B	13.0	B			0.1	A	0.1	A			22.5	C	22.5	C		
			Right	-	-					-	-					-	-					-	-				
			Left	126.3	F					169.3	F					83.7	F					146.7	F				
		EB	Through	147.5	F	141.3	F			159.3	F	162.6	F			136.1	F	123.2	F			129.8	F	135.4	F		
			Right	-	-					-	-					-	-					-	-				
			Left	87.7	F					162.1	F					79.2	E					167.8	F				
		WB	Through	162.4	F	128.4	F			147.7	F	175.9	F			158.9	F	113.8	F			156.1	F	135.2	F		
14	Sunrise Valley Drive at Reston Pkwy		Right	102	F			105.6	F	200.7	F			144.7	F	59.7	E			95.1	F	99.4	F			123.4	F
			Left	133.8	F					186.1	F					120.3	F					179	F				
		NB	Through	118.5	F	111.7	F			142.7	F	134.4	F			102.7	F	96.7	F			127.2	F	119.2	F		
			Right	4.9	A					3	A					8.8	A					3.3	A				
			Left	172.2	F					235	F					172.1	F					188.9	F				
		SB	Through	38.8	D	73.6	E			93.7	F	123.1	F			43	D	70.4	E			98.3	F	112.0	F		
			Right	35.3	D					9.8	A					32	C					7.2	A				

SECTION 4
ENVIRONMENTAL TRAFFIC DATA

This section describes the methodology for the development of environmental traffic data that was used in the air and noise analysis being conducted as part of the EA. The data itself is included in **Attachment E**.

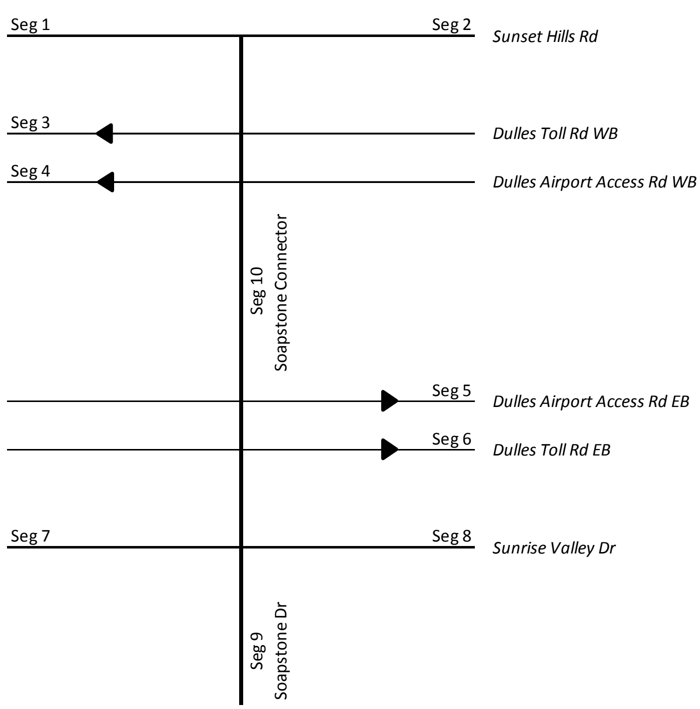
4.1 AIR AND NOISE STUDY DATA

Traffic data was developed using the Environmental Traffic Data (ENTRADA) program[9], a spreadsheet-based tool developed by VDOT to standardize the production of planning-level traffic data for environmental analyses.

Inputs to the ENTRADA program include the following:

- Project Information
- Roadway Segment Information (facility type, posted speed, number of lanes, lane width, terrain, signalization, etc.)
- Directional Factors
- K (Hourly) Factors
- Truck Percentages
- Existing and Forecast Daily Traffic Volumes

These inputs were derived primarily from the data collection program and traffic forecasting efforts described in Section 2. Environmental traffic data were prepared for existing (2015) and 2046 (No Build and Build) conditions for the 10 segments shown on the following diagram:



[9] ENTRADA Version 2016-08, received from VDOT September 13, 2016.

Outputs from the program include hourly traffic volumes, by vehicle classification, and travel speeds. Travel speeds were developed within ENTRADA using a standard traffic engineering formula (termed the Bureau of Public Roads [BPR] formula) that estimates speed based on the initial free-flow speed (speed in the absence of congestion) and the calculated ratio of hourly volume to hourly capacity.[10]

[10] The BPR relationship is used for a variety of purposes in traffic engineering, including use in regional travel demand models. The standard formulation of the formula is as follows: Congested Speed = (Free-Flow Speed) / (1 + *alpha* * [volume/capacity]^{beta}) where *alpha* and *beta* vary by facility type and by area. The following values were used for this study, based on guidance from VDOT: *alpha* = 0.15, *beta* = 4.

ATTACHMENT A
COUNT DATA

Electronic Appendix Only

ATTACHMENT B
MOU: LOS STANDARD FOR MULTIMODAL MIXED USE AREAS

MEMORANDUM OF UNDERSTANDING
LEVEL-OF-SERVICE STANDARD FOR MULTIMODAL MIXED USE AREAS

This Memorandum of Understanding serves to document an understanding between the Virginia Department of Transportation (VDOT) and the County of Fairfax, Virginia, that sets the appropriate Level of Service (LOS) requirement for non-National Highway System (NHS) roadways within certain Multimodal Mixed Use areas within the County identified in the Fairfax County Comprehensive Plan.

Fairfax County has many Multimodal Mixed Use Areas (activity centers) where concentrated, transit accessible nodes of development are planned. To balance the mobility needs of bicyclists, pedestrians, transit users and vehicles in these activity centers the County has included language in the Comprehensive Plan noting that LOS E is an acceptable design standard for non-NHS roadways within the following planning areas:

1. Annandale Community Business Center
2. Bailey's Crossroads Community Business Center
3. Seven Corners Community Business Center
4. Tysons Corner Urban Center
5. Wiehle-Reston East Transit Station Area
6. Reston Town Center Transit Station Area
7. Herndon Transit Station Area
8. Innovation Center Transit Station Area
9. Huntington Transit Station Area
10. Van Dorn Transit Station Area
11. Franconia-Springfield Transit Station Area & Springfield Community Business Center

Based on the inclusion of the LOS E language for these Multimodal Mixed Use Areas in the Fairfax County Comprehensive Plan, VDOT and Fairfax County have agreed that LOS E would be acceptable for non-NHS roadways within the 11 planning areas listed above. The boundaries of these 11 Multimodal Mixed Use Areas are shown in Attachment 1. Attachment 2 provides the Comprehensive Plan citations for the areas where the LOS E is considered to be acceptable for non-NHS roadways. Attachments 3a through 3i provide Comprehensive Plan area-specific maps and Comprehensive Plan excerpts for each of the designated areas.

If additional areas are designated as Multimodal Mixed Use Areas in the future, Fairfax County will provide to VDOT a letter documenting this modification to the Comprehensive Plan and a revised map which will include the areas shown in Attachment 1 and the new areas. Once VDOT receives the letter with notification of the changes in the Comprehensive Plan and the revised map, VDOT will begin accepting LOS E on non-NHS roadways within the new areas designated as Multimodal Mixed Use Areas.

In instances where a LOS E cannot be attained, remedies should be proposed to offset impacts using a tiered approach as described in the Comprehensive Plan language for the designated areas. The purpose of this tiered approach is to minimize the widths of streets in order to maintain a walkable environment and support the implementation of the grid of streets. A street grid network is more typical of urban areas and improves mobility for pedestrians, bicyclists, and other users.

Helen Cuervo

Helen Cuervo, District Administrator
Virginia Department of Transportation,
Northern Virginia District

Date: 8/23/16

Tom Biesiadny

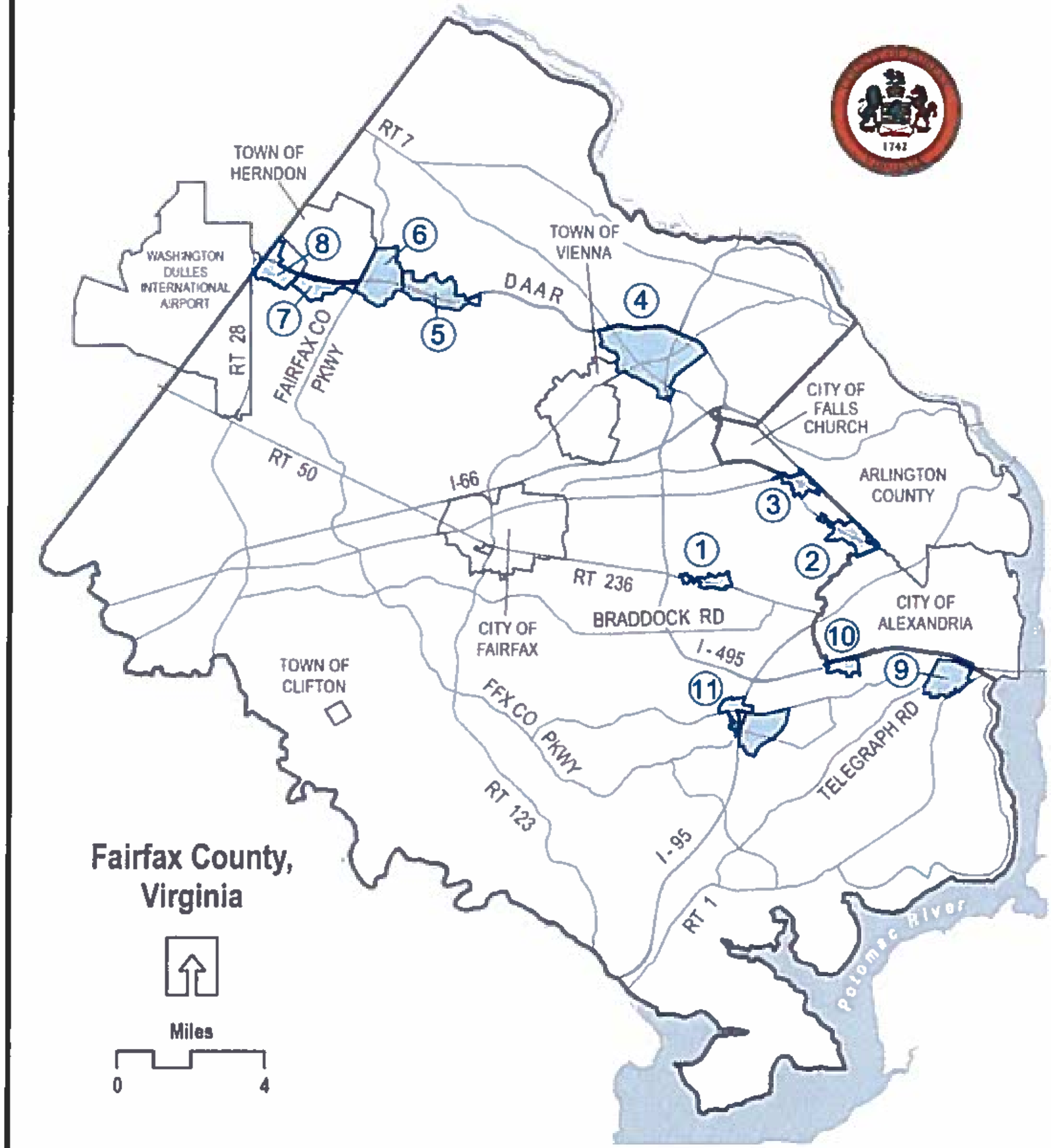
Tom Biesiadny, Director
Department of Transportation,
County of Fairfax, Virginia

