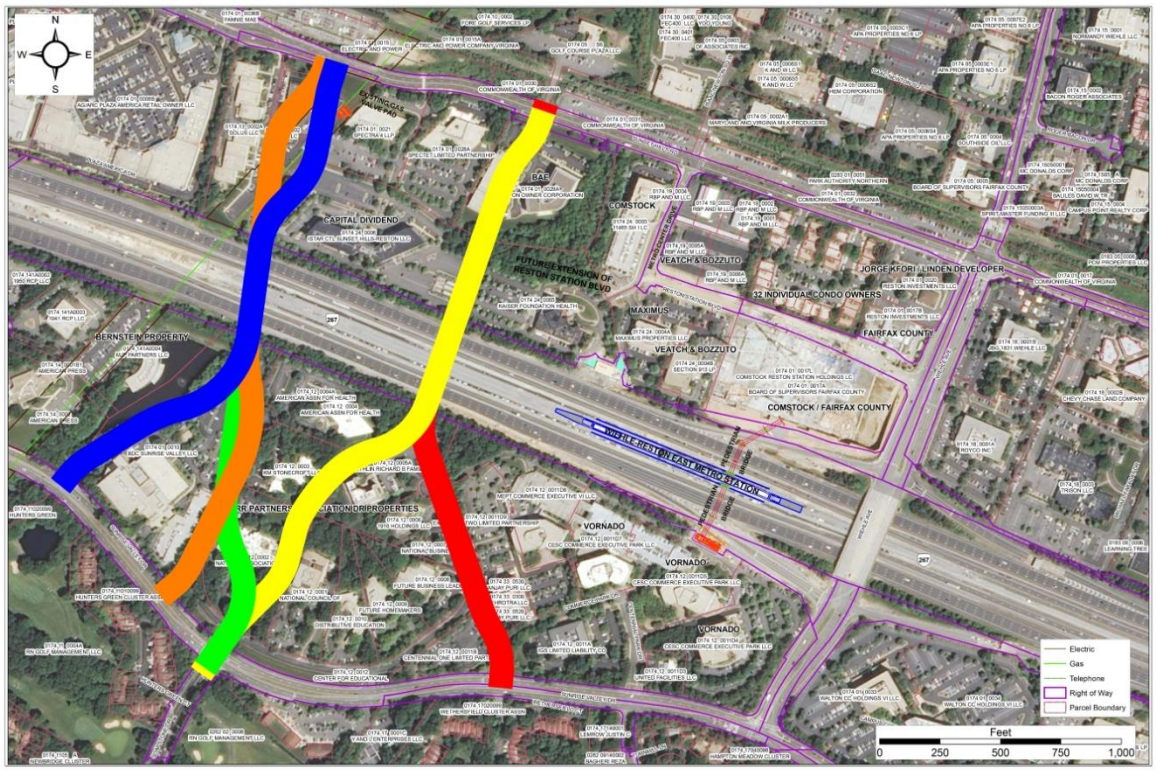
Technical Report

Soapstone Connector Feasibility Study



Prepared by ATCS, plc.,
2553 Dulles View Drive, Herndon, VA 20171, (703) 430-7500
www.atcsplc.com
In association with:
Michael Baker Corporation, Inc.
Athavale Lystad & Associates, Inc., and
MCV Associates, Inc.
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"SOAPSTONE CONNECTOR" FEASIBILITY STUDY

Executive Summary

Background

In 2008, Fairfax County conducted a station access management study of the planned Metrorail Stations at Wiehle Avenue and Reston Parkway. A Reston Metrorail Access Group (RMAG), appointed by Supervisor Hudgins, helped steer that study. The final report, which has become known as the RMAG report, recommended, among other improvements, the construction of a multi-modal roadway connecting Sunset Hills Road and Sunrise Valley Drive, west of the Metrorail Station at Wiehle Avenue. The southern terminus of this road was the intersection of Soapstone Drive and Sunrise Valley Drive. In the RMAG report, the name of the recommended new roadway was the "Soapstone Connector." The RMAG study concluded that the "Soapstone Connector" would have a positive impact on reducing peak period traffic volumes on Wiehle Avenue, improve bicycle access to the Wiehle – Reston East Metrorail Station and to the Washington and Old Dominion (W&OD) Trail, and provide an improved vehicular access for Fairfax County Connector buses and for motorists to the Station's kiss-and-ride, bus transit loading and unloading areas, and the public parking areas, which are on the north side of the Dulles Toll Road. Furthermore, the Soapstone Connector would create needed additional capacity across the Dulles Toll Road and provide another access to the Station area.

With the need for the facility established by the RMAG study, Fairfax County initiated an engineering feasibility study of the Soapstone Connector. The RMAG study was a planning study and the recommendation for the Soapstone Connector, and the original alignment for the new roadway, was not based on detailed data. The original alignment was based on plan view maps only, did not consider the topography of the area, and did not explicitly consider Fairfax County's and VDOT"s roadway design standards. Consequently, while the need had been established, it was unclear whether such a facility was feasible.

Recognizing that the RMAG planning study conducted between 2008 and 2009 did not include any detailed engineering analyses of the Soapstone Connector, Fairfax County sponsored an engineering feasibility study in 2012 to determine the feasibility of the Soapstone Connector. A consultant was engaged to conduct this feasibility study, which included the following objectives:

- Determine the engineering feasibility of multi-modal roadway that would provide a connection for motorists, pedestrians and bicyclists, and transit vehicles between Sunset Hills Road and Sunrise Valley Drive.
- Identify multiple alternative alignments to explore the full range of possibilities for the location of the Soapstone Connector in an area that has many existing buildings, parking garages and surface parking lots.

- Conduct a high-level screening of those alignments to narrow down to limited number of feasible candidate alternatives.
- Develop detailed alternatives, to include the development of vertical profiles, the establishment of intersections and access points on the Connector, and roadway alignment designs for the selected candidate alternatives.
- Conduct a more detailed evaluation of those alternatives and assess those alternatives in terms of traffic, environmental, land use and engineering criteria.
- Conduct traffic analyses of the candidate alternatives.
- Conduct a high-level assessment of the environmental features in the vicinity of the alternatives.
- Develop "rough order of magnitude" construction cost estimates and estimated the amount of new right-of-way that would be needed for the Soapstone Connector to be built on new alignment.
- Identify the most promising alignment(s) for the Soapstone Connector, recognizing that the road would be constructed on new alignment that is currently not owned by either Fairfax County or the Virginia Department of Transportation.
- Conduct a type, size and location (TS&L) analysis of a new bridge over the Dulles Corridor, which includes the Dulles Toll Road, the Dulles International Airport Access Highway and the Metrorail Silver Line.

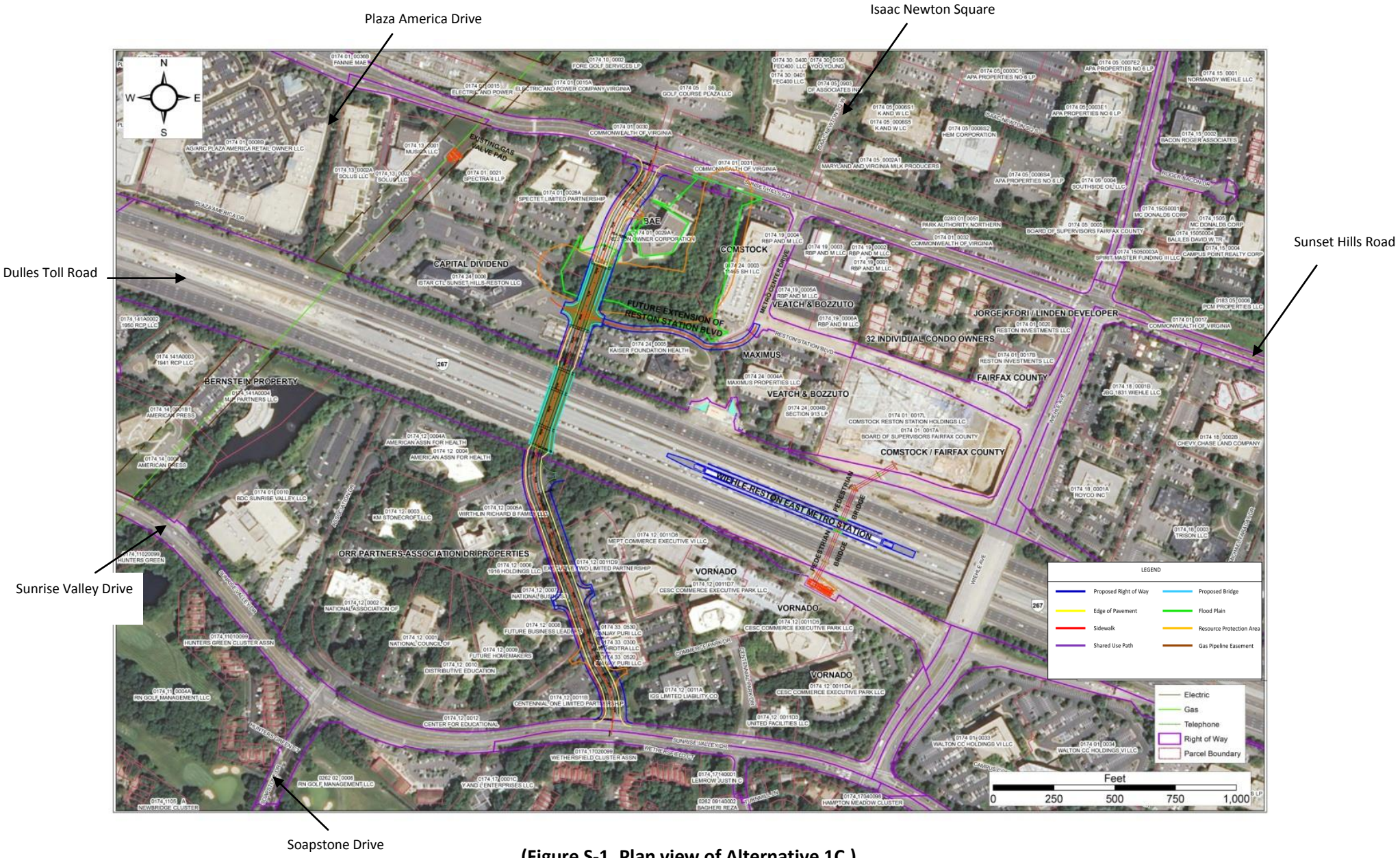
Screening of Candidate Alignments

The feasibility study involved a screening of a wider range of alignments than had been considered in the RMAG study. The typical section used in the screening process was 100 ft- wide, sufficient to provide for four (4) travel lanes, two (2) on-road bicycle lanes, a 10 ft-wide shared use path on the east side and a 5 ft-wide sidewalk on the west side. A total of 30 alignments were identified and screened, based on a qualitative consideration of factors related to traffic impacts, environmental features, existing land use and potential future development/redevelopment, roadway design and constructability, and construction cost indices. On the basis of the screening, five alignments were identified for more detailed assessment. The alignments were then developed into more detailed alternatives in terms of vertical profile, bridge and structural aspects, traffic control and access points.

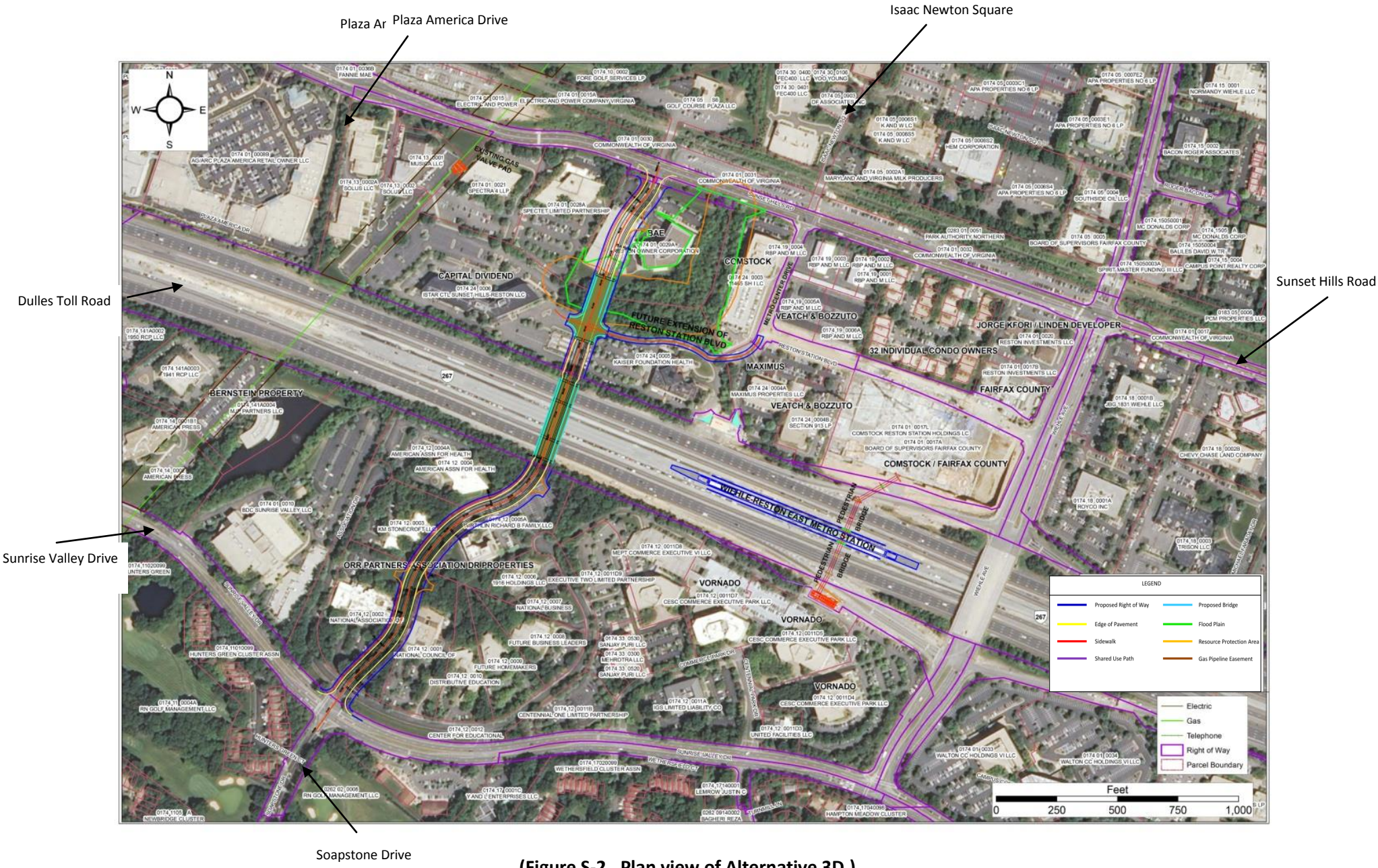
Alternatives

The five alternatives, which varied in terms of alignment and termini on Sunset Hills Road and Sunrise Valley Drive, are shown in Figures S-1 thru S-5. The "Soapstone Connector" was developed to meet the geometric design standards for an Urban Collector (GS-7) with a 30 mph design speed. An 8 percent

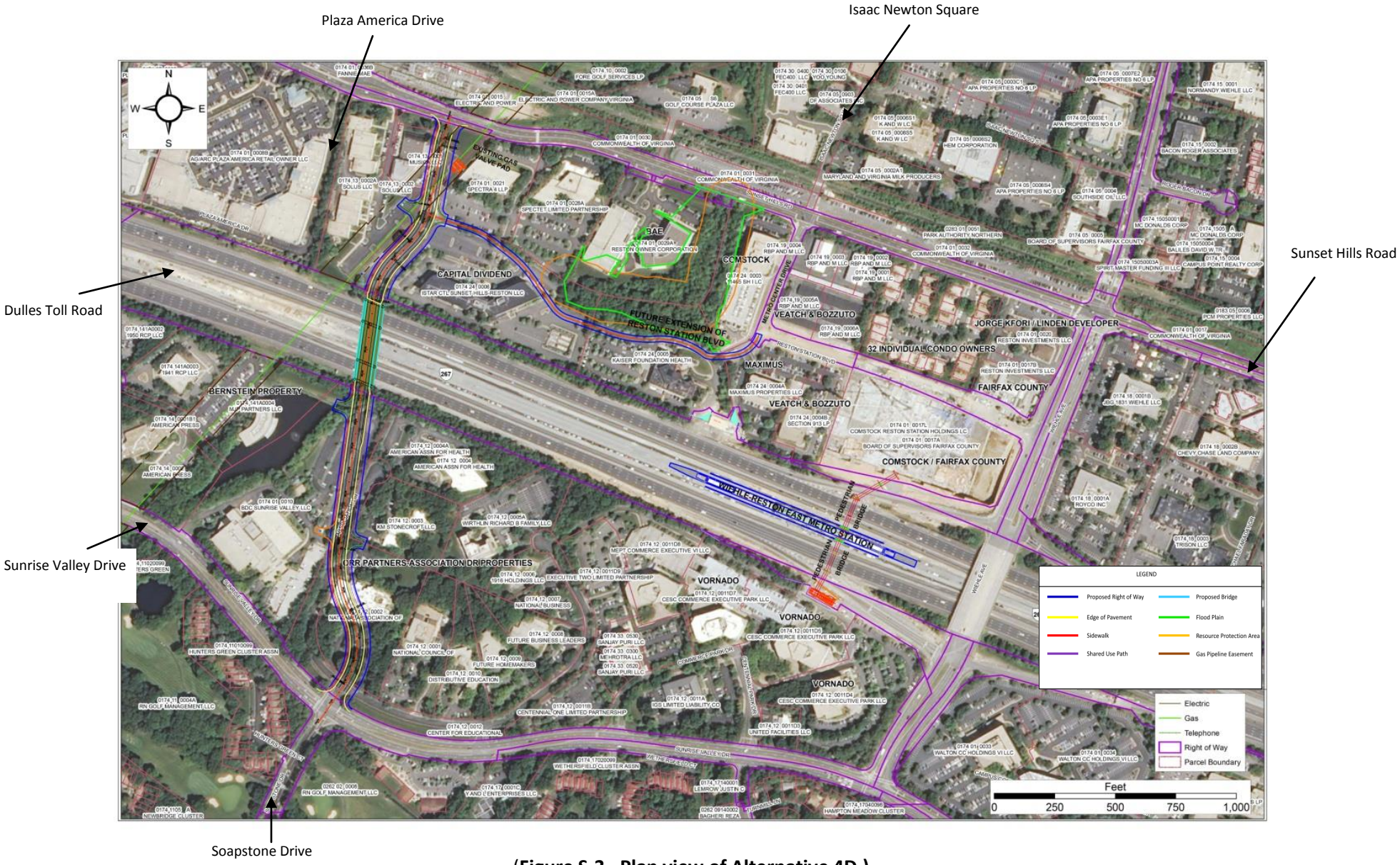
maximum grade was held for this analysis to minimize the height differential between the existing ground and the proposed grade in the area between the Dulles Toll Road and Sunset Hills Road. This meets both the VDOT and AASHTO criteria of 9% maximum grade for an urban collector with a 30 mph design speed. Table S-1 presents a tabular summary of key features of the five alternatives.



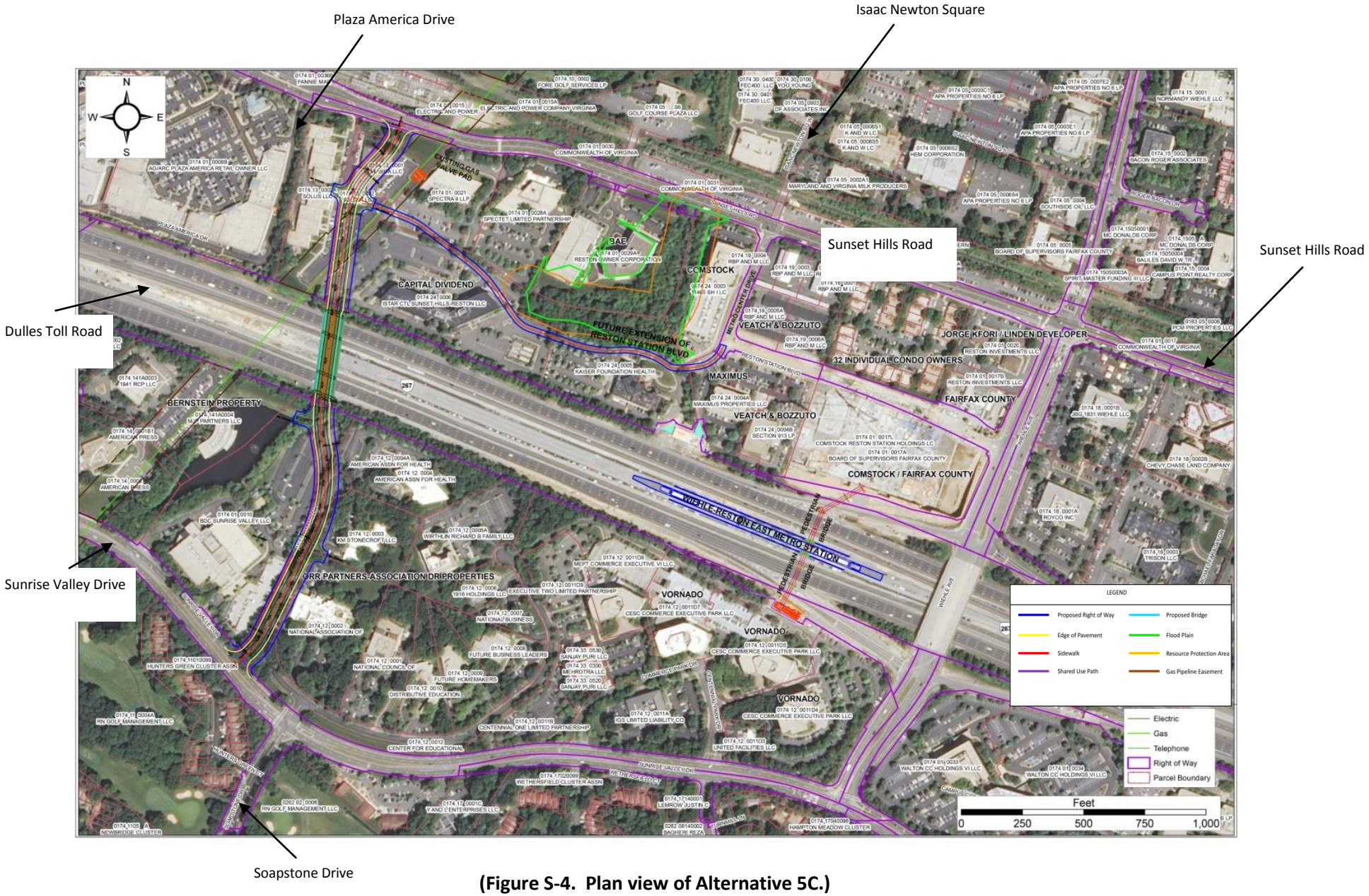
(Figure S-1. Plan view of Alternative 1C.)



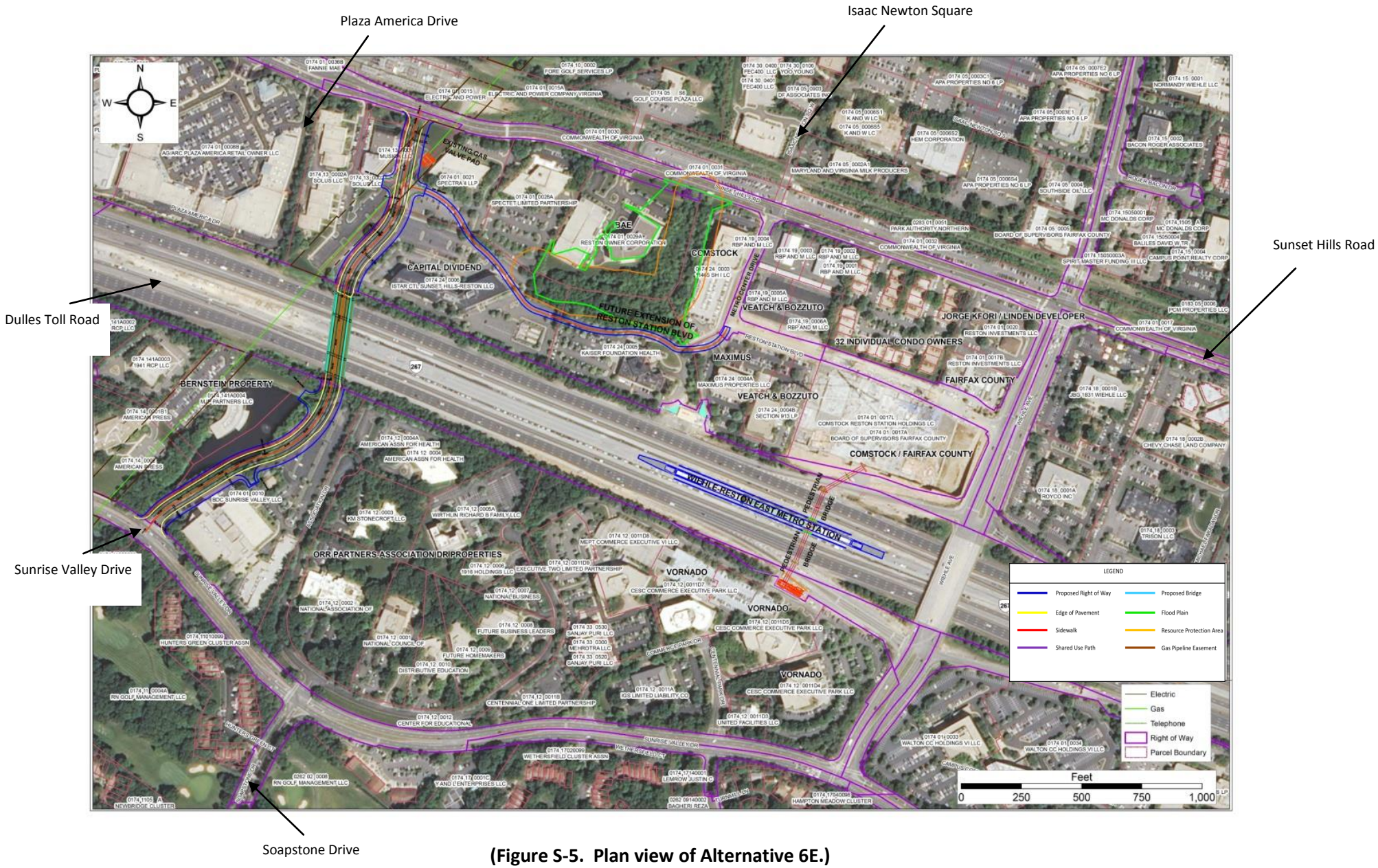
(Figure S-2. Plan view of Alternative 3D.)



(Figure S-3. Plan view of Alternative 4D.)



(Figure S-4. Plan view of Alternative 5C.)



(Figure S-5. Plan view of Alternative 6E.)

(Table S-1. Evaluation Summary of Engineering Factors.)

Alternative	Length of Road (mi)	Number of Bridges	Area of Bridge over DTR (1,000 sf)	Area of Bridge over floodplain (1,000 sf)	Area over Pipeline (1,000 sf)	Length of 8% grade (lineal ft)	Total Length with grade greater than 6 % (lineal ft)	Number of Properties within the 100 ft wide Soapstone Connector Right of Way	Number (Size) of Existing Buildings Demolished (each (1,000 sf))	Number of Parking Garages Demolished
Alt 1C	0.52	2	30.8	20.7	0.0	590	590	14	0	1**
Alt 3D	0.54	2	29.4	20.7	0.0	605	605	9	0	1**
Alt 4D	0.51	1	29.4	0.0	25.4	270	270	7	1 (36K)***	0
Alt 5C	0.46	1	29.9	0.0	21.3	0	215	8	1 (33K)****	0
Alt 6E*	0.45	1	29.8	0.0	25.4	300	300	5	0	0

*Also impacts 755 lin ft of stormwater management pond.
**Parking Structure for BAE Building
***National Association of Secondary School Principals Building
****The Musica LLC Building

Evaluation Results

The five alternatives were evaluated with respect to engineering, environmental, traffic and other considerations. The following summarizes the key results:

- Based on a preliminary Stage 1 Type, Size and Location (TS&L) study, the bridge over the Dulles Corridor, which includes the Toll Road, the Access Highway and the Metrorail Silver Line, is feasible. While the TS&L analysis was done for only one alternative, consistent with the scope for this feasibility study, the results are applicable to all the alternatives. Subject to more detailed structural engineering design, the total length of the bridge would be approximately 375-ft and consist of three spans. The main span would be approximately 160-ft. The flanking span to the south would be 120-ft. The flanking span to the north would be 95-ft in order to meet the vertical alignment for the alternative. The TS&L study showed ten steel plate girders, spaced at 8-ft 8-in, with 2-ft 7-in overhangs. The proposed bridge could have a tangent alignment. Piers could be either drilled shaft or walled piers with spread footers.

- To reduce the overall cost of the project, some sections of the Soapstone Connector would need to be constructed with mechanically stabilized earth (MSE) walls, a common construction technique to reduce the length of more costly bridge structures. The MSE walls could be seen as barrier to on-site circulation for parcels that could be divided by the Soapstone Connector. To mitigate this, a bridge structure could be continued from the Dulles Toll Road (DTR) to a certain minimum vertical height or point that would allow for a vehicle to pass under. Some of the proposed wall heights are beyond 30-ft. Therefore, more detailed geotechnical analyses would be required when a preliminary design project is initiated.

- Based on the engineering assessment, the horizontal and vertical alignment could be designed to meet the geometric design standards of the Virginia Department of Transportation (VDOT) and Fairfax County.

- Alternatives 1C and 3D would require a second bridge over the floodplain and also require the acquisition and demolition of the existing multi-level parking structure accessible from Sunset Hills Road.

- Alternatives 1C and 3D have the longest critical lengths of 8 percent grade among the alternatives evaluated. Alternative 1C has a length of approximately 590 ft, and Alternative 3D has a length of slightly more than 600 ft.

- While none of Alternatives 4D, 5C or 6E would traverse the floodplain impacted by Alternatives 1C and 3D, these three alternatives would traverse the Transcontinental Gas Pipeline Corporation's easement and need to cross over the pipeline, which would require additional

mitigation.

- Alternative 4D would impact the property owned by the National Association of Secondary School Principals (1904 Association Drive) and require the demolition of the existing 36,000 sf office building.

- Alternative 5C would require the demolition of the existing 33,000-sf Musica LLC office building.

- Alternatives 4D and 6E cross the easement for the Transcontinental Gas Pipeline Corporation. The total amount of area of the existing Transcontinental Gas Pipeline easement that would be traversed by the 100 ft wide swath used as a potential ultimate right-of-way for the Soapstone Connector assumed for this feasibility study was approximately 25,000-sf. Alternative 5C crosses the gas pipeline with approximately 21,000-sf of area crossing the Transcontinental Gas Pipeline Easement.

- The alignment for Alternative 6E is parallel and immediately adjacent to an existing stormwater management pond, which is south of the Dulles Toll Road and largely on the property owned by BDC Sunrise Valley, LLC.

- Alternative 5C's vertical alignment, as presently developed, most closely follows the existing ground and is the only alternative that has a maximum grade of less than 8 percent. The maximum grade for alternative 5C is approximately 6 ½ percent.

- Comparing the impacts in terms of traffic, there were minimal differences among the alternatives. Intuitively and effectively shown in the RMAG study, the Soapstone Connector would have a beneficial impact on reducing traffic volumes on Wiehle Avenue. However, the traffic impact analysis for this engineering feasibility study revealed that several intersections on Wiehle Avenue would not operate at acceptable levels of services (i.e., LOS D or better) in the year 2030 AM and PM peak hours if the Soapstone Connector was constructed.

- The rough order of magnitude of construction and design costs, exclusive of the cost for acquiring the right-of-way and costs for damages to landowners for impacts on existing development, were determined to be on the order of $50 to $60M. Recognizing that the land costs could be substantial, the total cost of construction of a four lane Soapstone Connector could be as high as $100 to $150M.

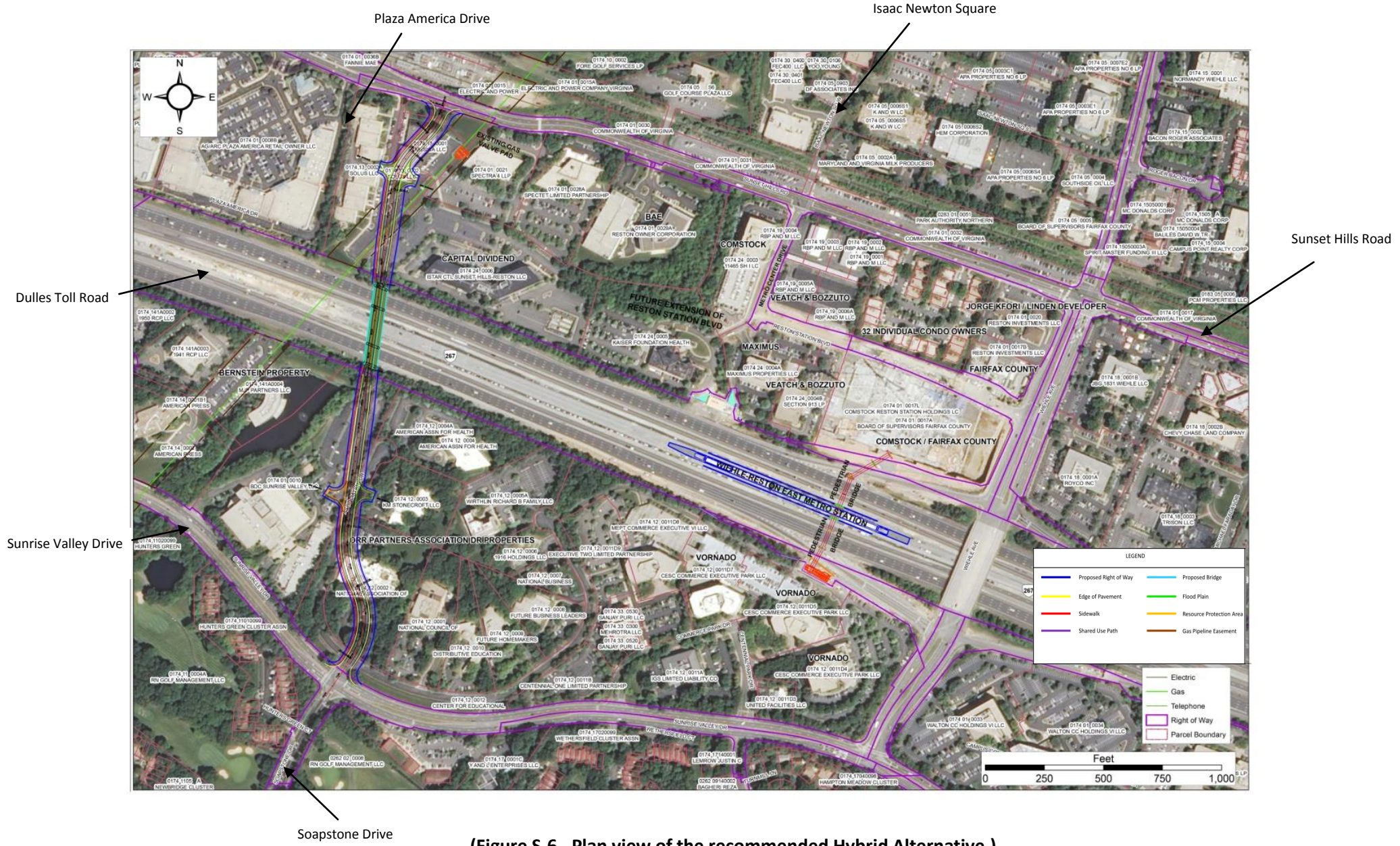
The "Hybrid" Alternative

During the assessment of the five alternatives, none of the alternatives emerged as being superior. Due to the proximity of the southern terminus to the Sunrise Valley Drive/Wiehle Avenue intersection, traffic congestion problems were projected for alternative 1C. Alternative 3D offered the advantages of having a southern terminus directly aligning with Soapstone Drive at the existing signal-controlled intersection on Sunrise Valley Drive. Alternative 3D also offered an appealing alignment for bicyclists traveling to and from the Washington and Old Dominion (W&OD) trail and a relatively straight connection from Soapstone Drive at Sunrise Valley Drive to Sunset Hills Road. However, Alternative 3D would necessitate the demolition of an existing large parking structure and require an additional bridge to cross a floodplain. Alternative 4D offers the advantages of having a southern terminus align with Soapstone Drive and an improved vertical profile compared to alternatives 1C and 3D, but alternative 4D also possesses a short section with an 8 percent grade and it would necessitate the demolition of an existing office building on Association Drive. Alternative 5C offers many advantages and has the most appealing vertical profile, but it introduces an offset intersection on Sunrise Valley Drive near Soapstone Drive. Alternative 6E, by virtue of its location, offers some advantages in terms of serving motorists traveling from/to western points on Sunrise Valley Drive. However, its intersection on Sunrise Valley Drive is the farthest west from the Wiehle – Reston East Metrorail Station and therefore would require circuitous trips by both vehicle and bicycle.

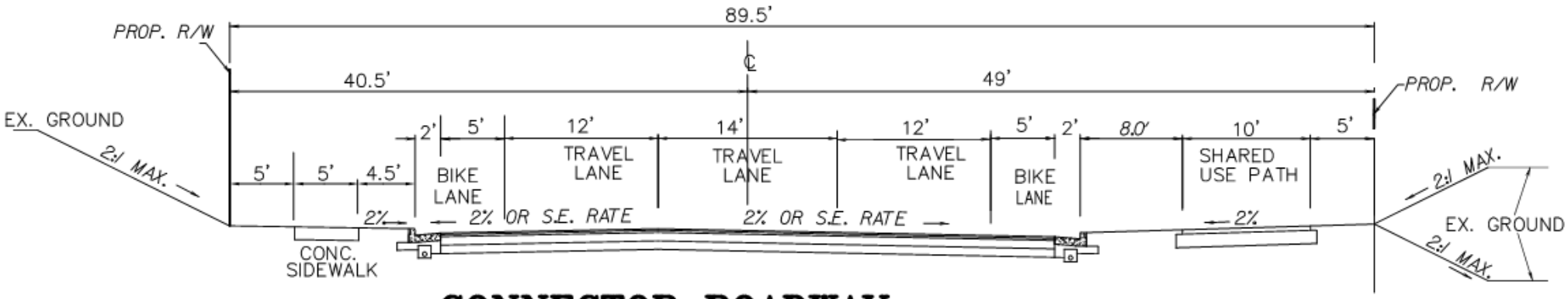
During the public involvement process, many citizens and involved stakeholders raised issues with both the width of the bridge, which affects the total cost of the project, and the location of the southern terminus. More people supported the intersection of Soapstone Drive and Sunrise Valley Drive as the southern terminus of the Soapstone Connector compared to either an intersection to the west at Indian Ridge Drive or an intersection to the east at Commerce Park Drive. In addition, members of the bicycle community voiced a strong desire that paths be provided from the Soapstone Connector and the Wiehle – Reston East Metrorail Station and from the Soapstone Connector to the W&OD Trail, regardless of the final alignment selected.

To better address these findings, citizen comments, and inputs from Supervisor Hudgins, a hybrid alternative was identified which featured a modified typical section and an alignment that combined alternative 5C north of the Dulles Toll Road with the alternative 4D south of the Dulles Toll Road. The Hybrid Alternative aligns directly with Soapstone Drive, allowing traffic to flow from Soapstone Drive, through the "Soapstone Connector," and onto Sunset Hills Road. The new roadway and new bridge over the Dulles Corridor creates a direct connection from Sunrise Valley Drive/Soapstone Drive to Sunset Hills Road. The hybrid also featured a reduced typical section. Rather than a four lane undivided typical section, the hybrid's typical section consisted of one lane in each direction and a two-way left turn only lane in the median plus on-road bike lanes. This typical section would be very similar to and consistent with the typical section that exists on Soapstone Drive south of Sunrise Valley Drive. The three lane cross section with on-road bicycle lanes was recently implemented by VDOT as part of a so-called "road diet" project. Prior to the "road diet," Soapstone Drive had a four lane undivided typical section with no bicycle lanes. The hybrid was deemed to offer advantages compared to the five alternatives previously evaluated in terms of consistency with the typical section on Soapstone Drive, construction costs,

enhanced mobility for bicyclists and motorists, among other reasons. Figure S-6 presents a plan view of the Hybrid Alternative. Figure S-7 presents the reduced typical section, and Figure S-8 presents the vertical profile. For flexibility in design, it is recommended that the right-of-way corresponding to a four-lane typical section be preserved for the hybrid alternative. While the required minimum right-of-way for the hybrid would be 89.5 ft, it is recommended that the right-of-way for the Soapstone Connector be established to be 99.5 ft. This will allow for potential future widening to a four lanes, if needed at some point in the future.



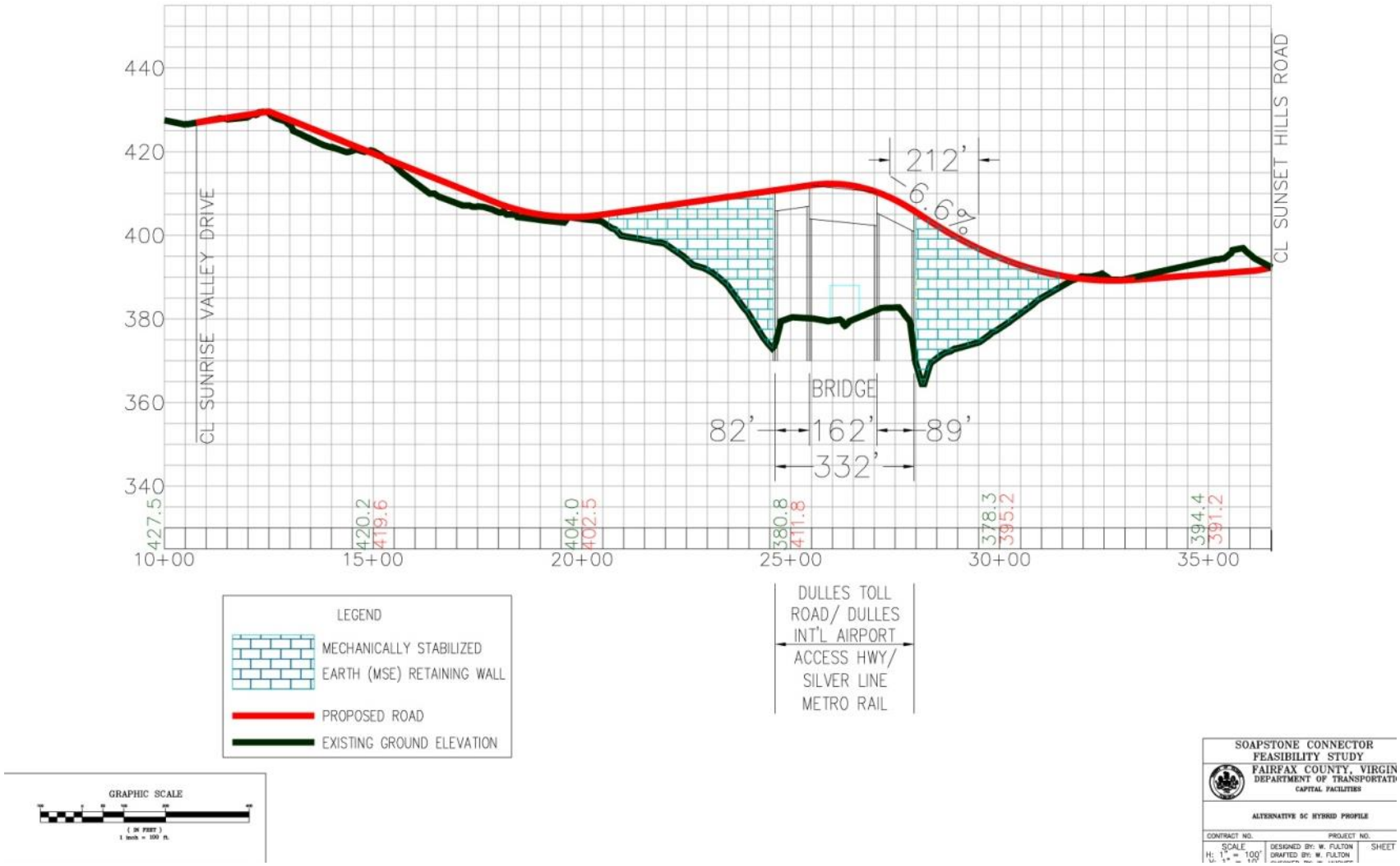
(Figure S-6. Plan view of the recommended Hybrid Alternative.)