Date: 8/15/16

CC:
Randy Dittberner, VDOT
Xuejun Fan, VDOT
Rahul Trivedi, VDOT
Paul Kraucunas, VDOT
Arsalan Faghri, VDOT
Kevin Nelson, VDOT
Lauren Mollerup, VDOT
Elizabeth Iannetta, Fairfax County
Gregg Steverson, Fairfax County

Attachments:

- **Attachment 1**: Map of Areas in Fairfax County with LOS E recommended in Comprehensive Plan
- **Attachment 2**: Comprehensive Plan Citations for areas with LOS E recommendation
- **Attachment 3a-3i**: Comprehensive Plan area-specific maps and Comprehensive Plan excerpts for each of the designated areas



Areas in Fairfax County which have Level of Service E language in the Comprehensive Plan

1) Annandale Community Business Center
2) Bailey's Crossroads Community Busines Center
3) Seven Corners Community Business Center
4) Tysons Corner Urban Center
5) Wiehle-Reston East Transit Station Area
6) Reston Town Center Transit Station Area
7) Herndon Transit Station Area
8) Innovation Center Transit Station Area
9) Huntington Transit Station Area
10) Van Dorn Transit Station Area
11) Franconia-Springfield Transit Station Area & Springfield Community Business Center

Map prepared by the
Fairfax County Department of Planning & Zoning
June 2016

Fairfax County Planning Areas with LOS E Standards:

Area I

- **Annandale CBC**: *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA I Annandale Planning District, Amended through 10-20-2015 Annandale Community Business Center Page 49*
- **Baileys Crossroads CBC:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA I Baileys Planning District, Amended through 10-20-2015 Baileys Crossroads Community Business Center Page 38*
- **Seven Corners:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA I Baileys Planning District, Amended through 10-20-2015 Seven Corners Community Business Center Page 137*

Area 2

- **Tysons:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA II Tysons Corner Urban Center, Amended through 4-29-2014 Areawide Recommendations: Transportation Page 60)*

Area 3

- **Innovation TSA:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA III Dulles Suburban Center, Amended through 10-20-2015 Dulles Suburban Center Land Unit Recommendations Page 64*
- **Wiehle-Reston East TSA:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA III Reston, Amended through 10-20-2015 Page 134*
- **Reston Town Center TSA:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA III Reston, Amended through 10-20-2015 Page 134*
- **Herndon TSA:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA III Reston, Amended through 10-20-2015 Page 134*

Area 4

- **Huntington TSA:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA IV Mount Vernon Planning District, Amended through 10-20-2015 MV1-Huntington Community Planning Sector Page 114*
- **Van Dorn Transit Station Area:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA IV Rose Hill Planning District, Amended through 10-20-2015 Van Dorn Transit Station Area Page 18*
- **Franconia-Springfield Area:** *FAIRFAX COUNTY COMPREHENSIVE PLAN, 2013 Edition AREA IV Franconia-Springfield Area and Fort Belvoir North Area, Amended through 10-20-2015 Franconia Springfield Area Area-wide Recommendations Page 18*

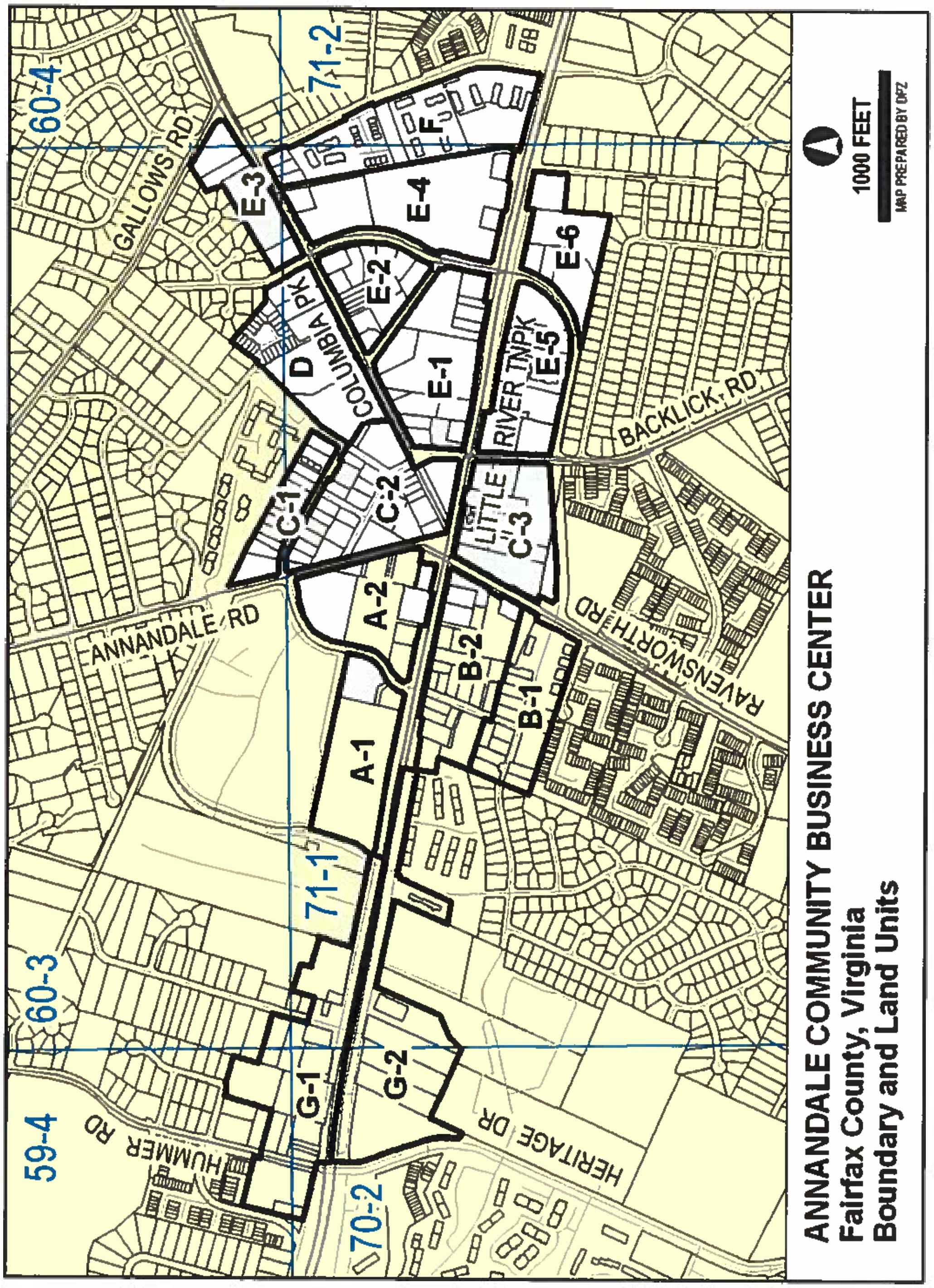

ANNANDALE COMMUNITY BUSINESS CENTER
Fairfax County, Virginia
Boundary and Land Units
1000 FEET
MAP PREPARED BY DPZ
60-4
71-2
71-1
60-3
59-4
70-2
GALLOWS RD
COLUMBIA PK
RIVER TNPK
BACKLICK RD
LITTLE RIVER TNPK
ANNANDALE RD
RAVENSWORTH RD
HUMMER RD
HERITAGE DR
A-1
A-2
B-1
B-2
C-1
C-2
C-3
D
E-1
E-2
E-3
E-4
E-5
E-6
F
G-1
G-2

FIGURE 15

- Pending the results of additional transportation analysis, the option of constructing a dual-lane roundabout at the intersection of Columbia Pike, Backlick Road and Maple Place should be considered, subject to review and approval by both the county and the Virginia Central Office Roundabout Review Committee. Transportation analysis indicates a roundabout at this location could provide better intersection operations than a conventional signalized intersection as the potential for queuing in the northbound direction is reduced and access to Columbia Pike to the south is improved. Additional, more detailed traffic and design study should be conducted with consideration given to the roundabout configuration regarding the number of lanes and relative location of nearby parcel access points, signage, and provisions for pedestrian crossings.

Bicycle Facilities

As indicated above, transportation in Fairfax County focuses on an extensive multi-modal system. In addition to roadways and transit, Fairfax County relies on a network of sidewalks and trails, including those for bicycles. Bicycle lanes should be provided within the Annandale CBC where appropriate.

In 2006, the Board of Supervisors approved a comprehensive bicycle initiative, designed to encourage bicycling and make Fairfax County bicycle friendly and safe. Among the elements of the program are that new streets be designed and older streets retro-fitted to better accommodate bicycles; transit options should become bike friendly with the addition of buses equipped with bicycle racks; ample safe, secure, and convenient bicycle parking should be installed Countywide; comprehensive way finding signage should provide guidance and information about destinations and paths; and a network of interconnected shared use paths, interfacing with an on-road bike network, should provide a cohesive and connected transportation environment conducive to bicycling. Revitalization and redevelopment within the Annandale CBC affords an opportunity to incorporate these elements of bicycling, making Annandale a bicycle friendly community.

A Bicycle Master Plan for the county has been initiated. Once completed, bicycle routes in, around, and through the revitalization area will be specified, and the general guidance provided here will be updated with these specifics. Bicycle Parking Standards for the county are also currently being developed. In the interim, until finalization and adoption of these standards, assistance with the calculation and placement of bicycle parking provisions is available from staff of the Fairfax County Department of Transportation Bicycle Program during the development process.

Level of Service (LOS) and Transportation Demand Management (TDM)

Level of Service

An overall Level of Service (LOS) 'D' goal is desired for the arterials and an overall minimum LOS 'E' is desired for collectors and local streets in the Annandale CBC. At locations where these standards cannot be attained or maintained with planned development, remedies should be proposed to offset impacts using the tiered approach described below.

Impacts on Transit, Pedestrian, and Bicycle Facilities

A high level of service should be maintained for pedestrians and cyclists, including safety and security, direct pathways, reasonable grades, and minimized delays at intersections. A high level of service should be maintained for transit users that minimizes delay, the need for transfers, and transfer delay. Where it is not possible to maintain a high level of transit service because of extraordinarily high costs, monetary contributions to a fund for the eventual improvement of transit service should be provided in lieu of the maintenance of a high quality transit service.

Transportation Demand Management (TDM) refers to a variety of strategies aimed at reducing the demand on the road system, particularly by reducing single occupant vehicles during peak periods, and expanding the choices available to residents, employees, shoppers and visitors. The result is more efficient use of the overall existing transportation system.

A broad, systematic, and integrated program of TDM strategies throughout the Annandale CBC can reduce peak period single occupancy vehicle trips by increasing the percentage of travelers using transit and non-vehicular modes of transportation. TDM programs should embrace the latest information technology techniques to encourage teleworking, provide sufficient information to enable commuters and other trip makers to choose travel modes and travel times.

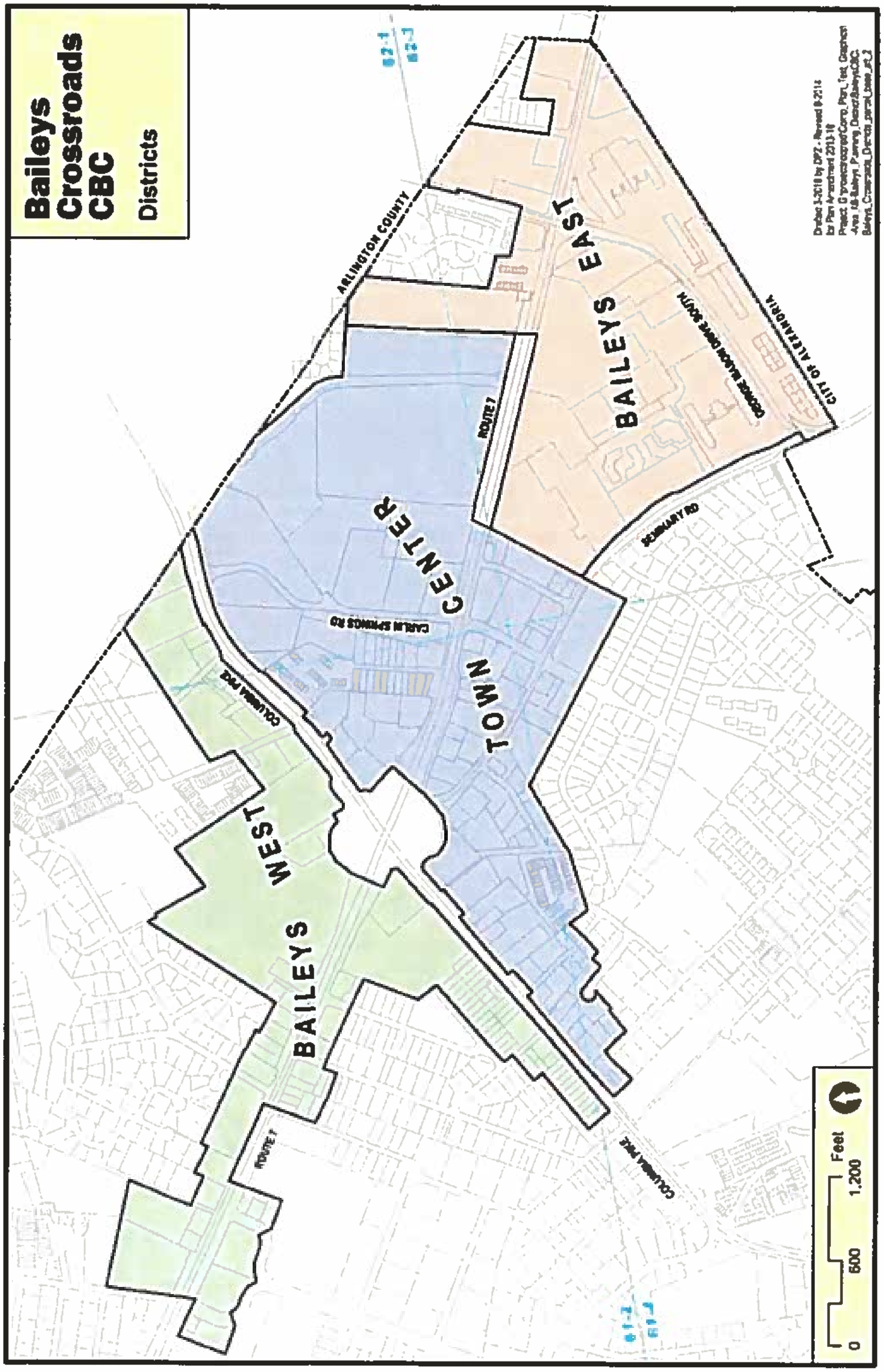
TDM programs should be encouraged, established, and implemented as part of all development proposals. Examples of TDM measures are contained in the county's Policy Plan and include the following:

- Parking reductions
- Transit and vanpool subsidies
- Pre-tax deduction of transit and vanpool fares
- Carpool and vanpool preferential parking
- Telework programs
- Shower and locker facilities for bicyclists and walkers
- Secure and weatherproof parking
- On-site car-sharing vehicles
- Employee shuttles
- Guaranteed Ride Home Program
- Commuter information center
- Employee Transportation Coordinator
- Flexible or alternative work hours
- TDM education programs
- Transportation Demand Agency to coordinate TDM efforts

TDM implementation plans should include at least the following:

- Phased trip reduction goals (developed in conjunction with FCDOT)
- Evaluations of potential TDM measures
- Listing of TDM measures to be provided
- Listing of alternate TDM measures which may be provided
- Implementation budgets
- Monitoring arrangements and associated remedial and contingency plans/funds to be utilized if TDM goals are not met

MAP 2


Baileys Crossroads CBC
Districts
BAILEYS EAST
TOWN CENTER
BAILEYS WEST
ARLINGTON COUNTY
CITY OF ALEXANDRIA
GEORGE MASON DRIVE SOUTH
ROUTE 7
SEMINARY RD
CARLIN SPRINGS RD
COLUMBIA PIKE
0
600
1,200
Feet

5. *Local Streets (Local)* - Local streets in this area include the internal circulation roads and the new planned streets which connect the land uses to collector roads and allow internal circulation.

   Curb to Curb Area:
   - Medians should only be required when they are part of the urban design concept and the landscape or open space plan.
   - 1 travel lane per direction (11 feet for each lane; however, 10 feet travel lane widths may be considered for residential streets.)
   - 8 feet for on-street parking per direction
   - Local streets are low speed facilities that may not require marked bike lanes but can be defined using bicycle signage and shared lane markings.

Bicycle Facilities

Map 4 shows a conceptual bicycle network. While bicycle facilities are shown on Leesburg Pike and Columbia Pike, there will be no separate bike lane on either of these roads; however, the curb lane will be wider to accommodate bikes.

On-road bike lanes should be provided on Carlin Springs Road, Seminary Road, Lacy Boulevard, South Jefferson Street, South George Mason Drive, and a new street that connects Carlin Springs Road and South Jefferson Street. Bicycle facilities are graphically depicted in Map 4 and in the Streetscape Design section. Text descriptions are located in the Street Types and Design Guidelines under the Road Network and Circulation section. In an effort to encourage bicycling in Baileys Crossroads CBC, safe, secure, and convenient bicycle parking should be provided. The number of bicycle parking spaces should be determined based on the planned land uses.

Level of Service

Level of Service for Roads

The Baileys Crossroads CBC has two major thoroughfares and while the intent is to maximize the use of non-vehicular modes of transportation, there is still the need to allow vehicles to circulate through, within, and around the CBC in a safe and efficient manner. It is recommended that an overall Level of Service (LOS) 'D' or better be maintained at intersections and roadways segments along Leesburg Pike and LOS E or better throughout the rest of the Baileys CBC area.

Level of Service for Transit, Pedestrian, and Bicycle Facilities

A high level of service should be maintained for transit users that minimizes wait times betweens on the transportation mode and when switching between modes. Where it is not possible to maintain a high level of transit service because of extraordinarily high costs, monetary contributions to a fund for the eventual improvement of transit service should be provided in lieu of the maintenance of a high quality transit service. An acceptable level of transit service nevertheless needs to be maintained. A high level of service should be maintained for pedestrians and cyclists, including safety and security, direct pathways, reasonable grades, and minimized delays at intersections especially within a quarter mile of the stations.