CONNECTOR ROADWAY TYPICAL SECTION

(It is recommended that the minimum right-of-way width for the Soapstone Connector be established to be 99.5 ft to allow for possible future widening to a four-lane section, if required in the future.)

(Figure S-7 Typical Roadway Section for the Hybrid Alternative.)



(Figure S-8 Vertical profile of the recommended Hybrid Alternative.

Conclusions and Recommendations

On the basis of this engineering feasibility analysis, it is concluded that a multi-modal Soapstone Connector is feasible from an engineering perspective. There will be engineering and environmental challenges with respect to constructing the Soapstone Connector, but none of them are insurmountable. The "Hybrid Alternative" emerged as the most promising alternative. The Hybrid Alternative would provide a direct connection to Soapstone Drive at its southern terminus. Compared to Alternative 5C, this alternative would not require 2 closely spaced intersections on heavily travelled Sunrise Valley Drive and would, in turn, avoid the "dog leg" maneuver for motorists. Preliminary analysis revealed that the reduction in the typical section from four (4) lanes with on-road bicycle lanes to three (3) lanes with on-road bicycle lanes could result in a reduction in the construction cost on the order of magnitude of 20 to 25 percent. The development of a more detailed design as part of a preliminary engineering phase and the identification of the Right-of-Way plans would be required. It is recommended that the Hybrid Alternative for the Soapstone Connector be advanced to the next phase. In subsequent phases, utilization of federal aid for any project phase (PE, RW or CN) would require compliance with NEPA and other federal environmental laws and regulations.

1. Introduction and Background

Background

In anticipation that additional Metrorail Stations would be coming to Fairfax County as part of the Washington Metropolitan Area Transit Authority's Silver Line, the Fairfax County Department of Transportation sponsored a planning study in 2008 to prepare for the construction of future Metrorail Stations near Wiehle Avenue and Reston Parkway. The objective of that study was to develop access management plans for the two stations. The Metrorail Station at Wiehle Avenue was going to be built as part of Phase 1 of the Silver Line with a target opening in 2013. The new Metrorail Station near Reston Parkway was going to be built later as part of Phase 2 of the project. A group called the "Reston Metrorail Access Group" (RMAG) was appointed by Fairfax County Supervisor Catherine Hudgins, the supervisor of the Hunter Mill District. The RMAG group was instrumental in steering the planning study toward a consensus on recommendations for highway and intersection improvements, pedestrian and bicyclist enhancements and changes in transit service, notably bus service provided by the County-operated Fairfax Connector.

One of the recommendations from that RMAG study, related to a proposed roadway, which was called the "Soapstone Connector" in the report. The Soapstone Connector would provide a direct connection between Sunset Hills Road and Sunset Valley Drive, on a new alignment west of Wiehle Avenue Metro Center. The alignment proposed in the RMAG study included segments of the existing Association Drive, south of the DTR, and the roadway that is now called Metro Center Drive. The southern terminus of the alignment proposed in the RMAG report was the signal-controlled intersection of Soapstone Drive and Sunrise Valley Drive. The proposed northern terminus of the RMAG-recommended Soapstone Connector was the signal-controlled intersection of Sunset Hills Road and Isaac Newton Square West. As presented in the RMAG study report, the Soapstone Connector was projected to have a positive effect on traffic conditions in the vicinity of the Metrorail Station at Wiehle Avenue, by helping to improve traffic operations on Wiehle and enhancing multi-modal access to the Wiehle Avenue Metrorail Station. The order of magnitude of the reduction in traffic on Wiehle Avenue was approximately 1,500 vehicles during both the 3-hour AM peak period and the 3-hour PM peak period. The alignment's southern termini intersected Sunrise Valley Drive. The alignment then traversed Association Drive, went through the parking lot owned by Mept Commerce Executives LLC, crossed the Dulles Toll Road (DTR), through the power sub-station installed just north of the DTR, traversed Metro Center Drive, and the northern termini intersected Sunset Hills Road. The study area is presented in Figure 1. The generalized alignment, which was extracted from the Reston Access Management Group Report, is presented in Figure 2.

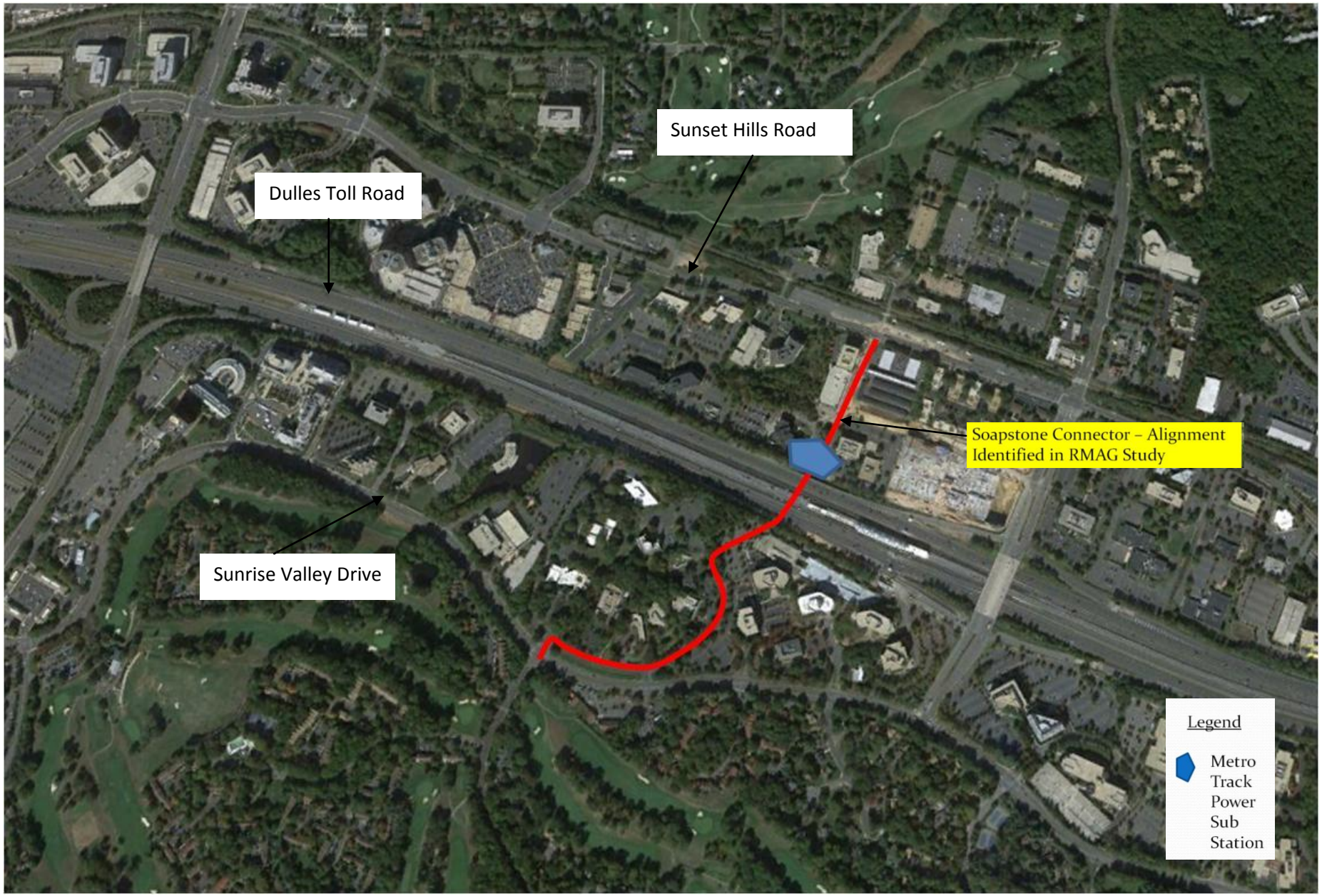


Figure 1: RMAG study area with Soapstone Connector horizontal alignment.

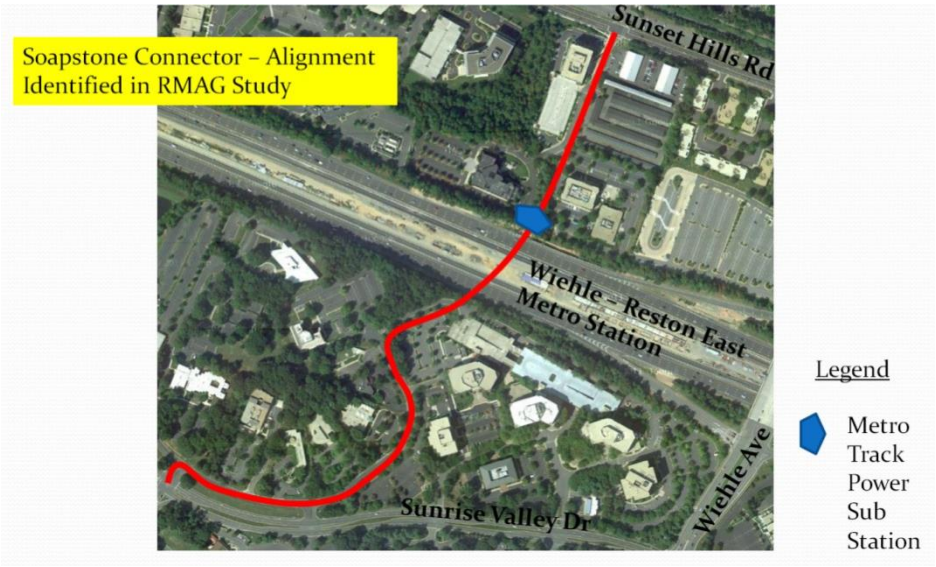


Figure 2: Horizontal alignment shown for a "Soapstone Connector" in the RMAG report.

Study Scope

Recognizing that the planning study conducted between 2008 and 2009 did not include any detailed engineering analyses of the Soapstone Connector, Fairfax County sponsored an engineering feasibility study in 2012 to determine the feasibility of the Soapstone Connector. A consultant was engaged to conduct this feasibility study, which included the following objectives:

- Determine the engineering feasibility of multi-modal roadway that would provide a connection west of the new Metrorail Station for motorists, pedestrians and bicyclists, and transit vehicles between Sunset Hills Road and Sunrise Valley Drive.
- Identify multiple alternative alignments to explore the full range of possibilities for the location of the Soapstone Connector in an area that has many key challenges including a flood plain, existing buildings, parking garages and surface parking lots.
- Conduct a high-level screening of those alignments to narrow down to limited number of feasible candidate alternatives.
- Develop detailed alternatives, to include the development of vertical profiles, the establishment of intersections and access points on the Soapstone Connector, and roadway alignment designs for the selected candidate alternatives.
- Conduct a more detailed evaluation of those alternatives and assess those alternatives in terms of traffic, environmental, land use and engineering criteria.
- Conduct traffic analyses of the candidate alternatives.

- Conduct a high-level assessment of the environmental features in the vicinity of the alternatives.
- Develop "rough order of magnitude" construction cost estimates and estimated the amount of new right-of-way required for each alignment alternative.
- Identify the most promising alignment(s) for the Soapstone Connector, recognizing that the road would be constructed on new alignment that is currently not owned by either Fairfax County or the Virginia Department of Transportation.
- Conduct a type, size and location (TS&L) analysis of a new bridge over the Dulles Corridor, which includes the right of way of the following:
    - Dulles Toll Road (DTR), which is Virginia Route 267.
    - The Dulles International Airport Access Highway (DIAAH).
    - The Silver Line of the Washington Metrorail System, which is being constructed as part of a Design-Build Project for the Metropolitan Washington Airports Authority and will be operated by the Washington Metropolitan Area Transit Authority.

  This right of way will be referred to as the Dulles Corridor. The right-of-way for the Dulles Corridor was originally owned by the Federal Government. It was purchased as part of the construction of Washington Dulles International Airport. Control of the land was later turned over the MWAA, when the Airports Authority was originally established and responsibility of the airport was taken over by MWAA. While TS&L studies are typically done after a preferred alternative is selected and a design for the road has been advanced to as much as 30 percent design, it was deemed necessary for this feasibility study to provide a solid basis on which to render an opinion on the constructability of a new bridge over the Dulles Corridor.
- Identify key challenges and mitigating strategies for advancement to the preliminary design phase.
- Develop recommendations for the Soapstone Connector.

The remainder of this report is devoted to the presentation of findings related to the scope items listed above.

2. Screening of Horizontal Alignments

As was pointed out earlier in Section 1 of this report, the RMAG study did not include any detailed engineering analysis of the proposed alignment. Quite frankly, the proposed alignment identified was based on efforts conducted at the planning level and no engineering analysis was conducted. The original alignment endeavored to utilize existing pavement for roadway sections. Hence, the section of Association Drive from Soapstone Drive to the east and north and section of the Metro Center Drive were identified as the southern section and northern section of a Soapstone Connector that could be connected via a new bridge over the Dulles Corridor. The existing topography was not considered when this Soapstone Connector was identified. Neither were roadway design standards, notably minimum degrees of curvature for horizontal curves that are required, in addition to other standards. As mentioned earlier, the engineering analysis was not conducted. The proposed alignment goes through an existing power sub-station (see Figure 1). This power sub-station did not exist while the RMAG study was taking place. The original RMAG alignment would not be feasible because of the new construction of the power sub-station. A feasibility study that only evaluated the RMAG alignment would have been too limiting, in that other alternatives for a roadway constructed on new alignment may have been not only feasible, but preferable to the original RMAG alignment in terms of environmental impacts, engineering considerations, land use impacts, traffic impacts, and construction costs. Consequently, the first step in this feasibility study was to identify and screen a wider range of alternatives than simply the original alignment proposed in the RMAG study report.

It is important to understand that the purpose of this screening process to narrow down a range of alignments into a much more manageable set of alternatives that could be subjected to more detailed evaluation. Since the funding available for this engineering feasibility study was limited, the original goal was to screen potential alignments down to 3 to 5 alternatives, rather than advancing a substantial number of alignments to evaluation. By screening the larger groups, it was expected that a limited number of alignments could be identified that were superior to the other alignments, based on qualitative considerations in terms of existing land use and potential future development, the proximity of selected environmental features, engineering factors and constructability issues, and qualitative projected traffic impacts. The following sections documents the methodology and the results.

Typical Section Used in the Screening Process

The screening objective was to identify a wide range of possible new alignments for the Soapstone Connector and narrow them down to a more manageable amount. Prior to initiation of possible alignments, a decision had to be made of the potential width for the new alignment. When the topic was originally vetted with County staff who served as an advisory group on the study, there was considerable discussion. The RMAG study had recommended that the Soapstone Connector be four lanes, with one lane in each direction designated for buses and bicyclists only. This type of treatment has been used effectively on some streets in major cities where bus volumes and bicyclist traffic can be

substantial. Concurrent to when this Soapstone Connector feasibility study was initiated, the County already had planning studies underway to establish a new master plan for the Reston area in light of the arrival of Metrorail service in the near future. As part of that master plan study, the County's transportation planning section, in association with one of their on-call consultants were developing future year traffic projections based on a variety of land use forecast scenarios that reflected different densities and build-outs in the vicinity of the Metrorail Stations. Preliminary forecasts indicated that the peak hour volumes on the Soapstone Connector could be as high as a total of 2,000 vehicles per hour during the peak hours and the future year 2030 Average Daily Traffic (ADT) could be as high as 20,000 vehicles per day, subject to the level of redevelopment in the area. These initial projections were sufficient to justify a typical section of four lanes, with none of those four lanes being designated as exclusive for bicyclists and buses on the Connector. Initial projections of Fairfax County Connector buses on the Soapstone Connector were on the order of 16-20, which was thought to be not enough to justify bus only lanes. Equally important was consideration for bicyclists on the Soapstone Connector. With the potential for bicyclists to use the Soapstone Connector while enroute to either the Wiehle-Reston East Metrorail Station or the Washington and Old Dominion (W&OD) trail, the typical section for the Soapstone Connector also needed to safely and efficiently accommodate bicyclists. The section of Soapstone Drive south of Sunrise Valley Drive had been converted from a four-lane, undivided typical section to a three lane cross section with on-road bike lanes. This reduction in the typical section, which is known as a "road diet," features one travel lane in each direction and a two-way, left turn only lane (TWLTL) in the flush median lane. At approaches to intersections, the TWLTL becomes an exclusive left turn only lane. On the basis of the information available at that time, the decision was to employ a typical section for the Soapstone Connector that included both four lanes for vehicles and on-road bicycle lanes. Furthermore, since there may be novice recreational bicyclists who may not feel comfortable or adept using on-road bicycle lanes, it was thought that an additional 10-ft wide shared use path would provide a greater degree of safety for the Soapstone Connector that would provide access to the Wiehle-Reston East Metrorail Station.

Therefore, for the purposes of screening and subsequent evaluation for engineering feasibility study, the typical section that was chosen for the Soapstone Connector consisted of the following:

- Four (4) 12-ft wide lanes, with two lanes in each direction and none restricted to buses and bicycles only.
- Two (2) 5-ft wide on-road bicycle lanes, with one lane in each direction.
- Curb and gutter closed sections on both sides consisting of a 2-ft wide gutter pan and a 6-inch wide, raised curb.
- An 8-ft buffer from the face of curb to the shared path on the east side, which includes the 6-inch wide, raised curb.
- A 10-ft wide multi-purpose shared-use path on the east side of the Soapstone Connector, which is the side of the road that is closer to Wiehle – Reston East Metrorail Station.
- A 4-ft wide buffer from the back of the curb to the sidewalk on the west side.
- A 5-ft wide sidewalk on the west side of the Soapstone Connector.
- A 5-ft wide buffer from the edge of the sidewalk to the Right-of-Way line.

In conformance with road and bridge standards of the Virginia Department of Transportation, the typical section for the bridge differs from the typical section for the roadway. Consistent with applicable VDOT standards, the typical sections for the roadway and bridge are shown in Figure 3 and Figure 4 respectively. The typical section was reduced from a total width of 99.5' for the roadway to 83.16' for the bridge.

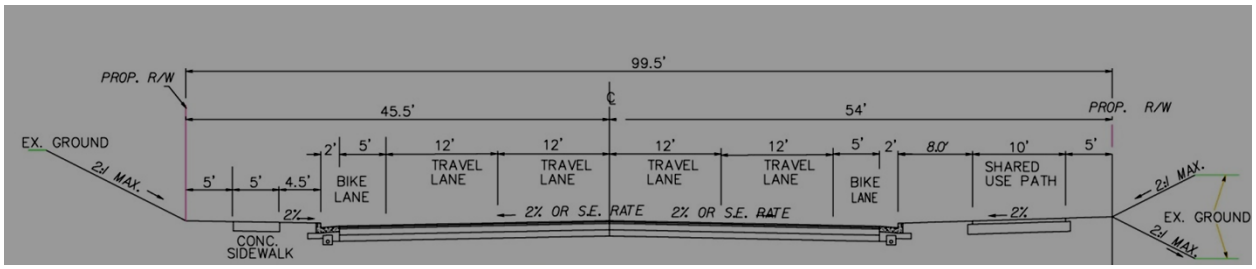


Figure 3: Roadway typical section used in the "Soapstone Connector" feasibility study.

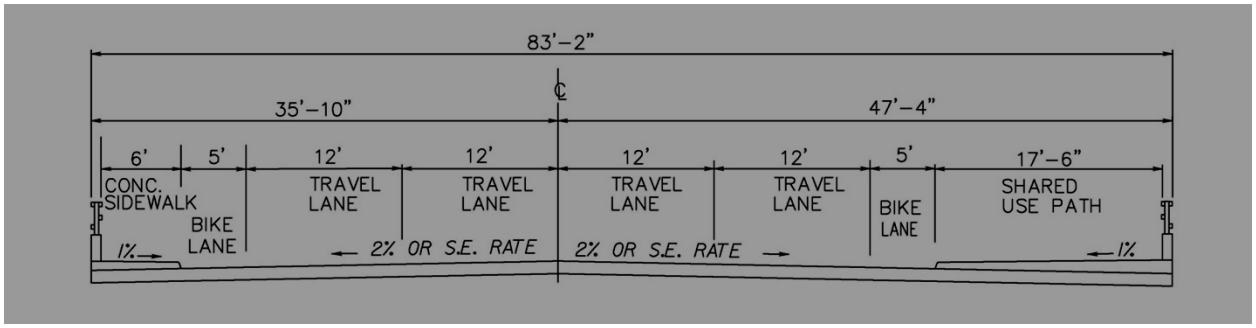


Figure 4: Typical Section used in the "Soapstone Connector" Feasibility Study for the bridge over the Dulles Toll Road and Dulles International Airport Access Highway.

Screening Criteria

Each of the alternatives were screened in terms of engineering, environmental features, land use, and traffic considerations. Specifically, the following screening criteria were employed:

Engineering Considerations:

- Physical dimension of the alternative, including the length of the Soapstone Connector, the amount of pavement area, the approximate area of the bridge over the Dulles Toll Road, the approximate area of the bridge over the floodplain, the approximate length along the existing pond, the maximum grade and length of maximum grade on the Soapstone Connector.

- A qualitative rating using a range from very poor to very good, to reflect the relative assessment of the engineering feasibility, with particular attention to critical elements, whether the connector goes "thru" or "touches" existing buildings and parking structures, and constructability.

- A relative engineering construction cost index that considers the length of the corridor, the bridge area, and other factors appropriate for a screening level evaluation.

Environmental Considerations:

- Area of floodplain impacted by the "swath width" of the Connector.

- Amount of the Resource Protection Area impacted by the "swath width" of the Connector. (Note: the swath width was defined earlier under the section labeled "Typical Section.")

- Length of the Connector that runs parallel to and immediately adjacent to wetlands.

- A qualitative rating, using a 5-point scale ranging from 1 (very poor) to 5 (very good), to reflect relative effect on known environmental features. This rating considered effects on floodplains, wetlands, and the Resource Protection Area.

Land Use Considerations:

- A qualitative rating, using a 5-point scale ranging from 1 (very poor) to 5 (very good), to reflect the anticipated relative effect on existing development.

- A qualitative rating, using a 5-point scale ranging from 1 (very poor) to 5 (very good), to reflect the anticipated relative effect on future development and redevelopment in the study area.

- A qualitative rating, using a 5-point scale ranging from 1 (very poor) and 5 (very good), to reflect the degree of consistency with the grid of streets that was recommended in the Dulles Corridor Study by the Reston Master Plan Special Study Task Force. Figures 4 and 5 show the grid of streets for the Dulles Corridor between Route 28 and Hunter Mill Road and for the detailed study are of this Soapstone Connector feasibility study, respectively.

- A summary rating to reflect the sum of the 3 qualitative ratings listed above.

Qualitative Traffic Considerations:

- A qualitative rating, using a 5-point scale ranging from 1 (very poor) to 5 (very good), to reflect the anticipated relative effect on the quality of traffic flow on Sunset Hills Road and on Sunrise Valley Drive. Factors related to the spacing of signalized intersections, arterial weaving associated with existing development.

- A qualitative rating, using a 5-point scale ranging from 1 (very poor) to 5 (very good), to reflect the anticipated relative effect on future development and redevelopment in the study area.

- A qualitative rating, using a 5-point scale ranging from 1 (very poor) and 5 (very good), to reflect the degree of consistency with the grid of streets that was recommended in the Dulles Corridor Study.

- A summary rating to reflect the sum of the 3 qualitative ratings listed above.

Figure 5 shows the grid of streets in the Fairfax County Dulles Corridor study area, Figure 6 shows a detailed view of the grid of streets in the Soapstone Connector study area.

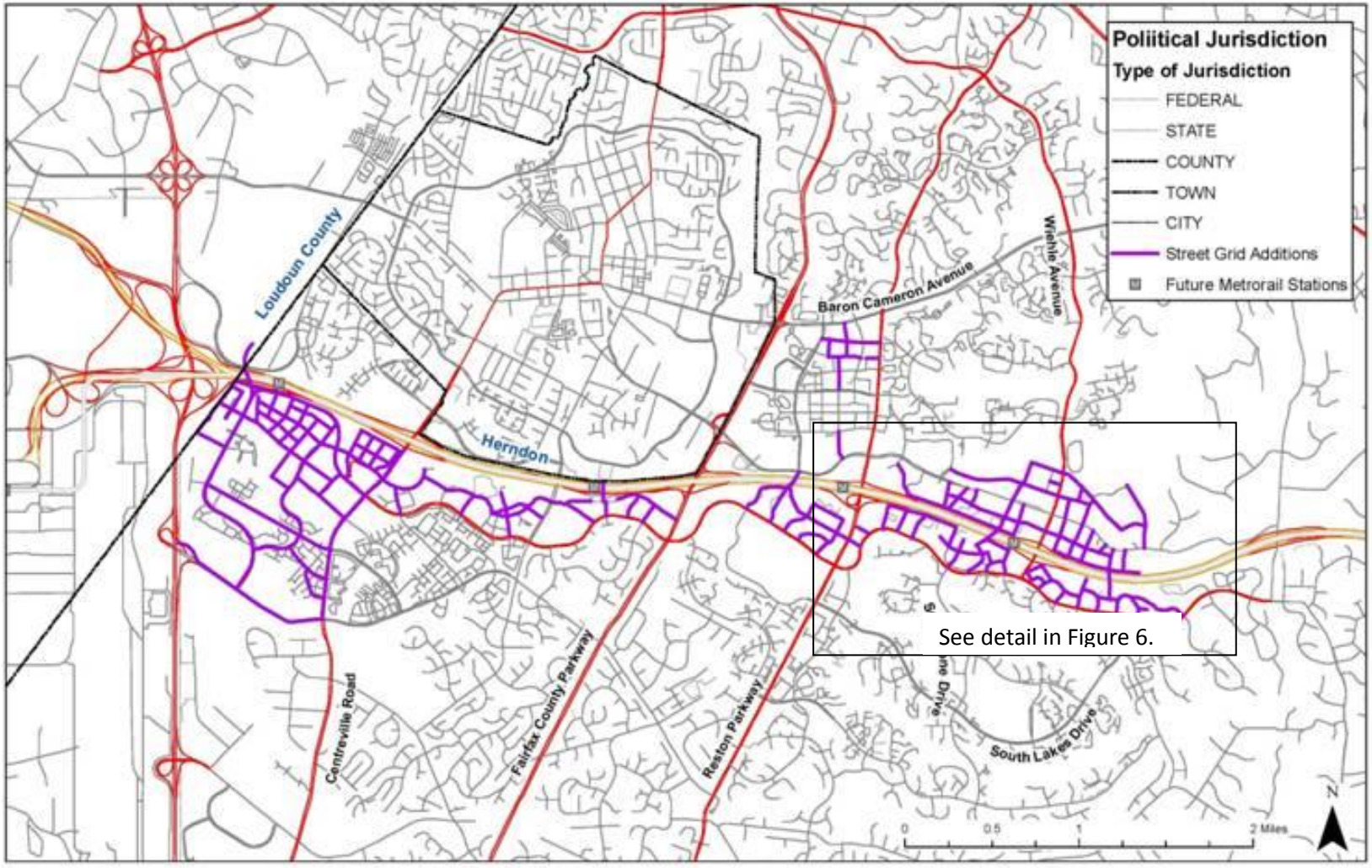


Figure 5: Grid of streets in the Fairfax County Department of Planning and Zoning's Dulles Corridor Study.

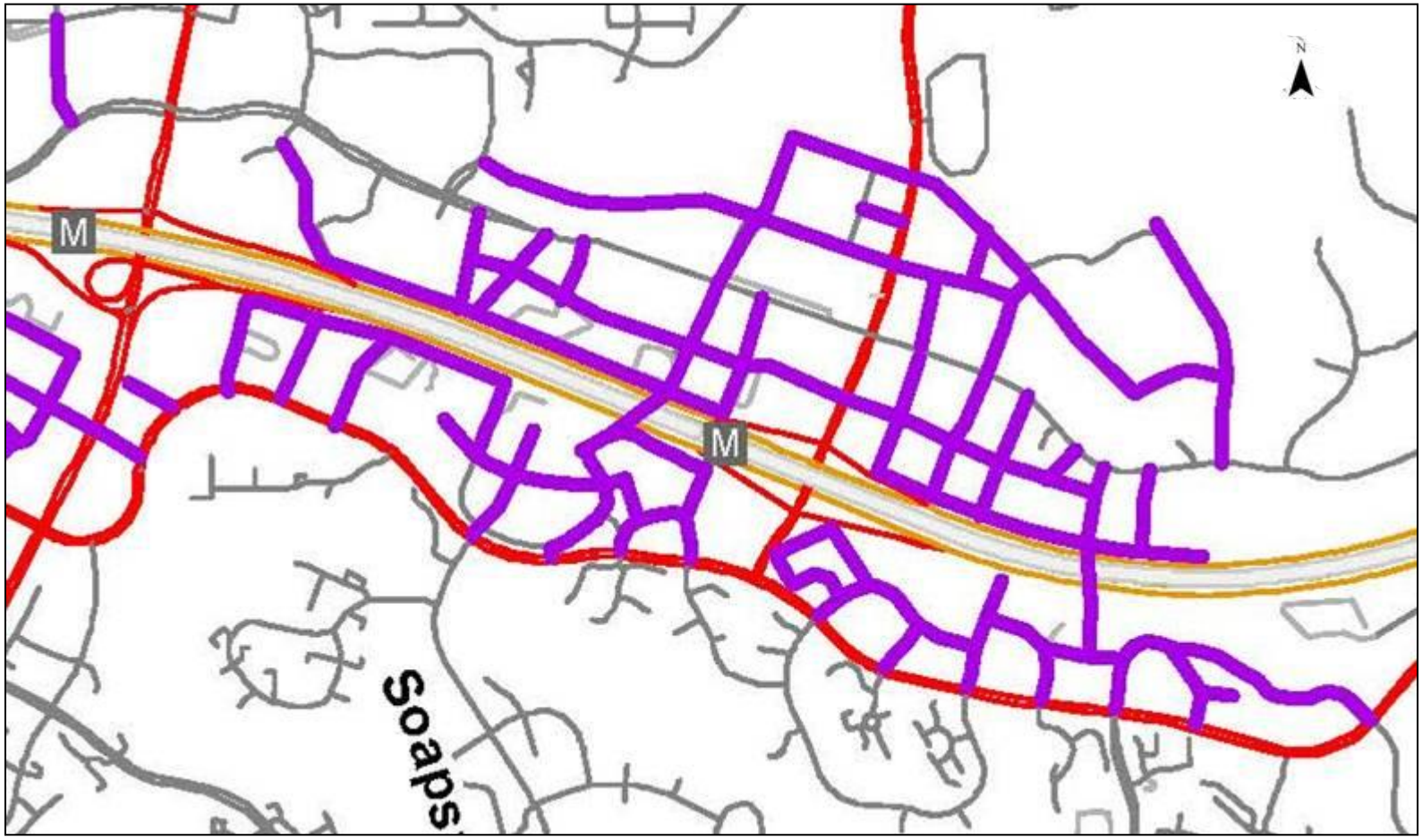


Figure 6: Grid of streets detail in the Fairfax County Department of Planning and Zoning's Dulles Corridor Study.

Description of Alternative Alignments

In developing the alternative alignments, a variety of alignments that connected Sunrise Valley Drive and Sunset Hills Road, west of the Wiehle-Reston East Station were identified. In total, 30 alternative alignments were identified and screened. In total, 30 alternative alignments were identified and screened. Alternative alignments varied in terms of the locations of the termini and alignment through the study area. The alternatives were grouped based on their southern terminus and labeled as follows:

- Alternatives 1A thru 1C all share Sunrise Valley Drive and Commerce Park Drive as the southern Terminus.

- Alternatives 2A thru 2C all share Sunrise Valley Drive and Soapstone Drive as the southern terminus and the alignment south of the Dulles Toll Road (DTR) generally goes thru the eastern portion of the Association Drive property.

- Alternatives 3A thru 3H all share Sunrise Valley Drive and Soapstone Drive as the southern terminus and the alignment south of the DTR generally goes thru the middle of the Association Drive property.

- Alternatives 4A thru 4F all share Sunrise Valley Drive and Soapstone Drive as the southern terminus and generally go thru the western portion of the Association Drive property.

- Alternatives 5A thru 5C all share a southern terminus on Sunrise Valley Drive that is approximately 300-ft west of the Soapstone Drive intersection and the alignment south of the DTR generally runs along the property boundary between the western parcels fronting Association Drive and the 11600 Sunrise Valley Drive parcel.

- Alternative 6A thru 6G all share Sunrise Valley Drive and Indian Ridge Drive as the southern terminus.

Appendix A presents plan views of the 30 alignments. Appendix B presents a tabular summary of the 30 horizontal alignments that were developed and screened.

Screening Results

The results of the Consultant's screening were provided to the County's project management team, who then met with the Consultant to discuss the screening memorandum. The relative advantages and disadvantages of the alternatives were vetted.

In accordance with the scope, alternatives would be more fully developed for the most promising 3-5 horizontal alignments from the screening. This included the development of vertical profiles, the

determination of features for pedestrians and bicycles, the identification of provisions for transit vehicles and stops, and the identification of the location of intersections and access management for the Soapstone Connector. The following alternatives were selected to be advanced. They represented the most promising of the various groups of horizontal alignments.

- **Alternative 1C**. Alternatives starting with the number 1 all shared a common southern terminus, specifically, the junction of Sunrise Valley Drive and Commerce Park Drive. The vertical alignment for Alternative 1A was deemed to be not feasible because the maximum grade would be over 10 percent. Alternative 1B was judged to be inferior to alternative 1C due to a relatively short (~ 350 ft) spacing between adjacent signalized intersections on Sunset Hills Road and the resulting short single left turn lane for westbound Sunset Hills Road traffic to the Soapstone Connector.

- **Alternative 3D**. Alternatives starting with the number 3 all shared a common southern terminus, specifically, the junction of Sunrise Valley Drive and Soapstone Drive and featured a horizontal alignment that traversed roughly the middle of the combined properties accessible via Association Drive. Comparing alternatives 3A through 3H, alternative 3D provided one of the most direct paths connecting Sunrise Valley Drive at Soapstone Drive with Sunset Hills Road while minimizing impacts to existing buildings south of the Dulles Toll Road. The alignment south of the Dulles Toll Road does go through the middle of the Association Drive property and the alignment north of the Dulles Toll Road does go through the existing parking garage that serves the office building at 11487 Sunset Hills Road currently occupied by BAE.

- **Alternative 4D**. Alternatives starting with the number 4 all shared a common southern terminus, specifically, the junction of Sunrise Valley Drive and Soapstone Drive and featured a horizontal alignment that traversed the western portion of the combined properties accessible via Association Drive. Comparing among alternatives 4A through 4F, alternative 4D had the lowest cost index, was the shortest, and had the least impact to properties and existing buildings north of the Dulles Toll Road.

- **Alternative 5C**. Alternatives starting with the number 5 all shared in a common southern terminus, specifically a new intersection approximately 200-ft east of the existing signalized intersection of Sunrise Valley Drive and Soapstone Drive. Alternative 5C was judged to be preferred compared to alternative 5A and 5B due in part to a shorter critical length of grade.

- **Alternative 6E**. Alternatives starting with the number 6 all shared a common southern terminus, specifically, the junction of Sunrise Valley Drive and Indian Ridge Road. Comparing among alternatives 6A through 6E, alternative 6E had the lowest cost index and was the second shortest in terms of length. This alternative minimizes the impact on the properties and existing buildings north of the Dulles Toll Road while avoiding the valve field for the Colonial/Plantation Pipeline.

Alternatives 2A, 2B and 2C were based on the alignment originally proposed in the RMAG study. All shared a common southern terminus, specifically, the junction of Sunrise Valley Drive and Soapstone Drive, and featured a horizontal alignment that traversed the eastern portion of the combined properties accessible via Association Drive. Due to the circuitous nature of the alignment and the potential adverse impact that such an alignment would have on the combined properties along Association Drive, alternatives 2A, 2B and 2C were dropped from further consideration and not advanced to Task 3.

3. Alternatives

Five (5) alternatives were selected for further evaluation. These five alternatives varied primarily in terms of their southern terminus on Sunrise Valley Drive and their northern terminus on Sunset Hills Road. More detailed descriptions of the alternatives are presented in the succeeding sections.

Alternative 1C

Figure 7 shows the alignment of Alternative 1C relative to Wiehle Avenue, Sunset Hills Road, Sunrise Valley Drive, the Dulles Toll Road (DTR), and the ramps providing access between Wiehle Avenue and the Dulles Toll Road. The southern terminus for Alternative 1C is closest to the Sunrise Valley Drive / Wiehle Avenue intersection, among the five alternatives that were evaluated for this engineering feasibility study. The alignment runs along portions of Commerce Park Drive and Association Drive.

North of the Toll Road, the alignment is roughly along the property boundary between the Kaiser Permanente property (1890 Metro Center Dr) and the property which has the large office building with Unisys as a major tenant (11493 Sunset Hills Rd). After bridging the floodplain, this alignment goes through the existing multi-level parking structure for the building with BAE as the primary tenant (11487 Sunset Hills Road).

From a connectivity perspective, the extension of Reston Station Blvd would further increase the benefits of alternative 1C by providing a direct connection to the kiss-and-ride area, the parking garage for the Metrorail Station, and future development in the vicinity of the station.

Figure 8 shows the vertical profile for the Alternative 1C and the locations of mechanically stabilized earth (MSE) walls and bridge structures over the Dulles Toll Road and the existing floodplain north of the DTR.

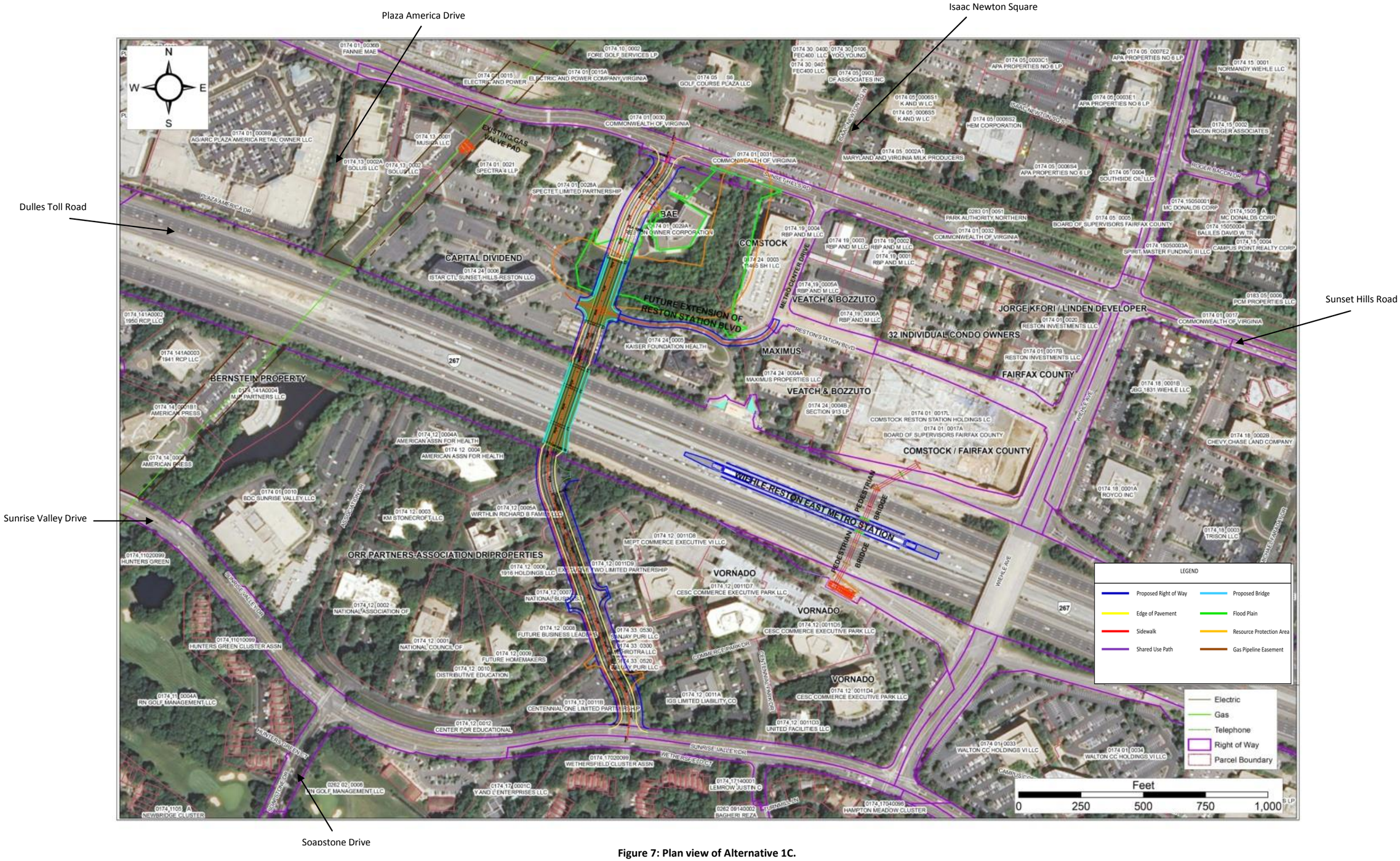


Figure 7: Plan view of Alternative 1C.

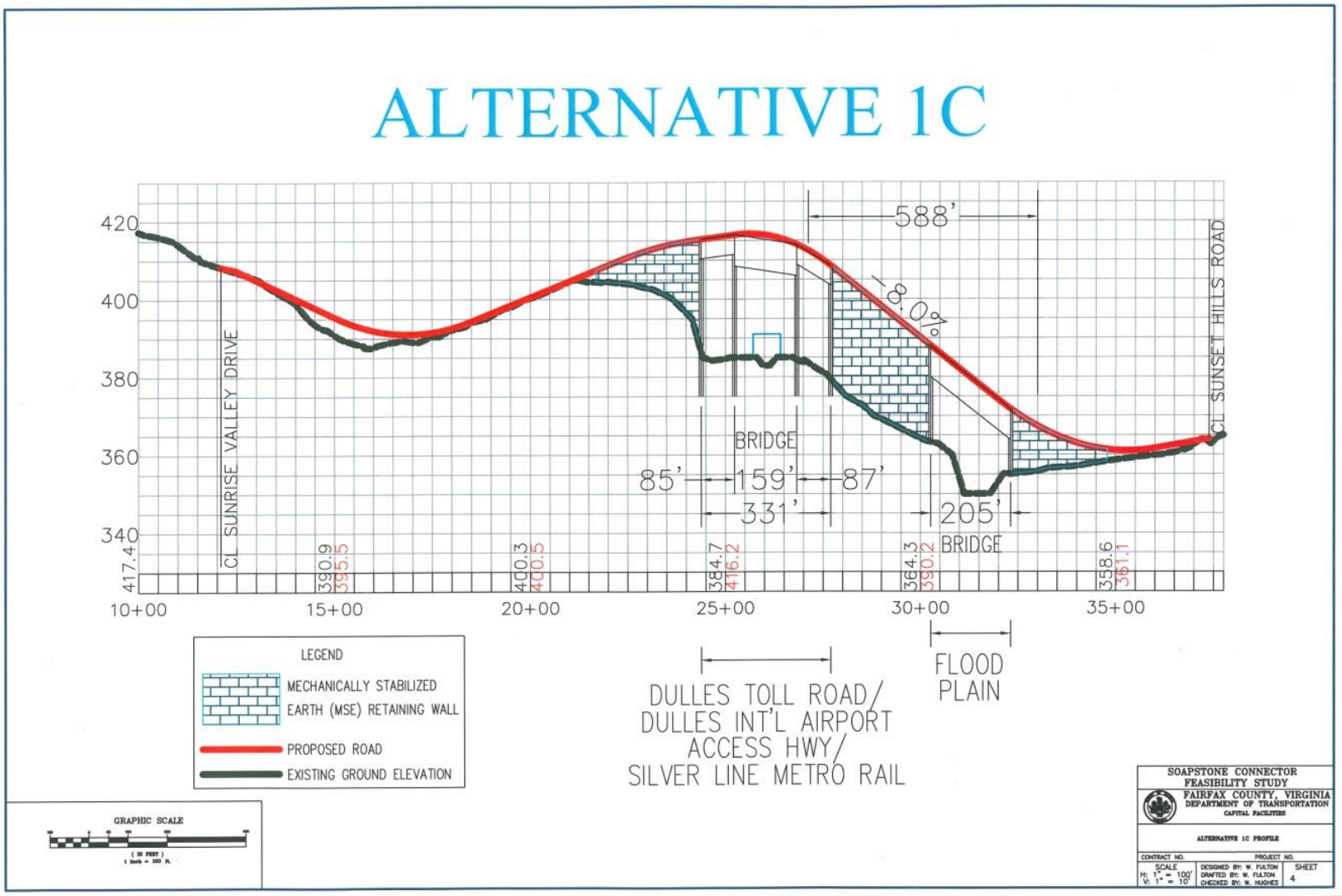


Figure 8: Profile view for Alternative 1C.

Alternative 3D

Figure 9 shows the alignment of alternative 3D, relative to Wiehle Avenue, Sunset Hills Road, Sunrise Valley Drive, the Dulles Toll Road, and the ramps providing access between Wiehle Avenue and the Dulles Toll Road. Alternative 3D features a fairly straight connection between Sunset Hills Road north of the Dulles Toll Road and Sunrise Valley Drive at Soapstone Drive, south of the Dulles Toll Road. This alternative aligns directly with Soapstone Drive at Sunrise Valley Drive. To minimize the impact on existing structures, It would take a curvilinear path through the parcels fronting Association Drive.

North of the Dulles Toll Road (DTR), Alternative 3D is very similar to Alternative 1C. The alignment for Alternative 3D runs roughly along the boundary between the Kaiser Permanente property (1890 Metro Center Dr) and the property which has the large office building with Unisys as a major tenant (11493 Sunset Hills Rd). After bridging the floodplain, this alignment is shown to go through the existing multi-level parking structure for the building with BAE as the primary tenant (11487 Sunset Hills Road).

Figure 10 shows the vertical profile for Alternative 3D and the locations of mechanically stabilized earth (MSE) walls and bridges over the Dulles Toll Road and the existing floodplain north of the DTR.

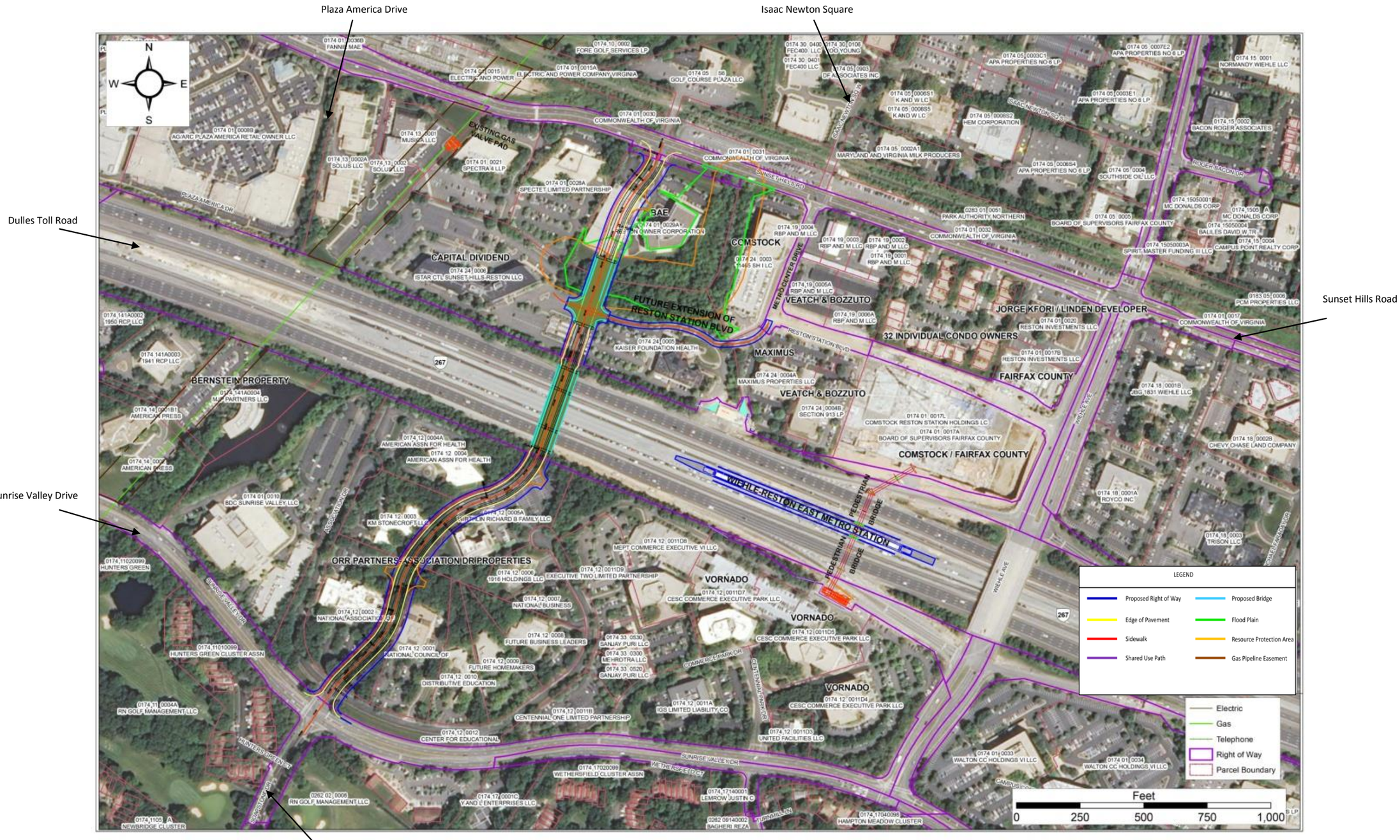


Figure 9: Plan view of Alternative 3D

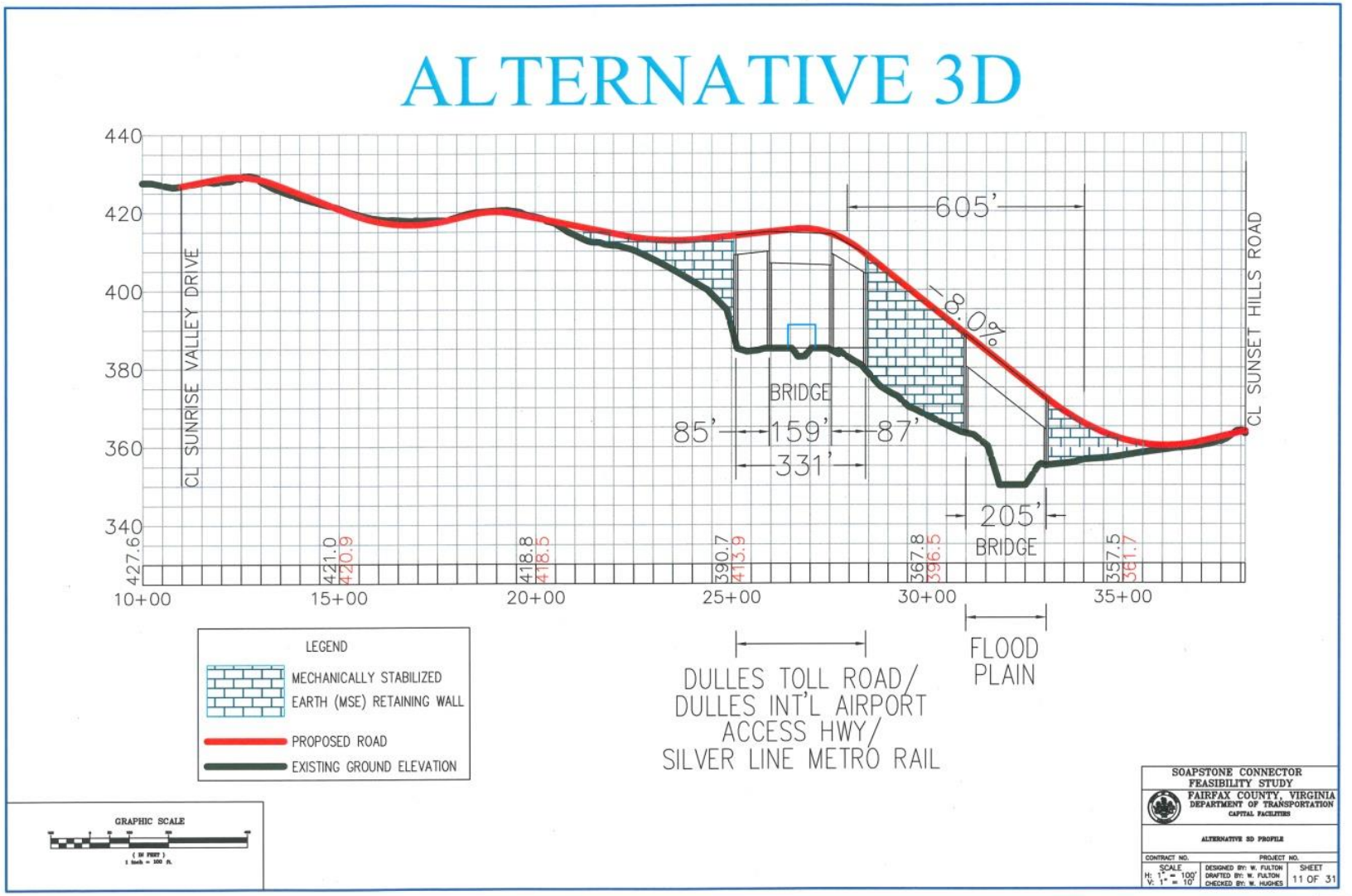


Figure 10: Profile view for Alternative 3D.

Alternative 4D

Figure 11 presents the alignment of alternative 4D. Similar to alternative 3D, Alternative 4D aligns directly with Soapstone Drive at its southern terminus on Sunrise Valley Drive. The horizontal alignment south of the Dulles Toll Road would cross the Dulles Toll Road further west than alternative 3D, and its northern intersection with Sunset Hills Road would be approximately 1,000-ft further west compared to alternative 3D.

Alternative 4D is shown to go through the building and traverse a good portion of the property owned by the National Association of Secondary School Principals (1904 Association Drive). The alignment traverses a short section of Association Drive and then a larger portion of the surface parking area for the property owned by BDC Sunrise Valley LLC (11600 Sunrise Valley Drive).

North of the Dulles Toll Road, the alignment traverses surface parking areas for the property currently owned by iSTAR CTL Sunset Hills – Reston, LLC (11493 Sunset Hills Rd), the Spectra 4 LLC property (11495 Sunset Hills Rd), the property owned by Musica LLC (11505 Sunset Hills Rd) and the property owned by Solus LLC (11505 Sunset Hills Rd). Alternative 4D is in close proximity to a "gas valve pad" for the Transcontinental Gas Pipeline Corporation. The valve pad is just south of and is visible from Sunset Hills Road between the signal-controlled intersection at Plaza America/American Dream Way and the signal-controlled intersection at Isaac Newton Square West/Metro Center Drive. It would be costly to relocated the valve pad. Therefore the alignment for Alternative 4D shifts to the west to avoid the valve pad.

Figure 12 shows the vertical profile for Alternative 4D and the locations of MSE walls and the bridge over the Dulles Toll Road. Unlike the previous two alternatives, Alternative 4D would not traverse the floodplain or the resource protection area north of the Dulles Toll Road.

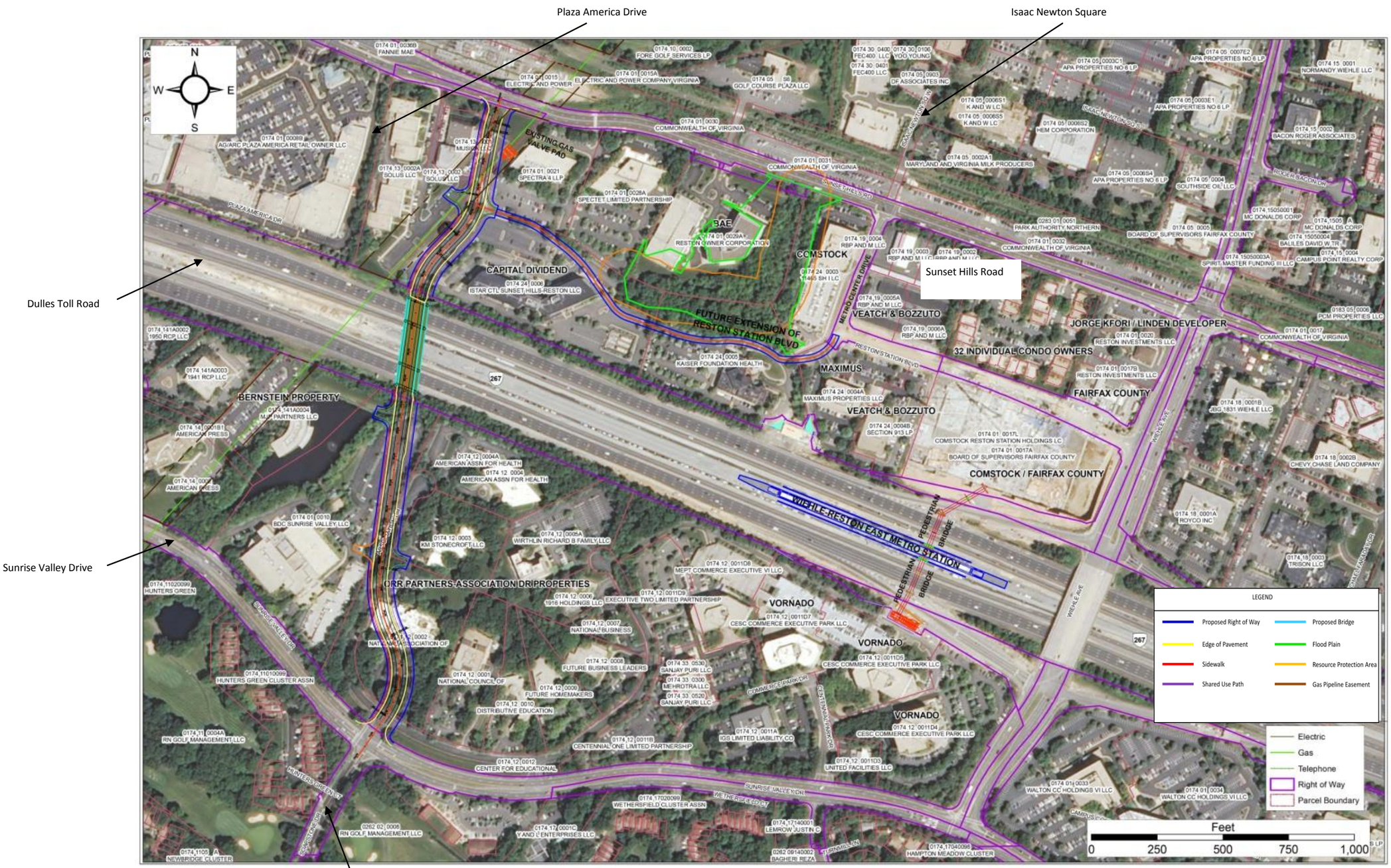


Figure 11: Plan view of Alternative 4D.

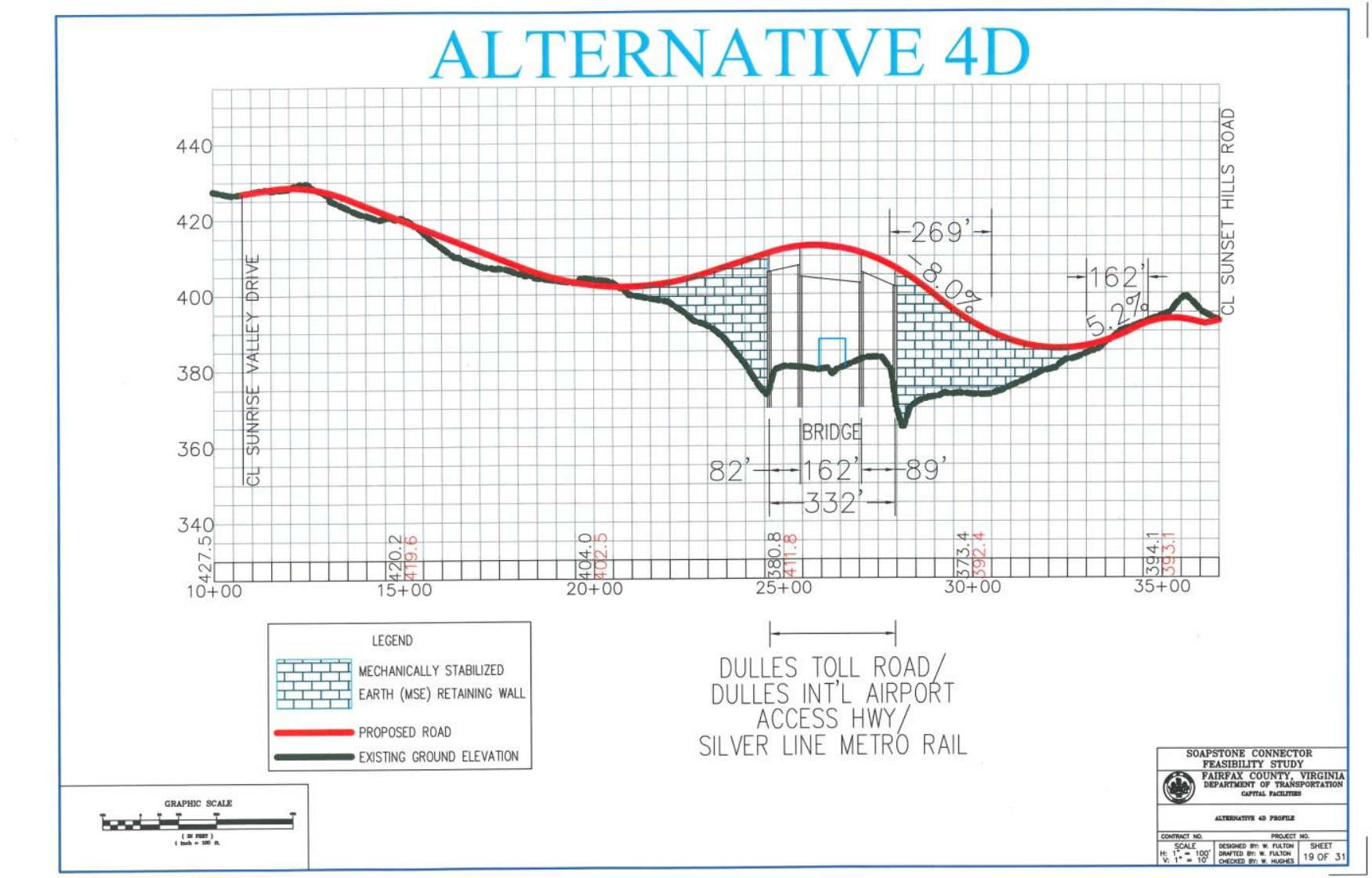


Figure 12: Profile view for Alternative 4D.

Alternative 5C

Figure 13 shows the horizontal alignment of Alternative 5C. This alternative features a southern terminus that is approximately 350-ft west of the existing signal controlled intersection of Sunrise Valley Drive and Soapstone Drive. Due to the proximity of the two intersections, the traffic signal controls would be operated by one signal controller. Motorists traveling from Soapstone Drive to the Soapstone Connector would have to make a "dog-leg" maneuver by first turning left onto WB Sunrise Valley Drive, then right onto NB Soapstone Connector. South of the Dulles Toll Road, the alignment generally runs along the boundary between the property owned by BDC Sunrise Valley LLC (11600 Sunrise Valley Drive) and the western segment of Association Drive (which provides access to the properties at 1904, 1902 and 1900 Association Drive). The alignment is shown to run adjacent to the existing parking garage for 11600 Sunrise Valley Drive. The alignment would then run through the northern portion of the BDC Sunrise Valley LLC property (11600 Sunrise Valley Drive).

North of the Dulles Toll Road, the alignment would cross the paved surface parking area in the southwest corner of the property owned by iSTAR CTL Sunset Hills – Reston LLC. The alignment through this parcel will avoid the existing office buildings leased by Unisys (11493 Sunset Hills Road). Continuing north, the alignment then traverses a portion of the paved parking area for the property owned by Solus, LLC (11505 Sunset Hills Road). The alignment for Alternative 5C is shown going through the building owned by Musica, LLC (11501 Sunset Hills Rd). The alignment also traverses the easement of the Transcontinental Gas Pipeline Corporation. and Figure 14 shows the vertical profile for Alternative 5C.

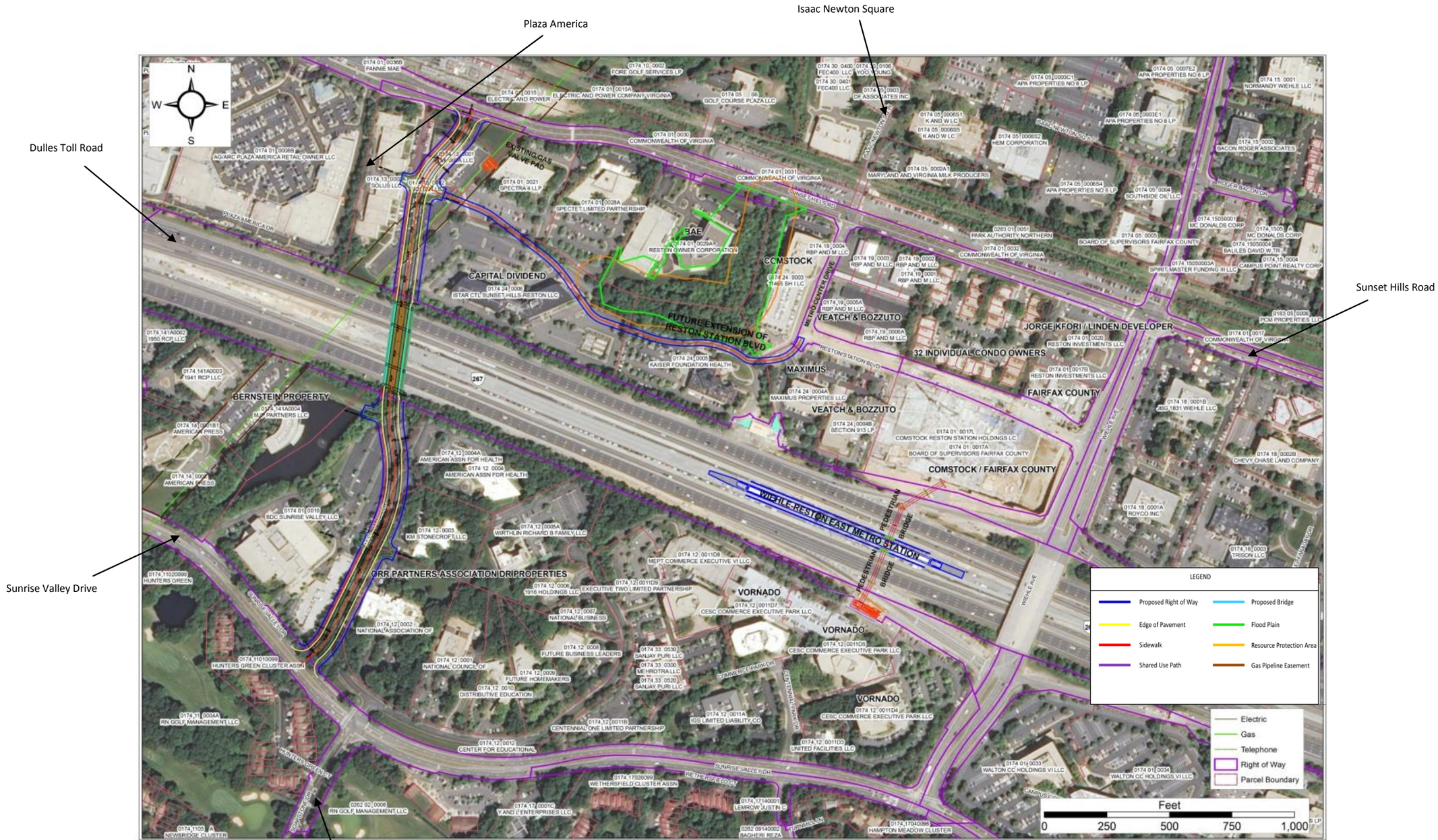


Figure 13: Plan view of Alternative 5C.

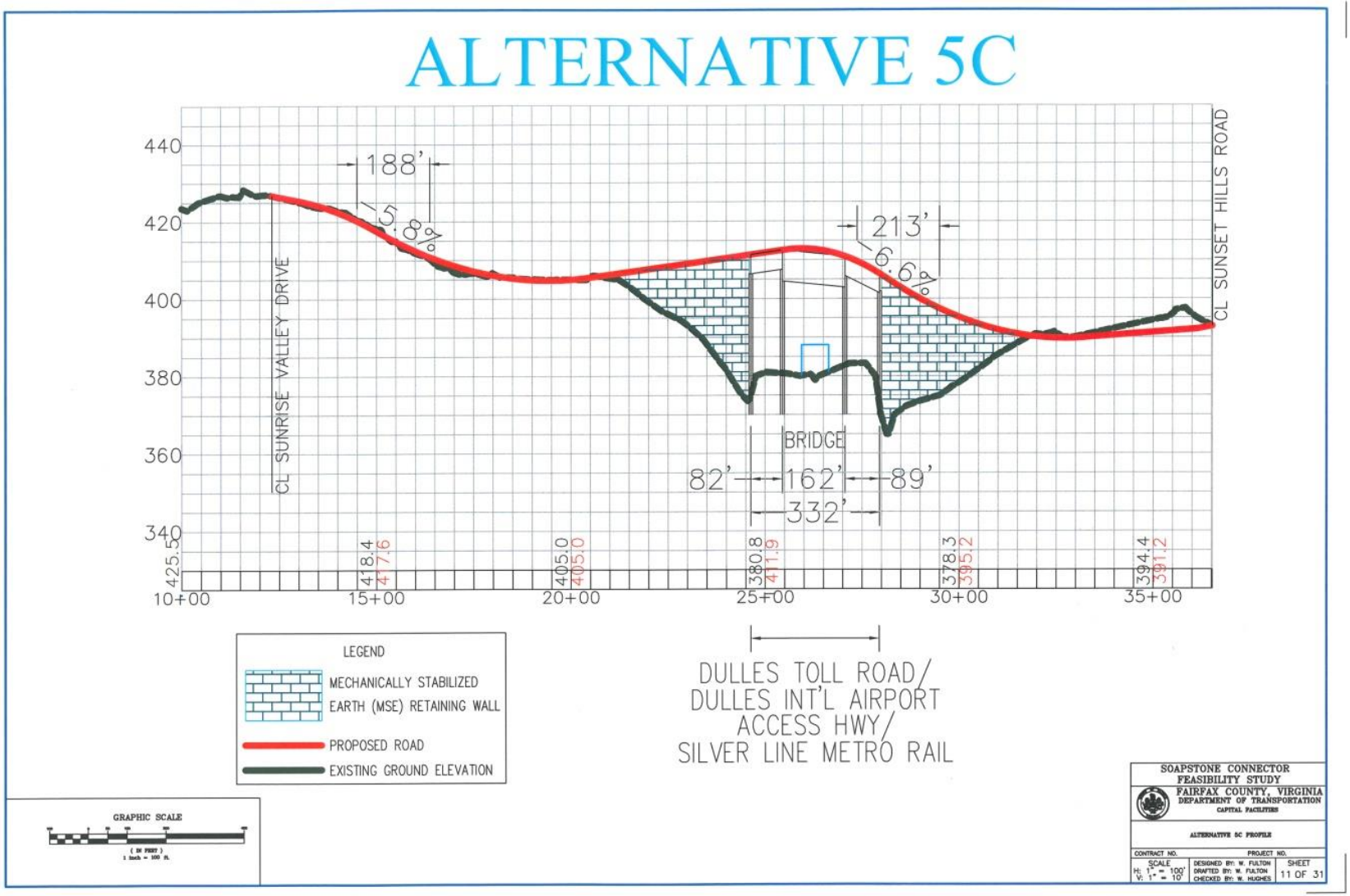


Figure 14: Profile view for Alternative 5C.

Alternative 6E

Figure 15 shows a plan view of alternative 6E. Among the five alternatives that were evaluated for this engineering feasibility study, the sourthern terminus for Alternative 6E is the farthest west. This southern terminus, located on Sunrise Valley Drive, is also the furthest from Wiehle Avenue and the Wiehle – Reston East Metrorail Station. However, this alternative could serve as a "middle" link providing access across the Dulles Toll Road and a connection between Sunset Hills Road and Sunrise Valley Drive.

From the southern end, the alignment proceeds through the property owned by BDC Sunrise Valley LLC (11600 Sunrise Valley Drive), west of the existing office building along the circulation road for the property. It runs parallel and adjacent to the existing storm water management pond that lying, in part, along the western side of this property.

North of the Dulles Toll Road, the alignment traverses a portion of the existing paved surface parking area for the property owned by iSTAR CTL Sunset Hills – Reston LLC (11493 Sunset Hills Road), just east of the easement for the Transcontinental Gas Pipeline Corporation. Alternative 6E then runs east of the existing building through the property owned by Musica LLC (11501 Sunset Hills Road) and just west of the so-called valve field for the pipeline, denoted in Figure 14 with a red symbol. The alignment traverses a small portion of the northern area of the parcel owned by Solus LLC (11505 Sunset Hills Road). Figure 16 shows a vertical profile.

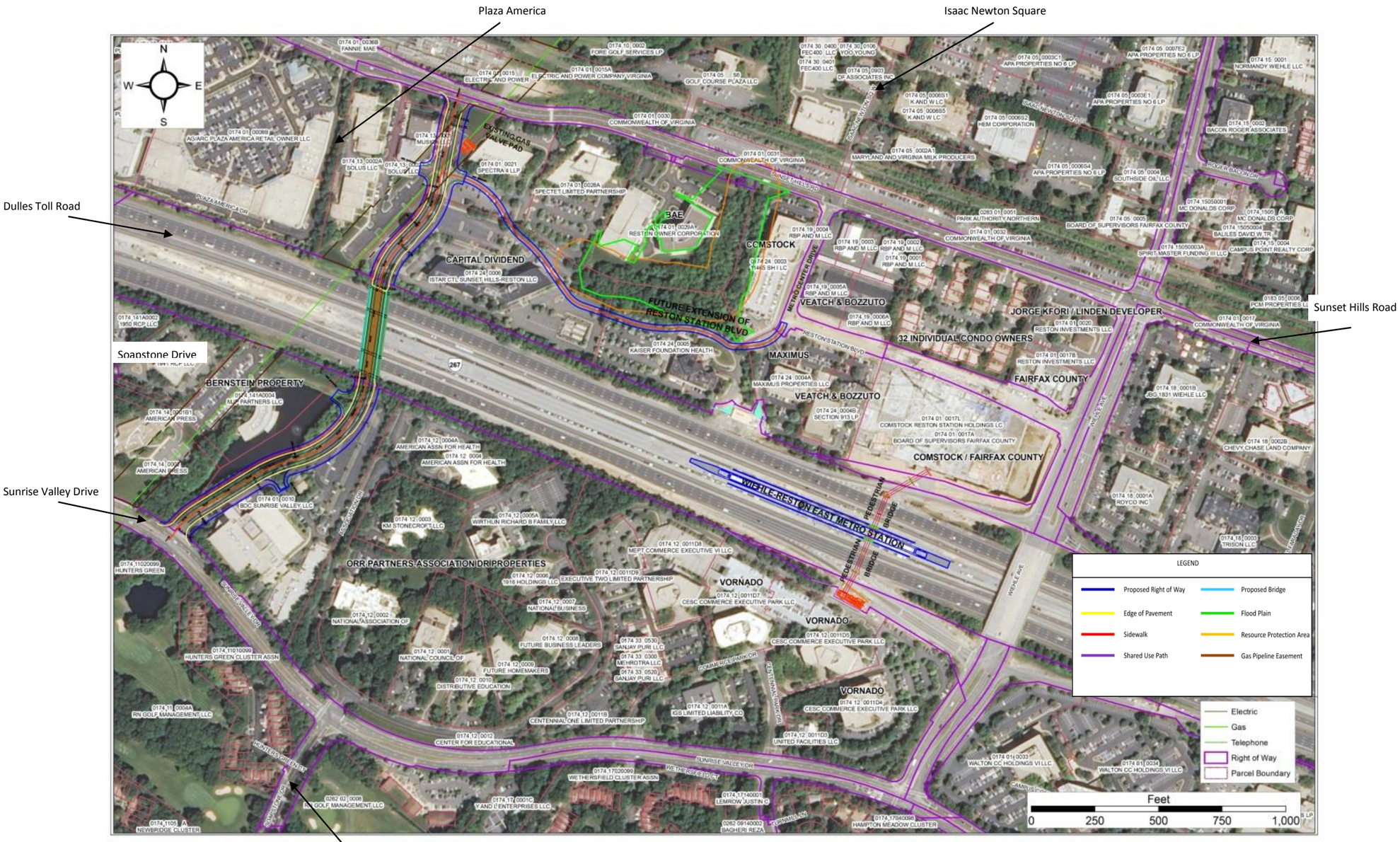


Figure 15: Plan view of Alternative 6E.

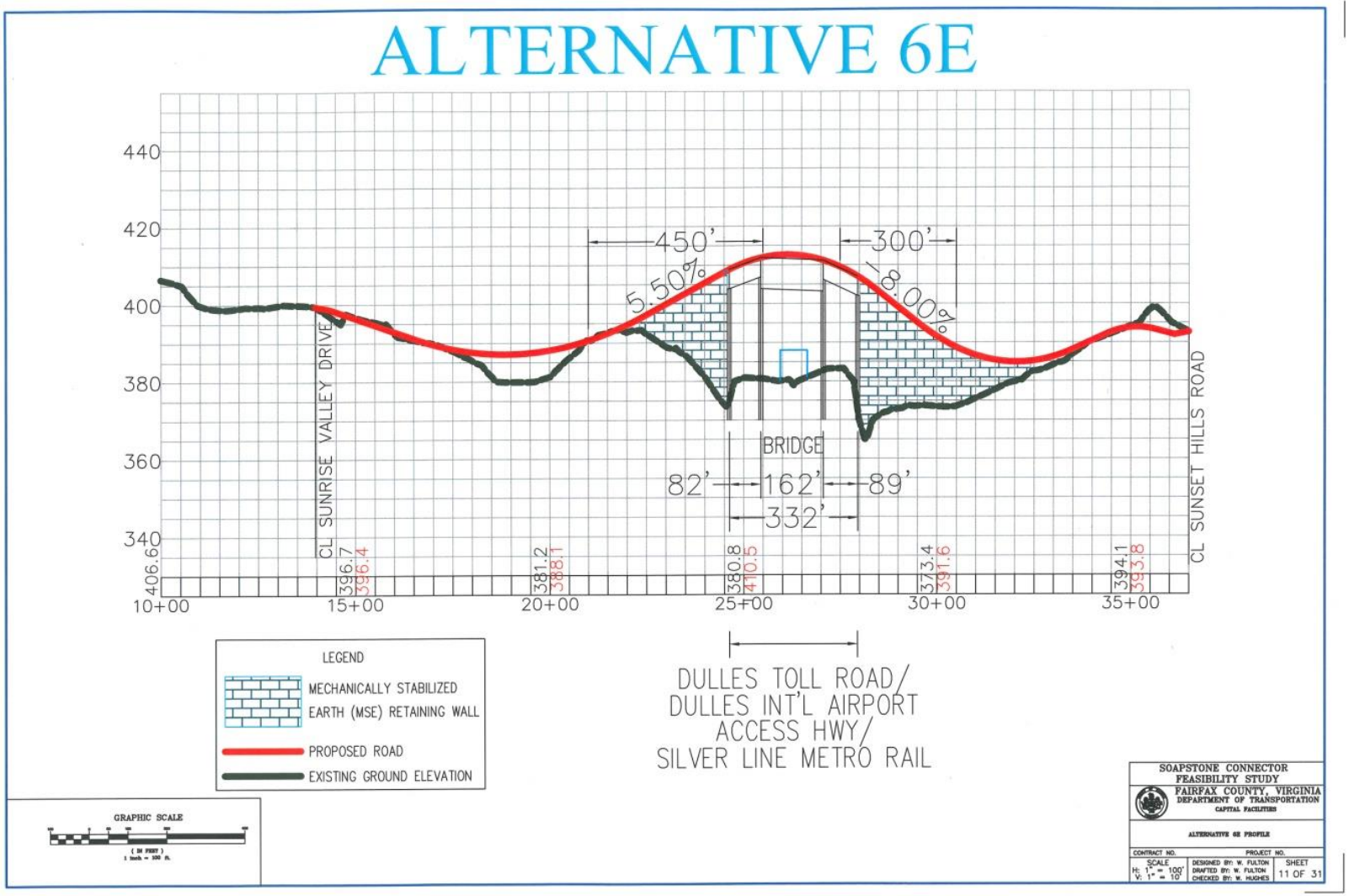


Figure 16: Profile for Alternative 6E.

4. Engineering Assessment

The evaluation of the alternatives considered constructability and engineering feasibility. A Type, Size and Location (TS&L) study was performed to investigate the feasibility of a bridge over the Dulles Corridor right-of-way. As noted earlier in this report, the Dulles Corridor in the context of this report includes the Dulles Toll Road, the Dulles International Airport Access Highway, and the WMATA Silver Line Metrorail line and Station. In addition, a high-level assessment of the proximity impacts of the Soapstone Connector on environmental features in the study area was conducted. The environmental assessment is presented in Section 5 of this report. To determine the order of magnitude effects on traffic of the Soapstone Connector alternatives, future year AM and PM peak hour traffic projections were developed and traffic analysis using the Synchro traffic model were conducted. The traffic results are presented in Section 6 of this report. The Soapstone Connector alternatives were also assessed in terms of pedestrian and bicyclist considerations. The pedestrian and bicycle assessments are presented in Section 7 of this report. The impacts on the existing properties was also investigated and documented in Section 8 of this report. Additionally, planning-level construction cost estimates were developed. Those results are presented in section 9 of this report.

Table 1 presents a summary of the assessment of the five (5) alternatives in terms of engineering considerations, including constructability. The results of the evaluation are summarized in this section.

Table 1: Evaluation Summary of Engineering Factors.

Alternative	Length of Road (mi)	Number of Bridges	Area of Bridge over DTR (1,000 sf)	Area of Bridge over floodplain (1,000 sf)	Area over Pipeline (1,000 sf)	Length of 8% grade (lineal ft)	Total Length with grade greater than 6 % (lineal ft)	Number of Properties within the 100 ft wide Soapstone Connector Right of Way	Number (Size) of Existing Buildings Demolished (each (1,000 sf))	Number of Parking Garages Demolished
Alt 1C	0.52	2	30.8	20.7	0.0	590	590	14	0	1**
Alt 3D	0.54	2	29.4	20.7	0.0	605	605	9	0	1**
Alt 4D	0.51	1	29.4	0.0	25.4	270	270	7	1 (36K)***	0
Alt 5C	0.46	1	29.9	0.0	21.3	0	215	8	1 (33K)****	0
Alt 6E*	0.45	1	29.8	0.0	25.4	300	300	5	0	0

*Also impacts 755 lin ft of stormwater management pond.
**Parking Structure for BAE Building
***National Association of Secondary School Principals Building
****The Musica LLC Building

Engineering Feasibility Assessment

The Soapstone Connector has been developed to meet the geometric design standards for an Urban Collector (GS-7) with a 30 mph design speed. An 8 percent maximum grade was held for this analysis to minimize the height differential between the existing ground and the proposed grade in the area between the Dulles Toll Road (DTR) and Sunset Hills Road. This meets both the VDOT and AASHTO criteria of 9 percent maximum grade for an urban collector with a 30 mph design speed. The Americans With Disabilities Act (ADA) requires a maximum of 5 percent grade for pedestrian traffic, and according to VDOT standards, the maximum length of a shared use path for a grade of 8 percent is 300 feet.

Each alternative does have specific issues that will need mitigation or adoption during final design for construction. These include the following:

- Alternatives 1C and 3D require a second bridge over the floodplain and also require the acquisition/demolition of an existing multi-level parking structure.

- Alternatives 4D and 5C require the acquisition/demolition of an office building.

- Alternatives 1C and 3D have the longest critical lengths of 8 percent grade, among the alternatives evaluated. Alternative 1C has a length of approximately 590 ft, and Alternative 3D has a length of slightly more than 600 ft.

- Alternatives 4D and 6E cross the easement for the Transcontinental Gas Pipeline Corporation. The total amount of area of the existing Transcontinental Gas Pipeline Corporation easement that would be traversed by the 100 ft wide swath used as a potential ultimate right-of-way for the Soapstone Connector assumed for this feasibility study was approximately 25,000 sf for alternatives 4D and 6E. Alternative 5C crosses the Transcontinental Gas Pipeline Corporation with approximately 21,000 sf of area.

- Alternative 6E's alignment runs parallel to an existing stormwater management pond.

- Alternative 5C's vertical alignment, as presently developed, most closely follows the existing ground and is the only alternative that has a maximum grade of less than 8 percent. The maximum grade for alternative 5C is 6.6 percent.

The existing terrain between Sunrise Valley Drive and Sunset Hills Road consists of rolling hills, and a floodplain is located north of the Dulles Toll Road and west of Metro Center Drive. Generally, the Dulles Toll Road traverses in an east to west direction a valley between Sunrise Valley Drive to the south and Sunset Hills Road to the north.

Heading north from Sunrise Valley Drive, perpendicular to the Dulles Toll Road, the terrain slopes downward at an approximately 4 percent grade. From east to west, parallel to and south of the Dulles Toll Road, the terrain cuts a valley between the Dulles Toll Road and Sunrise Valley Drive, with a positive slope heading west until one continuous slope of approximately 5 to 6 percent is formed from Sunrise Valley Drive to the Toll Road. Additionally, a ridge just south of the Dulles Toll Road, runs at a higher elevation and is parallel to the Dulles Toll Road.

On the north side of the Dulles Toll Road, the terrain generally has a positive slope from south-east to north-west, running parallel with the Dulles Toll Road. Perpendicular to the Toll Road, there is a positive slope of approximately 5 percent heading toward Sunset Hills Road. Additionally, at the lowest elevation between the Dulles Toll Road and Sunset Hills Road, there is a forested floodplain that will require a bridge for Alternatives 1C and 3D.

All of the alternatives include the placement of a relatively tall, mechanically stabilized earth (MSE) wall that carries the Soapstone Connector from the bridge over the Dulles Corridor right of way. The height of the wall falls within the VDOT design criteria of 50-ft. Geotechnical investigations were not included in the scope of this study and need to be conducted in the next phase to determine if the ground can support the MSE wall. The MSE wall essentially creates a barrier from one side of the Soapstone Connector to the other. To mitigate this, a bridge could be continued beyond its crossing of the Dulles Corridor to a certain height that would allow a vehicle to pass under.

Another common element to all of the alternatives is the proposed grade or vertical alignment follows more closely to the existing ground in the area between Sunrise Valley Drive and the Dulles Toll Road. Construction of each alternative will also be relatively the same when crossing the Dulles Toll Road.

Results of Engineering Feasibility Assessment

Engineering challenges exist for each of the alternatives. For example, alternatives 1C and 3D would require a second bridge to traverse a floodplain north of the Dulles Corridor. In addition, Alternatives 1C and 3D feature alignments that would necessitate the demolition of an existing multi-level parking garage. Alternatives 4D, 5C and 6E would traverse the Transcontinental Gas Pipeline Corporation's easement and need to cross over the pipeline, which would require additional mitigation. Alternative 4D would require the acquisition of the entire property and require the demolition of a 36,000 sf building currently owned by the National Association of Secondary School Principals (1904 Association Drive). Alternative 5C would require the acquisition of the entire property and the demolition of the existing 33,000 sf Musica LLC office building. Alternative 6E would require additional mitigation since that alignment runs parallel and adjacent to an existing stormwater retention pond.

Stage 1 Type, Size and Location (TS&L) Analysis

The Soapstone Connector would require the design and construction of a bridge over the Dulles Corridor. Consistent with the scope and budget for this engineering feasibility study, a Type, Size and Location (TS&L) study was conducted for one alternative to better assess the feasibility of constructing the bridge over the Dulles Corridor. The TS&L study was conducted for alternative 4D, but it is important to recognize that the bridges for the other four alternatives are very similar and consistent with bridge for alternative 4D. They have comparable overall lengths, comparable typical sections, and are similar in other respects. As such, the findings described in this section are deemed to be transferable to the other four alternatives

The overall width of the bridge crossing the Dulles Corridor will be approximately 83 ft, with a 58 ft net roadway width. The bridge will consist of ten steel plate-girders spaced at 8 ft 8 in with 2 ft 7 in overhangs. The proposed bridge and approaches would be on a straight alignment, but would have a horizontal curve, with a 300 ft horizontal curve, on the north side.

The profile of the bridge is on a vertical curve with a south approach grade at approximately 3 percent and a north approach grade of 8 percent. The bridge section has a normal cross slope of 2 percent. The new bridge type will be a three-span steel plate girder structure on a wall, reinforced concrete piers, and stub abutments behind MSE retaining walls. The preliminary layout of the bridge was established based on its location within the Dulles Corridor (DTR, DIAAH, and Silver Metrorail Line right-of-ways), span length, pier type, abutment type, and wall type and length. Aesthetics will match nearby projects. Figure 17 presents the developed section from the TS&L analysis. Figure 18 presents the traverse section from the Stage 1 TS&L analysis.