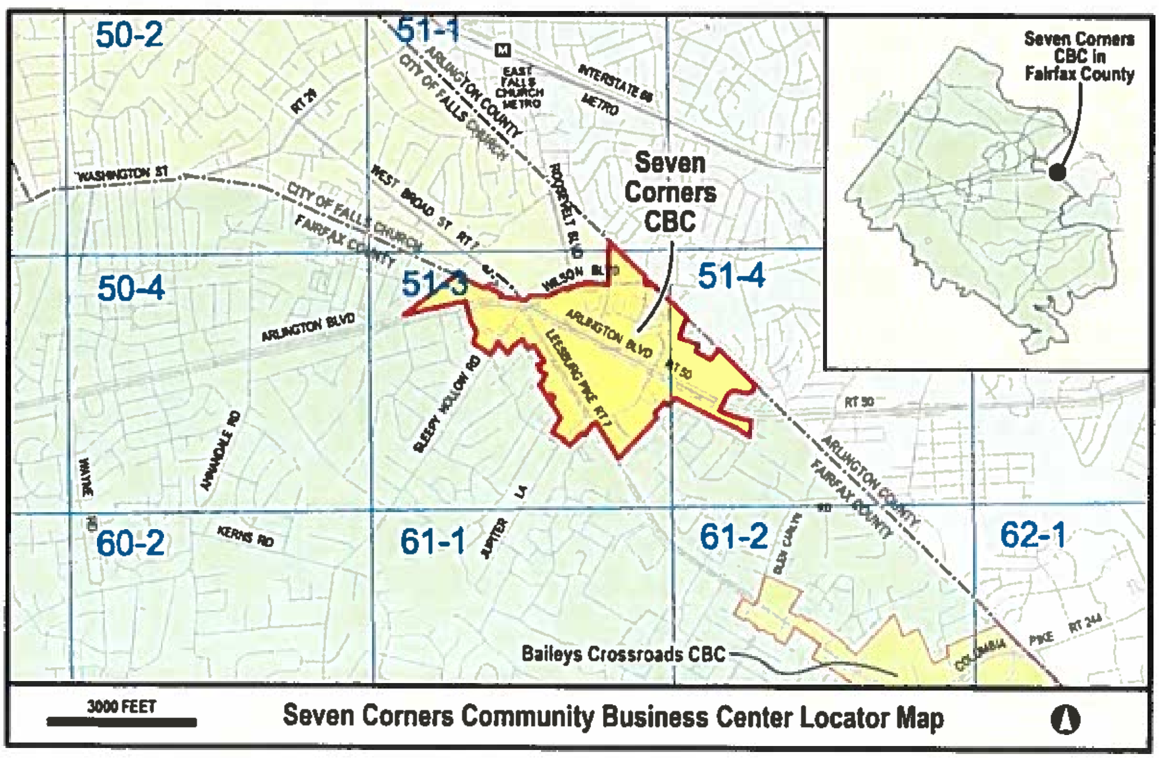
SEVEN CORNERS COMMUNITY BUSINESS CENTER

LOCATION AND CHARACTER

The Seven Corners Community Business Center (CBC) is a gateway to Fairfax County from both Arlington County and the city of Falls Church. The CBC (see Figure 23) is centered on the intersection of three regional commuter routes: Arlington Boulevard (Route 50), Leesburg Pike (Route 7), and Wilson Boulevard/Sleepy Hollow Road. The convergence of these major routes forms the multi-cornered interchange from which the CBC derives its name. The Seven Corners CBC is a vibrant and culturally diverse community that includes approximately 218 acres. Although dominated by the Seven Corners Shopping Center, Willston I and Willston II Shopping Centers, and The Corner at Seven Corners, the CBC also contains two high rise office towers, lower scale office buildings and a variety of residential uses including garden style complexes and townhouse neighborhoods. Surrounding the CBC are stable residential communities with a variety of densities, and a number of retail, automobile sales and service, and office uses located in the City of Falls Church which, with Arlington County, forms the northern and eastern boundaries of the CBC.

The Seven Corners Shopping Center is a dominant focal point of the area and is considered both locally and regionally as the "center" of the Seven Corners CBC. The automobile orientation of this landmark, the complicated Seven Corners interchange itself, and the concentration of other highway-oriented, commercial development pose significant challenges to creating a strong sense of place.

Figure 23 – Seven Corners CBC Locator Map



beyond walking distance from transit stops. They should also provide Seven Corners residents and workers the ability to travel within Seven Corners and beyond without the need to own or use a private vehicle. Some transportation services such as bike sharing, car sharing, and other personal transportation devices can be provided by the private sector.

Wayfinding

An effective wayfinding system is integral to urban design since it enhances the comprehension and use of the built environment. A wayfinding system should be provided and should:

- Guide vehicular, bicycle and pedestrian traffic to through and around the Seven Corners interchange prior to altering the interchange and then after the interchange has been reconstructed for ease of use.

- Guide vehicular, bicycle and pedestrian traffic to primary public, cultural, and recreational locations while providing a unified design standard and expressing a sense of place.

- Deliver information at locations where it is most needed.

- Guide transit passengers to main destinations within walking distance and to locations where feeder-distributor modes, such as a circulator, can be accessed to reach destinations beyond walking distance.

- Identify bikeable routes and provide bike route destinations and distance information. Provide consistent, clear, and attractive signage that is easy to maintain.

- Include stakeholder involvement in the design of the system.

Level of Service

An overall LOS E goal should be maintained for the street network in Seven Corners, except at intersections and roadways segments along Leesburg Pike and Arlington Boulevard, where LOS D should be maintained. At locations, other than on Arlington Boulevard and Leesburg Pike, where a LOS E standard cannot be attained or maintained with planned development, remedies should be proposed to offset impacts using the tiered approach described below. The purpose of this tiered approach is to support implementation of the expanded network of streets, which is more typical of urban areas and improves mobility for pedestrians and bicyclists. In the development review process, mitigation of problem locations should follow the following sequence:

1. First, determine whether addition of capacity and/or increased operational efficiency is possible to achieve without decreasing pedestrian walkability and safety. The widening of roads by adding exclusive turn lanes and/or through lanes will in most cases will not be desirable since it will increase street widths at intersections and therefore work against an attractive environment for pedestrians. In lieu of the addition of lanes, it is preferable to add links to the network of streets, where applicable, to expand connectivity, to create additional diversionary paths for vehicles, and in so doing, to decrease the traffic at problem locations in the vicinity of a proposed development.

2. Failing that, decrease future site-generated traffic by: changing the mix of land use within the parameters of the applicable land use guidelines for Seven Corners (e.g., replacing office or retail uses with residential and possibly hotel use), increasing transit use through provision of additional and improved services, and/or optimizing the application of TDM measures which might include greater transit use, walking, bicycling ridesharing and flexible working hours.

3. If the previous measures do not provide adequate improvement of LOS, a development proposal or phase of development may need to be conditioned on completion of offsetting improvements. Financial contributions of significant value dedicated to addressing deficiencies in the Seven Corners area may be considered as an offsetting improvement. These contributions may not be used as a credit against other contributions toward off-site transportation improvements.

4. A high LOS should be maintained for pedestrians, bicyclists and transit users, including safety and security, direct pathways, reasonable grades, minimized delays at intersections, reduced need for transfers, and transfer delay. Where it is not possible to maintain a high LOS for pedestrians, bicyclists and transit users, because of extraordinarily high costs, monetary contributions to a fund for the eventual improvement of pedestrian and bicycle facilities, as well as transit service, should be provided.

Transportation Demand Management

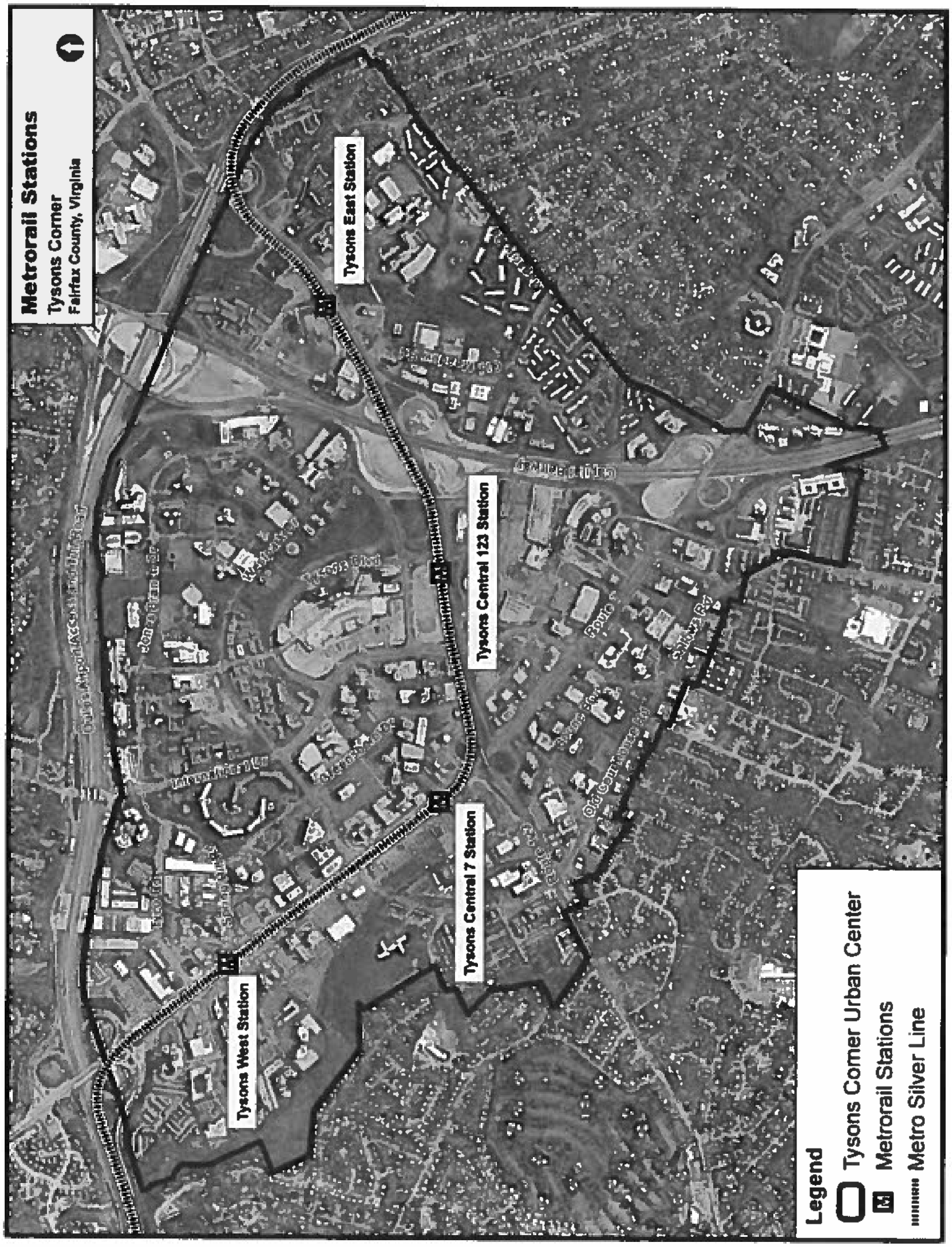
Transportation Demand Management refers to a variety of strategies aimed at reducing the demand on the transportation system, particularly to reducing single occupant vehicles during peak periods, and expanding the choices available to residents, employees, shoppers and visitors. The result is more efficient use of the existing transportation system. Transportation Demand Management is a critical component of this Plan. Traffic needs to be minimized to decrease congestion within Seven Corners, to create livable and walkable spaces, and to minimize the effects of traffic on neighboring communities.

A broad, systematic, and integrated program of TDM strategies throughout Seven Corners can reduce peak period single occupancy vehicle trips, as well as increase the percentage of travelers using transit and nonvehicular modes of transportation. TDM programs should embrace the latest information technology techniques to encourage teleworking, provide sufficient information to enable commuters and other trip makers to choose travel modes and travel times, or decide if travel is actually necessary at that time.

The objective of a successful TDM program for Seven Corners is to reduce the number of single occupant vehicle trips. These reductions are based on Institute of Transportation Engineers' (ITE) peak hour trip generation rates. The vehicle trip reduction goals for commercial and residential development are 35 percent to 25 percent and 25 percent to 15 percent, respectively.

Parking Management

To facilitate the achievement of TDM goals and encourage transit use, shared parking for uses which have different peak demand periods, instituting paid parking, or other parking reduction strategies are encouraged. Additionally, shared parking between similar uses with both existing and new buildings should be explored, especially if the existing use is over parked. These parking strategies can serve to reduce vehicle trips and increase the cost-effectiveness of the provision of parking. A parking plan should be submitted along with a


Metrorail Stations
Tysons Corner
Fairfax County, Virginia
Tysons East Station
Tysons Central 123 Station
Tysons Central 7 Station
Tysons West Station
Legend
Tysons Corner Urban Center
Metrorail Stations
Metro Silver Line

MAP 1

- Include stakeholder involvement in the design of the system.
- Include signs that are designed to easily accommodate changes in the venues listed on the signs.
- Include real-time parking availability information.