The main span of the bridge is recommended to be approximately 160-ft to allow future expansion of the Dulles Access Road (see Figure 17). The 120-ft flanking span to the west provides a good balance to the main span. However, the northern flanking span is restricted to 95-ft to 105-ft for all alternatives by the horizontal curve of the Soapstone Connector. Figure 18 is a section view along the construction center line. Figure 19 shows the transverse section of the bridge. There are ten (10) steel plate girders. A more detailed bridge design, including alternative designs, would be developed at a future time if the Soapstone Connector project is advanced to the preliminary design stage.

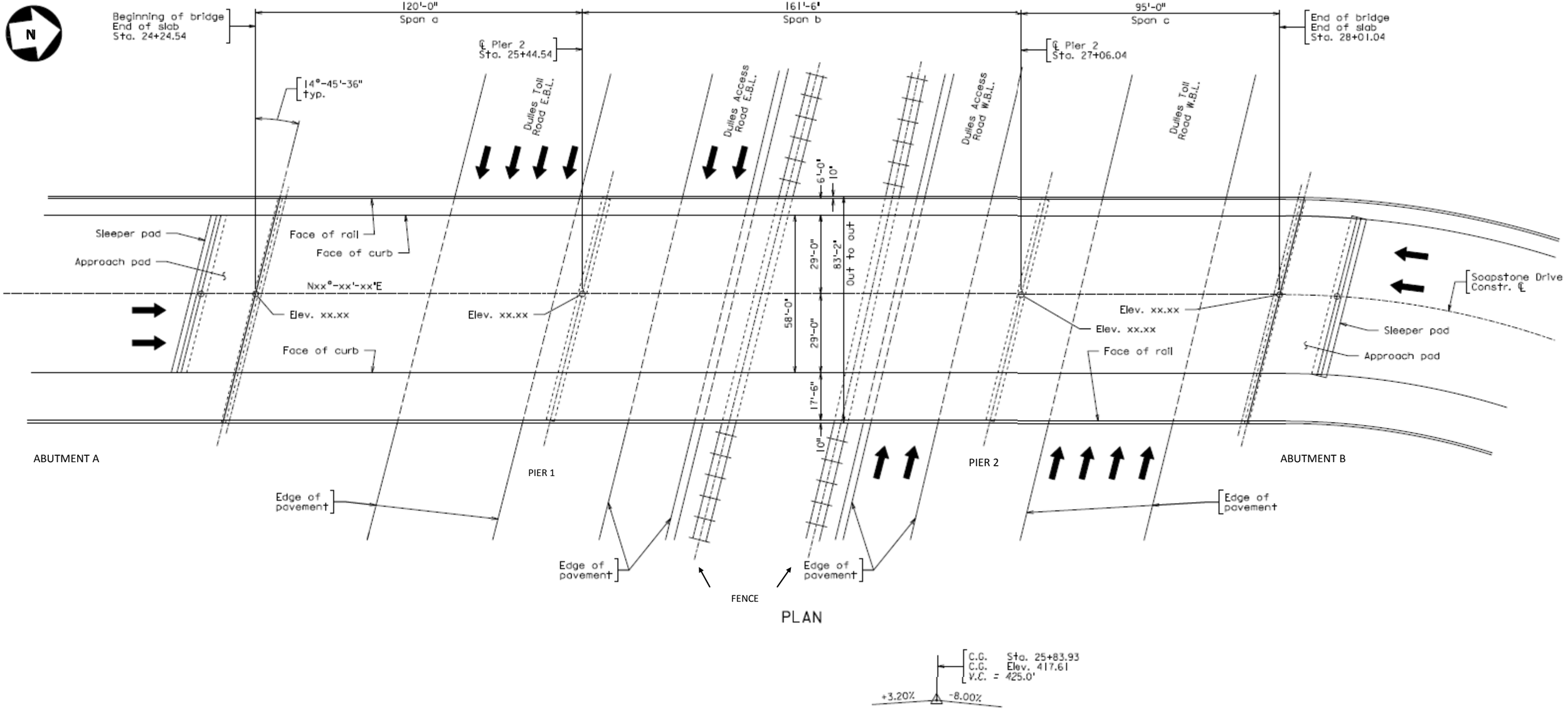
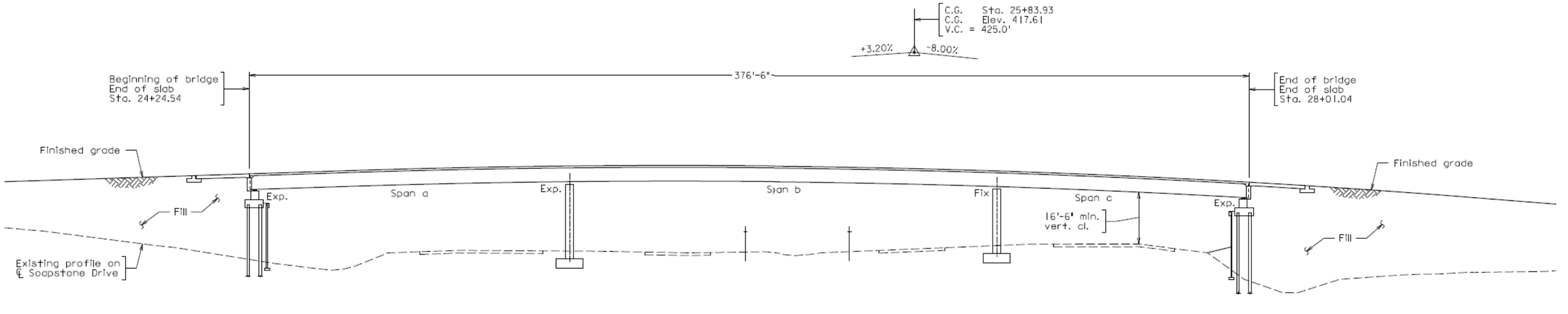


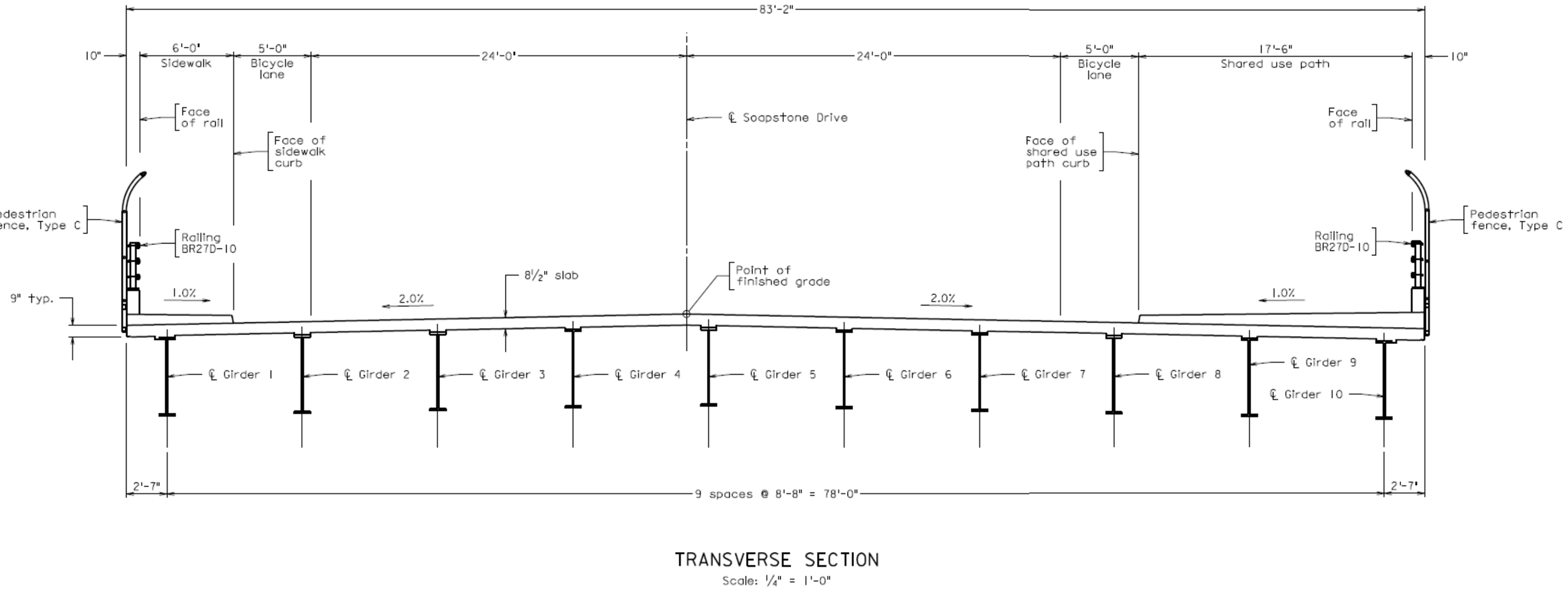
Figure 17: Developed section along the construction centerline.



DEVELOPED SECTION ALONG CONSTRUCTION ℄

Scale: 1" = 20'-0"

Figure 18: Section view along the construction centerline.



TRANSVERSE SECTION

Scale: ¼" = 1'-0"

Figure 19: Transverse section for the bridge over the Dulles Toll Road.

5. Environmental Features Assessment

This section presents the results of a high-level assessment of environmental features that are within or in close proximity to the alignments for the five (5) alternatives. It is important to recognize that this environmental assessment does not replace subsequent environmental analyses that would be conducted if the Soapstone Connector is advanced to become a preliminary design project. It should also be clearly understood that the environmental assessment did not have the benefit of a detailed engineering design, but relied on broadly defined Right-of-Way width for the Connector equating to approximately 100-ft. This area and key environmental constraints are depicted in Figure 20. Consistent with environmental assessments and classifications established by the National Environmental Policy Act (NEPA), this assessment presents the findings separately for the human environment and the natural environment. The potential impacts on the features related to the human environment are summarized in Table 2.

Figure 20: Project area with environmental constraints.

Table 2: Potential Impacts to the Human Environment.

Evaluation Criteria	Alternatives					
	No Build	Alt. 1C	Alt. 3D	Alt 4D	Alt. 5C	Alt. 6E
Residential Displacements (# Buildings)	0	0	0	0	0	0
Commercial Displacements (# Buildings)	0	0	0	0	0	0
Industrial Displacements (# Buildings)	0	0	0	1	1	0
Parking Structure Displacements (# Buildings)	0	1	1	0	0	0
Parking Lot Displacements (Acres)	0	1.2	1.1	2.5	1.4	1.9
Parks and Recreation Areas (# Properties)	0	0	0	0	0	0
Impacts to Known Historic or Archeological Sites	None	W&OD Historic District *NRHP Eligible*	W&OD Historic District *NRHP Eligible*	W&OD Historic District *NRHP Eligible*	W&OD Historic District *NRHP Eligible*	W&OD Historic District *NRHP Eligible*
Impacts to Known Historic or Archeological Sites (Area)	0	0.4 acres	0.4 acres	0.2 acres	0.2 acres	0.2 acres
Section 4(f) Impacts* **Only applicable if Federal funds used*	None	0.4 acres W&OD Historic District	0.4 acres W&OD Historic District	0.2 acres W&OD Historic District	0.2 acres W&OD Historic District	0.2 acres W&OD Historic District
Hazardous Materials Sites	None Disturbed	1 (Registered Petroleum Facility)	0	25,373 sf Transcontinental Gas Pipeline easement	21,293 sf Transcontinental Gas Pipeline easement	25,373 sf Transcontinental Gas Pipeline easement

Source: Michael Baker Jr., Inc.

Environmental Justice

Should federal funding be used for the project, it would be necessary to comply with Executive Order 12898. This Executive Order requires Environmental Justice (EJ) populations to be identified and to address the potential for disproportionately high and adverse impacts to these populations. The largest minority population in the project area is between Dulles Corridor and Sunrise Valley Drive and is

approximately 42 percent. The percentage of households below the poverty level within the study area ranges from 0 percent to 10 percent. The percentage of the population with limited English speaking proficiency ranges between 1 percent and 7 percent, which is relatively low compared to Fairfax County as a whole. If federal funding is not used, it will not be necessary to comply with Executive Order 12898. Table 3 presents a summary of these statistics.

Table 3: Environmental Justice (EJ) Populations.

Environmental Justice Population	Block Group 510594822022	Block Group 510594823011	Block Group 510594823012	Fairfax County
Percent of Total (Minority)	45.1%	21.0%	26.9%	43.6%
Percent of Total (Poverty) / Low-Income	5.2%	1.5%	1.5%	5.1%
Percent of Limited English Speaking Proficiency	6.7%	1.6%	1.7%	6.8%

Source: U.S. EPA EJView Website. http://epamap14.epa.gov/ejmap/ejmap.aspx?wherestr=dulles%20airport%2C%20reston%20va. Accessed 2/26/13.

Land Use and Community Features

Community features within the study area were analyzed to assess the different land uses, parks, publicly owned buildings, neighborhoods, and community centers within close proximity to the Soapstone Connector project area. It does not appear that there would be residential displacements associated with the construction of any of the Build Alternatives. Alternative 1C would displace one parking structure. Alternative 3D would also displace one parking structure. Alternative 6E would avoid displacing any commercial or industrial building. Alternative 4D would displace one industrial building, and would take the greatest area of parking lots (2.5 acres). Alternative 5C would also displace one industrial building. Under any alternative, the reduction of parking spaces is problematic due to the need for replacement parking nearby.

Noise Analysis and Abatement

Should federal funding be used for the project, it would be necessary to comply with the National Environmental Policy Act (NEPA) which requires state departments of transportation to study noise impacts and consider noise abatement as part of all new or expanded federally funded highway projects. The proposed Soapstone Connector would be a new roadway on a new location and would require a noise analysis and abatement, if warranted. The findings of the noise analysis will dictate if noise abatement measures such as sound barriers are warranted. If no federal funding is used for the project, a noise analysis will not be needed.

Hazardous Materials

There is one registered petroleum facility in the project area that could be impacted by Alternative 1C. No other alternatives would impact this site. Additionally, it is assumed that Alternatives 6E, 5C, and 4D will traverse the Transcontinental Gas Pipeline Corporation easement. No other types of monitored hazardous materials sites are anticipated to be impacted. Regardless of the funding source, prior to the acquisition of any right-of-way, a full Phase 1 Environmental Assessment would need to be conducted to determine the location of potential hazardous materials sites.

Historic and Archaeological Resources

There is one historic resource within the project area: the Washington & Old Dominion Railroad Historic District (DHR Site #053-0276). This resource has been determined by the DHR to be eligible for listing in the National Register of Historic Places (NRHP). All of the Build Alternatives would require land within the current boundaries of this historic district. Regardless of funding source, investigation of the project's potential impacts to this historic district would need to be conducted to determine if mitigation is warranted. There are no recorded archaeological resources within the project study area.

Section 4(f) Resources

Should federal funds from the USDOT be used for the project, it will be necessary to comply with the requirements of Section 4(f) of the U.S. Department of Transportation Act of 1966 (23 CFR 771 and 774, and 49 CFR 622). Section 4(f) prohibits the use of land of significant publicly owned parks, recreation areas, wildlife and waterfowl refuges, and land of a publicly or privately owned historic site for transportation projects unless the FHWA determines there is no feasible and prudent avoidance alternative and all possible planning to minimize harm has occurred.

Should the project require the physical and/or temporary use of Section 4(f) resources and should federal funds from the USDOT be used for the project, it will be necessary to conduct a Section 4(f) Evaluation for each resource impacted. The two Section 4(f) resources within the project area are the W&OD Railroad Regional Park and the W&OD Railroad Historic District. Documentation will be required showing that all possible measures have been utilized to minimize harm and use of Section 4(f) resources. If avoidance of Section 4(f) resources is not possible, then it will be necessary to demonstrate that avoidance alternatives were considered, and a test of prudent and feasible alternatives was conducted. If only state and/or local funds are used for this project, then the requirements of Section 4(f) do not apply.

Surface Water Resources

The potential impacts on the features related to surface water resources are summarized in Table 4. More detailed information on specific types of surface water resources is presented after table 4.

Table 4: Potential Impacts to the Natural Environment.

Evaluation Criteria	Alternatives					
	No Build	Alt. 1C	Alt. 3D	Alt 4D	Alt. 5C	Alt. 6E
Acres in 100-Year Floodplain		0.5	0.5	0.1	0.1	1.1
Acres of Wetlands Impacted	0	0	0	0.01	0.01	0.3
Linear Feet of Stream Impacted	0	0	0	0	0	0
Linear Feet of Bridge in Floodplain	0	228	228	0	0	0
Acres of RPA Impacted*	0	0.6	0.6	0	0	0
Known Protected Species	None	None	None	None	None	None
Mitigation Required	None	None	None	Wetland Mitigation to be Determined	Wetland Mitigation to be Determined	Wetland Mitigation to be Determined

Source: Michael Baker Jr., Inc.

- Wetlands and Streams. There is a jurisdictional surface water resource within the study area. It is a freshwater pond on the western edge of the project area. No other wetlands or riparian areas were identified. It is likely that any or all impacts could be designed to avoid these regulated waters. Regardless of funding source, if avoidance is not possible, a formal wetlands delineation will be necessary to confirm wetland type and limits, and mitigation costs should wetlands be impacted.

- 100-Year Floodplains. The project area includes two 100-year floodplain areas. Alternatives 1C and 3D would have the greatest impact (0.5 acre), but this floodplain area would be bridged by either of these two alternatives. The design of any of these alternatives would need to comply with Executive Order 11988 on floodplains.

- Chesapeake Bay Preservation Act. There is one designated Resource Protection Area (RPA) within the project area. While Alternatives 1C and 3D would impact 0.6 acres of RPA, none of the remaining alternatives would have an impact. In accordance with Fairfax County's Chesapeake Bay Ordinance; public utilities, railroads, and public roads are exempt from provisions protecting Resource Protection Areas (RPAs) and Resource Management Areas

(RMAs) (Chapter 118, Section 118-5-2), as long as these structures and facilities are in accordance with the Erosion and Sediment Control Law (Section 10.1-560 et seq. of the Code of Virginia) and with Chapter 104 of the Fairfax County Code and with the Stormwater Management Act (Section 10.1-603.1 et seq. of the Code of Virginia).

- Water Quality Permits. For Alternatives 4D, 5C, and 6E, wetlands and waters of the U.S. would be impacted. If an alternative impacts wetlands, a wetlands delineation must be completed and the boundaries approved by the Corps of Engineers via a Jurisdictional Determination. If no wetlands or waters of the U.S. are impacted, then a water quality permit from the Corps is not necessary. Under any alternative, and regardless of funding source, conveyances of stormwater from the proposed project would require compliance with the National Pollution Discharge Elimination System (NPDES) and the Virginia Pollution Discharge Elimination System (VPDES) standards and stormwater management regulations.

Federally Protected Species

According to the Virginia Fish and Wildlife Information Service (VaFWIS), there are no federally listed threatened or endangered species or critical habitats identified within the project area. Regardless of funding source, it will be necessary to formally coordinate with the FWS, DEQ – Division of Natural Heritage, and Department of Game and Inland Fisheries (DGIF) for a confirmation of these findings.

Additional Requirements Based on Funding Sources

If only state or local funding is used and the project costs $500,000 or more, the project sponsor (Fairfax County) must prepare and submit an Environmental Impact Report to DEQ in accordance with the requirements of the state environmental review process (Code of VA Section 10.1-1188). If federal funding is used, the project sponsor must complete the appropriate level of environmental documentation, as required by the National Environmental Policy Act (NEPA) (23 CFR 771). FHWA is responsible for signing the NEPA document and approving the Section 4(f) Evaluation. If the project is moved forward, then in subsequent phases, utilization of federal aid for any project phase (PE, RW or CN) would require compliance with NEPA and other federal environmental laws and regulations.

6. Traffic Analysis

This section presents the projected traffic volumes and discusses the projected traffic conditions. It is important to note that the RMAG study concluded that the construction of a Soapstone Connector would have a beneficial impact on the projected traffic conditions in the vicinity of the Wiehle-Reston East Metrorail Station. The RMAG study indicated that the Soapstone Connector would result in a reduction of approximately 1,500 vehicles on Wiehle Avenue over the 3 hour-long AM and PM weekday peak period. The Soapstone Connector was shown in the RMAG report to provide access to the kiss-and-ride lot, the transit stops, and the parking area north of the Wiehle – Reston East Metrorail Station. Without a Soapstone Connector, motorists, bicyclists and transit buses that are bound for the Station from Soapstone Drive and points west on Sunrise Valley Drive would have to travel east on Sunrise Valley Drive, turn left onto Wiehle Avenue, cross the existing Wiehle Avenue bridge over the Dulles Toll Road, and then turn left onto Reston Station Boulevard to gain access to the Station. With a Soapstone Connector, those same trips could avoid traveling on Wiehle Avenue altogether. Those drivers and bicyclists could use the Soapstone Connector and gain access to the parking areas north of the Station. The recommendation of the RMAG study established the need for a Soapstone Connector. Concurrently, it was also supported by citizens and elected officials. Consequently, the scope of this feasibility study was set to not require an analysis of a no-build scenario or to determine the positive traffic impacts that would result from the Soapstone Connector by comparing build scenarios with the no-build scenarios. That finding had been established in the RMAG study. Consequently, the objective of the traffic analyses conducted for this feasibility study were to investigate the incremental differences among the alternatives and endeavor to identify the relative benefits of one build alternative compared to the other build alternatives.

The traffic projections that were developed for this traffic analysis of build alternatives only is documented in the succeeding section. The traffic analysis findings, which were based on an analysis of the projected peak hour turn movements using the Synchro traffic model, are subsequently presented in the section after the traffic projections.

Projected Year 2030 AM and PM Peak Hour Traffic Volumes

The projected year 2030 AM and PM peak hour turn movements were developed for a group of intersections in the study area for the Soapstone Connector feasibility study. The intersections consisted of the five (5) major signal-controlled intersections on Wiehle Avenue between Sunset Hills Road and Sunrise Valley Drive, inclusive. This group included the signal-controlled ramp terminals of the ramps to/from the eastbound Dulles Toll Road and the ramps to/from the westbound Dulles Toll Road. In addition, this group included the signal-controlled intersection of Wiehle Avenue and Reston Station Boulevard, which will serve as a primary access to the parking garage and kiss-and-ride drop-off area for

the Metrorail Station. In addition to those five (5) intersections, the study area included key intersections on Sunrise Valley Drive, including the unsignalized intersection at Indian Ridge Drive, which is the westernmost terminus on Sunrise Valley Drive of the five (5) alternatives evaluated, the signal-controlled intersection at Soapstone Drive, and the unsignalized intersection at Commerce Park Drive, in addition to other locations on Sunrise Valley Drive. Future year traffic projections were also developed for other key intersections on Sunset Hills Road including the following two (2) signal-controlled intersections:

- American Dream Way (north leg) and access to Plaza America shopping center (south leg)
- Isaac Newtwon Square West (north leg) and Metro Center Drive (south leg).

The following procedure was used to develop the traffic projections for the intersections in the study area. Turning movement counts were collected during the AM and PM weekday peak hours by the consultant team for the turns to and from the side roads at the unsignalized intersections on Sunrise Valley Drive in the study area. In addition, counts for all turn movements were collected at the signal-controlled intersection of Sunrise Valley Drive and Soapstone Drive and at the signal-controlled intersection of Sunset Hills Road, Isaac Newton Square West, and Metro Center Drive.

Existing turn movement count data were extracted for the major intersections from the Chapter 527 traffic impact report, which was prepared in 2009 by others for the Reston Station Development, a property being developed as a joint public-private partnership of Comstock and Fairfax County. The Reston Station Development has been under construction for the past few years and the initial phase will be completed prior to or concurrent with the opening of the Wiehle – Reston East Metrorail Station at the end of 2013. The Reston Station development will include a large parking garage, an area for Fairfax County Connector transit vehicles to drop off and pick up passengers and kiss-and-ride area for personal vehicles, in addition to office, retail and residential development.

The existing AM and PM peak hour “through” movements on both Sunset Hills Road and Sunrise Valley Drive were estimated for all unsignalized intersections, using the turn movement counts for the signalized intersections. Adjustments were made to balance the flows between intersections and to extrapolate to a common year (i.e., 2012).

Assumptions were then made to account for the diversion of existing traffic as a result of the Soapstone Connector being added to the network. The assumptions on diversion considered both relative travel times via the Connector versus via Wiehle Avenue and the volume of the turn movements that would likely be influenced by the presence of a Soapstone Connector.

The increase in traffic traveling through the study, but not originating in or destined to locations within the study area was also estimated. In traffic impact terminology, this is usually considered background traffic. Estimates of growth in “background traffic” on Wiehle Avenue, on Sunset Hills Road, and on Sunrise Valley Drive, were based on the assumption that the already congested area will have a considerable increase in congestion due to the new Metrorail Station and development / redevelopment around it. Consequently, a rate of growth of approximately 1 percent per year,

compounded annually over 15 years, was used. The growth in background traffic assumed diversion attributable to the Soapstone Connector.

Site-generated traffic projections corresponding to the full build-out for Reston Station development, where were cited in the Chapter 527 report for the Reston Station development, were also used in the development of traffic projections. Basically, the site-generated AM and PM peak hour trips going to and coming from the Reston Station development were "traced" through a study area network that did not include a Soapstone Connector. Then, the diversion of Reston Station site-generated vehicular trips to the Soapstone Connector was then estimated considering relative travel times and delays via the Connector versus via Wiehle Avenue. The set of site-generated traffic turn movements, after adjustment for diversion, was then "layered onto" the existing turn movements.

The Chapter 527 report for the Reston Station development also presented estimates of vehicle trips related to the Wiehle-Reston East Metrorail Station. Metro-related vehicle trips included traffic bound to and from the parking garages for Metrorail riders and so-called "kiss and ride" vehicle trips for which Metrorail transit rider is dropped off or picked up. In a manner similar to the Reston Station trip generated trips were handled (described in the paragraph above), the Metro-related vehicle trips were first "traced" through a study area network that did not include a Soapstone Connector. The diversion assumptions were developed considering relative travel times and delays. The Soapstone Connector was assumed to have its largest impact on diverting trips that were traveling to and from the Wiehle-Reston East Station from Soapstone Drive and points west on Sunrise Valley Drive.

In addition to new trips that would be generated by the Reston Station development, new trips were also estimated for redevelopment and new development for other properties in the study area. Assumptions were made about redevelopment within the study area, particularly development associated with redevelopment of the Association Drive properties, the additional development in Centennial Park/Commerce Park area on three parcels that currently are surface parking lots, the redevelopment of the Veatch property, and additional development on the Dividend Capital property.

Lastly, the resulting total estimates were then compared with year 2030 traffic projections that had been previously developed for the Reston Master Plan and provided by the Transportation Planning Division of the Fairfax County Department of Transportation. The County had provided year 2030 AM and PM peak hour turn movement projections for the four signal-controlled intersections on Wiehle Avenue, namely at Sunset Hills Road, at the on-ramps to and off-ramps from the westbound Dulles Toll Road, at the on-ramps to and off-ramps from the eastbound Dulles Toll Road and at Sunrise Valley Drive.

The resulting year 2030 AM and PM peak hour traffic projections developed for alternatives 1C, 3D, 4D, 5C, and 6E are shown in Appendix E. The turn movements for all intersections in the study area for a given time period (i.e., 2030 AM peak hour or 2030 PM peak hour) and a given alternative are presented on single exhibits in Appendix E. As noted earlier, traffic projections were not developed for a no-build scenario, in accordance with the agreed upon scope for this feasibility study.

Projected Year 2030 Traffic Analysis Level of Service Results

The projected year 2030 AM and PM peak hour levels of Service (LOS), extracted from the results generated with the Synchro model, are presented in Tables 5 through 9, for alternatives 1C, 3D, 4D, 5C, and 6E, respectively. As can be seen in these tables, the intersection of Wiehle Avenue and Sunset Hills Road, the intersection of Wiehle Avenue and Reston Station Boulevard, and the intersection of Wiehle Avenue and Sunrise Valley Drive are projected to operate at level of service F (LOS F) for the year 2030 PM peak hour for all alternatives. It is important to recognize that while the Soapstone Connector would reduce volume on Wiehle Avenue, but the Soapstone Connector, by itself, would not produce LOS D or better conditions at two of the key intersections on Wiehle Avenue. There are substantial turning movement volumes at the Wiehle Avenue / Sunset Hills Road intersection. Many of these movements would not be impacted by the Soapstone Connector. Substantial traffic would still be attracted to Wiehle Avenue, due to the presence of the ramps that provide access to the Dulles Toll Road. The Soapstone Connector would not have new ramps to or from the Dulles Toll Road. In addition, while vehicle trips bound for the Wiehle – Reston East Metrorail Station from Soapstone Drive and points west on Sunrise Valley Drive would divert in greater numbers to the Soapstone Connector, vehicle trips bound for the Metrorail Station from Wiehle Avenue to the north, from Sunset Hills Road to the east, and from the off-ramps from the westbound and eastbound Dulles Toll Road would not likely divert to the Soapstone Connector. Neither would vehicle trips bound for the Reston Station Development from those same roads divert to the Soapstone Connector. The intersection counts from the Chapter 527 traffic impact report that the synchro model is based on are presented in tabular form in Appendix E, Tables E-1 through E-10.

In addition to the LOS results, the Synchro model results were used to develop summaries of key measures of network performance, including vehicle hours of travel (i.e., total travel time), vehicle miles of travel (i.e., distance traveled), vehicle hours of delay (i.e., total delay) and total stops. The Synchro-generated performance index is a measure of overall network performance. Lower values in the performance index indicate better network performance. Table 10 presents a summary of the Synchro-generated performance measures projected for the year 2030 AM peak hour traffic. Table 11 presents a summary of the Synchro-generated performance measures projected for the year 2030 PM peak hour. It is important to note that in Tables 10 and 11, unserved vehicles reflect traffic demand that is not adequately being accommodated. Higher numbers denote poorer performance. A review of the numbers in Table 11 indicate that Alternatives 3D and 4D and 5C had better network performance metrics compared to the Alternatives 1C and 6E in the AM Peak hour.

Table 5: Projected Year 2030 AM and PM Peak Hour Levels of Service for Alternative 1C.

	2030 AM Peak Hour		2030 PM Peak Hour		
Location	HCM Ave. Control Delay	HCM LOS	HCM Ave. Control Delay	HCM V/C Ratio	HCM LOS
Sunset Hills Rd & Connector	22.4	C	11.5	0.67	B
Sunset Hills Rd & Isaac Newton Sq W / Metro Center Dr	17.0	B	35.8	1.00	D
Wiehle Ave & Sunset Hills Rd	61.2	E	120.8	1.28	F
Wiehle Ave& Reston Station Blvd	17.8	B	161.3	2.38	F
Wiehle Ave & WB Dulles Toll Road Ramps	28.3	C	30.5	0.88	C
Wiehle Ave & EB Dulles Toll Rd Ramps	25.2	C	29.3	0.69	C
Wiehle Ave & Sunrise Valley Dr	41.1	D	63.4	1.12	E
Sunrise Valley Dr & Association Dr	29.9	C	33.5	0.90	C
Sunrise Valley Dr & Connector	43.2	D	52.5	1.41	D

Table 6: Projected Year 2030 AM and PM Peak Hour Levels of Service for Alternative 3D.

	2030 AM Peak Hour		2030 PM Peak Hour	
Location	HCM Average Control Delay	HCM LOS	HCM Average Control Delay	HCM LOS
Sunset Hills Rd & Connector	23.5	C	9.0	A
Sunset Hills Rd & Isaac Newton Sq W / Metro Center Dr	17.1	B	32.9	C
Wiehle Ave & Sunset Hills Rd	61.2	E	120.8	F
Wiehle Ave & Reston Station Blvd	17.8	B	161.2	F
Wiehle Ave & WB Dulles Toll Rd Ramps	28.3	C	30.7	C
Wiehle Ave & EB Dulles Toll Rd Ramps	25.2	C	29.5	C
Wiehle Ave & Sunrise Valley Dr	41.2	D	63.4	E
Sunrise Valley Dr & Connector	38.2	D	32.4	C

Table 7: Projected Year 2030 AM and PM Peak Hour Levels of Service for Alternative 4D.

	2030 AM Peak Hour		2030 PM Peak Hour	
Location	HCM Average Control Delay	HCM LOS	HCM Average Control Delay	HCM LOS
Sunset Hills Rd & Connector	23.8	C	9.1	A
Sunset Hills Rd & Isaac Newton Sq W / Metro Center Dr	17.4	B	32.8	C
Wiehle Ave & Sunset Hills Rd	61.0	E	120.8	F
Wiehle Ave & Reston Station Blvd	17.8	B	161.2	F
Wiehle Ave & WB Dulles Toll Rd Ramps	28.3	C	30.7	C
Wiehle Ave & EB Dulles Toll Rd Ramps	25.2	C	29.6	C
Wiehle Ave & Sunrise Valley Dr	41.4	D	61.9	E
Sunrise Valley Dr & Connector	38.4	D	34.0	C

Table 8: Projected Year 2030 AM and PM Peak Hour Levels of Service for Alternative 5C.

	2030 AM Peak Hour		2030 PM Peak Hour	
Location	HCM Average Control Delay	HCM LOS	HCM Average Control Delay	HCM LOS
Sunset Hills Rd & Connector	13.9	B	7.7	A
Sunset Hills Rd & Isaac Newton Sq W/ Metro Center Dr	19.5	B	35.8	D
Wiehle Ave & Sunset Hills Rd	61.5	E	120.8	F
Wiehle Ave & Reston Station Blvd	17.8	B	161.2	F
Wiehle Ave & WB Dulles Toll Road Ramps	28.3	C	30.7	C
Wiehle Ave & EB Dulles Toll Road Ramps	25.2	C	29.5	C
Wiehle Ave & Sunrise Valley Dr	41.4	D	62.4	E
Sunrise Valley Dr & Soapstone Dr	40.1	D	27.4	C
Sunrise Valley Dr & Connector	26.3	C	32.7	C

Table 9: Projected Year 2030 AM and PM Peak Hour Levels of Service for Alternative 6E.

	2030 AM Peak Hour		2030 PM Peak Hour	
Location	HCM Average Control Delay	HCM LOS	HCM Average Control Delay	HCM LOS
Sunset Hills Rd & Connector	13.6	B	8.1	A
Sunset Hills Rd & Isaac Newton Sq W / Metro Center Dr	19.5	B	35.8	D
Wiehle Ave & Sunset Hills Rd	61.5	E	120.8	F
Wiehle Ave & Reston Station Blvd	17.8	B	161.2	F
Wiehle Ave & WB Dulles Toll Rd Ramps	28.3	C	30.7	C
Wiehle Ave & EB Dulles Toll Rd Ramps	25.3	C	29.5	C
Wiehle Ave & Sunrise Valley Dr	45.0	D	63.4	E
Sunrise Valley Dr & Soapstone Dr	23.8	C	30.0	C
Sunrise Valley Dr & Connector	25.2	C	23.9	C

Table 10: Synchro Analysis Summary of Projected Year 2030 AM Peak Hour Traffic Conditions.

Alternative	No. of Signal-controlled Inter-sections	Total Delay (veh-hrs)	Total Stops	Total Travel Time (veh-hrs)	Distance Traveled (veh-mi)	Unserved Vehicles	Performance Index
1C	11	374	24,266	563	6,298	381	441.4
3D	10	351	24,242	544	6,405	235	418.6
4D	10	352	23,990	540	6,254	235	418.7
5C	11	350	25,463	536	6,224	190	420.8
6E	11	353	25,863	542	6,356	190	425.3

Table 11: Synchro Analysis Summary of Projected Year 2030 PM Peak Hour Traffic Conditions.

Alternative	No. of Signal-Controlled Inter-sections	Total Delay (veh-hrs)	Total Stops	Total Travel Time (veh-hrs)	Distance Traveled (veh-mi)	Unserved Vehicles	Performance Index
1C	11	941	31,279	1,146	6,766	1,980	1,027.4
3D	10	891	28,960	1,100	6,946	1,801	971.0
4D	10	888	29,519	1,091	6,748	1,801	969.9
5C	11	900	30,291	1,105	6,798	1,801	984.0
6E	11	899	30,206	1,101	6,769	1,801	983.0

All alternatives had lower network performance in the PM peak hour compared to the AM peak hour. This is due to the fact that higher traffic volumes were projected for the PM peak hour compared to the AM peak hour. In terms of comparative performance, there were neglible to very minor differences among the alternatives, with exception of Alternative 1C which had worst performance measures among the five alternatives that were evaluated.

7. Pedestrian and Bicycle Assessment

The effect of the "Soapstone Connector" on the mobility and safety of pedestrians and bicyclists was qualitatively assessed using the following factors.

- Compatibility with existing and planned bike routes, trails, and walkways in the Reston area.
- The degree to which a Soapstone Connector would enhance the pedestrian and bicycle networks in the area.
- The degree to which a Soapstone Connector would enhance pedestrian and bicycle access to the Wiehle – Reston East Metrorail Station.
- The degree to which a Soapstone Connector would enhance pedestrian and bicycle access to the Washington and Old Dominion (W & OD) Trail.
- The degree to which a Soapstone Connector would reduce travel by single occupant vehicles (SOV) in the study area. Non-SOV travel includes walking, bicycling and travel via bus.

With respect to the third bullet listed above, namely, the one related to enhancement in pedestrian and bicycle access to the Wiehle-Reston East Metrorail Station, it is important to recognize that the Soapstone Connector would not provide direct access to the Wiehle - Reston East Metrorail Station. Pedestrian bridges to the Metrorail Station in the median over the Dulles Corridor would provide pedestrian direct access to the Wiehle – Reston East Metrorail Station. In addition, there are many projects in construction and currently being planned that will change the pedestrian paths and streets in the immediate vicinity of the Wiehle-Reston East Metrorail Station. As part of the "Reston Station" development, which is a joint Fairfax County-Comstock development west of Wiehle Avenue and north of the Wiehle-Reston East Metrorail Station, street and sidewalk improvements are being implemented to improve pedestrian and bicycle access to the Station from both Sunset Hills Road and Wiehle Avenue. The land south of the Dulles Toll Road in the immediate vicinity of the Station is largely privately owned. However, the Fairfax County Department of Transportation (FCDOT) is currently considering pedestrian improvement projects on the south side of the Wiehle – Reston East Metrorail Station. This pedestrian improvement project would improve access to the south enterance of the station through the Vornado Property to Sunrise Valley Drive. Other pedestrian and bicycle improvements will likely occur in the area due to future developments in the study area.

The existing pedestrian paths within and beyond the study area limits are depicted below in Figures 21 and 20. The pedestrian improvements planned due to the Wiehle – Reston East Metrorail Station will substantially improve the existing pedestrian network. The pedestrian improvement projects are shown in Figure 22. The enumerated projects that appear in Figure 22 are described in a tabular manner in Appendix C.

In order to properly assess the impacts, the pedestrian assessment and the bicycle assessment were done separately. The results of those assessments are presented in the following sections.

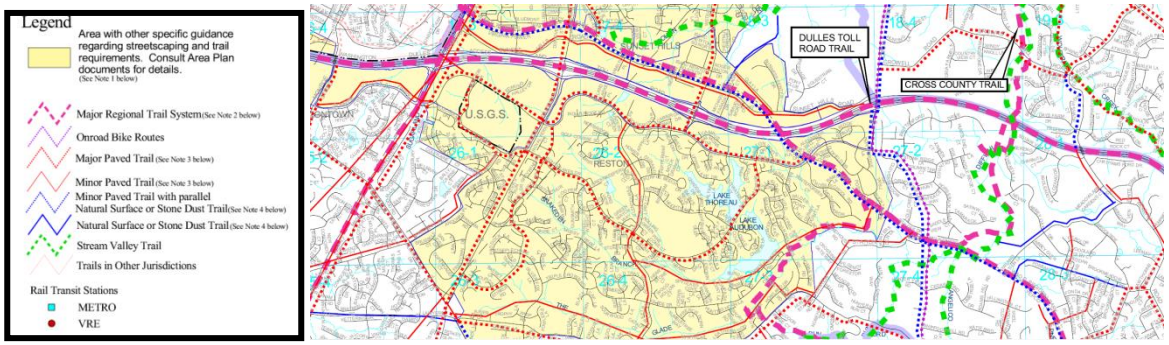


Figure 21: Major regional trails, Steam Valley trails, on-road bike routes, and major and minor paved trails.

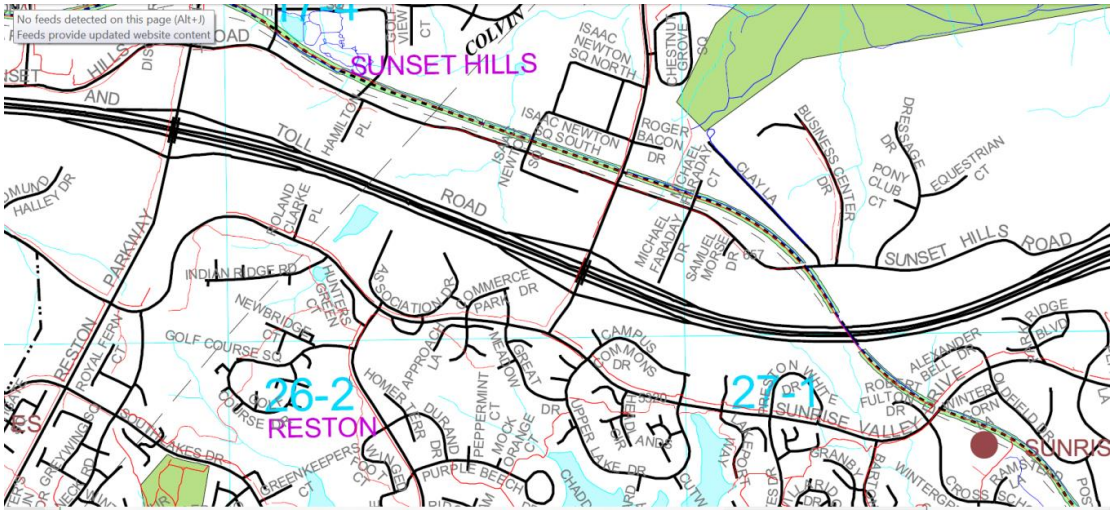


Figure 22: The W&OD Trail (shown as a dashed line highlighted in green) and other existing pedestrian trails/paths (shown as red lines.)

Reston Area Metrorail Station Access Improvement Projects

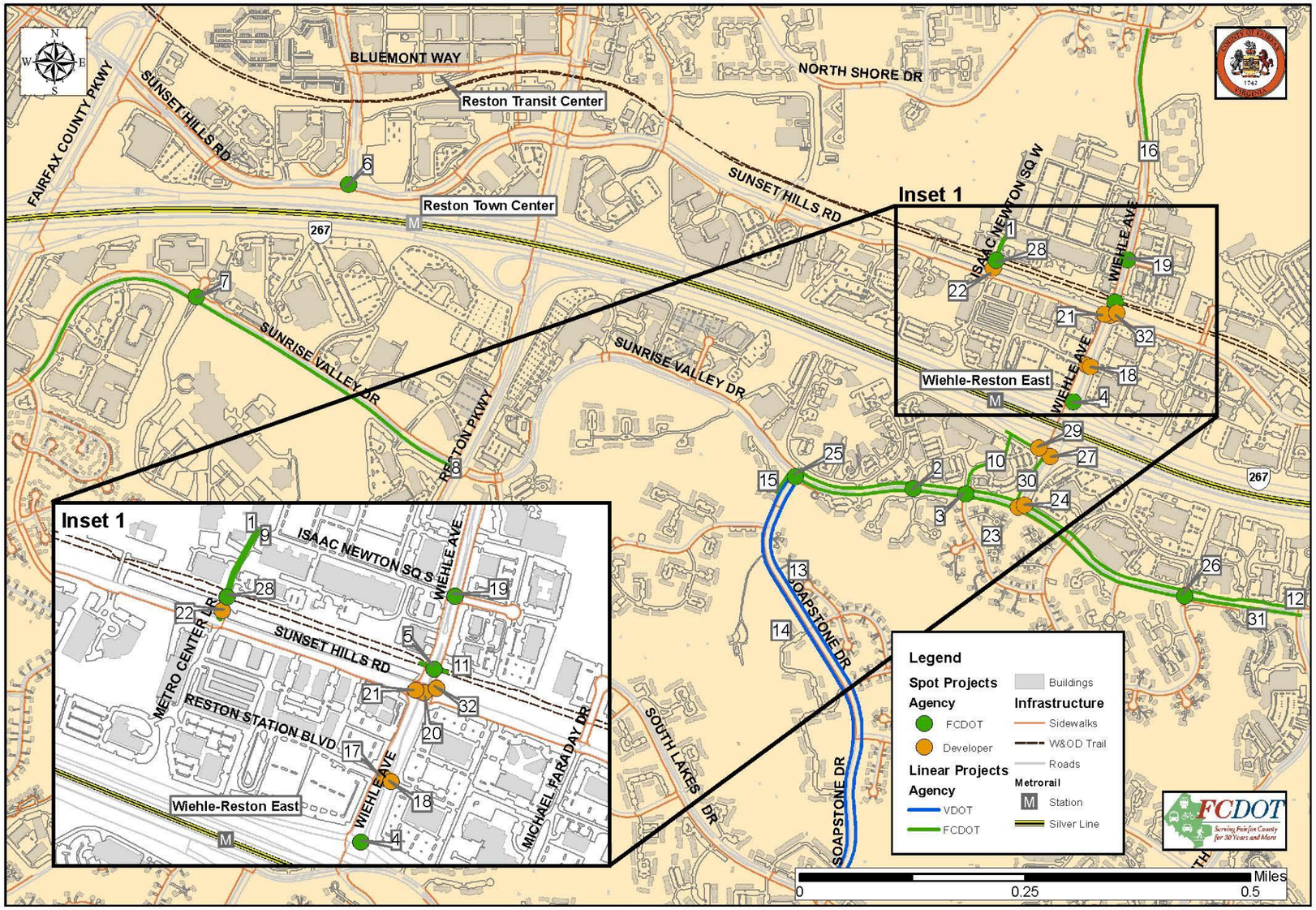


Figure 23: Wiehle - Reston East Metro Station Access Improvement projects.