Detailed guidelines for wayfinding signage will be addressed in the forthcoming Tysons urban design guidelines.

Level of Service

Impacts on Roads

An overall Level of Service (LOS) 'E' goal is expected for the street network in Tysons Corner. At locations where a LOS E standard cannot be attained or maintained with planned development, remedies should be proposed to offset impacts using the tiered approach described below. The purpose of this tiered approach is to support implementation of the grid of streets, which is more typical of urban areas and improves mobility for pedestrians and bicyclists.

In the development review process, mitigation of problem locations should follow the following sequence:

1. First, determine whether addition of capacity and/or increased operational efficiency is possible to achieve without decreasing pedestrian walkability and safety. The widening of roads by adding exclusive turn lanes and/or through lanes will in most cases not be desirable since it will increase street widths at intersections and therefore work against an attractive environment for pedestrians. In lieu of the addition of lanes, it is preferable to add links to the grid of streets where applicable and possible to promote the build out of the grid of streets and to create additional diversionary paths for vehicles, and in so doing, to decrease the traffic at problem locations in the vicinity of a proposed development.

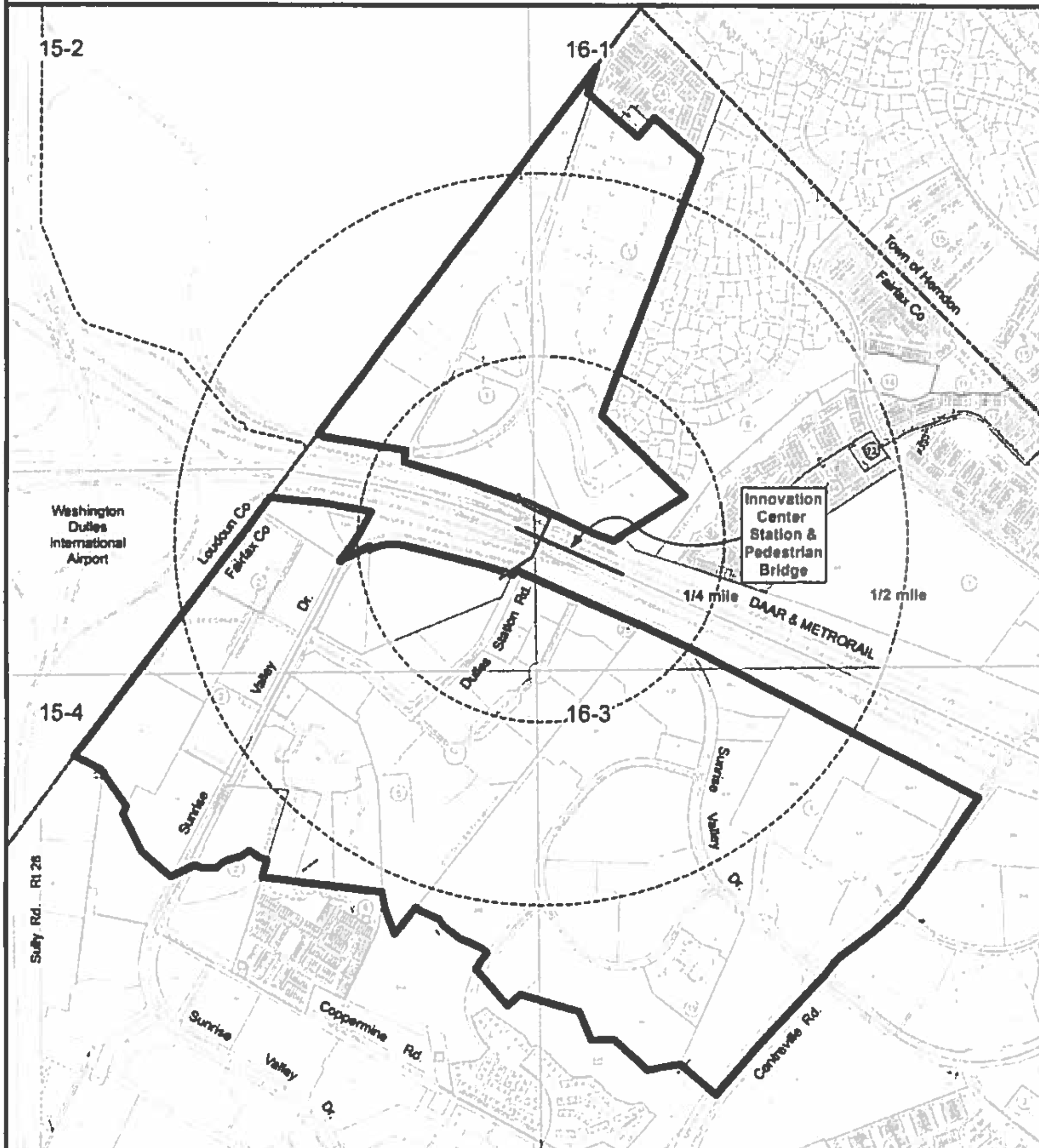
2. Failing that, decrease future site-generated traffic by: changing the mix of land use within the parameters of the applicable land use guidelines for Tysons (e.g., replacing office or retail uses with residential use), increasing transit use through provision of additional and improved services, and/or optimizing the application of TDM measures which might include greater transit use, walking and bicycling.

3. If the previous measures do not provide adequate improvement of LOS, a development proposal or phase of development may need to be conditioned on completion of offsetting improvements. Financial contributions of significant value dedicated to addressing deficiencies in the Tysons area may be considered as an offsetting improvement. These contributions may not be used as a credit against other contributions toward off-site transportation improvements.

Impacts on Transit, Pedestrian, and Bicycle Facilities

A high level of service should be maintained for transit users that minimizes delay, the need for transfers, and transfer delay. Where it is not possible to maintain a high level of transit service because of extraordinarily high costs, monetary contributions to a fund for the eventual improvement of transit service should be provided in lieu of the maintenance of a high quality transit service. An acceptable level of transit service nevertheless needs to be maintained.

INNOVATION CENTER TRANSIT STATION AREA



1000 FEET

PREPARED BY THE DEPARTMENT OF PLANNING AND ZONING USING FAIRFAX COUNTY GIS PARCEL INFORMATION CURRENT TO DECEMBER 2013

FIGURE 13

Monitoring System

Maintaining a balance between land use and transportation is dependent on a number of factors. The transportation infrastructure, modal split levels, and vehicle trip reduction levels needed to maintain this balance have been analyzed extensively based on known conditions at the time of developing this Plan guidance. However, these conditions might change in the future which could result in changes in the number, frequency or direction of vehicle trips. For this reason, it is considered essential to monitor built and approved development and vehicle trips in the area over time and determine if the balance of development over time, vehicle trips and delay and the provision of transportation infrastructure have been maintained. This review should occur at least every five years or based on changes in circumstances and should be the primary responsibility of the county with survey input and assistance from landowners and tenants where available.

Public Transportation

Metrorail - The introduction of Metrorail service along the Dulles Airport Access Road and Toll Road is an integral factor to providing increased mobility and reducing vehicle dependency for employees and residents in this area. Focusing the densest development around the Innovation Center Metrorail station is vital to promote the use of public transportation and achieving the vision for Land Unit A.

Local Bus Service - There is existing Fairfax Connector bus service that serves both local riders and people commuting through Land Unit A. These routes will be modified to provide convenient and reliable feeder service to the surrounding area from the Innovation Center Station.

Road Network and Circulation

The road network and circulation recommendations provide additional transportation guidance and recommendations for development within Land Unit A. For new streets not built to their full cross-section, right-of-way should be provided for the ultimate cross-section including pedestrian and bicycle facilities as identified in the Plan. The streets should provide a level of connectivity and accommodate all modes of transportation to the fullest extent possible. Road planning should balance the efficiency of through movements with the need for reasonable access to existing and planned uses. Existing property access points should be retained to the greatest extent possible.

In the planning and design of transportation projects, it will be necessary to balance the competing needs of many stakeholders starting in the earliest stages of project development. The design of a facility should be safe and function for all users regardless of the mode of travel they choose. Flexibility in design may be considered to achieve plan objectives.

Network Level of Service

An overall LOS E is the goal for the intersections within the street network in the Innovation Center TSA. In instances where a LOS E standard cannot be attained or maintained with planned development, remedies should be proposed to offset impacts (using approaches described below) with the purpose of improving mobility for all users within the TSA.

As a first approach, the network should be evaluated to determine if increased operational efficiency is possible to achieve without decreasing pedestrian walkability and safety. The widening of roads by adding exclusive turn lanes and/or through lanes will not be desirable in, some cases, since it will increase street widths at intersections and therefore work against creating an attractive environment for pedestrians. In lieu of additional lanes, it is preferable to add links to the street grid where applicable and possible to promote the build out of the grid of streets and to create additional diversionary paths for vehicles; doing so is intended to decrease the traffic at problem locations in the vicinity of a proposed development. If this approach does not attain the recommended LOS, or is not feasible, other approaches should be considered, such as:

- Decrease future site-generated traffic by changing the mix of land use within the parameters of the applicable land use guidelines (e.g., replacing a higher peak hour trip generating land use with a lower one).
- Increase transit use through the provision of additional and improved services.
- Optimize the application of TDM measures which might include greater transit use, walking, and bicycling.
- Condition development on the completion of offsetting improvements.
- Consider financial contributions of significant value dedicated to addressing deficiencies in the TSA as on offsetting improvement. These should not be used as a credit against other contributions toward off-site transportation improvements.

Road Transportation Improvements

The following list of roadway network improvements are recommended to achieve the vision for Land Unit A and enhance connectivity through the area by creating multiple and enhanced connections.

- River Birch Road extension to Frying Pan Road
- Additional Centreville Road crossing at McNair Farms Drive
- New bridge over Dulles Toll Road to Loudoun County
- A grid of streets in the Transit Station Area
- Widen or improve Coppermine Road (4 lanes, Sunrise Valley Drive to Centreville Rd)
- Widen or improve Frying Pan Road (6 lanes)
- Widen or improve Sunrise Valley Drive (4 lanes, Centreville Road to Innovation Center Station)
- Widen or improve Centreville Road (6 lanes, Sunrise Valley Drive to Town of Herndon) and maintain and improve pedestrian and bike crossing in proximity to or along Centerville Road.

A fundamental purpose of this conceptual grid of streets is to provide alternative paths for vehicles, pedestrians, and bicyclists and, therefore, reduce congestion and increase connectivity in this area. A conceptual illustration of the enhanced street network is shown on Figure 17. In planning the grid of streets, consideration should be given to avoiding intersections with acute or awkward angles; minimizing exclusive turn lanes; and designing block sizes generally within a 400 foot to 600 foot range. Any block longer than 600 feet should contain a mid-block pedestrian connection where possible.

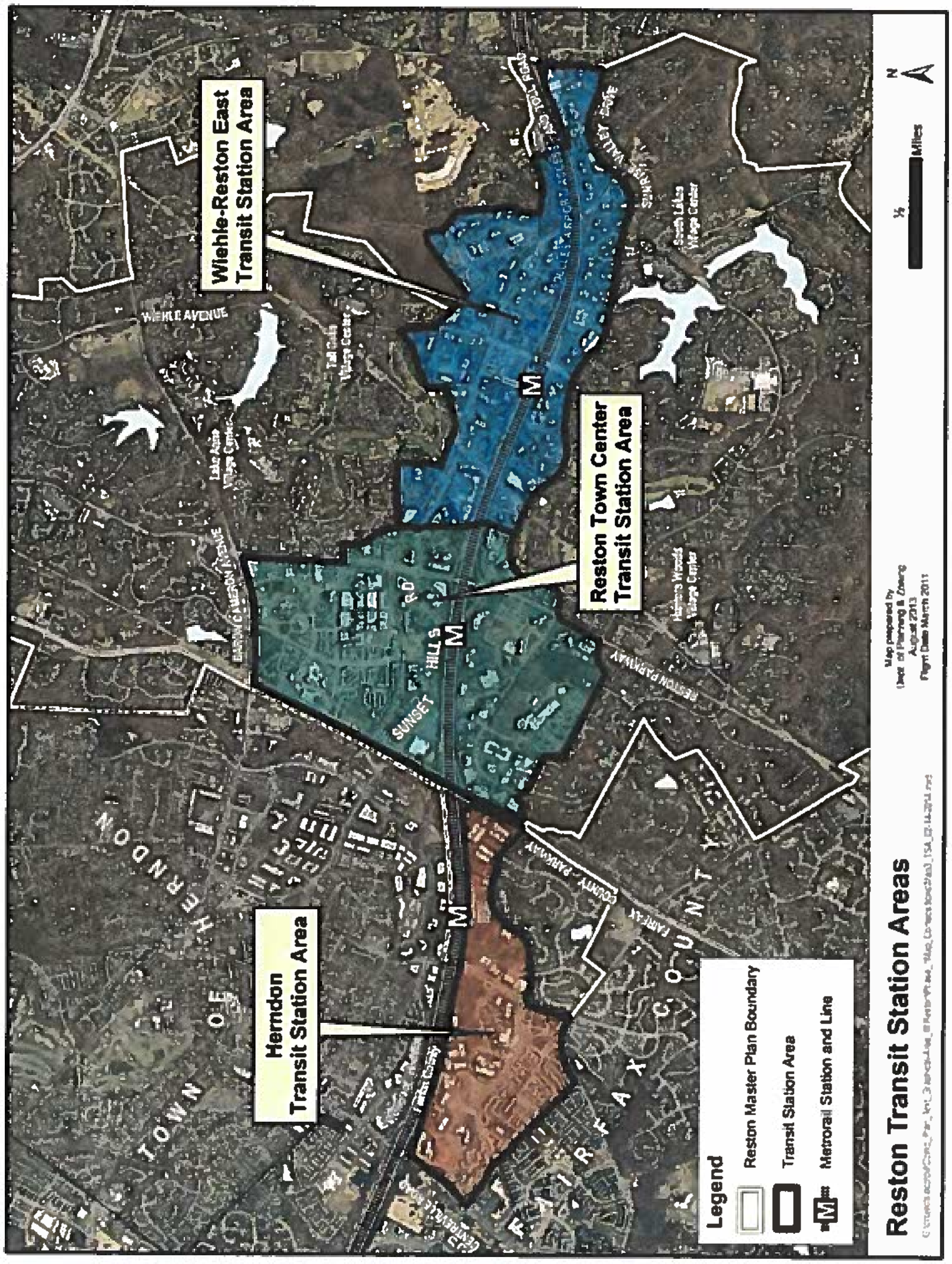


FIGURE 31

RESTON TRANSIT STATION AREAS BOUNDARIES

Public Transportation

Metrorail

The introduction of Metrorail service along the Dulles Airport Access Road and Dulles Toll Road (DAAR, Route 267) is a key component to providing increased mobility and reducing vehicle dependency for employees and residents in the three TSAs. Focusing the highest density development, especially new office development, around the Metrorail stations is vital to promote the use of mass transit and achieving the vision for these TSAs.

Local Bus Service

Fairfax Connector bus service currently serves both local riders and people commuting from the TSAs to other employment centers. These routes will be modified to provide convenient and reliable feeder service from other parts of Reston as well as the outlying communities to the Metrorail stations. There will also be a need for effective service between the TOD areas and between areas on both sides of the DAAR. The Countywide Transit Development Plan provides details regarding planned adjustments to existing routes and new routes to be added.

Road Network and Circulation

The road network and circulation recommendations provide additional transportation guidance for development within the Wiehle-Reston East, Reston Town Center, and Herndon TSAs. As new streets are constructed, right-of-way should be provided for their ultimate configuration including pedestrian and bicycle facilities as identified in the Plan. The streets should provide a high level of connectivity and accommodate all modes of transportation to the fullest extent possible.

Balancing the competing needs of numerous stakeholders will be necessary from the earliest stages in the planning and design of transportation projects. The design of a facility should ensure safety and function appropriately for all users regardless of the mode of travel they choose. Flexibility in design may be considered to achieve Plan objectives.

Network Level of Service

An overall Level of Service (LOS) 'E' is the goal for the intersections within the street network of Reston TSAs. In instances where a LOS E standard cannot be attained or in a TSA with planned development, remedies should be proposed to offset impacts using the tiered approach described below. The purpose of this tiered approach is to maintain a walkable environment and support implementation of the grid of streets, which is more typical of urban areas and improves mobility for pedestrians and bicyclists.

In the development review process, mitigation of problem locations should follow the following sequence:

1. First, determine whether increased operational efficiency is achievable without decreasing pedestrian walkability and safety.

2. If increased operational influence does not result in an acceptable level of service, additional turn and through lanes can be considered on condition that the level of walkability remains acceptable. However, exclusive turn lanes and/or through lanes will

not be desirable in most cases since it will increase street widths at intersections and therefore work against an attractive environment for pedestrians.

3. In lieu of additional lanes, it is preferable to add links to the street grid where applicable with the goal of promoting the build out of the grid of streets. This strategy creates additional diversionary paths for vehicles and decreases the traffic at problem locations in the vicinity of a proposed development.

4. When step 3 is not achievable, decrease future site-generated traffic by (1) changing the mix of land use within the parameters of the applicable land use guidelines (e.g., replacing office or retail uses with residential use); (2) increasing transit use through provision of additional and improved services; and/or, (3) optimizing the application of TDM with measures that might include greater transit use, carpooling, ridesharing, walking and bicycling.

5. If the measures outlined in the previous two steps do not provide adequate improvement of LOS, a development proposal or future phase of development may need to be conditioned on funding or completion of offsetting improvements. Financial contributions of significant value dedicated to addressing deficiencies in the TSA may be considered as an offsetting improvement. These contributions may not be used as a credit against other contributions toward off-site transportation improvements.

Transportation Demand Management

Transportation Demand Management (TDM) refers to a variety of strategies aimed at reducing the demand on the transportation system, particularly reducing single occupant vehicles during peak periods, and expanding the choices available to residents, employees, and visitors. Examples can be found in the county's Policy Plan. The result is a more efficient use of the existing transportation system. TDM is a critical component in achieving the Plan's goal of land use and transportation balance.

The objective of a successful TDM program for the TSAs is to reduce the number of single occupant vehicle trips. These reductions are based on Institute of Transportation Engineers' (ITE) trip generation rates and are to fall within the ranges shown in the TDM Goals (See Figure 44). These goals are the ultimate objective once rail is operational and public transit is in place. The recommendations are for reductions of at least 35 percent for the areas within ¼ mile of the Metrorail stations and at least 30 percent for the areas between ¼ and ½ mile from the Metrorail stations. TDM Goals lower than those shown in Figure 44 may be considered, on an interim basis, prior to the opening of each Transit Station Area's Metrorail Station.