Pedestrian Assessment

This section presents the results of the pedestrian assessment. It is important to recognize that the desirable maximum grade for pedestrian facilities established by the Americans With Disability Act (ADA) is 5 percent. This is not to say that pedestrian facilities cannot have steeper grades. They can, but the design would have to meet additional criteria, such as the provision of level "landings" to separate shorter sections of steeper grades. Since this was a feasibility study and not a design project, the precise design details for sidewalks and shared use paths on the Soapstone Connector were not developed. However, the vertical profiles were considered during the pedestrian assessment. Alternatives that had longer sections with 8 percent grades were judged to be less desirable compared to alternatives with shorter sections of 8 percent grades. Alternatives with maximum grades of 8 percent were judged to be less desirable compared to alternatives with maximum grades of 6.5 percent. However, maximum grade and critical length of grade were not the only factors that were considered in the assessment. In addition, the provision of a new pedestrian crossing over the Dulles Corridor was deemed beneficial in terms of adding to the network of pedestrian paths in the study area. However, since a Connector would not provide a more direct path to the Wiehle – Reston East Metrorail Station compared to other sidewalks and pedestrian paths to the pedestrian bridges that provide direct access to the Station, there was limited utility from the Soapstone Connector in enhancing pedestrian access to the station. The assessment considered that many pedestrians coming from the north would utilize sidewalks along Sunset Hills Road to Metro Center Drive and Reston Station Boulevard rather than using the Soapstone Connector to gain access to and from the Station. Similarly, pedestrians traveling from Soapstone Drive or points west on Sunrise Valley Drive were assumed to use the pedestrian paths along Sunrise Valley Drive to gain access to and from the Station, rather than using the Soapstone Connector. In terms of a relative comparison among the alternatives, one consideration was the relative proximity to the Metrorail Station. Alternatives that were closer to the Metrorail Station would produce an incremental benefit in terms of pedestrian mobility compared to Soapstone Drive alternatives that were further away. The pedestrian activity center for the study area was considered to be the Metrorail Station. Hence, provision of more paths in the vicinity of the Station was deemed to have a more positive value compared to the provision of paths that were more distant from the pedestrian activity area. This is not to imply that the provision of new pedestrian paths farther from Station would not have value. Rather, these alternatives would have incrementally lower values.

<u>Alternative 1C</u>

This alternative has a maximum grade of 8 percent. The critical length of 8 percent grade for this alternative is approximately 590-ft. Given the choice for pedestrians bound for the Metrorail Station and approaching the area from points east on Sunset Hills Road, it is highly likely that these pedestrians would use pedestrian paths along Wiehle Avenue. For pedestrians bound for the Metrorail Station approaching from points west on Sunrise Valley Drive and Soapstone Drive, it is likely that they will find

the shortest paths to the Station and not likely to use the Alternative C alignment. This alternative does provide additional pedestrian paths in an area closer to the Metrorail Station and is therefore seen to offer advantages compared to alternatives that are further west of the Station.

Alternative 3D

This alternative has a maximum grade of 8 percent. The critical length of 8 percent grade for this alternative is 605-ft. While that is the longest critical length of grade compared to the other alternatives, Alternative 3D offers several advantages compared to the other alternatives. It provides for a new pedestrian path that directly connects Soapstone Drive and Sunset Hills Road with Sunset Hills Road and would add significantly to the pedestrian network in the study area. Since its relative location is closer to the Station compared to Alternatives 4D, 5C, and 6E, Alternative 3D offers additional incremental benefits to the pedestrian network in the vicinity of the Station. This alignment is more desirable than Alternative 1C because it provides a path to the Station for pedestrians to/from the west and from Soapstone Drive. Lastly, for pedestrians who want to use the W&OD Trail, Alternative 3D provides the most direct paved path to the Trail compared to the other alternatives.

Alternative 4D

This alternative has one very short section (i.e., 270-ft) of an 8 percent grade and another short section (i.e., 160 ft) with a grade greater than 5 percent but less than 8 percent. As such, the vertical profile of alternative 4D offers advantages compared to the vertical profile for Alternatives 1C and 3D. This alternative has many of the positive qualities in terms of pedestrian accommodation as Alternative 3D; however, alternative 4D would be further from the immediate station area. In addition, while alternative 3D provides a paved direct connection from Sunset Hills Road to the W&OD Trail, the pedestrian linkage for Alternative 4D directly from Sunset Hills Road to the W&OD trail is not as good.

Alternative 5C

This alternative is the most attractive in terms of pedestrian grade considerations with a maximum grade of 6.6 percent. The total length with a grade exceeding 5 percent is approximately 400 ft. Compared to all other alternatives, Alternative 5C offer a vertical profile that has the least amount of steep grades. Alternative 5C is farther from the Station and therefore its enhancement to the pedestrian access to the Station is less than Alternatives 1C and 3D. The location of this alternative would add value to the regional pedestrian network by creating a new pedestrian path that would allow improved access across the Dulles Corridor.

Alternative 6E

This alternative features a maximum grade of 8 percent. The critical length of 8 percent grade is 300 ft. In addition, Alternative 6E features a 450 ft long section with a 5.5 percent grade.

Table 12 presents an overall summary of the pedestrian assessment and an overall relative rank ordering of the five (5) alternatives, 1 (best) to 5 (worst), in terms of pedestrian safety and mobility decisions.

Table 12: Summary of Pedestrian Assessment.

Alternative	Length of Facility with Grade Greater than 5 Percent	Enhancement in Pedestrian Accessibility to Wiehle – Reston East Metro Station	Enhancement in Pedestrian Accessibility to W & OD Trail	Contribution to Pedestrian Network	Overall Relative Rating with Respect to Pedestrian Considerations
1C	590	Fair	Good	Fair	5
3D	605	Fair	Good	Very Good	1
4D	430	Limited	Good	Very Good	2
5C	400	Limited	Very Good	Good	3
6E	750	Limited	Good	Fair	4

Bicycle Assessment

The Washington and Old Dominion Trail (W&OD) is the major bicycle path in the area and is owned and maintained by the Northern Virginia Regional Park Authority. The trail runs east-west through the study area, just north of Sunset Hills Road. Figure 24 shows the preferred and less preferred bicycling routes on the streets and roads, and primary and secondary shared use paths in the area. Figure 25 provides a more detailed view in the area near the Wiehle – Reston East Metrorail Station. The "Soapstone Connector" would provide improved access for bicyclists using the W&OD Trail.

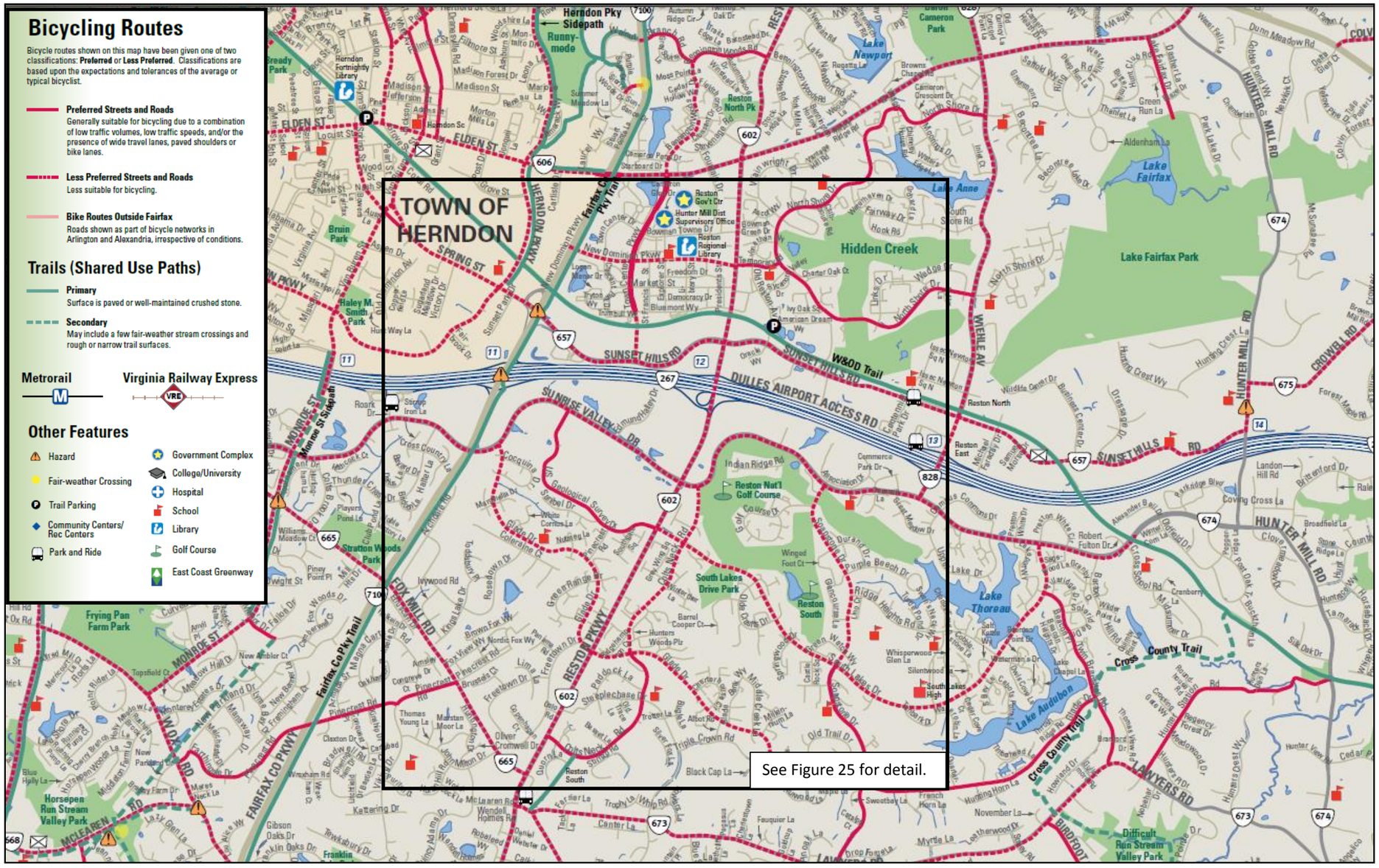


Figure 24: Bicycle routes in project area.

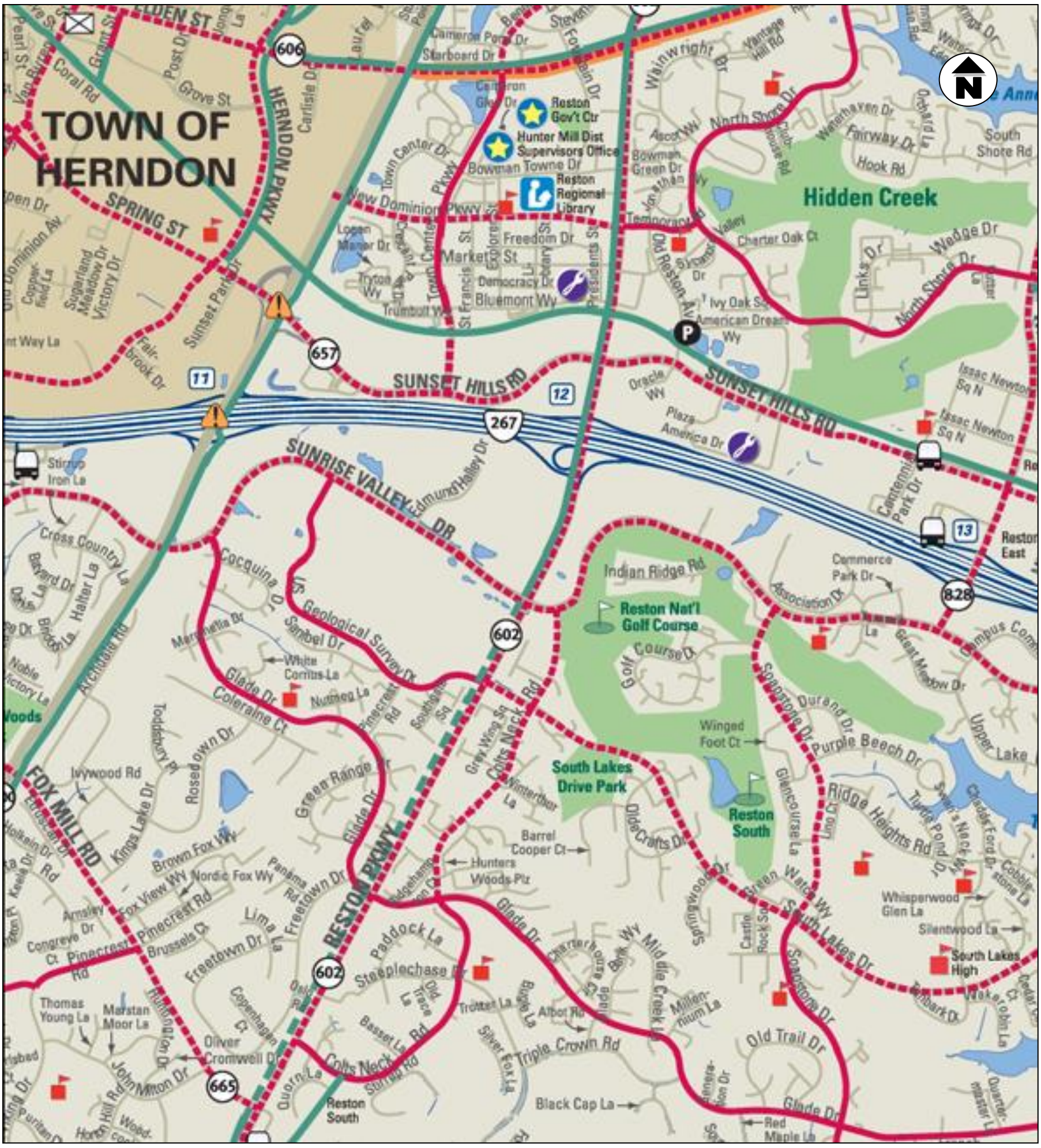


Figure 25: Detailed view of Bicycle Routes in the Project Area.

Because all five (5) of the alternatives would provide an additional crossing of the Dulles Corridor, all the alternatives produce additional beneficial for bicyclists. This bridge would afford greater accessibility to the W & OD Trail, certainly from the bike lanes on Soapstone Drive. With its on-road bike lanes and shared use path, the Soapstone Connector would provide greater accessibility to the Wiehle-Reston East Metrorail Station.

Alternative 1C

This alternative does provide a direct connection to the W&OD Trail via a paved path north of Sunset Hills Road, but does not provide a direct connection for bicyclists using the bike lanes on Soapstone Drive.

Alternative 3D

Compared to the other alternatives, Alternative 3D provides a direct path from the on-road bike lanes on Soapstone Drive at Sunrise Valley Drive to Sunset Hills Road. Moreover, this alternative does provide a direct connection to the W&OD Trail via a paved path north of Sunset Hills Road.

Alternative 4D

Bicyclists may find this alternative as a preferable path from Soapstone Drive to the W&OD Trail. However, there is no direct connection to the W&OD Trail via a paved path north of Sunset Hills Road.

Alternative 5C

The vertical profile has the least amount of steep grades. Consequently, Alternative 5C may be more appealing to bicyclists, especially novice and inexperienced bicyclists, compared to the other alternatives. It is important to point out that while this alternative has a favorable vertical alignment, it does not offer a direct connection to the W&OD Trail via a paved path north of Sunset Hills Road. While Alternative 5C does not provide a direct connection for bicyclists using the bike lanes on Soapstone Drive as was provided by Alternatives 3D and 4D, this alternative requires bicyclists from Soapstone Drive to travel a short section of Sunrise Valley Drive while traveling to and from the W&OD Trail and points north of the Dulles Corridor. As such, Alternative 5C offers advantages compared to Alternatives 1C and 6E.

Alternative 6E

In terms of bicycle use, Alternative 6E does not provide a direct connection for bicyclists using the bike lanes on Soapstone Drive. In addition, there is no direct connection to the W&OD Trail via a paved path north of Sunset Hills Road.

An overall summary of the assessment with respect to bicyclists is presented in Table 13.

Table 13: Summary of Bicycle Assessment.

Alternative	Maximum Length of Grade		Bicycle Connectivity to Wiehle – Reston East Metro Station	Bicycle Connectivity to W&OD Trail	Consistency with Long Range Bicycle Transportation Plan	Relative Overall Ranking with respect to Bicycle Considerations
	Max. Grade (percent)	Length of Max. Grade (ft)				
1C	8	590	Very Good	Fair	Good	4
3D	8	605	Very Good	Very Good	Very Good	1
4D	8	270	Good	Very Good	Very Good	3
5C	**6.6**	215	Good	Very Good	Good	2
6E	8	300	Fair	Good	Fair	5

8. Land Use Assessment

This section of the report identifies the specific properties that would be traversed by the new alignment for the Soapstone Connector. The overall width of the Soapstone Connector, for the purposes of this feasibility study, was assumed to be approximately 100 ft. The results are summarized for the each alternative, separately.

Alternative 1C

The 100-ft wide new alignment for Alternative 1C would require land from a total of fourteen (14) properties. Eight (8) parcels abut Association Drive, three (3) abut Commerce Park Drive, and three (3) are accessible from Sunset Hills Road. The total land area from the fourteen (14) parcels required for the Right of Way is approximately 295,500-sf. Table 14 identifies the specific properties, the land owners, the total size of the parcel and the amount of land that would be needed from each parcel for the Soapstone Connector's alignment.

Alternative 3D

The 100-ft wide new alignment for Alternative 3D would require land from a total of nine (9) properties. Six (6) parcels abut Association Drive and three (3) parcels are accessible from Sunset Hills Road. The total land area from the nine (9) parcels required for the Right of Way is approximately 238,000-sf. Table 15 identifies the specific properties, the land owners, the total size of the parcel and the amount of land that would be needed from each parcel for the Soapstone Connector's alignment.

Alternative 4D

The 100-ft wide new alignment for Alternative 4D would require land from a total of seven (7) properties. Two (2) of the parcels are accessible from Association Drive, two (2) are accessible from Sunset Hills Road, one (1) is the Association Drive Right of Way, and one (1) is accessible from Sunset Hills Rd. The total land area from the seven (7) parcels required for the Right of Way is approximately 394,000-sf. Table 16 identifies the specific properties, the land owners, the total size of the parcel and the amount of land that would be needed from each parcel for the Soapstone Connector's alignment.

Alternative 5C

The 100-ft wide new alignment for Alternative 5C would require land from a total of eight (8) properties. One (1) parcel is accessible from Sunrise Valley Drive, three (3) parcels are accessible from Association Drive, one (1) is the Association Drive Right of Way, and three (3) parcels are accessible from Sunset Hills Road. The total land area from the eight (8) parcels required for the Right of Way is approximately 281,000-sf. Table 17 identifies the specific properties, the land owners, the total size of the parcel and the amount of land that would be needed from each parcel for the Soapstone Connector's alignment.

Alternative 6E

The 100-ft wide new alignment for Alternative 6E would require land from a total of five (5) properties. Three (3) parcels are accessible from Sunset Hills Road, and two (2) abut the right-of-way for Sunrise Valley Drive. The total land area from the five (5) parcels required for the Right of Way is approximately 170,000-sf. Table 18 identifies the specific properties, the land owners, the total size of the parcel and the amount of land that would be needed from each parcel for the Soapstone Connector's alignment.

See Appendix D Table D-1 for a comprehensive list of all properties in the study area. As noted earlier in this report, due to the uncertainty with respect to the value of the land and properties, cost estimates for the right-of-way to be acquired were not developed.

Table 14: Parcels impacted by Alternative 1C.

Alt.	Parcel #	Address	Owner	Total Area of Parcel (sf)	Size of Building on Parcel (sf)	Land Area required for R/W (sf)
1C	0174 01 0029A	11487 Sunset Hills Rd	Reston Owner Corporation	252,480	140,381	47,500
	0174 12 0004	1900 Association Dr	American Association for Health, Physical Education and Recreational Teachers	147,272	34,256	29,000
	0174 12 0005A	1920 Association Dr	Richard B. Wirthlin Family, LLC	146,954	51,022	2,000
	0174 12 0006	1916 Association Dr	1916 Holdings, LLC	37,026	4,824	27,500
	0174 12 0007	1914 Association Dr	National Business Education Association	37,039	14,210	2,000
	0174 12 0008	1912 Association Dr	Future Business Leaders of American Phi Beta	73,660	10,370	14,500
	0174 12 0011A	11495 Commerce Park Dr	IGS LLC	181,824	46,205	2,500
	0174 12 0011B	-*	Centennial One Limited Partnership	66,914	0	10,000
	0174 12 0011D8	11480 Commerce Park Dr	MEPT Commerce Executive VI LLC	162,901	142,965	6,000
	0174 12 0011D9	1913 Association Dr	Executive Two Limited Partnership	131,534	0	65,000
	0174 12 0012	Association Dr**	Center for Educational Associates	198,398	0	35,000
	0174 24 0005	1890 Metro Center Dr	Kaiser Foundation Health Plan of the Mid-Atlantic States, Inc	225,032	64,324	21,250
	0174 24 0006	11493 Sunset Hills Rd	ISTAR CTL Sunset Hills – Reston LLC	348,484	181,392	21,250
	0174 33 C	11490 Commerce Park Dr	Executive Two Limited Partnership	50,897	48183	11,000

*Parking Lot **Area containing Association Dr

Table 15: Parcels impacted by Alternative 3D.

Alt.	Parcel #	Address	Owner	Total Area of Parcel (sf)	Size of Building on Parcel (sf)	Land Area required for R/W (sf)
3D	0174 01 0029A	11487 Sunset Hills Rd	Reston Owner Corporation	252,480	140,381	55,000
	0174 12 0001	1906 Association Dr	Nat'l Council of Teachers of Math, Inc.	110473	31,520	3,000
	0174 12 0002	1904 Association Dr	National Association of Secondary School Principals	184,132	36,233	65,000
	0174 12 0003	1902 Association Dr	KM Stonecroft, LLC	110,459	17,688	20,000
	0174 12 0004	1900 Association Dr	AMERICAN ASSN FOR HEALTH, PHYSICAL ED AND REC	147,272	34,256	1,000
	0174 12 0005A	1920 Association Dr	Richard B. Wirthlin Family, LLC	146,954	51,022	37,500
	0174 12 0012	Association Dr**	CENTER FOR EDUCATIONAL, ASSOCIATES	198,398	0	13,800
	0174 24 0005	1890 Metro Center Dr	Kaiser Foundation Health Plan of the Mid-Atlantic States, Inc.	225,032	64,324	21,250
	0174 24 0006	11493 Sunset Hills Rd	ISTAR CTL Sunset Hills – Reston, LLC	348,484	181,392	21,250

*Parking Lot **Area containing Association Dr

Table 16: Parcels impacted by Alternative 4D.

Alt.	Parcel #	Address	Owner	Total Area of Parcel (sf)	Size of Building on Parcel (sf)	Land Area required for R/W (sf)
4D	0174 01 0010	11600 Sunrise Valley Dr	BDC Sunrise Valley, LLC	432,115	158,102	55,000
	0174 12 0002	1904 Association Dr	NATIONAL ASSOCIATION OF, SECONDARY SCHL PRINCIPALS	184,132	36,233	184,132
	0174 12 0003	1902 Association Dr	KM STONECROFT LLC,	110,459	17,688	1,000
	0174 12 0012	Association Dr**	CENTER FOR EDUCATIONAL, ASSOCIATES	198,398	0	90,600
	0174 13 0001	11501 Sunset Hills Rd	MUSICA, LLC	59,146	32950	25,000
	0174 13 0002A	11505 Sunset Hills Rd	SOLUS, LLC	201,542	40758	1,000
	0174 24 0006	11493 Sunset Hills Rd	ISTAR CTL Sunset Hills – Reston LLC	348,484	181,392	37,500

**Area containing Association Dr

Table 17: Parcels impacted by Alternative 5C.

Alt.	Parcel #	Address	Owner	Total Area of Parcel (sf)	Size of Building on Parcel (sf)	Land Area required for R/W (sf)
5C	0174 01 0010	11600 Sunrise Valley Dr	BDC Sunrise Valley LLC	432,115	158,102	70,000
	0174 12 0002	1904 Association Dr	NATIONAL ASSOCIATION OF, SECONDARY SCHOOL PRINCIPALS	184,132	36,233	27,500
	0174 12 0003	1902 Association Dr	KM STONECROFT LLC,	110,459	17,688	1,000
	0174 12 0004	1900 Association Dr	American Association for Health, Physical Education and Recreation	147,272	34,256	7,500
	0174 12 0012	Association Dr**	Center for Educational Associates	198,398	0	61,000
	0174 13 0001	11501 Sunset Hills Rd	MUSICA LLC	59,146	32950	59,146
	0174 13 0002A	11505 Sunset Hills Rd	SOLUS LLC	201,542	40758	35,000
	0174 24 0006	11493 Sunset Hills Rd	ISTAR CTL Sunset Hills – Reston, LLC	348,484	181,392	20,000

**Area containing Association Dr

Table 18: Parcels impacted by Alternative 6E.

Alt.	Parcel #	Address	Owner	Total Area of Parcel (sf)	Size of Building on Parcel (sf)	Land Area required for R/W (sf)
6E	0174 01 0010	11600 Sunrise Valley Dr	BDC Sunrise Valley, LLC	432,115	158,102	100,000
	0174 01 0021	11495 Sunset Hills Rd	SPECTRA 4, LLP	130,697	41,950	27,500
	0174 13 0001	11501 Sunset Hills Rd	MUSICA, LLC	59,146	32950	1,000
	0174 14 0002	11690 Sunrise Valley Dr	RP 11690 LLC	177,755	48200	1,000
	0174 24 0006	11493 Sunset Hills Rd	ISTAR CTL Sunset Hills – Reston, LLC	348,484	181,392	40,000

9. Cost Estimates

A detailed analysis was conducted to develop preliminary, planning-level construction cost estimates for the five alternatives. The methodology employed is described in the succeeding section and then the estimates are presented.

Cost Estimation Methodology

The cost estimation methodology employed fairly rudimentary information available for the concept. While concept plans were drawn, horizontal alignments and vertical alignments developed and a typical section was identified, there was not even a 30 percent set of design plans available on which to develop the cost estimation. Consequently, a number of simplifying assumptions were made and used. The factors that were considered are discussed below.

- *Design***.**

  The design cost is a lump sum based on 20 percent of the total construction costs for each alternative, which include quantified construction costs and a contingency.

- *Category 1 – Right of Way***.**

  Due to the lack of recent appraisals of the properties in the area and the uncertainty of the real impact of the Metrorail Station on the property values in this area, it was neither prudent nor appropriate to produce estimates for the cost of the land for the right-of-way as part of the Soapstone Connector, which would be constructed largely on a new alignment. Areas of each parcel that will be affected by the proposed alignments were quantified. The area includes the direct area where the road will be and portions of the parcel that will lose their utility.

- *Category 2 - Land Impact*.

  Similar to the cost for right-of-way, it is extremely difficult to assess the costs for land impacts for damages attributable to the Soapstone Connector with a detailed survey, land appraisals, and a final design. For these reasons, the land damages costs were not estimated.

- *Category 3 – Demolition*.

  Category 3 is quantified per cubic foot of building volume and per square yard of pavement demolition for each option. The cost for each building includes demolition and disposal of material. Each alternative will require the demolition of parts of Association Drive and portions of existing structures to support the proposed alignment. Alternatives 1C and 3D require the demolition of an existing 4-story parking garage on the land currently occupied by the BAE office

buiding. Alternative 4D requires a demolition of the National Association Secondary Schools office building. Alternative 5D will require the demolition of the Musica office building. The cost for building demolition is based on RS Means Pricing, which includes demolition and disposal of material. The unit cost of pavement demolition is based upon the Fairfax County Department of Public Works Environmental Services Land Development Services 2012 Comprehensive Unit Price Schedule (DPWES UPS).

- *Category 4 – Roadway.*

  Category 4 is a breakdown of items typically associated with roadway construction and is based on the preliminary alignments including the stub outs to the property connections and to the proposed Grid of Streets. The cost includes grading, stone base, and the asphalt pavement section. The roadway areas were broken down into the different layers of material typically used for construction. Using best available data as a basis for our typical roadway section, it was assumed that eight inches of aggregate base material would be placed on grade followed by seven inches of asphalt pavement. The pavement areas were calculated using the future alignment length and the width of the typical section. The unit cost for the pavement items is based on VDOT cost estimates.

- *Category 5 – Curb & Gutter.*

  Category 5 includes all costs to install new curb and gutter along both sides of the roadway and at the stub outs to the property connections and to the proposed Grid of Streets such as stone, concrete and labor and equipment for installation. From the VDOT Road Design Manual the standard curb and gutter for this type of roadway and posted speed is CG-6. The unit cost for the curb and gutter is based on the Fairfax County DPWES UPS.

- *Category 6 – Sidewalk***.**

  Category 6 includes all costs to install a five (5) foot wide and four (4) inch thick unreinforced sidewalk along one side of the roadway, such as concrete and labor and equipment for installation. The area of sidewalk was measured from the plan view. It is assumed that the sidewalk will be concrete with no reinforcement and no base. The unit price for sidewalk items is based on VDOT cost estimates.

- *Category 7 - Shared Use Path.*

  Category 7 includes all costs to install a new ten (10) foot wide shared use path along one side of the roadway, such as stone, asphalt and labor and equipment for installation. The area of shared use path is measured from the plan view. It is assumed that the shared use path would

be bituminous concrete (asphalt). The costs for the shared use path are based on VDOT cost estimates.

- *Category 8 - Pavement Markings*.

  Category 8 includes the installation of all permanent pavement markings for the project. The linear footage of pavement markings is measured along the alignment of new pavement. In addition to the standard double yellow and single white lines for the roadway, it is assumed that there will be a shared turn lane at either end necessitating a single arrow, a double arrow, and an "ONLY" pavement marking. It is also assumed that there will be a bicycle arrow and bicycle lane symbol every 500-ft on each bike lane. The unit costs for the pavement markings are based on the 2012 DPWES UPS.

- *Category 9 – Signage.*

  Category 9 is broken down into three parts: the intersection approaches, speed limit signs, and bicycle signs. The intersection approaches are counted at every instance there is an access point along the Soapstone Connector. A single approach is counted where two access points are directly across from each other. The termini located at Sunrise Valley Drive and Sunset Hills Road are also accounted for. It was assumed that there will be a speed limit sign every quarter (1/4) of a mile in each direction. It was also assumed that there will be a bike sign every tenth (1/10) of a mile in each direction. The cost for each grouping is based on best available data for similar arrangements.

- *Category 10 – Drainage*.

  Category 10 costs are based on a simple storm sewer infrastructure assuming 24 inch RCP, Class III pipe with a depth of cut between ten (10) and sixteen (16) feet. The system is assumed to run on both sides of the entire alignment and include DI-3B curb drop inlets with a slot length of 10 feet placed every 200 feet. The unit cost for the pipe and inlet items are based on the 2012 DPWES UPS.

- *Category 11 – Stormwater Management.*

  Category 11 takes into account the cost of permitting and construction for stormwater management throughout the project. This scope is separate from the drainage infrastructure mentioned in Category 10. The estimated stormwater management cost for Alternatives 1C, 3D, 4D, and 5C is fifteen (15) percent of the sum of the roadway, curb and gutter, sidewalk, shared use path, drainage, bridge, and earthwork costs. The alignment for alternative 6E has an impact on the existing stormwater management pond south of the Dulles Toll Road and west of the building owned by BDC Sunrise Valley LLC. Due to this impact the stormwater management cost

for Alternative 6E is estimated at thirty (30) percent of the sum of the roadway, curb and gutter, sidewalk, shared use path, drainage, bridge, and earthwork cost.

- *Category 12 – Lighting***.**

  Category 12 is broken down into two light pole fixture types; intersection lighting poles and roadway lighting. Existing Wiehle Avenue was used as an example for the typical lighting design. Four (4) Lighting Poles with thirty (30) foot arms will be placed at each new signalized intersection. Two (2) Lighting Poles with thirty (30) foot arms will be placed at each modified signalized intersection. The second type of light fixture is a Colonial on steel pole and will be placed every fifty (50) feet along the roadway alignment on both sides of the road. The unit price for both items is based on the Northern Virginia District Averages from April 2010 to March 2012 and best available data.

- *Category 13 – Utilities***.**

  Category 13 includes costs for the re-routing of old and installation of new wet and dry utilities. These include sewer lines, waterlines, manholes, structures, electrical conduit, valves, and pumps. The utility cost will be roughly ten (10) to fifteen (15) percent of the construction cost.

- *Category 14 – Transcontinental Gas Pipeline.*

  Category 14 includes major costs associated with the mitigation required to traverse the Transcontinental Gas Pipeline in alternatives 4D, 5C, and 6E. For this engineering stage, it is assumed that we will traverse the gas easement to allow access to the pipeline and mitigate any potential damage that additional fill and traffic loading could cause. The cost is based on best available data per square foot of easement encroachment.

- *Category 15 – Bridge***.**

  Category 15 utilizes a per square foot cost that includes all typical items for bridge construction such as piers, foundations, abutments and wing walls, girders, deck installation, parapets, etc. No utilities are assumed in this area. There are three distinctive areas where square footage is quantified on this project: over the Dulles Toll Road, over the stream, and any stub-out that will have to be on structure. The bridge deck unit cost is $300 per square foot, and is based best available data.

- *Category 16 - Mechanically Stabilized Earth (MSE) Walls***.**

  Category 16 is quantified per square foot of face of MSE wall and includes material, labor and equipment to install the footings, panels, straps and backfill for the estimated area of MSE walls.

It also includes a contingency to cover indirect costs associated with installation. The square footage is measured from the profile view and accounts for MSE wall on both sides of the road and the front face of the wall under the bridge. The beginning of the MSE wall is assumed to be where the profiles show a fill height greater than three feet. At the stub-outs where the profile is elevated more than three feet, the surface area of MSE is measured using simple geometry assuming a stub-out of fifty feet perpendicular to the edge of pavement. The unit cost for all MSE walls was taken from the best available data for similar projects.

- *Category 17 – Earthwork.*

  Category 17 volumes are quantified using the profile sections and the Average End-Area Method at both ends of the alignment where the profile height is less than three feet. All earthwork quantities are increased using a fifteen (15) percent contingency to account for any unforeseen costs at this preliminary stage of project. The unit cost is taken from VDOT 2012 District Averages for NOVA area. Additionally, clearing and grubbing is approximately two (2) percent to five (5) percent of the total construction cost.

- *Category 18 - Erosion & Sediment Control.*

  Category 18 a lump sum cost based on ten (10) percent of the collective construction costs for the categories of pavement, sidewalk, shared use path, drainage, and MSE walls for each alternative.

- *Category 19 - Maintenance of Traffic (MOT)-Roadway and Track***.**

  Category 19 costs include initial MOT set-up, daily lane closures and traffic switches to accommodate construction. The cost a lump sum based on thirty (30) percent of all construction costs for categories 3-16 for the project. The costs for the track MOT include the expense for a WMATA track escort for the anticipated days working around or over the Metrorail tracks. This cost is based on ten (10) percent of the total construction cost of the main bridge over the Dulles Toll Rd and the Metrorail tracks.

- *Category 20 - Traffic Signal Control.*

  Category 20 includes all signals for the new and modified intersections along the proposed alignments for each option. There will be at least one new intersection along the Soapstone Connector. On most of the alternatives, the existing intersections at the termini will be modified to reflect the new traffic pattern. For the options where there are not existing traffic signals at the termini, new traffic signal control systems will be added. Modified and a new intersections are estimated as lump sum items and based on best available data.

- *Category 21 – Restoration***.**

  Category 21 is a lump sum cost that is based on fifteen (15) percent of the construction costs for the roadway, curb and gutter, shared use path, and MSE walls. The cost includes reestablishing turf in the disturbed areas using topsoil, seed, and straw. No plantings are included.

- *General Contingency.*

  The general contingency applied to the construction costs for each alternative is forty (40) percent at this early phase of project development and accounts for unforeseen conditions and potential changes that may arise. Additionally, mobilization cost was considered in the cost estimate according to VDOT standards.

Preliminary Planning Level Cost Estimates

Based on application of this methodology, Table 19 presents a summary of planning level cost estimates for the five alternatives. To better account for the large amount of uncertainty associated with the information available at this point in the process and without the benefit of detailed engineering design, it was assumed that the range in the construction and design costs could be as much as 50 percent higher than the estimate originally estimated. Moreover, there is even greater uncertainty in the land and property costs, including the cost for damages to existing property owners impacted by the Soapstone Connector and the costs to acquire the land needed for the new right-of-way since most of the Soapstone Connector would be constructed on new right-of-way. Hence, it was deemed appropriate to assume that the total land costs could be as much as three times higher than the estimates developed.

Table 19: Preliminary Construction and Design Cost Estimation Summary, in $ Millions.

	Alignment Options				
Description	**1C**	**3D**	**4D**	**5C**	**6E**
CONSTRUCTION & DESIGN COSTS					
Environmental Permitting	$ 1.0	$ 1.0	$ 1.0	$ 1.0	$ 1.0
Construction	$ 49.5	$ 49.7	$ 47.5	$ 43.8	$ 46.9
Design	$ 7.4	$ 7.5	$ 7.1	$ 6.6	$ 7.0
Subtotal, Design and Construction Costs	$ 57.9	$ 58.1	$ 55.6	$ 51.4	$ 54.9
Possible Range in Design & Construction Costs to account for uncertainty	$58 - $86	$58-86	$56-79	$51-76	$55-82

10. The Hybrid Alternative

During the assessment of the five (5) alternatives, which was documented in the previous chapters of this report, none of the alternatives emerged as being superior compared to the other alternatives. Alternative 5C offers many advantages and has the most appealing vertical profile, but it introduces an offset intersection on Sunrise Valley Drive near Soapstone Drive. Alternative 4D offers the advantages of having a southern terminus align with Soapstone Drive, but would necessitate the demolition of an existing office building on Association Drive. Alternative 3D offered advantages including a fairly straight connection from Soapstone Drive at Sunrise Valley Drive to Sunset Hills Road and an appealing alignment for bicyclists to and from the W&OD trail. However, Alternative 3D would necessitate the demolition of an existing large parking structure and require an additional bridge to cross a floodplain. Alternative 6E, by virtue of its location, offers some advantages in terms of local roadway network and serving motorists traveling from/to western points on Sunrise Valley Drive. However, its intersection on Sunrise Valley Drive is the farthest west from the Wiehle – Reston East Metrorail Station and therefore would require circuitous trips by both vehicle and bicycle.

During the public involvement process, many citizens and involved stakeholders raised issues with both the width of the bridge, which in turn affects to the total cost of the project, and the location of the southern terminus. More people supported the intersection of Soapstone Drive and Sunrise Valley Drive as the southern terminus of the Soapstone Connector, as opposed to an intersection to the west at Indian Ridge Drive or an intersection to the east at Commerce Park Drive. In addition, members of the bicycle community voiced a strong desire that future paths/trails should be provided from the Soapstone Connector and the Wiehle – Reston East Metrorail Station and from the Soapstone Connector to the W&OD Trail, regardless of the final alignment selected.

To better address these findings, citizen comments, and inputs from Supervisor Hudgins, a hybrid alternative was identified which featured a modified typical section and an alignment that combined Alternative 5C north of the Dulles Toll Road with the Alternative 4D south of the Dulles Toll Road. As shown in Figure 26, the Hybrid Alternative aligns directly with Soapstone Drive, allowing traffic to flow from Soapstone Drive, through the “Soapstone Connector,” and onto Sunset Hills Road. The new roadway and new bridge over the Dulles Corridor creates a direct connection from Sunrise Valley Drive/Soapstone Drive to Sunset Hills Road. The Hybrid also featured a reduced typical section. Rather than four undivided typical section, the Hybrid’s typical section consisted of one lane in each direction and a two-way left turn only lane in the median plus on-road bike lanes. This typical section would be very similar to and consistent with the the typical section that exists on Soapstone Drive south of Sunrise Valley Drive. The three lane cross section with on-road bicycle lanes was recently implemented by VDOT as part of a so-called “road diet” project. Prior to the “road diet,” Soapstone Drive had a four lane undivided typical section with no bicycle lanes.

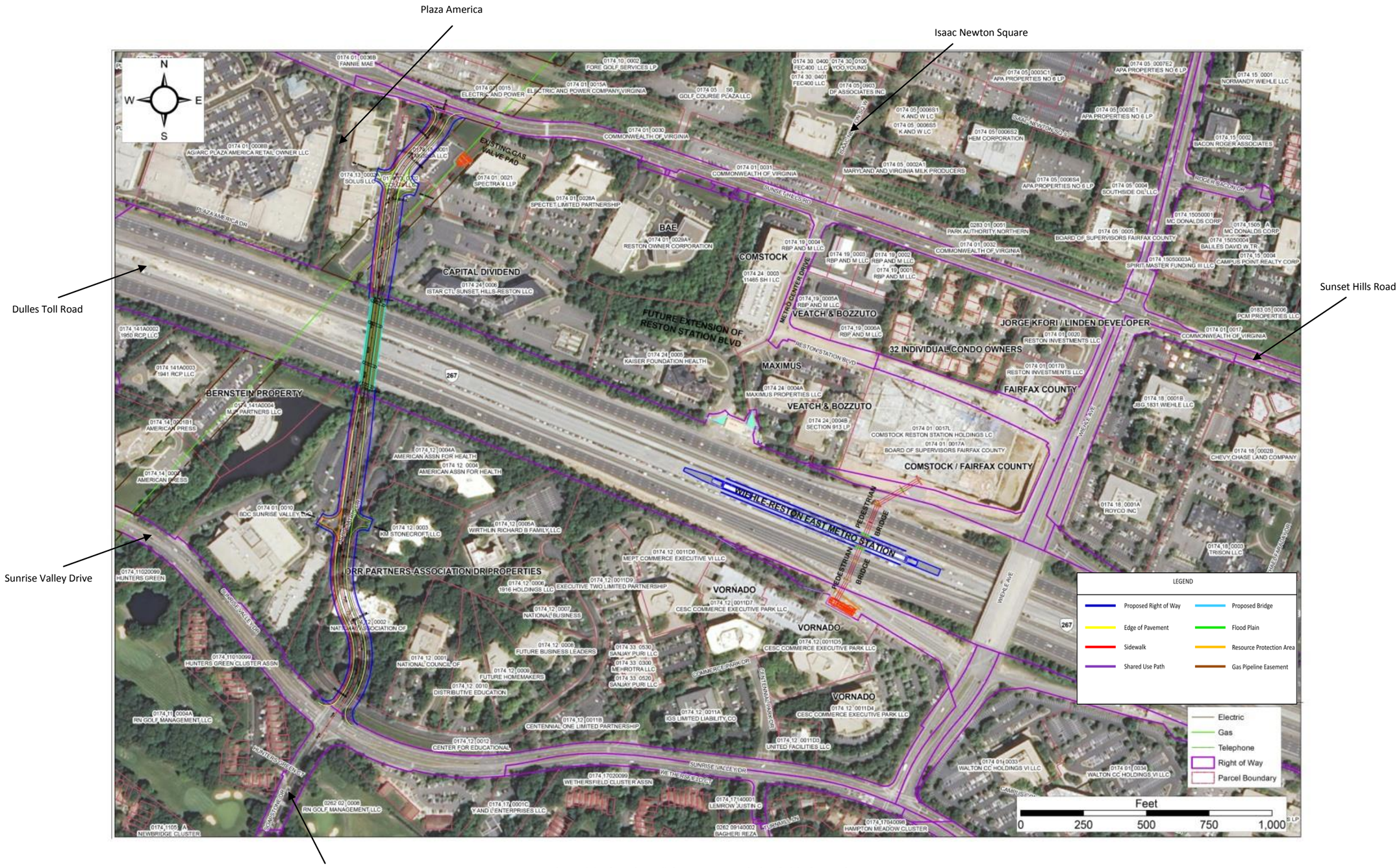


Figure 26: Plan view of the recommended Hybrid Alternative.