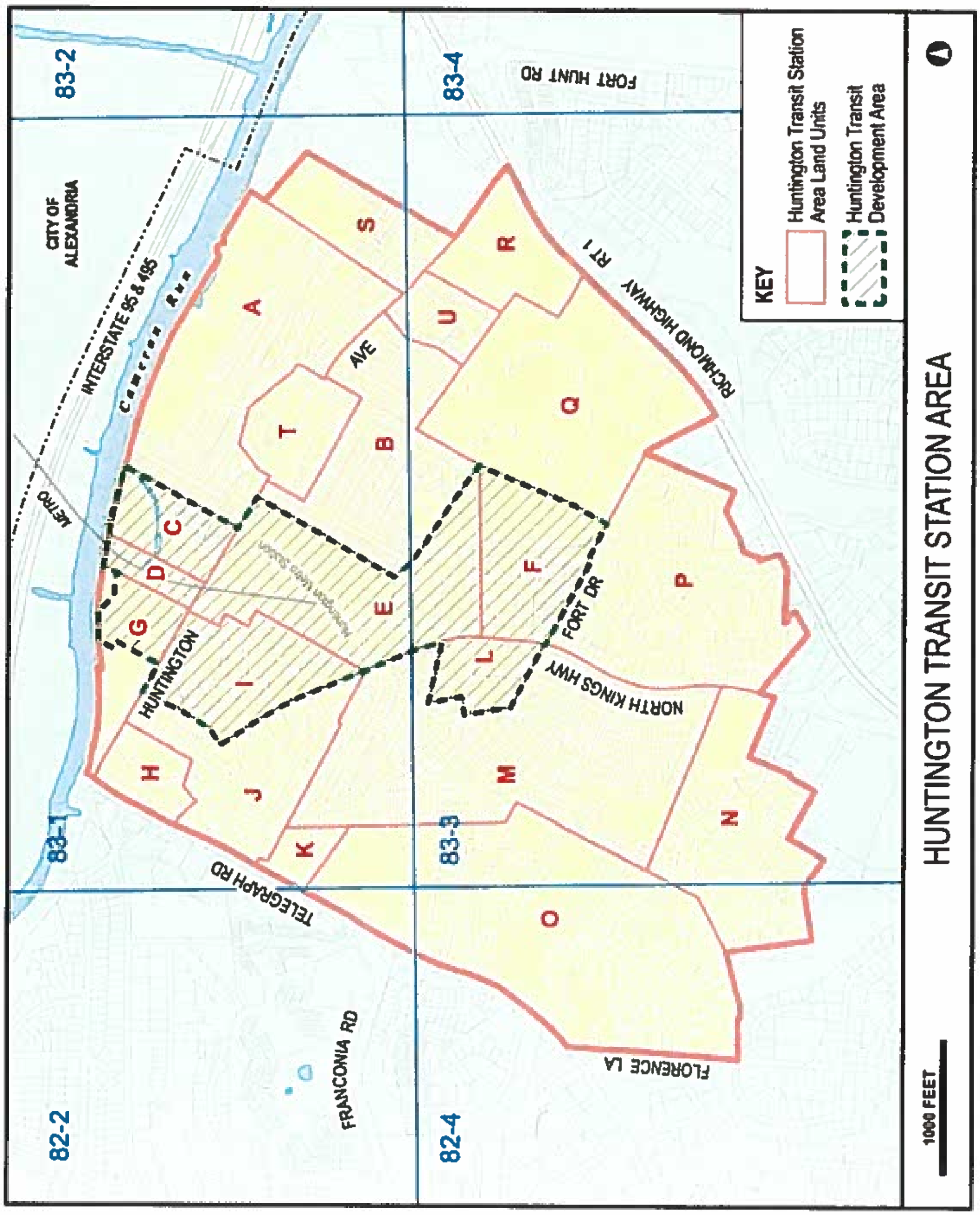

HUNTINGTON TRANSIT STATION AREA
KEY
Huntington Transit Station Area Land Units
Huntington Transit Development Area
1000 FEET
83-2
83-4
83-1
83-3
82-2
82-4
CITY OF ALEXANDRIA
INTERSTATE 95 & 495
Cameron Run
METRO
FORT HUNT RD
RT 1
RICHMOND HIGHWAY
AVE
HUNTINGTON
FORT DR
NORTH KINGS HWY
TELEGRAPH RD
FRANCONIA RD
FLORENCE LA
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U

FIGURE 22

Surface parking lots should be avoided. Creative approaches to reduce the amount of parking provided on site should be considered. Accompanied by a parking analysis, reductions to parking standard minimums should be encouraged with an appropriate mixed use project.

Transportation

Proximity of Land Bay L to the Huntington Metrorail Station should be maximized by creating safe, attractive, and logical pedestrian and bicycle connections to adjacent residential streets and the Metro station. Enhanced pedestrian connectivity from the site to the Metro station is essential to the redevelopment of this site. A well-designed east-west connection should provide direct pedestrian and bicycle access between the site and the Metro station. A pedestrian circulation plan is also recommended.

The number of vehicular access points along North Kings Highway should be minimized to enhance pedestrian and bicycle accessibility, reduce interruptions to traffic flow, and improve safety. The main vehicular access to the site on North Kings Highway should be reconfigured to align with the Huntington Metro Access Road. Vehicular access is not recommended on Farmington Drive and Monticello Road. Limiting vehicular access to ingress only is the preferred approach on Fort Drive. Consultation with the Fairfax County Department of Transportation (FCDOT), Virginia Department of Transportation (VDOT), and other appropriate agencies will be required to determine whether limited access on Fort Drive is feasible.

In accordance with the Guidelines for Transit Oriented Development, a lower standard for level of delay of Level of Service (LOS) E may be acceptable as a result of redevelopment. If the necessary transportation improvements are found to be in conflict with pedestrian and bicycle access recommendations found in the Guidelines for Transit Oriented Development, improvements, measures and/or monetary contributions to a fund enabling the application of techniques to reduce vehicle trips by an appropriate amount in and around the area should be made.

Given the projected roadway capacity issues in the Huntington Transit Station Area, the number of single occupancy vehicle (SOV) trips made to and from this site should be reduced while encouraging transit ridership. A transportation demand management (TDM) program that includes a TDM trip reduction goal of 30-40 percent should be pursued for the residential and office components of the site. Steps should be taken to encourage carpooling, ridesharing, bicycle and pedestrian use, transit use, teleworking, flexible work schedules, alternative work schedules, parking management and other TDM strategies.

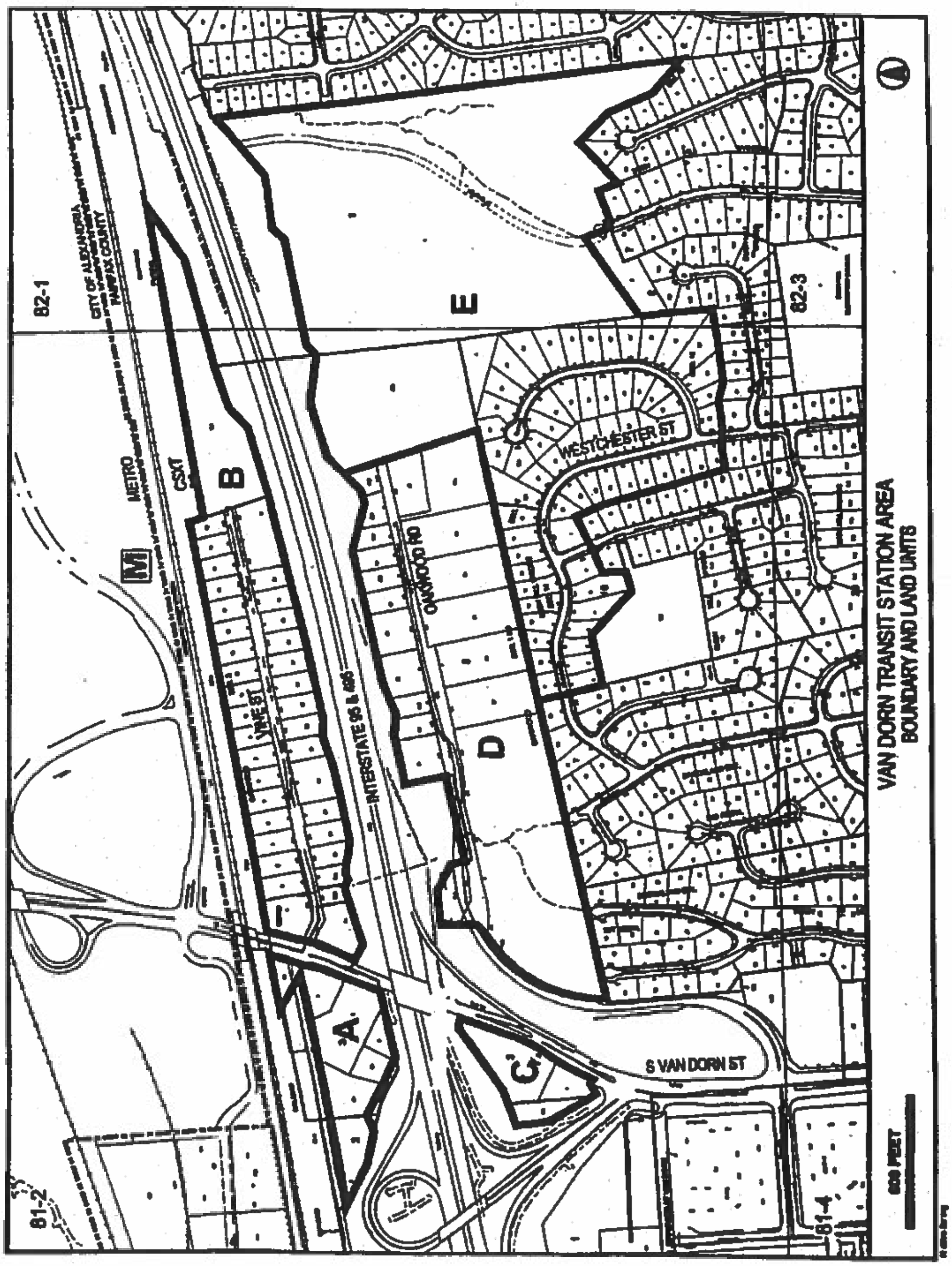
Environment

The Policy Plan's Environment section provides guidance for green building practices and standards applicable to Transit Station Areas. Redevelopment should include sustainable practices in accordance with the Environment section of the Policy Plan.

Stormwater quantity and quality control measures that are substantially more extensive than minimum requirements should be provided, with the goal of reducing the total runoff volume. The emphasis should be on low impact development (LID) techniques and best management practices (BMPs) that evapotranspire water, filter water through vegetation and/or soil, return water into the ground or reuse it, and should include such features as rooftop landscaping.

Stormwater management measures that are sufficient to attain the stormwater design-quantity control credit and stormwater design-quality control credit of the most current version of the Leadership in Energy and Environmental Design for New Construction (LEED-NC) or the Leadership in Energy and Environmental Design for Core and Shell (LEED-CS) rating system

FIGURE 8


VAN DORN TRANSIT STATION AREA
BOUNDARY AND LAND UNITS
A
B
C
D
E
82-1
82-3
81-2
81-4
METRO
CSXT
CITY OF ALEXANDRIA
FAIRFAX COUNTY
VINE ST
INTERSTATE 95 & 495
OAKWOOD RD
WESTCHESTER ST
S VAN DORN ST

The overall goal in the Van Dorn Transit Station Area is to provide opportunities for appropriate transit-oriented development given access and environmental constraints, while ensuring the continued stability of the existing residential areas which border it to the south and east. In order to achieve this objective, a more urban and pedestrian-oriented development pattern is encouraged. A mix of uses with intensity up to 1.0 FAR is recommended for a large portion of the Transit Station Areas with the Vine Street area identified as the focal point. As further incentive to development in the Vine Street area, an intensity above 1.0 FAR is offered if it maximizes transit use and provides a bridge connection to Oakwood Road. Low- to medium-intensity office use is encouraged in the eastern area of Oakwood Road due to environmental challenges.

In order to achieve the vision for development of the Transit Station Area, the following guidance is recommended in addition to site specific land use recommendations specified in each land unit:

- Provision is made for adequate access in view of impacts of planned transportation improvements in and adjacent to the Transit Station Area. Pedestrian, bicycle, and vehicular traffic should be safely accommodated and encouraged;

- Development should generate a traffic Level-of-Service no worse than "E" (LOS E), at signalized or other access points including a component of Transportation Demand Management which attempts to optimize use of Metrorail to and from the station area;

- Development should be sensitive to environmental characteristics such as steep slopes, stream valleys, eroded areas, marine clays, and noise; and

- Development should provide a compatible transition to the adjacent residential areas.