The Hybrid Alternative was deemed to offer advantages compared to the five (5) alternatives previously evaluated in terms of consistency with the typical section on Soapstone Drive, construction costs, enhanced mobility for bicyclists and motorists, among other reasons. The following sections provide more detail discussion of the key features of the Hybrid Alternative.

Alignment

As shown in Figure 24, just north of Sunrise Valley Drive, the alignment for the Hybrid Alternative would go through the existing building and cross the property owned by the National Association of Secondary School Principals (1904 Association Drive). The alignment would traverse a short section of Association Drive and then a larger portion of the surface parking area for the property owned by BDC Sunrise Valley LLC (11600 Sunrise Valley Drive).

North of the Dulles Toll Road, the alignment would cross the paved surface parking area in the southwest corner of the property owned by iSTAR CTL Sunset Hills – Reston LLC (11493 Sunset Hills Road). ISTAR is a subsidiary of Dividend Capital Total Realty Inc. The property in question includes the office buildings leased by Unisys.

The horizontal alignment of the hybrid then traverses the easement of the Transcontinental Gas Pipeline Corporation. North of the Pipeline easement, the hybrid then crosses a paved parking area for the property owned by Solus, LLC (11505 Sunset Hills Road). The alignment then would go through a building owned by Musica, LLC (11501 Sunset Hills Rd) and the northern portion of the Solus property.

Southern Terminus

The four-legged intersection (shown in figure 27) should be designed such that the intersecting angle formed by the junction of Sunrise Valley Drive, Soapstone Drive, and the “Soapstone Connector” is 90 degrees for safety and operating efficiency. To maximize the discharge rate when the southbound approach receives a green signal indication, it is further recommended that a tangent alignment be provided for at least 200-ft on the approach to the Sunrise Valley Drive signalized intersection.

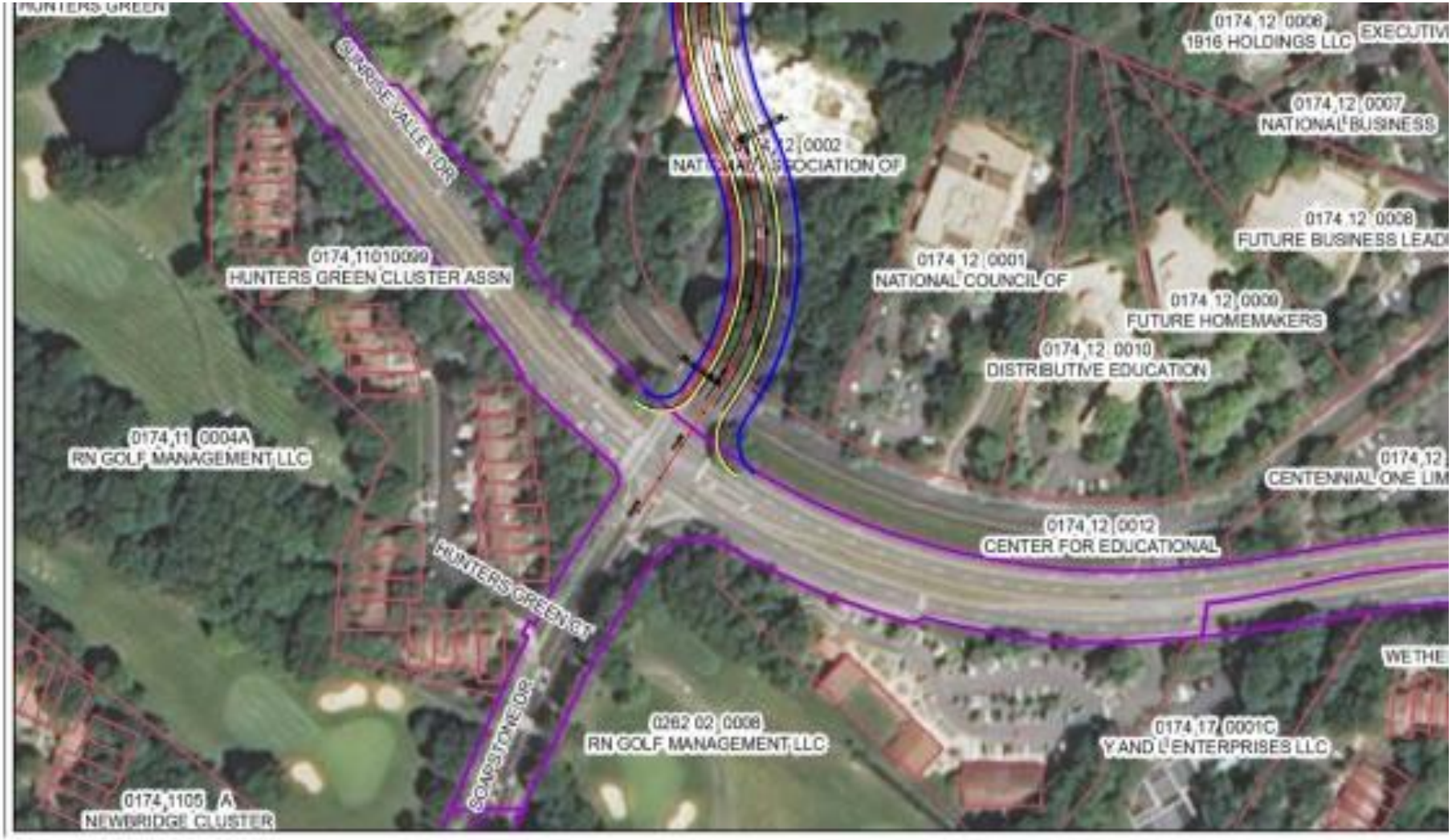


Figure 27: Southern terminus for the Hybrid Alternative.

Vertical Alignment

Figure 28 shows the vertical profile for the Hybrid and the locations of MSE walls and the bridge over the Dulles Toll Road. As indicated in this figure, the maximum grade is 6.6 percent, similar to Alternative 5C. The length of this maximum grade is approximately 215-ft.

Typical Roadway Section

The alternatives that were shown previously in this report all assumed four 12-ft travel lanes and on-road, 5-ft wide bicycle lanes. The recommended Hybrid Alternative features a three-lane cross section with on-road bicycle lanes. The typical section for the roadway, which is shown in Figure 29, would be consistent with the typical section for existing Soapstone Drive, which includes one (1) travel lane in each direction, a two-way, left turn only lane, and on-road bicycle lanes. This typical section will continue as three (3) travel lanes at the bridge over the Dulles Toll Road (DTR) / Dulles International Airport Highway (DIAAH) / the MWATA Metrorail Silver Line Extension. However, in order to provide flexibility in design, it is recommended that the right-of-way for the Soapstone Connector be established to be approximately 100 ft, to allow for the potential to widen to a four-lane section if needed in the future.

As stated above, this typical section is consistent with the existing typical section on Soapstone Drive, which underwent a "road diet" in 2011. Soapstone Drive was converted from a four-lane undivided section to a three (3) lane section with on-road bike lanes. The center lane is a two-way, left-turn only (TWLTO) lane, which can serves as a left turn storage lane at approaches to intersections.

The typical section is depicted in Figure 28. As shown, the center lane is 14-ft wide, and the adjacent lanes are 12-ft wide. There are 5-ft bike lanes on either side. This is a "closed" section with 2-ft gutter "pan," measured from the face of curb to edge of the travel lane. The distance from the face of curb to the sidewalk is 4.5-ft, which includes a 6-in wide curb and 4-ft for a utility strip. The concrete sidewalk on the west side is 5-ft wide. On the east side the shared use path is 10-ft, and there is an 8-ft buffer space that serves to provide a safe separation distance from the face of curb and the edge of the shared use path.

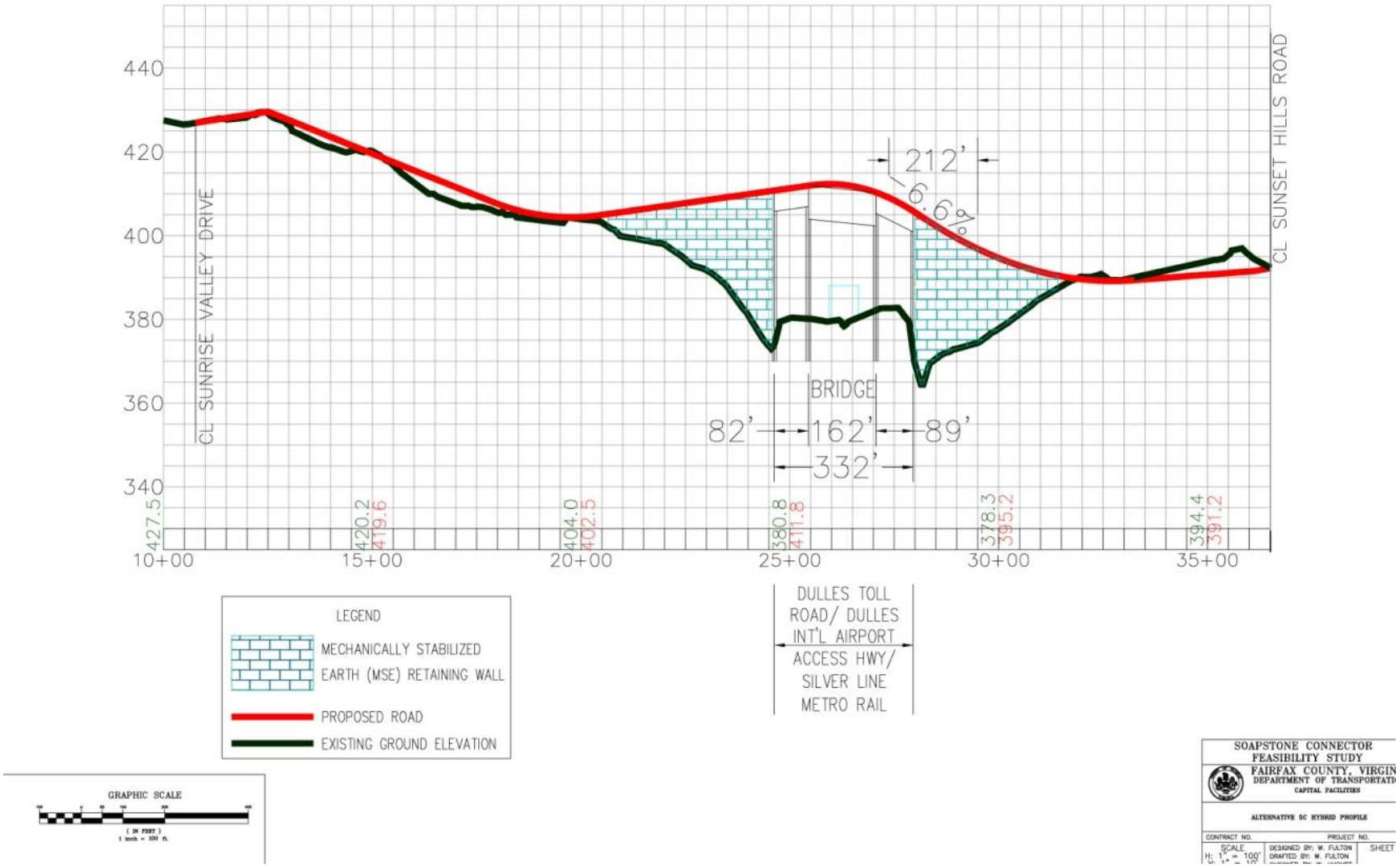
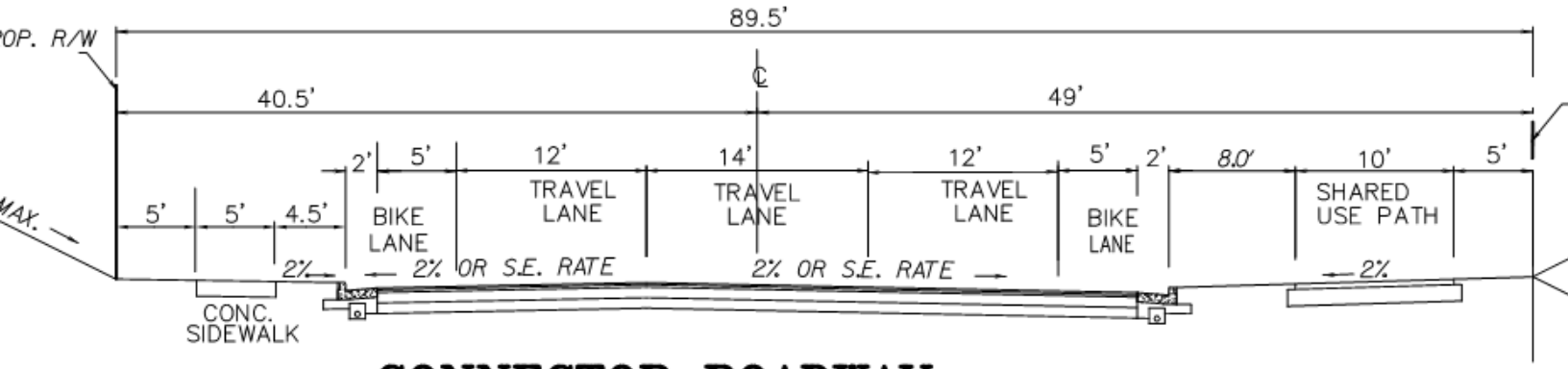
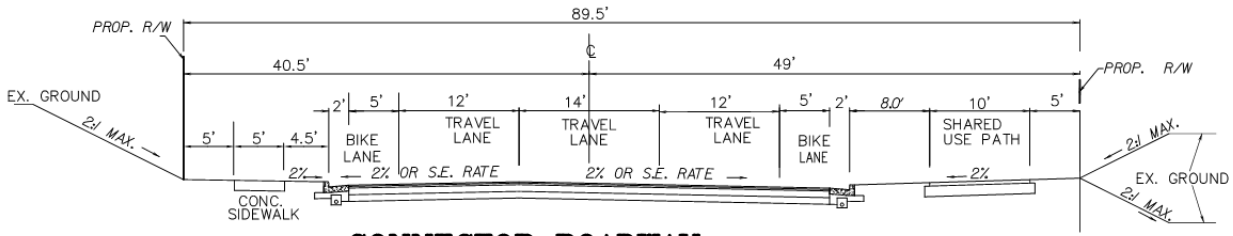


Figure 28: Vertical profile of the recommended Hybrid Alternative.



CONNECTOR ROADWAY TYPICAL SECTION



CONNECTOR ROADWAY TYPICAL SECTION

(It is recommended that the minimum right-of-way width for the Soapstone Connector be established to be 99.5 ft to allow for possible future widening to a four-lane section, if required in the future.)

Figure 29: Typical Roadway Section for the recommended Hybrid Alternative.

Typical Bridge Section

At the outset of the study, it was hypothesized that four (4) lanes on the bridge might be needed to support the projected traffic volumes for the Dulles Corridor study. Based on the subsequent analysis of traffic that considered both diversion and additional development in the study area, the results indicate that four (4) lanes may not be necessary. Consequently, the Hybrid could be reduced to a three (3) lane road over the Dulles Corridor. The reduction in the typical section, especially at the bridge would further reduce the cost for design and

construction, the cost for right-of-way acquisition, and the cost to compensate land owners for property damages due to the Soapstone Connector.

Like the typical roadway section, the typical bridge section, shown in Figure 29, would consist of three (3) lanes. As seen in Figure 30, the effective width of the concrete sidewalk would be 6-ft from the face of the curb to the face of the bridge parapet wall on the west side. The width of the shared use path would be 17.5-ft, measured from the face of curb to the face of the bridge parapet wall on the east side. The width of the northbound and southbound bike lanes is 5-ft. All three (3) travel lanes are 12-ft wide. These dimensions are consistent with the Virginia Department of Transportation's design standards.

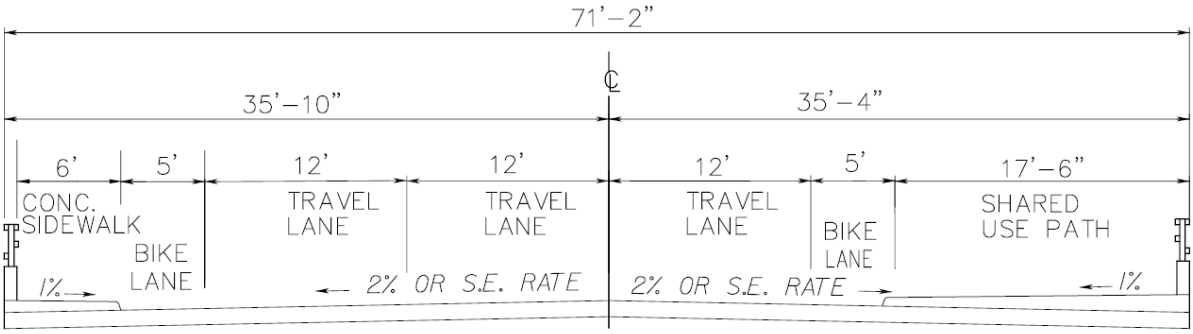


Figure 30: Typical bridge section for the recommended Hybrid Alternative.

With respect to access points on the Connector between Sunrise Valley Drive and Sunset Hills Road, a minimum of two (2) junctions would be needed. One would be south of Sunset Hills Road and north of the bridge over the Dulles Corridor. The western leg of this junction would provide access to the parking area and potential redevelopment of the property owned by Solus, LLC (11505 Sunset Hills Road). The eastern leg of this junction would provide access to the parking areas and potential redevelopment of the property owned by iSTAR CTL Sunset Hills – Reston LLC, which currently houses the office buildings leased by Unisys (11493 Sunset Hills Road) and the properties owned by the Spectra 4 LLP (11495 Sunset Hills Road) and the Spectet Limited Partnerships (11491 Sunset Hills Road). This eastern leg of the unsignalized intersection could also be a new street connection and could provide a direct connection through the properties east of the Soapstone Connector's alignment to the intersection of Metro Center Drive and Reston Station Boulevard. In fact, this eastern leg could be an extension of the Reston Station Boulevard, as was proposed as part of the grid of streets from Fairfax County DOT's Dulles Corridor Study. It is important to note that while this junction could be designed as an at-grade intersection with

stop-controlled side street approaches, the junction could also be designed as a roundabout. The roundabout would be appropriate for this junction since highway speeds would be relatively low.

North of Sunrise Valley Drive, the other recommended junction on the Soapstone Connector would provide access to properties south of the Dulles Toll Road. The western leg of this junction could serve as a driveway entrance to parking area or redevelopment on the property owned by BDC Sunrise Valley, LLC (11600 Sunrise Valley Drive). The eastern leg of this unsignalized intersection would provide a new access to the existing buildings and properties that abut Association Drive and to redevelopment of the properties along Association Drive. Similar to the eastern leg of the junction on the Connector north of the DTR, the eastern leg of the intersection on the Connector south of the DTR could be part of the grid of streets recommended as part of Fairfax County DOT's Dulles Corridor Study, and provide interparcel access from the Soapstone Connector to Commerce Park Drive. In addition, the junction could be designed as a conventional at-grade intersection, with stop controlled side street approaches, or a roundabout, which is an equally applicable design configuration at this junction.

In terms of traffic operations, it was determined that recommended Hybrid Alternative would achieve acceptable traffic performance at the two signal-controlled intersections at the Soapstone Connector's termini, based on the results of the Synchro analysis of the AM and PM peak hours due to its direct connection with Soapstone Drive. These results are summarized in Table 20.

Table 20: Projected Year 2030 AM and Peak Hour Levels of Service for Recommended Hybrid Alternative

	2030 AM Peak Hour		2030 PM Peak Hour	
Location	HCM Ave. Control Delay	HCM LOS	HCM Ave. Control Delay	HCM LOS
Sunset Hills & Connector	26.6	C	7.4	A
Sunset Hills & Isaac Newton	26.6	C	107.2	F
Wiehle & Sunset Hills	60.9	E	119.9	F
Wiehle & Reston Station	17.8	B	161.2	F
Wiehle & WB DTR Ramps	28.3	C	30.7	C
Wiehle & EB DTR Ramps	25.2	C	29.5	C
Wiehle & Sunrise Valley	41.3	D	61.6	E
Sunrise Valley & Connector	37.6	D	34.5	C

Compared to the other five (5) alternatives that were evaluated, the recommended Hybrid Alternative follows the existing ground and features an approximately 215-ft critical length of a maximum grade of 6.6 percent, which would be preferable for both pedestrians and bicyclists compared to four of the other alternatives that were evaluated. It is recommended that bicyclists be provided adequate paths to travel from the Soapstone Connector directly to the Washington and Old Dominion Trail (W&OD). Both of these are major attractions for the bicycle community.

While on-road bicycle lanes and a shared use path are recommended for as part of the Hybrid Alternative, there is no provision to allow bicyclists to cross Sunset Hills Road and gain access to the W&OD Trail. Bicyclists can ride along Sunset Hills Road west to Old Reston Avenue and gain access at the W&OD Trail crossing. However, they would need to ride with traffic in the travelway of Sunset Hills Road.

Due to the proximity of the substation for Dominion Power, a shared use path currently does not exist between Old Reston Avenue and the proposed northern terminus of the Soapstone Connector. Bicyclists could travel east along Sunset Hills Road to gain access to the W&OD Trail at either Isaac Newton Square W, Wiehle Avenue or a private roadway on the property owned by Golf Course Plaza, LLC (11480 Sunset Hills Road). To do so, they would have to travel on a heavily traveled, four (4) lane section of Sunset Hills Road.

It is also recommended that bicyclists be provided adequate paths to travel from the Soapstone Connector directly to the Wiehle-Reston East Metrorail Station. If Reston Station Boulevard Extension is designed and constructed, then it may be possible for bicyclists to travel from the Soapstone Connector to Metro Center Drive. If the Extension is constructed at a future date, then it is recommended that on-road bicycle lanes be constructed as part of the Reston Station Boulevard Extension. Whether the Reston Station Boulevard Extension is ever constructed or not, it is recommended that, at a minimum, a 10-ft shared use path should be constructed from the Soapstone Connector parallel to and immediately adjacent to the Right-of-Way for the Dulles Toll Road. This would extend over a lineal distance of 1,300-ft. This is within property owned by iSTAR CTL Sunset Hills – Reston LLC, which currently includes the office buildings leased by Unisys (11493 Sunset Hills Road) and within property owned by Kaiser Foundation Health (1890 Metro Center Dr). It is recommended that the shared use path be continued and constructed so it ultimately connects with Reston Station Boulevard near Metro Center Drive.

The Hybrid Alternative is recommended to be advanced to preliminary design. It would provide a direct connection to Soapstone Drive at its southern terminus. Compared to Alternative 5C, this alternative would not require two (2) closely spaced intersections on heavily travelled Sunrise Valley Drive and would, in turn, avoid the “dog leg” maneuver for motorists. Compared to Alternative 4D, this alignment would have less of an effect on the nearby existing properties by avoiding any impacts on the Spectra 4 LLC property (1495 Sunset Hills Rd).

While the cost of the Hybrid was not explicitly calculated using the methodology described in Chapter 9, preliminary analysis revealed that the reduction in the typical section from four (4) lanes with on-road

bicycle lanes to three (3) lanes with on-road bicycle lanes could result in a reduction in the construction cost on the order of magnitude of 20 to 25 percent.

The table summarizes how the Hybrid Alternative qualitatively compares to the other alternatives in terms of simplified criteria related to traffic, pedestrians, bicyclists, constructability and citizen concerns.

Alternative	Traffic Operations Index	Impact to Pedestrians Index	Impact to Bicyclists Index	Construct-ability Index	Citizen Concerns Index	Overall Ranking
1C	2.0	3.3	4.0	2.0	1.0	6
3D	4.0	4.0	5.0	2.0	3.0	3
4D	4.0	3.7	4.7	3.5	3.0	2
5C	3.0	3.7	4.7	4.0	2.0	5
6E	2.5	3.0	3.3	3.0	1.0	4
Hybrid	4.5	3.7	4.7	4.5	5.0	1

11. Recommendations

On the basis of this engineering feasibility study, the following recommendations are proposed:

1) Advance the Hybrid Alternative for the Soapstone Connector to the Preliminary Design Phase. The need for a Soapstone Connector was established in 2008 with the completion of the RMAG study. At that time, the RMAG study indicated that 1,500 vehicle trips would be diverted from Wiehle Avenue to the "Soapstone Connector" for the 3 hour-long AM Peak period and another 1,500 vehicle trips would be diverted from Wiehle Avenue to the Soapstone Connector during the 3 hour-long PM Peak Hour.

   The RMAG study further showed significant improvements for pedestrian and notably bicycle and transit access from the South to the Metrorail Station parking areas, kiss-and-ride areas and bus transit loading/unloading areas. Without a Soapstone Connector, Fairfax County Connector buses running on routes along Sunrise Valley Drive and Soapstone Drive would necessarily have to travel on heavily congested Wiehle Avenue and gain access to the loading and unloading areas for the Metrorail Station. The improvements in time and accessibility to the Station area would encourage greater bus transit use in the area.

   The safe accommodation of bicyclists on an alternative to Wiehle Avenue and the increased accessibility to the W & OD Trail for bicyclists enabled by the Soapstone Connector is likely to increase the bicycle traffic in the immediate area and potentially could produce noticeable reductions in single occupant vehicle (SOV) traffic in and around the Station area.

The Soapstone Connector would have a positive effect on new development and redevelopment in the

immediate vicinity of the Wiehle Avenue Metrorail Station and beyond. By providing another crossing of Dulles Toll Road / Dulles International Airport Access Highway as part of a more urbanized grid of streets, the Soapstone Connector will foster smarter growth. Development of the desired densities to truly support transit oriented development near a Metrorail Station would be better served by a roadway network that includes the Soapstone Connector.

The spacing of traffic signals has been found to influence both traffic progression and crash occurrence on arterials. If one were to plan for ideal progression on a major arterial highway, spacings on order of ½ miles would be optimal to promote two-way progression. As spacing between adjacent signalized intersections decreases, the speed and quality of progression of platoons on an arterial can also decrease. In general, the rule of thumb for desirable signal spacing is ¼ mile, recognizing that there are many highway networks where safe and efficient progressions can be achieved when the signal spacing is less than ¼ mile. Currently on Sunset Hills Road, the existing spacings between adjacent signal-controlled intersections are as follows:

- Approximately 800 ft between Old Reston Avenue and Plaza America Drive (west)
- Approximately 530 ft between Plaza America Drive (west) and American Dream Way / Plaza America Dr (east).
- Approximately 2,270 ft between American Dream Way / Plaza America Dr (east) and MetroCenter Drive/Isaac Newton Square West.
- Approximately 1,270 ft between Metro Center Drive / Isaac Newton Square West and Wiehle Avenue.

The introduction of another signal-controlled intersection for the Soapstone Connector, to be located between American Dream Way / Plaza America Drive (east) and MetroCenter Drive / Isaac Newton Square West on Sunset Hills Road, will reduce the signal spacing. The shortest spacing between adjacent signal-controlled intersections would be less than VDOT desirable minimums for minor arterials, collectors and local streets. Hence, an exception to the spacing criteria (using form AM-2) for Sunset Hills Road would need to be pursued as part during the next phase of the project, which involves preliminary design. Similarly, exception to the spacing criteria would also be needed for Sunrise Valley Drive, if the Soapstone Connector does not directly align with Soapstone Drive.

The results of this study revealed that the Soapstone Connector is feasible and could be constructed. The most promising alternative(s) to advance to the next level will depend on Fairfax County's elected officials, staff, and decision makers within the Fairfax County Department of Transportation. The decision on which alternative to advance one or more to the preliminary engineering stage depends on the weighting of the diverse criteria that could be used. Notwithstanding the previous sentence, the Hybrid Alternative is recommended as the most promising alternative based on considerations relate to construction and design costs, land use impacts, traffic level of service and network performance, engineering design, environmental features, and citizen inputs and support. The Hybrid Alternative is recommended to be advanced to preliminary design. It would provide a direct connection to Soapstone Drive

at its southern terminus. Compared to Alternative 5C, this alternative would not require two (2) closely spaced intersections on heavily travelled Sunrise Valley Drive and would, in turn, avoid the "dog leg" maneuver for motorists. Compared to Alternative 4D, this alignment would have less of an effect on the nearby existing properties by avoiding any impacts on the Spectra 4 LLC property (1495 Sunset Hills Rd). In subsequent phases, utilization of federal aid for any project phase (PE, RW or CN) would require compliance with NEPA and other federal environmental laws and regulations.

2) Conduct Location Studies and then Design and Construct Additional Bicycle Path Connections. It is also recommended that studies be conducted to ensure that bicyclists would have a direct connection from the northern terminus of the Soapstone Connector to W&OD Trail. For all the alternatives evaluated, including the Hybrid Alternative, the Soapstone Connector with its on-road bike lanes and shared use path would end at Sunset Hills Road, just south of the W&OD Trail. To reach its highest and maximum potential for serving bicyclists, it is recommended that improved bicycle connections be designed and integrated into the regional network to allow bicyclists to travel from the Sunset Hills Rd / Soapstone Connector intersection to the W&OD Trail along a short and direct paved path.

   In addition, it is recommended that additional paved bicycle paths be provided to connect the Soapstone Connector with the Wiehle Avenue – Reston East Metrorail Station. If an extension of Reston Station Boulevard is designed and constructed, then it is recommended that the extension be designed to explicitly accommodate bicyclists through the provision of a shared use path and/or on-road bicycle lanes. Without either of those types of bicycle facilities, bicycles could travel in mixed traffic along the extension without having to use any segment of Sunset Hills Road. If the decision is to defer extension of Reston Station Boulevard till a point in time long after the Soapstone Connector is built or if the decision is to never pursue an extension of the Reston Station Boulevard, then a separate bicycle path or shared use path should be studied, designed and constructed to provide bicyclists a route to go from the Soapstone Connector to the Wiehle – Reston East Metrorail Station. In fact, independent of any Extension of the Reston Station Boulevard, it is recommended that, at a minimum, a 10-ft shared use path be constructed from the Soapstone Connector parallel to and immediately adjacent to the right-of-way for the Dulles Toll Road. This would extend over a lineal distance of 1,300 ft. This is within property owned by iSTAR CTL Sunset Hills – Reston LLC, which currently includes the office buildings leased by Unisys (11493 Sunset Hills Road) and within property owned by Kaiser Foundation Health (1890 Metro Center Dr). It is recommended that the shared use path be continued and constructed so it ultimately connects with Reston Station Boulevard near Metro Center Drive.

3) Conduct Geotechnical Investigation & Analyses and Establish Design Parameters. For the alternatives that were evaluated in this engineering feasibility study, there was no geotechnical investigation and analyses. Very limited information was obtained from the previous bridge studies for the existing Wiehle Avenue bridge over the Dulles Toll road and information from the MWAA Metrorail Silver Line Extension Project. The Type, Size and Location (TS&L) study

conducted for this study could have benefited from detailed data on soil information. Moreover, it is highly desirable to capture geotechnical data to ensure that the existing soils in the anticipated bridge locations can support the proposed MSE Walls. If the soils are found to not support the heights of the MSE walls proposed, then lower height MSE walls and longer bridge structures would be required. Consequently, the geotechnical analysis should be one of the first activities completed if/when the Soapstone Connector project is advanced to the preliminary design phase.

4) Identify the Needed Right-of-Way. It is equally important to finalize a design so that the location for the Soapstone Connector can be determined and the right-of-way acquisition package developed. A formal approval of the Right-of-Way Plans will allow all stakeholders, including developers interested in the area to develop and redevelop properties in the study area without jeopardizing the future for a Soapstone Connector. By analogy, there were many issues over the long course of planning, designing and ultimately constructing the Fairfax County Parkway on largely new alignment within the County. Based on the many lessons learned during that process, it is incumbent on the County to identify the needed right-of-way as soon as possible, so that the opportunity to construct the Soapstone Connector will not be lost due to development and redevelopment in the area.

5) Continue to Work with Property Owners Seeking Redevelopment. Seek to Preserve Land for the Right-of-Way for Soapstone Connector. Solicit Proferred Dedications of Land for the Right-of-Way. This feasibility study found that the total costs for the construction of the Soapstone Connector were highly dependent on the cost for land acquisition (i.e., the "land take") as well as for cost for damages to adjacent property owners due to adverse impacts to existing developments and properties resulting from construction (i.e., compensation for damages as part of the right-of-way acquisition process). If some of the needed land can be obtained by proffered dedication as part of redevelopment, then the total cost of the project would be reduced. Consequently, it highly desirable to finalize on a preferred alignment and establish plans for development in the area of the Wiehle – Reston East Metrorail Station. The development of an update comprehensive master plan for the Reston Station areas is already underway with the Reston Master Plan Special Study. Now is the time to reach consensus on not only the location of the Soapstone Connector but on the detailed plans for development and redevelopment in the study area.

6) Investigate and identify sources to fund the Soapstone Connector, including proffers. Sources of funding should be identified before the Right-of-Way acquisition and the construction phases for the Soapstone Connector are initiated. The recent passage of the tax increase for transportation allows a large amount of new funding for transportation projects. These funds had not been available in recent years and could be a source of funding for the Soapstone Connector. Without funding, the Soapstone Connector project cannot be advanced.

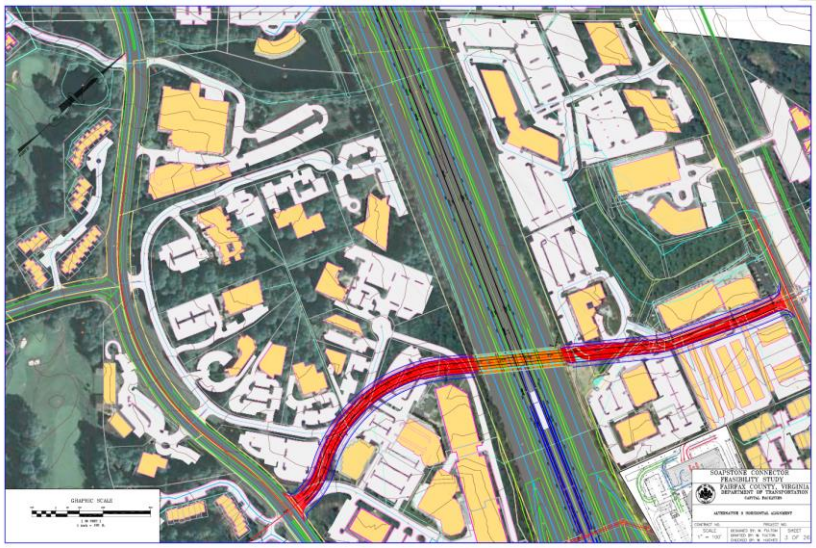
7) Add the Soapstone Connector to the Financially Constrained Long Range Transportation Plan. In addition to having the "Soapstone Connector" on the Fairfax County Long Range Transportation

Plan, there is a need to add the transportation link to the financially constrained long range transportation plan (FCLRP) that is adopted by the Metropolitan Washington Council of Governments and used in the regional transportation planning processes. Through its inclusion of the FCLRP, the Soapstone Connector could be eligible for additional funds.

8) Extension of the Reston Station Boulevard. Traffic bound to and from the Wiehle – Reston East Metrorail Station parking area and kiss-and-ride lots using the Soapstone Connector would have to travel on a short section of Sunset Hills Road. The construction of an extension of a Reston Station Boulevard would shorten the time and distance to those areas and reduce the amount of unnecessary traffic on Sunset Hills Road. Reston Station Boulevard extension would be constructed in an area chock full of existing development constraints and environmental features, including a floodplain and a resource protection area. Research done as part of this study revealed that public roads are exempted from some of the conditions for a resource protection area and could be constructed in a resource protection area with mitigation. From a transportation network connectivity perspective, the extension of Reston Station Boulevard from its soon to be constructed intersection with Metro Center Drive to a new intersection with the Soapstone Connector is highly desirable and would increase the attractiveness of the Soapstone Connector for motorists, transit bus riders, bicyclists, pedestrians and truck drivers. Since the engineering feasibility and constructability of the Reston Station Boulevard extensions has not yet been conducted, it is recommended that the study be initiated. This is especially true since the alignment is likely to go near and potential through a portion of the existing floodplain and resource protection area.

APPENDIX A

Plan Views of Preliminary Horizontal Alignment



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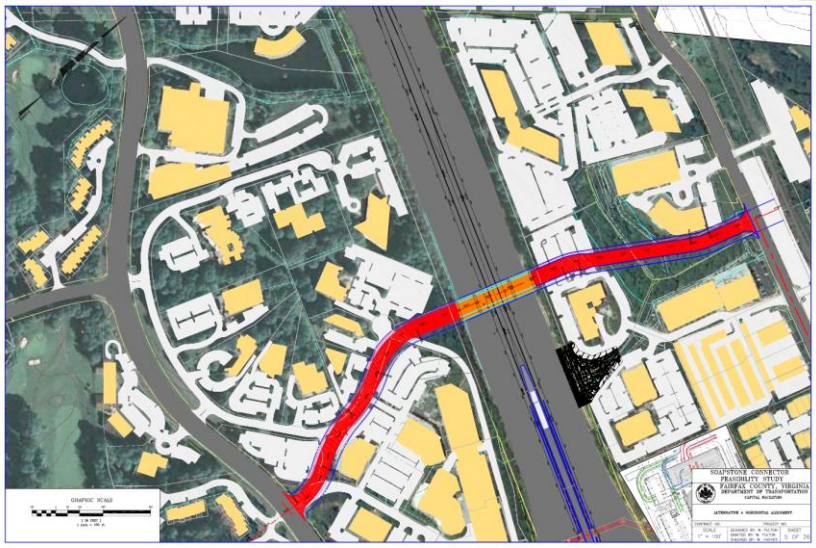

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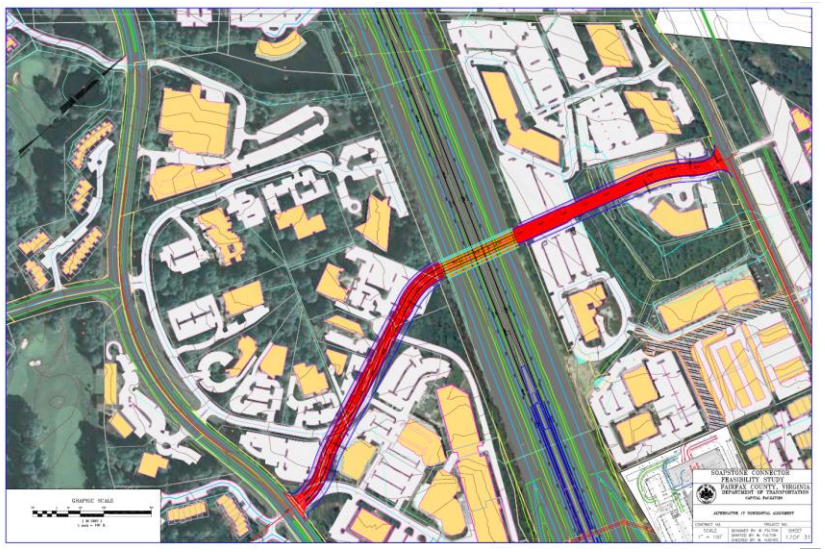

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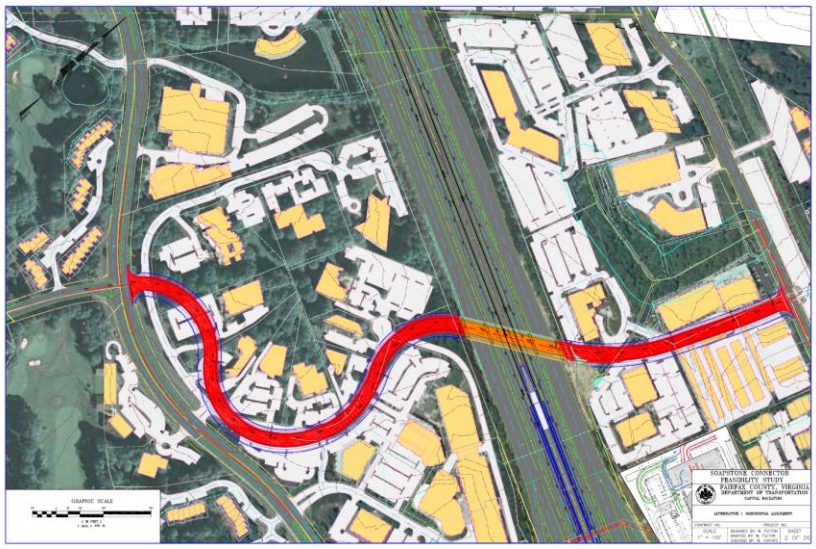

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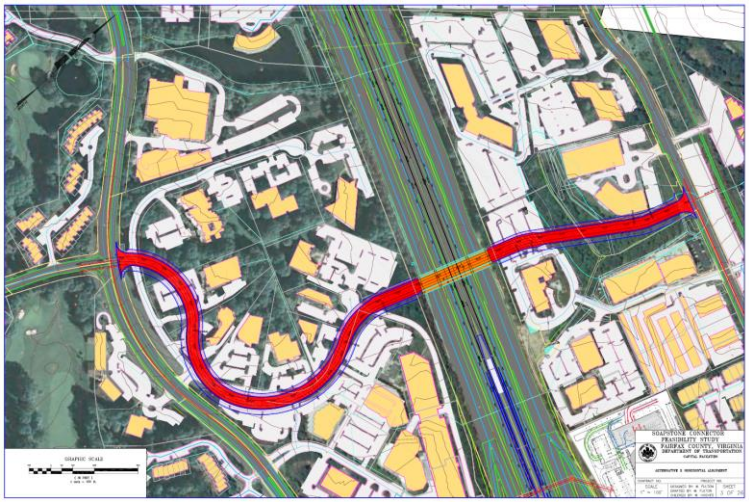

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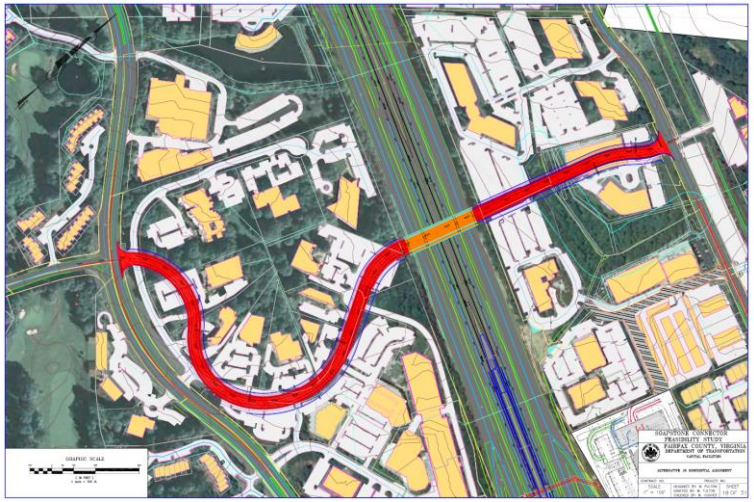

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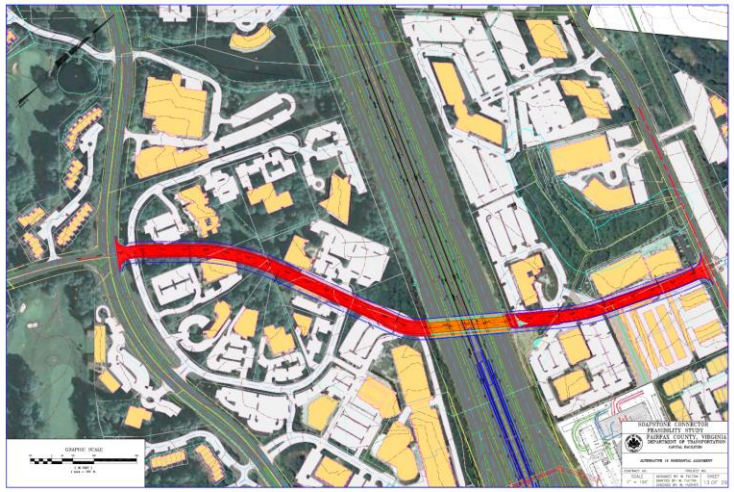

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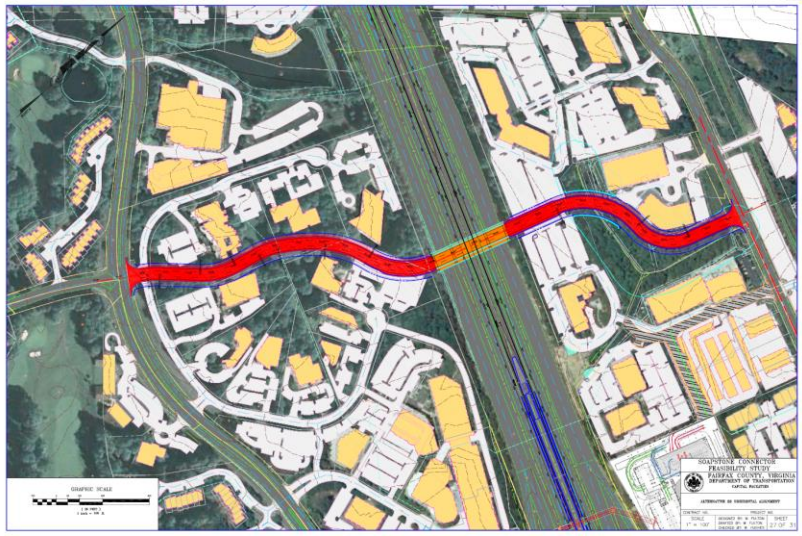

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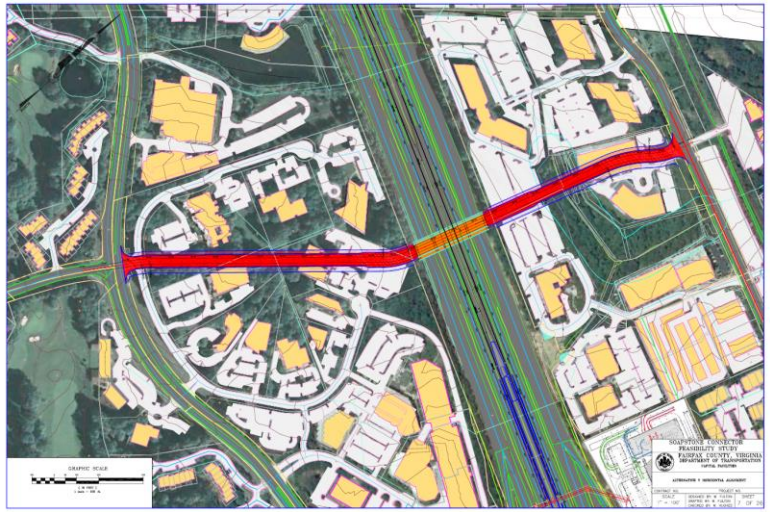

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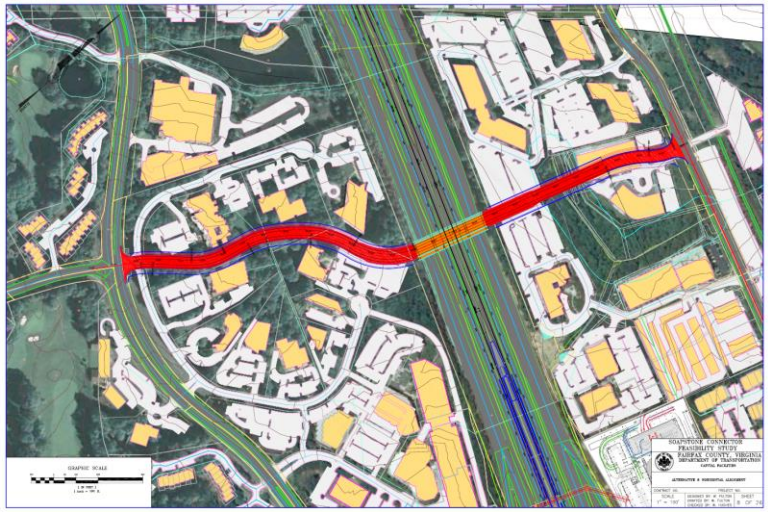

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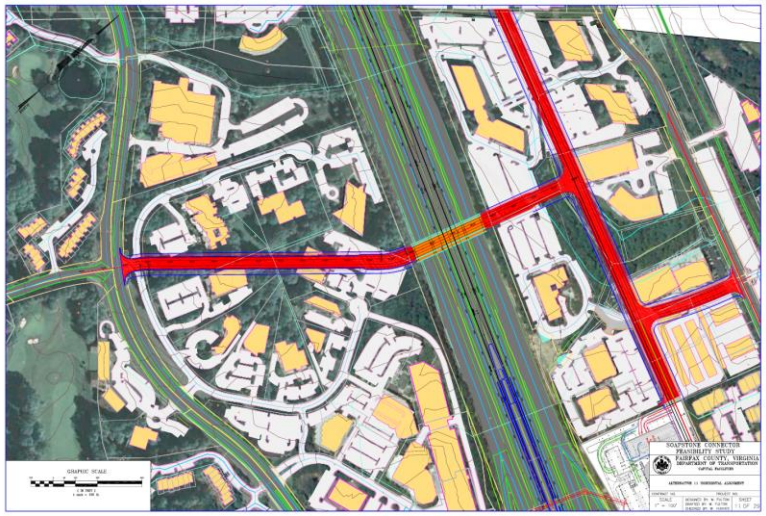

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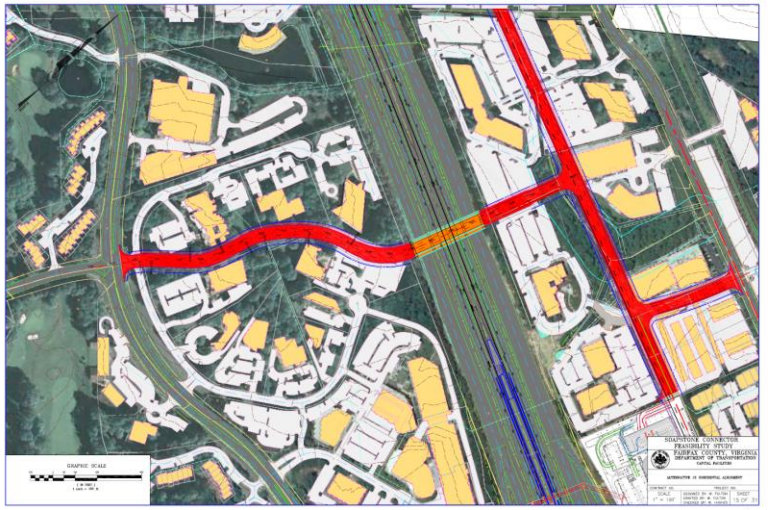

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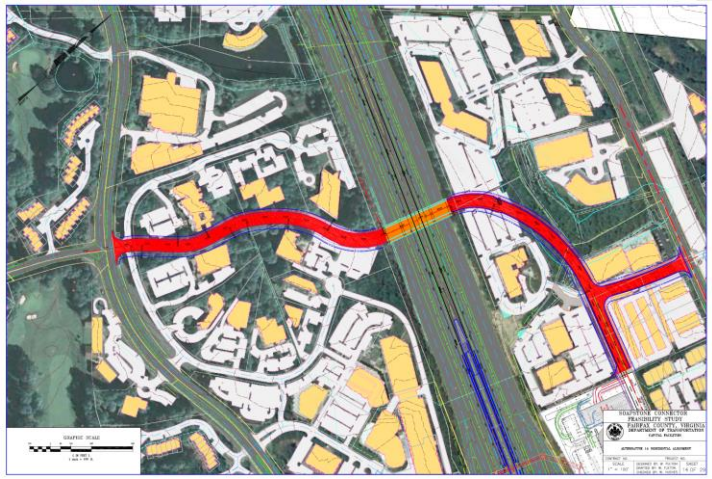
Alternative 3G



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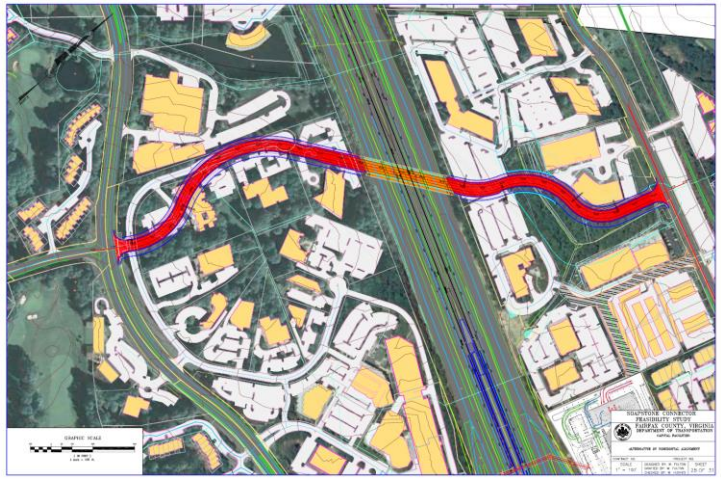

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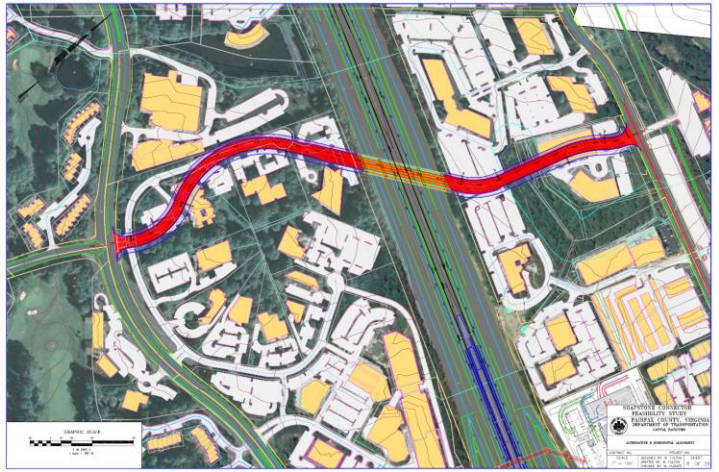

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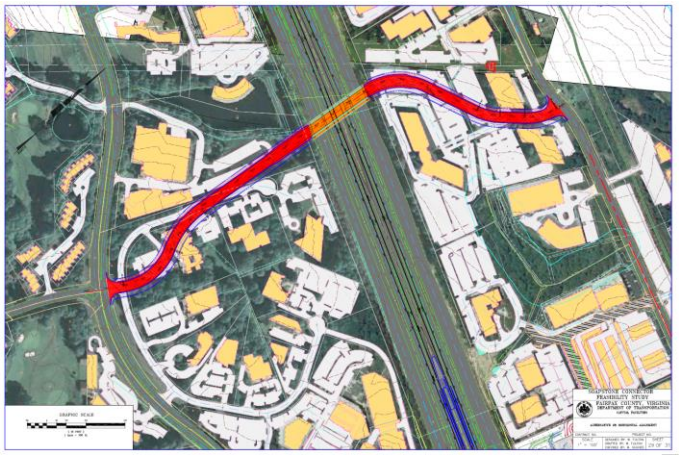

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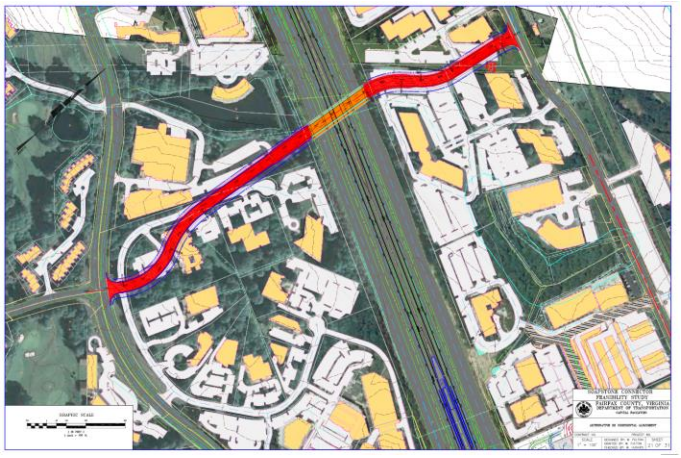

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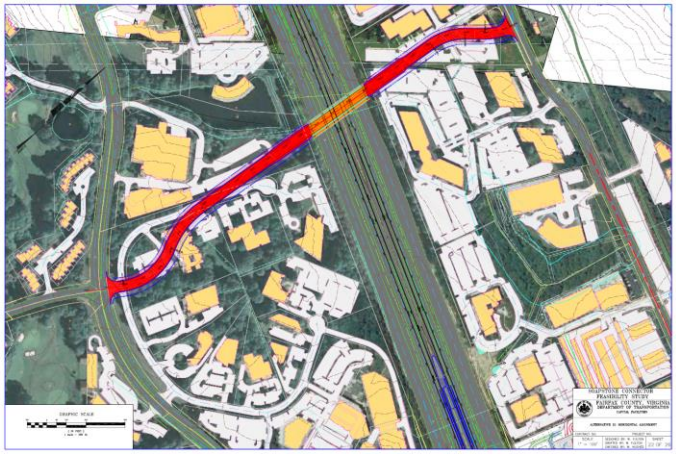

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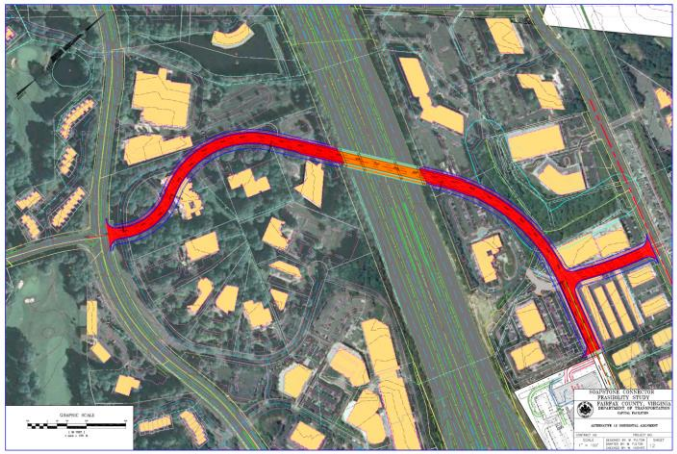

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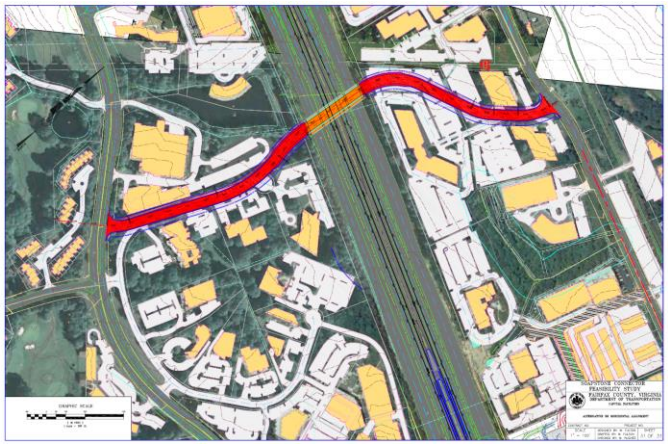

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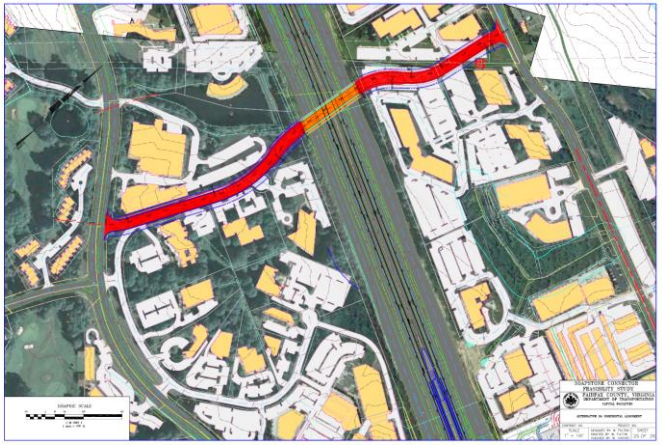

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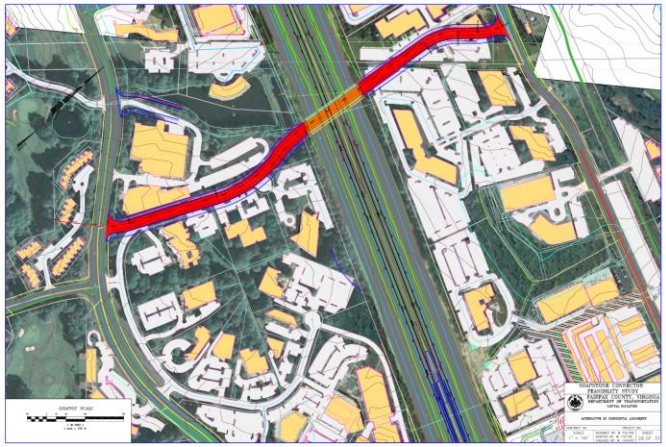

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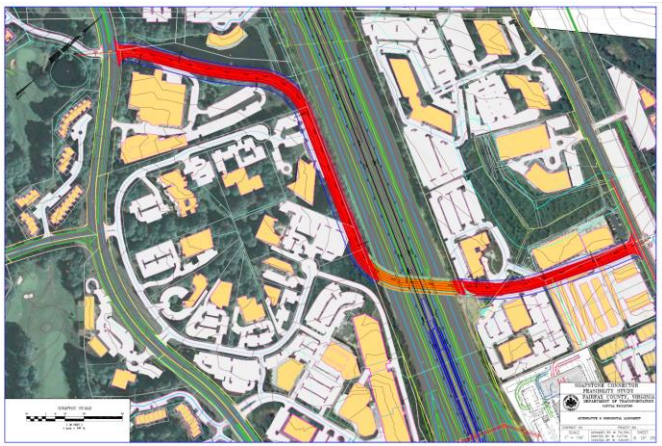

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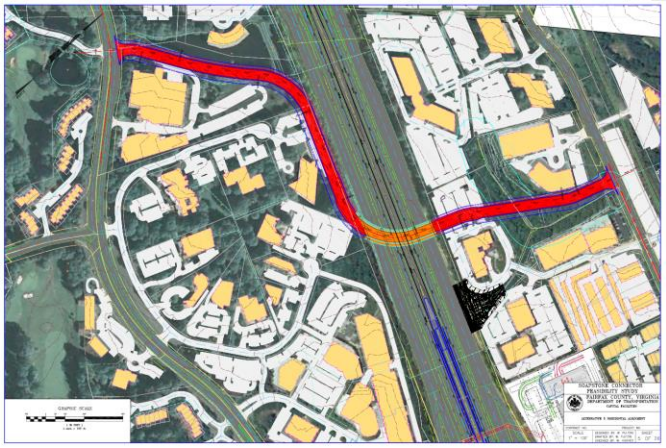

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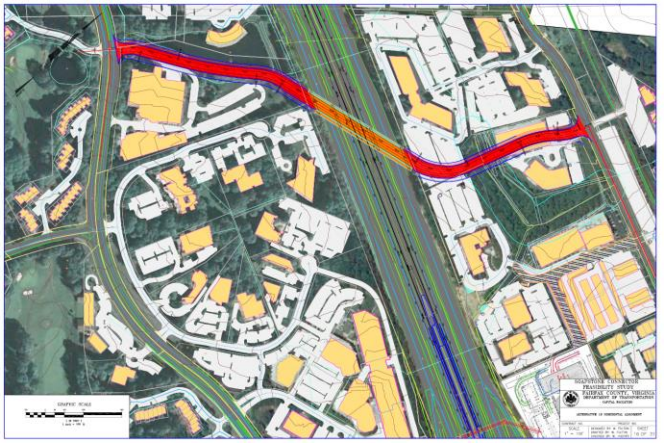

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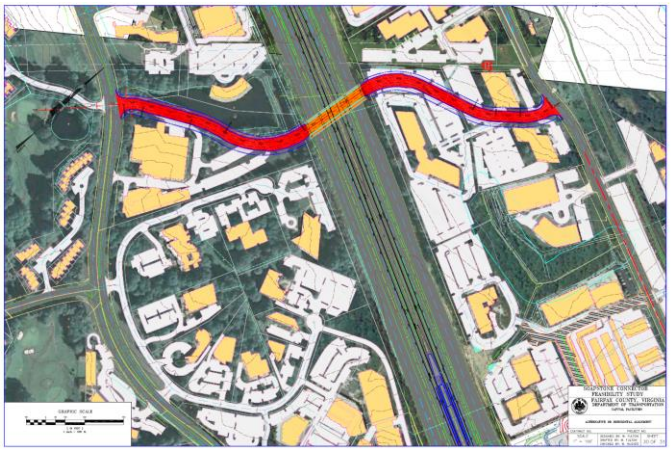

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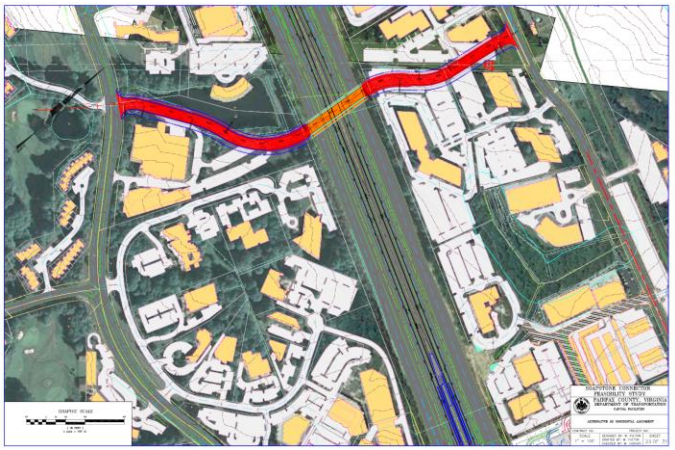

Alternative 6E

Alternative 6F

Alternative 6G

APPENDIX B

Tabular Summary of Features of the 30 Horizontal Alignments that were Screened

Table B-1. Description of Preliminary Horizontal Alignments

Alternative	Southern Terminus on Sunrise Valley Drive	Alignment South of DTR	Bridge Crossing over DTR			Alignment North of DTR	Northern Terminus
			Location of Bridge relative to Station*	Angle	Length of span (ft)		
1. 1A	Commerce Park Dr	On new alignment generally west of buildings in Commerce Park	100 ft west	Slight Angle ~ 75 degrees	375	On new alignment and Comstock Metro Center Dr	Sunset Hills Rd and Isaac Newton Square W / Comstock Metro Center Drive
2. 1B	Commerce Park Dr	On new alignment generally west of buildings in Commerce Park	390 ft west	Perpen-dicular ~ 90 degrees	350	On new alignment in floodplain / RPA	Sunset Hills Road and New Intersection located approximately 350 ft west of Isaac Newton Square W
3. 1C	Commerce Park Dr	On new alignment generally west of buildings in Commerce Park	585 ft west	Almost Perpen-dicular ~ 93 degrees	340	On new alignment thru existing parking garage+	Sunset Hills Rd and a new intersection approximately 700 ft west of Isaac Newton Square W

4. 2A	Soapstone Dr	Generally along eastern portion of Association Drive	190 ft west	Skewed ~ 60 degrees	450	On new alignment and Comstock Metro Center Dr	Sunset Hills Road and Isaac Newton Square W / Comstock Metro Center Drive
5. 2B	Soapstone Dr	Generally along eastern portion of Association Drive	390 ft west	Almost Perpen-dicular ~ 92 degrees	345	On new alignment in floodplain / RPA	Sunset Hills Road and New Intersection located approximately 350 ft west of Isaac Newton Square W
6. 2C	Soapstone Dr	Generally along eastern portion of Association Drive	585 ft west	Almost Perpen-dicular ~ 93 degrees	340	On new alignment thru existing parking garage+	Sunset Hills Rd and a new intersection approximately 700 ft west of Isaac Newton Square W
7. 3A	Soapstone Dr	Generally Tangent through Association Drive	90 ft west	Slight Angle ~ 75 degrees	380	On new alignment and Comstock Metro Center Dr	Isaac Newton Square W / Comstock Metro Center Dr
8. 3B	Soapstone Dr	Generally Tangent through Association Drive				On new alignment in floodplain / RPA	Sunset Hills Road and New Intersection located approximately 350 ft west of Isaac Newton Square W
9. 3C	Soapstone Dr	Generally Tangent through	585 ft west	Almost Perpen-	340	On new alignment	Sunset Hills Rd and a new

		Association Drive Development		dicular ~ 93 degrees		thru existing parking garage+	intersection approximately 700 ft west of Isaac Newton Square W
10. 3D	Soapstone Dr	Generally Tangent through Association Drive	585 ft west	Almost Perpen-dicular ~ 93 degrees	340	On new alignment thru existing parking garage	Sunset Hills Rd and a new intersection approximately 700 ft west of Isaac Newton Square W
11. 3E	Soapstone Dr	Generally Tangent through Association Drive	585 ft west	Almost Perpen-dicular ~ 93 degrees	340	On new alignment intersecting Reston Station Blvd extended	Reston Station Blvd EXTENDED, approximately 675 ft west of Comstock Metro Center Dr and Reston Station Blvd
12. 3F	Soapstone Dr	Generally Tangent through Association Drive Development	585 ft west	Almost Perpen-dicular ~ 87 degrees	340	On new alignment curving thru RPA	Reston Station Blvd and Comstock Metro Center Dr
13. 3G	Soapstone Dr	Generally Tangent through Association Drive Development	580 ft west	Almost Perpen-dicular ~ 93 degrees	340	On new alignment curving thru RPA	Reston Station Blvd and Comstock Metro Center Dr
14. 3H	Soapstone Dr	Generally Tangent through Association Drive Development	585 ft west	Almost Perpen-dicular ~ 87 degrees	340	On new alignment curving thru RPA	Reston Station Blvd and Comstock Metro Center Dr
15. 4A	Soapstone	Generally along				On new	Sunset Hills Road

	Dr	western portion of Association Dr				alignment in floodplain / RPA	and New Intersection located approximately 350 ft west of Isaac Newton Square W
16. 4B	Soapstone Dr	Generally along western portion of Association Dr	805 ft west	Skewed ~ 60 degrees	430	On new alignment thru existing parking garage	Sunset Hills Rd and a new intersection approximately 700 ft west of Isaac Newton Square W
17. 4C	Soapstone Dr	Generally along western portion of Association Dr					At intersection of existing driveway between 11491 and 11495 Sunset Hills Rd
18. 4D	Soapstone Dr	Generally along western portion of Association Dr	585 ft west	Almost Perpen-dicular ~ 93 degrees	340		Just east of Colonial Pipeline crossing of Sunset Hills Rd
19. 4E	Soapstone Dr	Generally along western portion of Association Dr	585 ft west	Almost Perpen-dicular ~ 93 degrees	340	On new alignment	Near Colonial Pipeline crossing of Sunset Hills Rd
20. 4F	Soapstone Dr	Generally along western portion of Association Dr	805 ft west	Skewed ~ 60 degrees	430	On new alignment curving thru RPA	Reston Station Blvd and Comstock Metro
21. 5A	~ 250 ft west of Soapstone	Along property line between western parcels				On new alignment between	Where existing driveway between 11491 and 11495

	Dr	on Association Dr and 11600 Sunrise Valley Dr				11491 and 11495 Sunset Hills Rd intersects Sunset Hills Rd	Sunset Hills Rd intersects Sunset Hills Rd
22. 5B	~250 ft west of Soapstone Dr	Along property line between western parcels on Association Dr and 11600 Sunrise Valley Dr				On new alignment west of Unisys and 11495 Sunset Hills Rd	Just east of Colonial Pipeline crossing
23. 5C	~250 ft west of Soapstone Dr	Along property line between western parcels on Association Dr and 11600 Sunrise Valley Dr				On new alignment west of Unisys and then east of 11501 Sunset Hills Rd	Approximately at crossing of Colonial Pipeline
24. 6A	Indian Ridge Dr	On new alignment just east of stormwater pond w/fountain and then immediately adjacent and parallel to DTR	150 ft west	Curved south end; Skewed ~ 63 degrees	~ 470	On new alignment and Comstock Metro Center Dr	Sunset Hills Rd and Isaac Newton Square W / Comstock Metro Center Drive
25. 6B	Indian Ridge Dr	On new alignment just east of stormwater pond w/fountain and then immediately adjacent and	410 ft west	Curved south end; Slight Angle ~ 75 degrees	405	on new alignment in floodplain / RPA	Sunset Hills Road and New Intersection located approximately 350 ft west of Isaac Newton Square W

		parallel to DTR					
26. 6C	Indian Ridge Dr	On new alignment just east of stormwater pond w/fountain and then immediately adjacent and parallel to DTR	810 ft west	Skewed ~ 60 degrees	420	On new alignment thru existing parking garage+	Sunset Hills Rd and a new intersection approximately 700 ft west of Isaac Newton Square W
27. 6D	Indian Ridge Dr	On new alignment just east of stormwater pond w/fountain and then immediately adjacent and parallel to DTR				On new alignment west of Unisys Bldgs and between 11491 and 11495 Sunset Hills Rd	Where existing driveway between 11491 and 11495 Sunset Hills Rd intersects Sunset Hills Rd
28. 6E	Indian Ridge Dr	On new alignment just east of stormwater pond w/fountain and then immediately adjacent and parallel to DTR	790 ft west	Large angle ~ 37 degrees	470	On new alignment west of Unisys Bldgs and 11495 Sunset Hills Rd	East of the Colonial Pipeline crossing
29. 6F	Indian Ridge Dr	On new alignment just east of stormwater pond w/fountain and then immediately adjacent and parallel to DTR				On new alignment west of Unisys Bldgs and just east of 11501 Sunset Hills Rd	At the crossing of the Colonial Pipeline
30. 6G	Indian Ridge	On new	970 ft	Large	590	East of	Sunset Hills Rd

	Dr	alignment just east of stormwater pond w/fountain and then immediately adjacent and parallel to DTR	west	angle ~ 37 degrees		Unisys Bldgs and then north of Kaiser intersecting with Reston Station Blvd	and Isaac Newton Square W / Comstock Metro Center Drive

* - Measured from the east face of the Bridge to the west side of the western-most building on the Wiehle - Reston East Metro Station platform.
** - Angle Relative the DTR

APPENDIX C

Pedestrian and Bicycle Improvements in the Wiehle-Reston Station Area

Table C-1. Pedestrian and Bicycle Improvements in the Wiehle-Reston Station Area.

Reston Area Metrorail Station Access Improvement Projects - Spot Projects

Map ID	Project Improvements	Location	Dulles Rail Phase	Scheduled Completion	Lead Agency	Type
2	Upgrade crosswalk on north leg; Add crosswalks on east and south legs	Intersection of Sunrise Valley Dr & Commerce Park Dr	Phase I	July 2017	FCDOT	Crosswalk
3	Upgrade crosswalk on north leg; Add crosswalks on west and south legs	Intersection of Sunrise Valley Dr & Great Meadow	Phase I	July 2017	FCDOT	Crosswalk
4	Pedestrian intersection improvements - Add crosswalk on west leg	Intersection of Wiehle Ave & Dulles Toll Rd westbound	Phase I	TBD	FCDOT	Crosswalk
5	W&OD Trail Improvements - Improve trail crossing	Intersection of Wiehle Ave & W&OD Trail	Phase I	TBD	FCDOT	Shared-Use
6	Pedestrian intersection improvements - Add crosswalks on north and west legs	Intersection of Sunset Hills Rd & Town Center Pkwy	Phase II	TBD	FCDOT	Crosswalk
7	Pedestrian intersection improvements - Add crosswalks on north, south, and west legs	Intersection of Sunrise Valley Dr & Mercator Dr - USGS	Phase II	TBD	FCDOT	Crosswalk
17	Pedestrian intersection improvements - Upgrade crosswalks on all legs of the intersection	Intersection of Wiehle Ave & Reston Station Blvd	Phase I	December 2013	Rail Project	Crosswalk
18	Add a second left turn lane for northbound traffic and provide a second inbound lane	Wiehle Ave & Reston Station Blvd	Phase I	December 2013	Rail Project	Road
19	Add crosswalks on all legs of the intersection	Intersection of Wiehle Ave & Isaac Newton Sq South	Phase I	TBD	VDOT	Crosswalk
20	Pedestrian intersection improvements - Upgrade crosswalks on all legs of the intersection	Intersection of Wiehle Ave & Sunset Hills Rd	Phase I	December 2013	Rail Project	Crosswalk
21	Decrease right turn radius on north leg and south leg; Channelize right turn lane and decrease right turn radius on west leg	Intersection of Wiehle Ave and Sunset Hills Rd	Phase I	December 2013	Rail Project	Road
22	Intersection improvements - Add and upgrade crosswalks on all legs of the intersection; Construct new left turn lane on westbound approach	Intersection of Sunset Hills Rd and Isaac Newton Sq West	Phase I	December 2013	Rail Project	Road & Crosswalk

Reston Area Metrorail Station Access Improvement Projects - Spot Projects

Map ID	Project Improvements	Location	Dulles Rail Phase	Scheduled Completion	Lead Agency	Type
23	Pedestrian intersection improvements - Add crosswalks on north and west legs of the intersection	Intersection of Wiehle Ave and Sunrise Valley Dr	Phase I	December 2013	Rail Project	Crosswalk
24	Channelize right turns from the east and realign right turn channelization from the north	Intersection of Sunrise Valley Dr at Wiehle Ave	Phase I	December 2013	Rail Project	Road
25	Upgrade crosswalks on all legs of the intersection	Intersection of Sunrise Valley Dr and Soapstone Rd	Phase I	July 2017	FCDOT	Crosswalk
26	Pedestrian intersection improvements - Add crosswalk an upgrade curb ramps on north leg	Intersection of Sunrise Valley Rd and Upper Lake Dr	Phase I	July 2017	FCDOT	Crosswalk
27	Pedestrian intersection improvements - Decrease right turn radius, add crosswalk on west leg of the intersection	Intersection of Wiehle Ave and Eastbound Dulles Toll Rd ramp	Phase I	December 2013	Rail Project	Crosswalk
28	Pedestrian intersection improvements - Upgrade and add asphalt sidewalk on west side to Sunset Hills Rd	Intersection of Isaac Newton Sq West and W&OD Trail	Phase I	Complete	Rail Project	Shared Use
29	Intersection improvements - Construct left turn lane	Eastbound Dulles Toll Road ramp at Wiehle Ave	Phase I	December 2013	Rail Project	Road

Reston Area Metrorail Station Access Improvement Projects - Linear Projects

Map ID	Project Improvements	Location	Dulles Rail Phase	Scheduled Completion	Lead Agency	Type
1	Widen Isaac Newton Square West	Metro Center Dr to Isaac Newton Sq South	Phase I	TBD	FCDOT	Road
8	Sunrise Valley Sidewalk	South side from Glade Dr to Reston Pkwy	Phase II	TBD	FCDOT	Sidewalk
9	Isaac Newton Square West Walkway	Metro Center Drive entrance to Isaac Newton Sq South	Phase I	TBD	FCDOT	Sidewalk
10	Wiehle Avenue Walkway/Bikeway	Wiehle-Reston East Station entrance to Sunrise Valley Dr	Phase I	TBD	FCDOT	Shared-Use
11	W&OD Trail Improvements	Grade Separation at Wiehle Ave	Phase I	TBD	FCDOT	Shared-Use
12	Sunrise Valley Shared Use Path	North side from Soapstone Dr to South Lakes Dr	Phase I	July 2017	FCDOT	Shared-Use
13	Soapstone Bike Lanes	West side from the end of Soapstone to Sunrise Valley Dr	Phase I	Complete	VDOT	Bicycle Lane
14	Soapstone Bike Lanes	East side from the end of Soapstone to Sunrise Valley Dr	Phase I	Complete	VDOT	Bicycle Lane
15	Soapstone Sidewalk	West side from Sunrise Valley Dr to Hunters Green Ct	Phase I	August 2013	FCDOT	Sidewalk
16	Wiehle Avenue Sidewalk	East side from Chestnut Grove Sq to North Shore Dr	Phase I	June 2013	FCDOT	Sidewalk
30	Wiehle Avenue Walkway	Sunrise Valley Dr to Wiehle-Reston East Station entrance	Phase I	Complete	FCDOT	Sidewalk
31	Sunrise Valley Sidewalk	South side from Soapstone Dr to South Lakes Dr	Phase I	July 2017	FCDOT	Sidewalk

APPENDIX D

Comprehensive List of Properties

Table D-1. Comprehensive List of Properties in the study area.

Map #	Address	Owner	Land area	Zon-ing	2012 Assessed Values Land	2012 Building Assessed Value	Total Prop. Assessed Value	Commercial Info Prop. Name	Yr Built	Building size (GSF)	Storie s
0174 12 0001	1906 Association Drive	Nat'l Council of Teachers of Math, Inc.	110,473	I-3	$927,970	$3,695,950	$4,623,920	NCTM BUILDING	1973	31,520	2
0174 12 0002	1904 Association Drive	NATIONAL ASSOCIATION OF SECONDARY SCHOOL PRINCIPALS	184,132	I-3	$1,546,710	$4,545,770	$6,092,480	NASSAP BUILDING	1973	36,233	2
0174 12 0003	1902 Association Drive	KM STONECROFT LLC,	110,459	I-3	$927,840	$3,014,390	$3,942,230	1902 ASSOCIATION DR	1975	17,688	1
0174 12 0004	1900 Association Drive	AMERICAN ASSN FOR HEALTH, PHYSICAL ED AND REC	147,272	I-3	$1,413,810	$3,996,230	$5,410,040	AAHPERD BLDG	1980	34,256	2
0174 12 0005A	1920 ASSOCIATION DR	WIRTHLIN RICHARD B FAMILY LLC,	146,954	I-3	$910,560	$5,527,960	$6,438,520	CFEC BUILDING	1973	51,022	5
0174 12 0006	1916 ASSOCIATION DR	1916 HOLDINGS LLC,	37,026	I-3	$311,010	$631,530	$942,540	NAEA BUILDING	1977	4,824	1
0174 12 0007	1914 ASSOCIATION DR	NATIONAL BUSINESS, EDUCATION ASSN	37,039	I-3	$298,410	$1,624,920	$1,923,330	NAT BUS ED ASSN OFF	1981	14,210	2
0174 12 0008	1912 ASSOCIATION DR	FUTURE BUSINESS LEADERS, OF AMERICA PHI BETA	73,660	I-3	$618,740	$1,019,420	$1,638,160	FUT BUS LEADERS	1991	10,370	1
0174 12 0009	1910 ASSOCIATION DR	FUTURE HOMEMAKERS, OF AMERICA INC	73,203	I-3	$614,900	$2,974,680	$3,589,580	FUTURE HOMEMAKERS	1982	29,710	2
0174 12 0010	1908 ASSOCIATION DR	DISTRIBUTIVE EDUCATION, CLUBS OF AMERICA INC	73,908	I-3	$620,820	$864,570	$1,485,390	DECA BUILDING	1976	22,100	2
0174 01 0010	11600 SUNRISE VALLEY DR	BDC SUNRISE VALLEY LLC	432,115	I-5	$4,893,360	$18,339,290	$23,232,650	11600 SUNRISE LP	1972	158,102	4
0174 12 0011D8	11480 COMMERCE PARK DR	MEPT COMMERCE EXECUTIVE VI LLC	162,901	I-3	$2,926,150	$21,641,760	$24,567,910	COMMERC EXECUTIVE VI	1998	142,965	6
0174 12 0011A	11495 COMMERCE PARK DR	IGS LIMITED LIABILITY CO	181,824	I-3	$974,310	$6,624,350	$7,598,660	COMMERCE EXECUTIVE I	1982	46,205	3
0174 12 0011D7	11440 COMMERCE PARK DR	CESC COMMERCE EXECUTIVE PARK LLC	134,950	I-3	$3,095,520	$22,359,610	$25,455,130	COMMERCE EXECUTIVE V	1988	168,797	6
0174 12 0011D5	11400 COMMERCE PARK DR	CESC COMMERCE EXECUTIVE PARK LLC	142,216	I-3	$3,071,950	$17,938,970	$21,010,920	COMMERCE EXECUTIVE IV	1987	146,958	6
0174 12 0011D4	1850 CENTENNIAL PARK DR	CESC COMMERCE EXECUTIVE PARK LLC	227,219	I-3	$2,641,100	$15,807,490	$18,448,590	COMMERC EXECUTIVEIII	1985	114,806	6
0174 12 0011D3	1900 CENTENNIAL PARK DR	UNITED FACILITIES LLC	27,299	I-3	$1,100,000	$986,880	$2,086,880	UNITED FACILITIES / BUSINESS BANK	1984	3,185	1
0174 01 0020	11301 SUNSET HILLS RD	RESTON INVESTMENTS LLC	77,968	I-4	$1,591,800	$3,798,130	$5,389,930	SUNSET SQ. OFC. PARK	1979	19,215	2
0174 20A 0001	11367 SUNSET HILLS RD	BCCM LLC	-	I-4	$70,470	$281,880	$352,350	OFFICE CONDO	1981	1350	1
0174 20A 0002	11365 SUNSET HILLS RD	PROVIDENCE MEADOW ENTERPRISES LLC	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20A 0003	11363 SUNSET HILLS RD	BBLMT ASSOCIATES	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20A 0004	11361 SUNSET HILLS RD	BBLMT ASSOCIATES	-	I-4	$70,470	$281,880	$352,350	OFFICE CONDO	1981	1350	1
0174 20B 0005	11351 SUNSET HILLS RD	MERCANTINI JOHN A TR	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20B 0006	11349 SUNSET HILLS RD	FARRELL JOHN D JR MD	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20B 0007	11347 SUNSET HILLS RD	BLANKESPOOR GIL L	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1

Map #	Address	Owner	Land area	Zon-ing	2012 Assessed Values Land	2012 Building Assessed Value	Total Prop. Assessed Value	Commercial Info Prop. Name	Yr Built	Building size (GSF)	Storie s
0174 20B 0008	11345 SUNSET HILLS RD	AZURE SUNSET LLC	-	I-4	$80,180	$320,720	$400,900	OFFICE CONDO	1981	1536	1
0174 20C 0009	11343 SUNSET HILLS RD	11343 SUNSET HILLS ROAD LLC	-	I-4	$87,590	$350,370	$437,960	OFFICE CONDO	1981	1678	1
0174 20C 0010	11341 SUNSET HILLS RD	RESTON MEDICAL LEASING, LLC	-	I-4	$78,670	$314,660	$393,330	OFFICE CONDO	1981	1507	1
0174 20C 0011	11339 SUNSET HILLS RD	MUSS INVESTMENTS LLC	-	I-4	$78,670	$314,660	$393,330	OFFICE CONDO	1981	1507	1
0174 20C 0012	11337 SUNSET HILLS RD	KBG LLC	-	I-4	$78,670	$314,660	$393,330	OFFICE CONDO	1981	1507	1
0174 20C 0013	11335 SUNSET HILLS RD	LAMMERS LAWRENCE, LAMMERS JEAN C	-	I-4	$78,670	$314,660	$393,330	OFFICE CONDO	1981	1507	1
0174 20C 0014	11333 SUNSET HILLS RD	LAMMERS LAWRENCE, LAMMERS JEAN C	-	I-4	$87,590	$350,370	$437,960	OFFICE CONDO	1981	1678	1
0174 20D 0015	11331 SUNSET HILLS RD	11331 SUNSET HILLS ROAD LLC	-	I-4	$80,180	$320,720	$400,900	OFFICE CONDO	1981	1536	1
0174 20D 0016	11329 SUNSET HILLS RD	SUNSET HILLS ENTERPRISES, AZURE PROPERTIES III	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20D 0017	11327 SUNSET HILLS RD	NOVICK ARTHUR J, NOVICK NANCY E	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20D 0018	11325 SUNSET HILLS RD	NOVICK ARTHUR J, NOVICK NANCY	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20E 0019	11315 SUNSET HILLS RD	GURNEY ROBERT W,	-	I-4	$70,470	$281,880	$352,350	OFFICE CONDO	1981	1350	1
0174 20E 0020	11313 SUNSET HILLS RD	SULLIVAN MARY M TR,	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20E 0021	11311 SUNSET HILLS RD	SULLIVAN MARY M TR,	-	I-4	$81,170	$324,690	$405,860	OFFICE CONDO	1981	1555	1
0174 20E 0022	11309 SUNSET HILLS RD	SULLIVAN MARY M TR	-	I-4	$70,470	$281,880	$352,350	OFFICE CONDO	1981	1350	1
0174 20F 0023	11317 SUNSET HILLS RD	SUNHILL INVESTMENT, PARTNERS	-	I-4	$88,950	$355,790	$444,740	OFFICE CONDO	1981	1704	1
0174 20F 0024	11319 SUNSET HILLS RD	CHIRORUNNER LLC	-	I-4	$90,930	$363,730	$454,660	OFFICE CONDO	1981	1742	1
0174 20F 0025	11321 SUNSET HILLS RD	JADHWANI PROPERTIES LLC	-	I-4	$90,930	$363,730	$454,660	OFFICE CONDO	1981	1742	1
0174 20F 0026	11323 SUNSET HILLS RD	JCB MANAGEMENT CO LLC	-	I-4	$88,950	$355,790	$444,740	OFFICE CONDO	1981	1704	1
0174 20G 0027	11353 A SUNSET HILLS RD	DIBBS FREDERICK N TR	-	I-4	$88,950	$355,790	$444,740	OFFICE CONDO	1981	1704	1
0174 20G 0028	11355 SUNSET HILLS RD	LANDO HOWARD M REVOCABLE TRUST	-	I-4	$90,930	$363,730	$454,660	OFFICE CONDO	1981	1742	1
0174 20G 0029	11357 SUNSET HILLS RD	LANDO HOWARD M TR	-	I-4	$90,930	$363,730	$454,660	OFFICE CONDO	1981	1742	1
0174 20G 0030	11359 SUNSET HILLS RD	SUNSET HILLS ASSOCIATES	-	I-4	$88,950	$355,790	$444,740	OFFICE CONDO	1981	1704	1
0174 19 0001	11407 SUNSET HILLS RD	RBP AND M LLC	21,780	I-4	$228,690	$1,399,550	$1,628,240	RESTON BUSINESS PARK	1985	33,600	2
0174 19 0002	-	RBP AND M LLC	21,780	I-4	$228,690	$0	$228,690	RESTON BUSINESS PARK	1985	33,600	2
0174 19 0003	11411 SUNSET HILLS RD	RBP AND M LLC	21,780	I-4	$228,690	$1,399,550	$1,628,240	RESTON BUSINESS PARK	1985	33,600	2