<u>Design Concept</u>

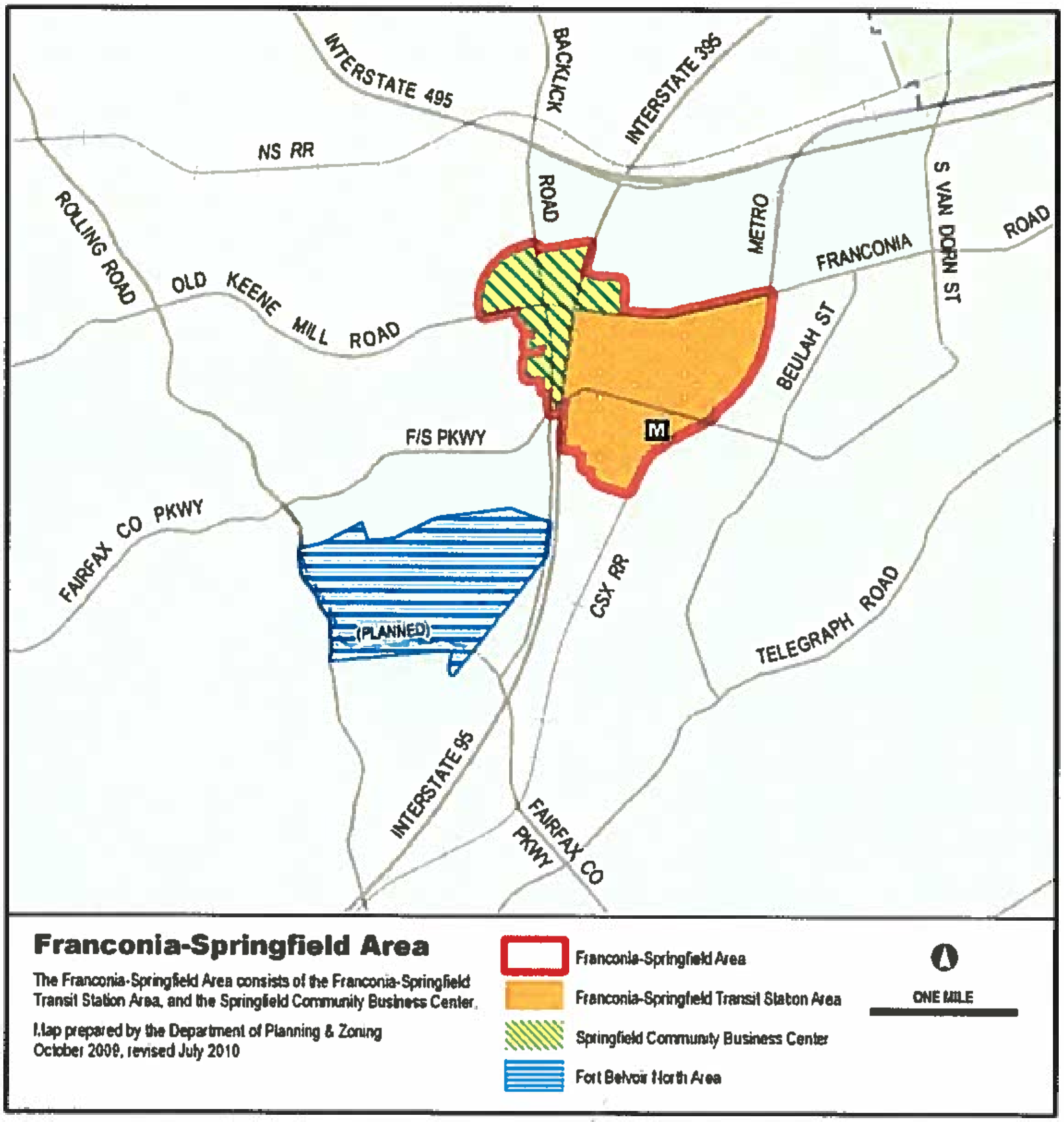
An overall image or an architectural "sense of place" should be created in this highly visible area in order to promote the use of mass transit and to create an attractive gateway to the county. Design measures that unify land units and provide functional and aesthetic connections in the area should be employed. The area along Vine Street with the greatest visibility and accessibility to Metrorail should function as the focal point for the Transit Station Area.

The following guidelines are intended to facilitate accomplishment of the above:

- New development should be clustered in order to accommodate environmental characteristics and to promote a sense of place. The location of buildings and parking should take advantage of unique site-specific attributes. Building height, topography, appropriate architectural style, and open space should be utilized to reduce the impact of new development on existing residential areas as well as create an identity for the Transit Station Area;

- A landmark building or buildings may highlight the land unit. On the south side of the Beltway, density and building height should taper down with the greatest intensity and concentration of buildings centered on Oakwood Road south of the Metro station itself;

- A coordinated circulation system should provide internal connections, as well as ingress and egress to the area. An integrated bicycle and pedestrian system with landscaped open spaces, parks and plazas should provide connections between buildings, streets and different clusters of development, as well as non-motorized access from adjacent residential neighborhoods. In order to increase pedestrian access to and from nearby residential areas, a bridge over the Beltway should be provided in addition to South Van Dorn Street pedestrian routes;



FRANCONIA-SPRINGFIELD AREA AND FORT BELVOIR NORTH AREA **FIGURE 1**

bus riders of all ages and abilities should be able to safely move along and across a complete street. Design elements address safe pedestrian crossings and enhanced pedestrian movement, with the goal of reducing pedestrian and vehicular conflicts and improving accessibility. This approach is recommended to be applied to the redesign and improvement of arterial roadways in the area. The Franconia-Springfield Area Urban Design and Streetscape Guidance, appended to this plan should be used for guidance in the development of these improved street sections and intersections.

Level-of-service E – In order to achieve the multi-modal connectivity goals set forth, while maintaining a balance between vehicular and pedestrian/non-motorized movement in the area, a level-of-service (LOS) E standard is recommended to be applied in assessing transportation system adequacy. A LOS E standard allows more congestion with greater amounts of delay than the general countywide standard of LOS D. Applicants for new development should demonstrate that their proposals meet the LOS E standard when proposing mitigation needed for critical road segments and intersections impacted by the site development. This standard is established in recognition that other improvements will also be made with the goal of creating a more multi-modal transportation system serving the area, including transit, pedestrian and bicycling connectivity improvements. In exchange for establishing a lower vehicle LOS policy for traffic mitigation, commitments should be made by applicants to help bring about the evolution of the Franconia-Springfield Area into a more transit-oriented and walkable activity center.

At locations where conditions are worse than LOS E and cannot be mitigated, remedies should be considered and provided to offset impacts, under the "non degradation" and "offsetting impacts" policies described in the Policy Plan. Where LOS E cannot be attained, mitigation of problem intersections or locations should follow this sequence:

- First, determine whether additional capacity and/or increased operational efficiency is possible;
- Failing that, decrease future site-generated traffic by: reducing the intensity of development, phasing development to minimize adverse impacts, changing the mix of land uses (e.g., replacing office or retail with residential use), increasing transit use through provision of new or improved services, and/or optimizing the application of Transportation Demand Management (TDM) measures that support the use of more transit, walking, and bicycling;
- Failing that, provide appropriate contributions to an area-wide transportation fund established for eventual mitigation of problem locations.

These remedies should be designed to help reduce area traffic, improve future accessibility, and/or add capacity to the transportation system serving the Franconia-Springfield Area. Applying the LOS guidance described above, intersections in and around the area should be improved to the extent possible. Modifications to geometry, lane configuration, timing and operation of signals, and pedestrian accommodations should be provided at these intersections, in order to improve access and safety and minimize traffic congestion.

Public transportation/mode split performance – The land use concept recommended for the Franconia-Springfield Area is based on the assumption that at least 10 percent of trips generated by development will be arriving and departing by public transportation. Implementation of this policy would substantially reduce future peak hour traffic, and is based on achieving the public

ATTACHMENT C
SYNCHRO OUTPUT

Electronic Appendix Only

ATTACHMENT D
REVIEW OF 2046 FORECASTS FOR SOAPSTONE DR

Daily forecasts for Soapstone Drive south of Sunrise Valley Drive were estimated in order to determine the effects of the Build condition on this roadway outside of the immediate study area. Within the study area, immediately north and south of Sunrise Valley Drive, the volumes on Soapstone Drive were obtained directly from the model as the modeled volumes within the study area reflect the detailed adjustments (as described earlier in this report) to the trip tables during the matrix estimation process. Outside of this immediate area, where traffic data sets at the same level of detail were not available to validate/adjust the trip table, model output was adjusted using standard post-processing methods as described in the National Cooperative Highway Research Program (NCHRP) 765 report[11]. The NCHRP methodology considers the absolute difference and percent difference in the model output compared to existing counts in order to refine model output. For this analysis, average annual weekday traffic (AAWDT) data published by VDOT were used in lieu of actual count data. The processing procedure also included manual adjustments based on adjacent land uses and roadway connections. For the Build scenario, adjustments also reflected the model-predicted differences between the No Build and Build conditions.

As shown in **Table D-1**, the Soapstone Connector could add 2,400 vehicles per day (vpd) to Soapstone Drive just south of Sunrise Valley Drive (from 12,400 vpd in the No Build condition to 14,800 vpd in the Build condition). The difference in volumes on Soapstone Drive between the No Build and Build conditions decreases as distance increases from Sunrise Valley Drive south on Soapstone Drive, to approximately 1,000 vpd in the vicinity of Lawyers Road. On an hourly basis, based on rule-of-thumb directional and peak hour factors, the one-way hourly volume difference in the peak hour between the No Build and Build condition would be about 100 to 120 vehicles at the most (and less further south away from Sunrise Valley Drive).

Table D-1. Existing (2015) and Forecast (2046) Daily Volumes on Soapstone Drive

Segment			Bidirectional Daily Forecasts (vehicles per day)					
Road/Link	**From**	**To**	**2015**	**2046 No Build**	**2046 Build**	**No Build Growth (2015-2046)**	**Build Growth (2015-2046)**	**Difference 2046 Build vs No Build**
Soapstone Connector	Sunset Hills Rd	Sunrise Valley Dr	0	0	18,200	0	18,200	18,200
Soapstone Drive	Sunrise Valley Dr	Ridge Heights Rd	11,000	12,400	14,800	1,400	3,800	2,400
Soapstone Drive	Ridge Heights Rd	South Lakes Dr	7,000	8,000	9,500	1,000	2,500	1,500
Soapstone Drive	South Lakes Dr	Glade Dr	7,400	8,400	9,600	1,000	2,200	1,200
Soapstone Drive	Glade Dr	Lawyers Rd	5,000	6,000	7,000	1,000	2,000	1,000
Soapstone Drive	Lawyers Rd	Blue Smoke Tr	500	1,300	1,700	800	1,200	400

[11] National Cooperative Highway Research Program Report 765, Analytical Travel Forecasting Approaches for Project-Level Planning and Design, Transportation Research Board, Washington, D.C., 2014.

ATTACHMENT E
ENVIRONMENTAL TRAFFIC DATA (ENTRADA) OUTPUT

Electronic Appendix Only