Map #	Address	Owner	Land area	Zon-ing	2012 Assessed Values Land	2012 Building Assessed Value	Total Prop. Assessed Value	Commercial Info Prop. Name	Yr Built	Building size (GSF)	Storie s
0174 19 0004	-	RBP AND M LLC	21,780	I-4	$228,690	$0	$228,690	RESTON BUSINESS PARK	1985	33,600	2
0174 19 0005A	11401 SUNSET HILLS RD	RBP AND M LLC	53,906	I-4	$740,140	$6,475,120	$7,215,260	RESTON MINI STG	1980	66,860	2
0174 19 0006A	11403 SUNSET HILLS RD	RBP AND M LLC	59,013	I-4	$651,880	$0	$651,880	RESTON MINI STG	1980	66,860	2
0174 24 0004B	11417 SUNSET HILLS RD	SECTION 913 LP, C/O R H HAGNER & CO INC	72,986	I-4	$875,830	$3,536,330	$4,412,160	RESTON BUSINESS PARK	1986	30,608	1
0174 24 0004A	11419 SUNSET HILLS RD	MAXIMUS PROPERTIES LLC	116,330	I-4	$1,448,540	$9,376,960	$10,825,500	GRIFFON PLAZA	1986	60,356	4
0174 24 0003	11465 SUNSET HILLS RD	11465 SH I LC	141,181	PDC	$3,116,750	$13,570,950	$16,687,700	COMSTOCK/NETPLEX/RESTON STATION	2001	90,861	6
0174 24 0005	11445 SUNSET HILLS RD	KAISER FOUNDATION HEALTH, PLAN OF THE MID-ATL ST INC	225,032	I-4	$1,482,700	$10,858,390	$12,341,090	RESTON MD CTR-KAISER	1990	64,324	4
0174 24 0006	11493 SUNSET HILLS RD	ISTAR CTL SUNSET HILLS-RESTON LLC	348,484	I-4	$4,354,530	$20,426,140	$24,780,670	11493 SUNSET HILLS	1987	181,392	5
0174 01 0021	11495 SUNSET HILLS RD	SPECTRA 4 LLP	130,697	I-4	$882,210	$3,574,660	$4,456,870	11495 SUNSET HILLS	1979	41,950	2
0174 01 0028A	11491 SUNSET HILLS RD	SPECTET LIMITED PARTNERSHIP	159,752	I-4	$869,460	$8,991,270	$9,860,730	HUNTER LAB II	1986	69,830	2
0174 01 0029A	11487 SUNSET HILLS RD	RESTON OWNER CORPORATION	252,480	I-4	$2,920,790	$33,672,610	$36,593,400	RESTON COMMONS	2002	140,381	6
0174 01 0017A	1860 WIEHLE AVE	BOARD OF SUPERVISORS FAIRFAX COUNTY	330,088	PDC	$32,166,920	$0	$32,166,920	BOS LAND LEASED TO COMSTOCK	1900	-	-
0174 01 0017B	-	RESTON INVESTMENTS LLC	12,707	I-4	$130,280	$0	$130,280	SUNSET SQ. OFFC. PK	1979	19,215	2
0174 12 0011B	-	CENTENNIAL ONE LIMITED PARTNERSHIP	66,914	I-3	$300,000	$104,000	$404,000	EXEC.PARK - PKNG LOT	-	-	-
0174 12 0011D9	1913 ASSOCIATION DR	EXECUTIVE TWO LIMITED PARTNERSHIP	131,534	I-3	$13,150	$0	$13,150	VACANT LAND	1700	-	-

APPENDIX E

Turn Movement Exhibits

Table E-1: Future AM Alternate 1C Peak Hour

		Inbound Flows														
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	End of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	107	63	0	198	89	642	83	122	0	10	140	0	612	863	0
	T	1127	1644	1667	1297	1581	1278	1120	0	1574	0	692	0	1	645	152
	R	340	13	0	72	21	3	11	203	158	0	314	0	399	0	0
	Total	1574	1720	1667	1567	1691	1923	1214	325	1732	10	1146	0	1012	1508	152
WB	L	103	4	0	193	32	5	3	5	204	33	181	577	0	0	0
	T	965	802	739	499	727	693	696	0	970	0	440	1	0	323	139
	R	58	3	54	22	23	427	139	2	0	61	102	782	0	945	0
	Total	1126	809	793	714	782	1125	838	7	1174	94	723	1360	0	1268	139
NB	L	115	18	0	214	16	39	11	499	235	0	502	491	0	0	0
	T	0	0	0	37	1	0	34	1790	0	242	898	1634	1540	0	0
	R	32	22	0	403	37	8	5	77	68	159	586	0	270	0	0
	Total	147	40	0	654	54	47	50	2366	303	401	1986	2125	1810	0	0
SB	L	27	1	0	39	2	210	6	39	0	181	337	0	522	1138	0
	T	21	0	0	4	36	36	0	1496	0	181	1331	1407	1462	0	0
	R	94	4	119	51	5	166	11	385	0	0	267	215	0	704	0
	Total	142	5	119	94	43	412	17	1920	0	362	1935	1622	1984	1842	0
Total Entering		**2989**	**2574**	**2579**	**3029**	**2570**	**3507**	**2119**	**4618**	3209	867	**5790**	**5107**	**4806**	**4618**	**291**
WB	West Leg	1174	824	858	764	748	898	718	884	1205	0	1209	707	0	1027	139
EB	East Leg	1186	1667	1667	1739	1620	1496	1131	116	1642	340	1615	0	793	1783	152
SB	South Leg	464	17	0	269	89	44	14	1704	362	214	1826	1984	1861	0	0
NB	North Leg	165	66	54	257	113	1069	256	1914	0	313	1140	2416	2152	1808	0
Total Exiting		**2989**	**2574**	**2579**	**3029**	**2570**	**3507**	**2119**	**4618**	**3209**	**867**	**5790**	**5107**	**4806**	**4618**	**291**

Table E-2: Future PM Alternate 1C Peak Hour Intersection Counts

Future PM ALT 1C with all Projected New Trips added

Inbound Flows																
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Eastern Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at eastern median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	72	186	0	61	1	236	20	613	0	0	297	0	327	673	0
	T	1022	567	600	467	763	798	708	0	1244	0	374	0	0	386	83
	R	150	14	0	126	10	11	14	733	342	0	486	0	216	0	0
	Total	1244	767	600	654	774	1045	742	1346	1586	0	1157	0	543	1059	83
WB	L	36	20	0	657	21	31	4	136	118	127	700	430	25	0	0
	T	1034	1153	1127	789	1400	1271	1232	1	1553	0	586	0	0	543	72
	R	39	100	2	55	3	46	26	32	0	66	407	630	0	1308	0
	Total	1109	1273	1129	1501	1424	1348	1262	169	1671	193	1693	1060	25	1851	72
NB	L	362	21	0	72	23	4	9	346	224	0	389	567	0	0	0
	T	0	0	0	6	0	0	1	1611	0	264	1678	1441	1655	0	0
	R	143	27	0	187	33	10	7	38	106	32	275	0	359	0	0
	Total	505	48	0	265	56	14	17	1995	330	296	2342	2008	2014	0	0
SB	L	43	105	0	128	24	309	119	11	0	230	134	0	675	1170	0
	T	2	0	0	47	0	1	0	2146	0	230	1218	2660	2416	0	0
	R	157	339	46	185	67	647	86	281	0	0	189	404	0	1396	0
	Total	202	444	46	360	91	957	205	2438	0	460	1541	3064	3091	2566	0
Total Entering		**3060**	**2532**	**1775**	**2780**	**2345**	**3364**	**2226**	**5948**	3587	949	**6733**	**6132**	**5673**	**5476**	**155**
Outbound Flows																
WB	West Leg	1553	1513	1173	1046	1490	1922	1327	628	1777	0	1164	971	0	1939	72
EB	East Leg	1208	699	600	782	820	1117	834	49	1350	262	783	0	1034	1556	83
SB	South Leg	188	34	0	830	31	43	18	3015	460	357	2404	3090	2657	0	0
NB	North Leg	111	286	2	122	4	282	47	2256	0	330	2382	2071	1982	1981	0
Total Exiting		**3060**	**2532**	**1775**	**2780**	**2345**	**3364**	**2226**	**5948**	**3587**	**949**	**6733**	**6132**	**5673**	**5476**	**155**

Table E-3: Future AM Alternate 3D Peak Hour Intersection Counts

		Inbound Flows														
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	107	63	0	475	89	365	83	122	0	0	140	0	612	863	0
	T	1127	1644	1667	1297	1581	1278	1120	0	1574	0	692	0	1	645	152
	R	340	13	0	72	21	3	11	203	158	0	314	0	399	0	0
	Total	1574	1720	1667	1844	1691	1646	1214	325	1732	0	1146	0	1012	1508	152
WB	L	103	4	0	193	32	5	3	5	204	33	181	577	0	0	0
	T	965	802	739	499	727	693	696	0	970	0	440	1	0	323	139
	R	58	3	54	204	23	245	139	2	0	61	102	782	0	945	0
	Total	1126	809	793	896	782	943	838	7	1174	94	723	1360	0	1268	139
NB	L	115	18	0	214	16	39	11	499	235	0	502	491	0	0	0
	T	0	0	0	37	1	0	34	1790	0	242	898	1634	1540	0	0
	R	32	22	0	403	37	8	5	77	68	159	586	0	270	0	0
	Total	147	40	0	654	54	47	50	2366	303	401	1986	2125	1810	0	0
SB	L	27	1	0	214	2	35	6	39	0	181	337	0	522	1138	0
	T	21	0	0	4	36	36	0	1496	0	181	1331	1407	1462	0	0
	R	94	4	119	184	5	33	11	385	0	0	267	215	0	704	0
	Total	142	5	119	402	43	104	17	1920	0	362	1935	1622	1984	1842	0
Total Entering		**2989**	**2574**	**2579**	**3796**	**2570**	**2740**	**2119**	**4618**	3209	857	**5790**	**5107**	**4806**	**4618**	**291**
WB	West Leg	1174	824	858	897	748	765	718	884	1205	0	1209	707	0	1027	139
EB	East Leg	1186	1667	1667	1914	1620	1321	1131	116	1642	340	1615	0	793	1783	152
SB	South Leg	464	17	0	269	89	44	14	1704	362	214	1826	1984	1861	0	0
NB	North Leg	165	66	54	716	113	610	256	1914	0	303	1140	2416	2152	1808	0
Total Exiting		**2989**	**2574**	**2579**	**3796**	**2570**	**2740**	**2119**	**4618**	**3209**	**857**	**5790**	**5107**	**4806**	**4618**	**291**

Table E-4: Future PM Alternate 3D Peak Hour Intersection Counts

Inbound Flows																
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Eastern Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at eastern median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	72	4	0	243	1	54	20	613	0	0	297	0	327	673	0
	T	1022	567	600	467	763	798	708	0	1244	0	374	0	0	386	83
	R	150	14	0	126	10	11	14	733	342	0	486	0	216	0	0
	Total	1244	585	600	836	774	863	742	1346	1586	0	1157	0	543	1059	83
WB	L	36	20	0	657	21	31	4	136	118	127	700	430	25	0	0
	T	1034	1153	1127	789	1400	1271	1232	1	1553	0	586	0	0	543	72
	R	39	0	2	155	3	46	26	32	0	66	407	630	0	1308	0
	Total	1109	1173	1129	1601	1424	1348	1262	169	1671	193	1693	1060	25	1851	72
NB	L	362	21	0	72	23	4	9	346	224	0	389	567	0	0	0
	T	0	0	0	6	0	0	1	1611	0	264	1678	1441	1655	0	0
	R	143	27	0	187	33	10	7	38	106	32	275	0	359	0	0
	Total	505	48	0	265	56	14	17	1995	330	296	2342	2008	2014	0	0
SB	L	43	5	0	228	24	209	119	11	0	230	134	0	675	1170	0
	T	2	0	0	47	0	1	0	2146	0	230	1218	2660	2416	0	0
	R	157	12	46	512	67	320	86	281	0	0	189	404	0	1396	0
	Total	202	17	46	787	91	530	205	2438	0	460	1541	3064	3091	2566	0
Total Entering		**3060**	**1823**	**1775**	**3489**	**2345**	**2755**	**2226**	**5948**	3587	949	**6733**	**6132**	**5673**	**5476**	**155**
Outbound Flows																
WB	West Leg	1553	1186	1173	1373	1490	1595	1327	628	1777	0	1164	971	0	1939	72
EB	East Leg	1208	599	600	882	820	1017	834	49	1350	262	783	0	1034	1556	83
SB	South Leg	188	34	0	830	31	43	18	3015	460	357	2404	3090	2657	0	0
NB	North Leg	111	4	2	404	4	100	47	2256	0	330	2382	2071	1982	1981	0
Total Exiting		**3060**	**1823**	**1775**	**3489**	**2345**	**2755**	**2226**	**5948**	**3587**	**949**	**6733**	**6132**	**5673**	**5476**	**155**

Table E-5: Future AM Alternate 4D Peak Hour Intersection Counts

		Inbound Flows														
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	107	63	0	475	89	365	83	122	0	0	140	0	612	863	0
	T	1127	1644	1667	1297	1581	1278	1120	0	1574	0	692	0	1	645	152
	R	340	13	0	72	21	3	11	203	158	0	314	0	399	0	0
	Total	1574	1720	1667	1844	1691	1646	1214	325	1732	0	1146	0	1012	1508	152
WB	L	103	4	0	193	32	5	3	5	204	33	181	577	0	0	0
	T	965	802	739	499	727	693	696	0	970	0	440	1	0	323	139
	R	58	3	54	204	23	245	139	2	0	61	102	782	0	945	0
	Total	1126	809	793	896	782	943	838	7	1174	94	723	1360	0	1268	139
NB	L	115	18	0	214	16	39	11	499	235	0	502	491	0	0	0
	T	0	0	0	37	1	0	34	1790	0	242	898	1634	1540	0	0
	R	32	22	0	403	37	8	5	77	68	159	586	0	270	0	0
	Total	147	40	0	654	54	47	50	2366	303	401	1986	2125	1810	0	0
SB	L	27	1	0	214	2	35	6	39	0	181	337	0	522	1138	0
	T	21	0	0	4	36	36	0	1496	0	181	1331	1407	1462	0	0
	R	94	4	119	184	5	33	11	385	0	0	267	215	0	704	0
	Total	142	5	119	402	43	104	17	1920	0	362	1935	1622	1984	1842	0
Total Entering		**2989**	**2574**	**2579**	**3796**	**2570**	**2740**	**2119**	**4618**	3209	857	**5790**	**5107**	**4806**	**4618**	**291**
WB	West Leg	1174	824	858	897	748	765	718	884	1205	0	1209	707	0	1027	139
EB	East Leg	1186	1667	1667	1914	1620	1321	1131	116	1642	340	1615	0	793	1783	152
SB	South Leg	464	17	0	269	89	44	14	1704	362	214	1826	1984	1861	0	0
NB	North Leg	165	66	54	716	113	610	256	1914	0	303	1140	2416	2152	1808	0
Total Exiting		**2989**	**2574**	**2579**	**3796**	**2570**	**2740**	**2119**	**4618**	**3209**	**857**	**5790**	**5107**	**4806**	**4618**	**291**

Table E-6: Future PM Alternate 4D Peak Hour Intersection Counts

		Inbound Flows														
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Eastern Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at eastern median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	72	4	0	243	1	54	20	613	0	0	297	0	327	673	0
	T	1022	567	600	467	763	798	708	0	1244	0	374	0	0	386	83
	R	150	14	0	126	10	11	14	733	342	0	486	0	216	0	0
	Total	1244	585	600	836	774	863	742	1346	1586	0	1157	0	543	1059	83
WB	L	36	20	0	657	21	31	4	136	118	127	700	430	25	0	0
	T	1034	1153	1127	789	1400	1271	1232	1	1553	0	586	0	0	543	72
	R	39	0	2	155	3	46	26	32	8	66	407	630	0	1308	0
	Total	1109	1173	1129	1601	1424	1348	1262	169	1671	193	1693	1060	25	1851	72
NB	L	362	21	0	72	23	4	9	346	224	0	389	567	0	0	0
	T	0	0	0	6	0	0	1	1611	0	264	1678	1441	1655	0	0
	R	143	27	0	187	33	10	7	38	106	32	275	0	359	0	0
	Total	505	48	0	265	56	14	17	1995	330	296	2342	2008	2014	0	0
SB	L	43	5	0	228	24	209	119	11	0	280	134	0	675	1170	0
	T	2	0	0	47	0	1	0	2146	0	280	1218	2660	2416	0	0
	R	157	12	46	512	67	320	86	281	0	0	189	404	0	1396	0
	Total	202	17	46	787	91	530	205	2438	0	460	1541	3064	3091	2566	0
Total Entering		**3060**	**1823**	**1775**	**3489**	**2345**	**2755**	**2226**	**5948**	3587	949	**6733**	**6132**	**5673**	**5476**	**155**
		Outbound Flows														
WB	West Leg	1553	1186	1173	1373	1490	1595	1327	628	1777	0	1164	971	0	1939	72
EB	East Leg	1208	599	600	882	820	1017	834	49	1350	262	783	0	1034	1556	83
SB	South Leg	188	34	0	830	31	43	18	3015	460	357	2404	3090	2657	0	0
NB	North Leg	111	4	2	404	4	100	47	2256	0	330	2382	2071	1982	1981	0
Total Exiting		**3060**	**1823**	**1775**	**3489**	**2345**	**2755**	**2226**	**5948**	**3587**	**949**	**6733**	**6132**	**5673**	**5476**	**155**

Table E-7: Future AM Alternate 5C Peak Hour Intersection Counts

Inbound Flows																	
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Sunrise Valley & Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	107	63	0	198	89	365	83	122	0	277	0	140	0	612	863	0
	T	1127	1644	1667	1297	1581	1278	1120	0	1574	1390	0	692	0	1	645	152
	R	340	13	0	72	21	3	11	203	158	0	0	314	0	399	0	0
	Total	1574	1720	1667	1567	1691	1646	1214	325	1732	1667	0	1146	0	1012	1508	152
WB	L	103	4	0	193	32	5	3	5	204	0	33	181	577	0	0	0
	T	965	802	739	499	727	693	696	0	970	582	0	440	1	0	323	139
	R	58	3	54	22	23	245	139	2	0	182	61	102	782	0	945	0
	Total	1126	809	793	714	782	943	838	7	1174	764	94	723	1360	0	1268	139
NB	L	115	18	0	214	16	39	11	499	235	0	0	502	491	0	0	0
	T	0	0	0	37	1	0	34	1790	0	0	242	898	1634	1540	0	0
	R	32	22	0	403	37	8	5	77	68	0	159	586	0	270	0	0
	Total	147	40	0	654	54	47	50	2366	303	0	401	1986	2125	1810	0	0
SB	L	27	1	0	39	2	35	6	39	0	175	181	337	0	522	1138	0
	T	21	0	0	4	36	36	0	1496	0	0	181	1331	1407	1462	0	0
	R	94	4	119	51	5	33	11	385	0	133	0	267	215	0	704	0
	Total	142	5	119	94	43	104	17	1920	0	308	362	1935	1622	1984	1842	0
Total Entering		**2989**	**2574**	**2579**	**3029**	**2570**	**2740**	**2119**	**4618**	3209	2739	**857**	**5790**	**5107**	**4806**	**4618**	**291**
WB	West Leg	1174	824	858	764	748	765	718	884	1205	715	0	1209	707	0	1027	139
EB	East Leg	1186	1667	1667	1739	1620	1321	1131	116	1642	1565	340	1615	0	793	1783	152
SB	South Leg	464	17	0	269	89	44	14	1704	362	0	214	1826	1984	1861	0	0
NB	North Leg	165	66	54	257	113	610	256	1914	0	459	303	1140	2416	2152	1808	0
Total Exiting		**2989**	**2574**	**2579**	**3029**	**2570**	**2740**	**2119**	**4618**	**3209**	**2739**	**857**	**5790**	**5107**	**4806**	**4618**	**291**

Table E-8: Future PM Alternate 5C Peak Hour Intersection Counts

Inbound Flows																	
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Eastern Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at eastern median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Sunrise Valley & Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	72	4	0	61	1	54	20	613	0	182	0	297	0	327	673	0
	T	1022	567	600	467	763	798	708	0	1244	418	0	374	0	0	386	83
	R	150	14	0	126	10	11	14	733	342	0	0	486	0	216	0	0
	Total	1244	585	600	654	774	863	742	1346	1586	600	0	1157	0	543	1059	83
WB	L	36	20	0	657	21	31	4	136	118	0	127	700	430	25	0	0
	T	1034	1153	1127	789	1400	1271	1232	1	1553	946	0	586	0	0	543	72
	R	39	0	2	55	3	46	26	32	0	100	66	407	630	0	1308	0
	Total	1109	1173	1129	1501	1424	1348	1262	169	1671	1046	193	1693	1060	25	1851	72
NB	L	362	21	0	72	23	4	9	346	224	0	0	389	567	0	0	0
	T	0	0	0	6	0	0	1	1611	0	0	264	1678	1441	1655	0	0
	R	143	27	0	187	33	10	7	38	106	0	32	275	0	359	0	0
	Total	505	48	0	265	56	14	17	1995	330	0	296	2342	2008	2014	0	0
SB	L	43	5	0	128	24	209	119	11	0	100	230	134	0	675	1170	0
	T	2	0	0	47	0	1	0	2146	0	0	230	1218	2660	2416	0	0
	R	157	12	46	185	67	320	86	281	0	327	0	189	404	0	1396	0
	Total	202	17	46	360	91	530	205	2438	0	427	460	1541	3064	3091	2566	0
Total Entering		**3060**	**1823**	**1775**	**2780**	**2345**	**2755**	**2226**	**5948**	3587	2073	949	**6733**	**6132**	**5673**	**5476**	**155**
Outbound Flows																	
WB	West Leg	1553	1186	1173	1046	1490	1595	1327	628	1777	1273	0	1164	971	0	1939	72
EB	East Leg	1208	599	600	782	820	1017	834	49	1350	518	262	783	0	1034	1556	83
SB	South Leg	188	34	0	830	31	43	18	3015	460	0	357	2404	3090	2657	0	0
NB	North Leg	111	4	2	122	4	100	47	2256	0	282	330	2382	2071	1982	1981	0
Total Exiting		**3060**	**1823**	**1775**	**2780**	**2345**	**2755**	**2226**	**5948**	**3587**	**2073**	**949**	**6733**	**6132**	**5673**	**5476**	**155**

Table E-9: Future AM Alternate 6E Peak Hour Intersection Counts

Inbound Flows																
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	107	340	0	198	89	365	83	122	0	0	140	0	612	863	0
	T	1127	1644	1667	1297	1581	1278	1120	0	1574	0	692	0	1	645	152
	R	340	13	0	72	21	3	11	203	158	0	314	0	399	0	0
	Total	1574	1997	1667	1567	1691	1646	1214	325	1732	0	1146	0	1012	1508	152
WB	L	103	4	0	193	32	5	3	5	204	33	181	577	0	0	0
	T	965	802	739	499	727	693	696	0	970	0	440	1	0	323	139
	R	58	185	54	22	23	245	139	2	0	61	102	782	0	945	0
	Total	1126	991	793	714	782	943	838	7	1174	94	723	1360	0	1268	139
NB	L	115	18	0	214	16	39	11	499	235	0	502	491	0	0	0
	T	0	0	0	37	1	0	34	1790	0	242	898	1634	1540	0	0
	R	32	22	0	403	37	8	5	77	68	159	586	0	270	0	0
	Total	147	40	0	654	54	47	50	2366	303	401	1986	2125	1810	0	0
SB	L	27	176	0	39	2	35	6	39	0	181	337	0	522	1138	0
	T	21	0	0	4	36	36	0	1496	0	181	1331	1407	1462	0	0
	R	94	137	119	51	5	33	11	385	0	0	267	215	0	704	0
	Total	142	313	119	94	43	104	17	1920	0	362	1935	1622	1984	1842	0
Total Entering		**2989**	**3341**	**2579**	**3029**	**2570**	**2740**	**2119**	**4618**	**3209**	**857**	**5790**	**5107**	**4806**	**4618**	**291**
WB	West Leg	1174	957	858	764	748	765	718	884	1205	0	1209	707	0	1027	139
EB	East Leg	1186	1842	1667	1739	1620	1321	1131	116	1642	340	1615	0	793	1783	152
SB	South Leg	464	17	0	269	89	44	14	1704	362	214	1826	1984	1861	0	0
NB	North Leg	165	525	54	257	113	610	256	1914	0	303	1140	2416	2152	1808	0
Total Exiting		**2989**	**3341**	**2579**	**3029**	**2570**	**2740**	**2119**	**4618**	**3209**	**857**	**5790**	**5107**	**4806**	**4618**	**291**

Table E-10: Future PM Alternate 6E Peak Hour Intersection Counts

Future PM ALT 6E with all Projected New Trips added

Inbound Flows																
Approach	Movement	Sunset Hills Rd & Isaac Newton Sq.	Sunrise Valley Dr. & Indian Ridge Rd.	Sunrise Valley Dr. at Eastern Driveway to 11600	Sunrise Valley Dr. & Soapstone Dr.	Sunrise Valley at eastern median opening at Association Dr.	Sunrise Valley Dr. at Commerce Park Dr.	Sunrise Valley Dr. at Centinnial Park Dr.	Wiehle and Reston Station Blvd	Sunset Hills and Soapstone Connector	Grid of Streets "Blue Rd" and Soapstone Connector	Wiehle & Sunset Hills	Wiehle & WB DTR Ramps	Wiehle & EB DTR Ramps	Wiehle & Sunrise Valley	Plaza America & Sunset Hills
EB	L	72	186	0	61	1	54	20	613	0	0	297	0	327	673	0
	T	1022	567	600	467	763	798	708	0	1244	0	374	0	0	386	83
	R	150	14	0	126	10	11	14	733	342	0	486	0	216	0	0
	Total	1244	767	600	654	774	863	742	1346	1586	0	1157	0	543	1059	83
WB	L	36	20	0	657	21	31	4	136	118	127	700	430	25	0	0
	T	1034	1153	1127	789	1400	1271	1232	1	1553	0	586	0	0	543	72
	R	39	100	2	55	3	46	26	32	0	66	407	630	0	1308	0
	Total	1109	1273	1129	1501	1424	1348	1262	169	1671	193	1693	1060	25	1851	72
NB	L	362	21	0	72	23	4	9	346	224	0	389	567	0	0	0
	T	0	0	0	6	0	0	1	1611	0	264	1678	1441	1655	0	0
	R	143	27	0	187	33	10	7	38	106	32	275	0	359	0	0
	Total	505	48	0	265	56	14	17	1995	330	296	2342	2008	2014	0	0
SB	L	43	105	0	128	24	209	119	11	0	230	134	0	675	1170	0
	T	2	0	0	47	0	1	0	2146	0	230	1218	2660	2416	0	0
	R	157	339	46	185	67	320	86	281	0	0	189	404	0	1396	0
	Total	202	444	46	360	91	530	205	2438	0	460	1541	3064	3091	2566	0
Total Entering		**3060**	**2532**	**1775**	**2780**	**2345**	**2755**	**2226**	**5948**	**3587**	**949**	**6733**	**6132**	**5673**	**5476**	**155**
Outbound Flows																
WB	West Leg	1553	1513	1173	1046	1490	1595	1327	628	1777	0	1164	971	0	1939	72
EB	East Leg	1208	699	600	782	820	1017	834	49	1350	262	783	0	1034	1556	83
SB	South Leg	188	34	0	830	31	43	18	3015	460	357	2404	3090	2657	0	0
NB	North Leg	111	286	2	122	4	100	47	2256	0	330	2382	2071	1982	1981	0
Total Exiting		**3060**	**2532**	**1775**	**2780**	**2345**	**2755**	**2226**	**5948**	**3587**	**949**	**6733**	**6132**	**5673**	**5476**	**155**

Existing AM

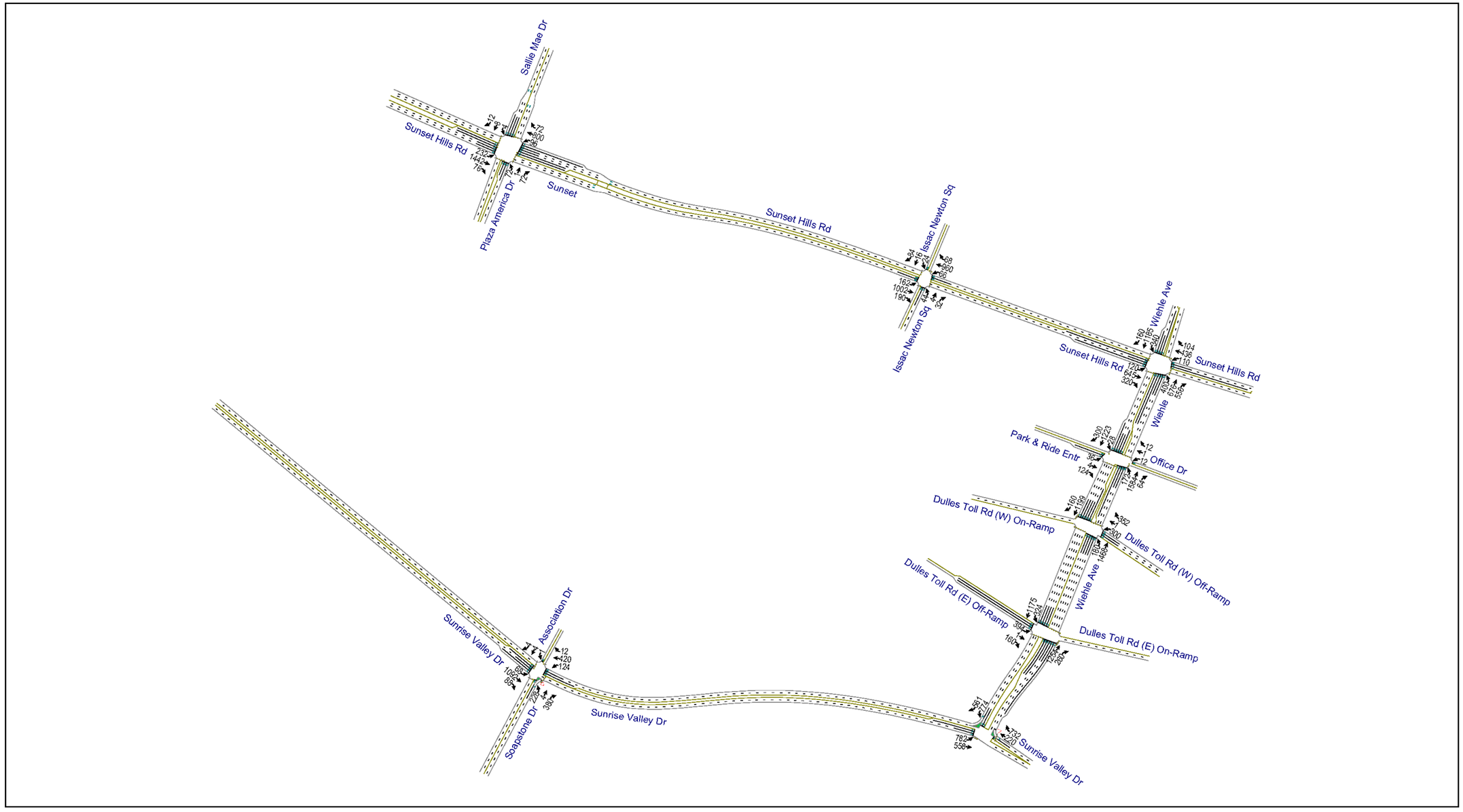

Figure E-1. Existing AM Peak Hour Movements.

Existing PM

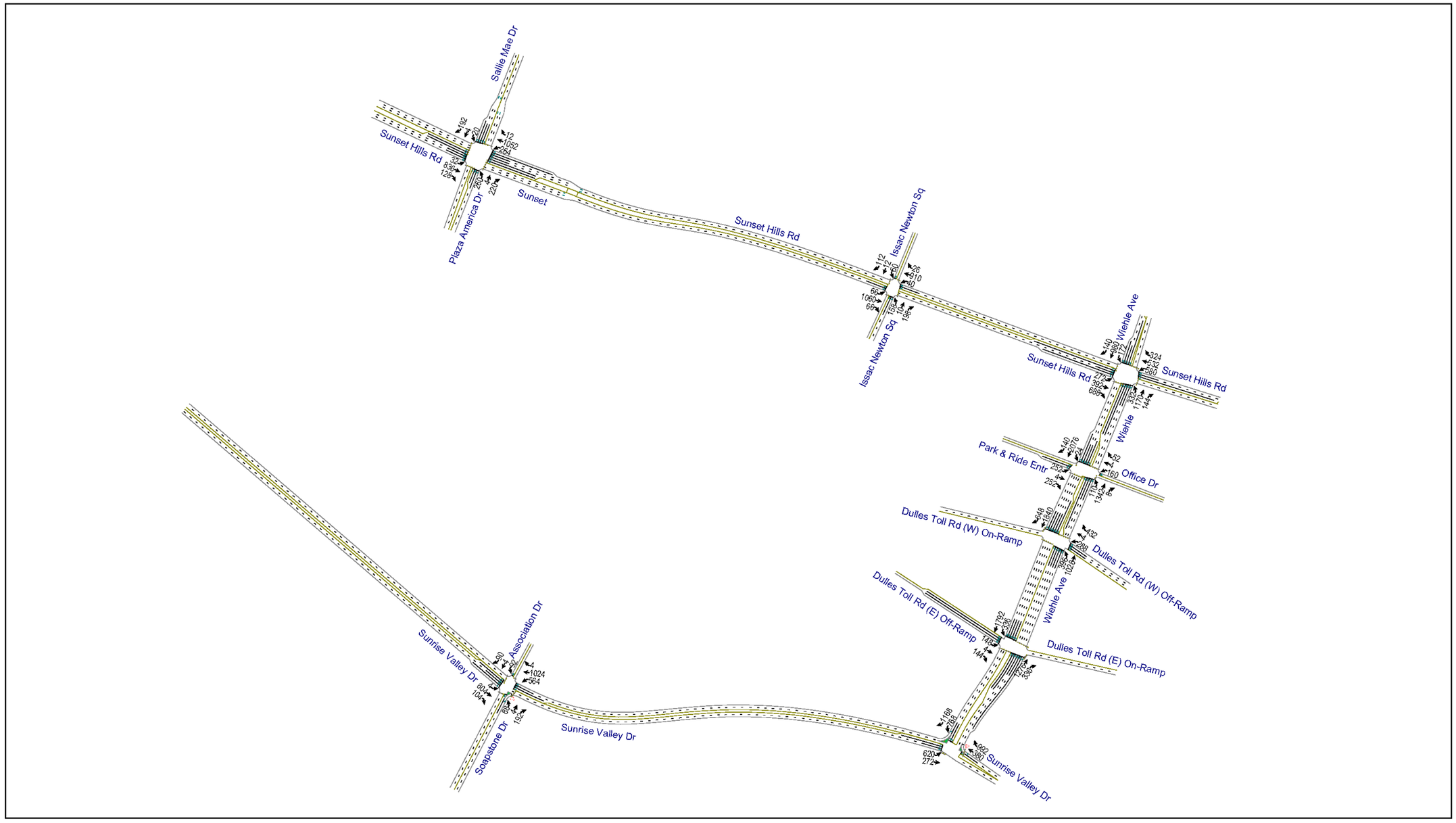

Figure E-2. Existing PM Peak Hour Movements

1C AM

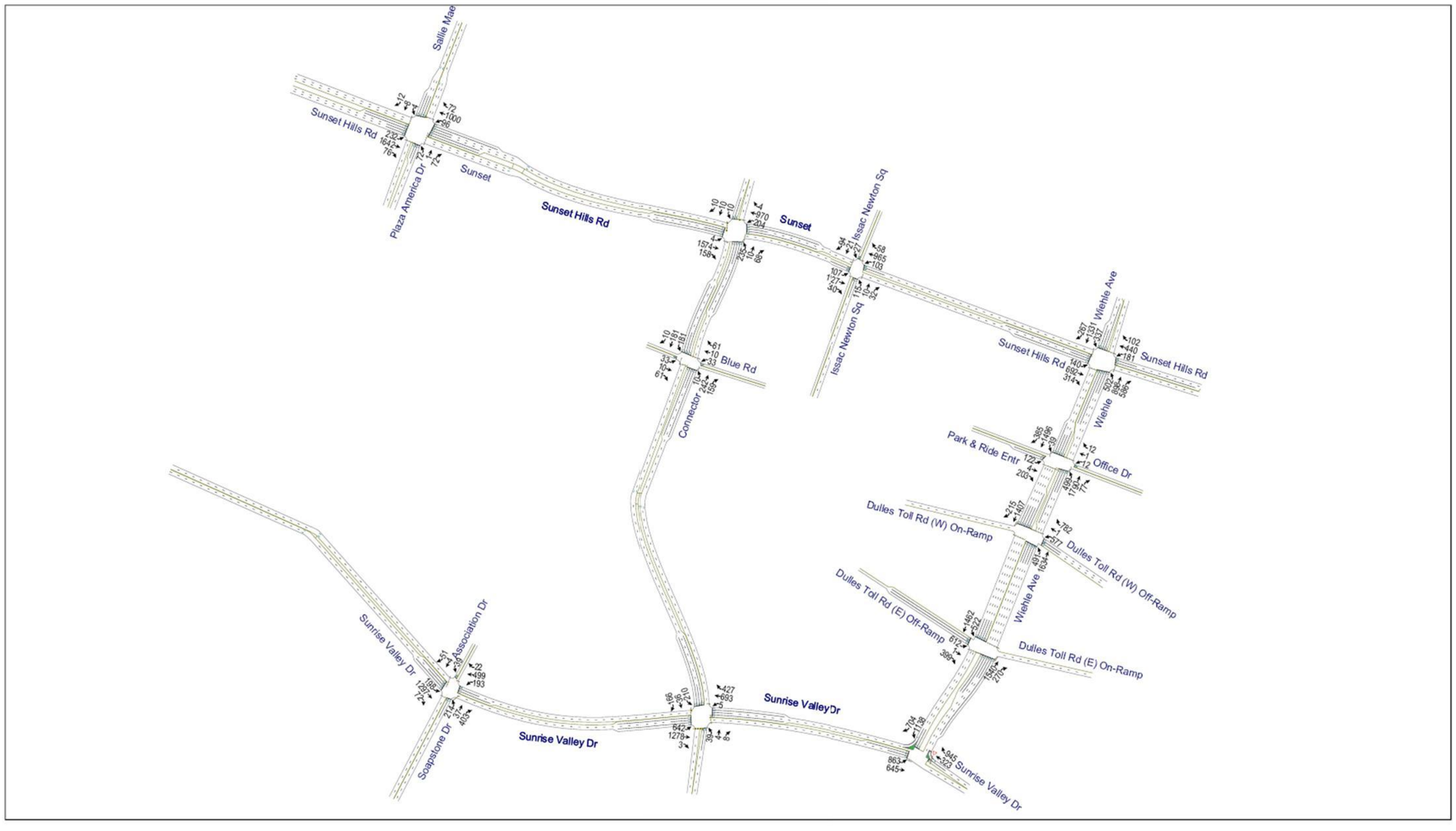

Figure E-3. 2030 AM Peak Hour Movements for Alternative 1C.

1C PM

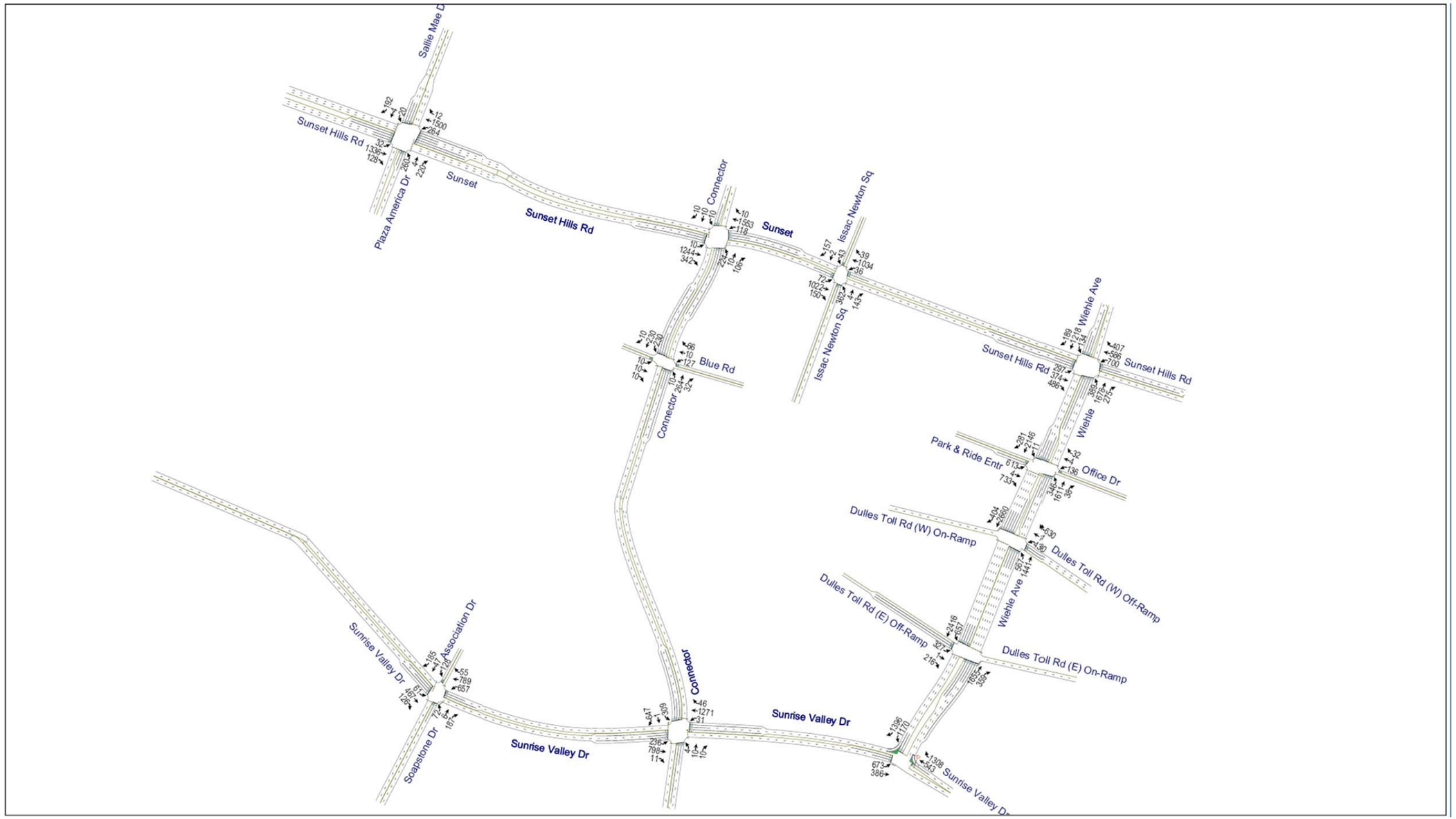

Figure E-4. 2030 PM Peak Hour Movements for Alternative 1C.

3D AM

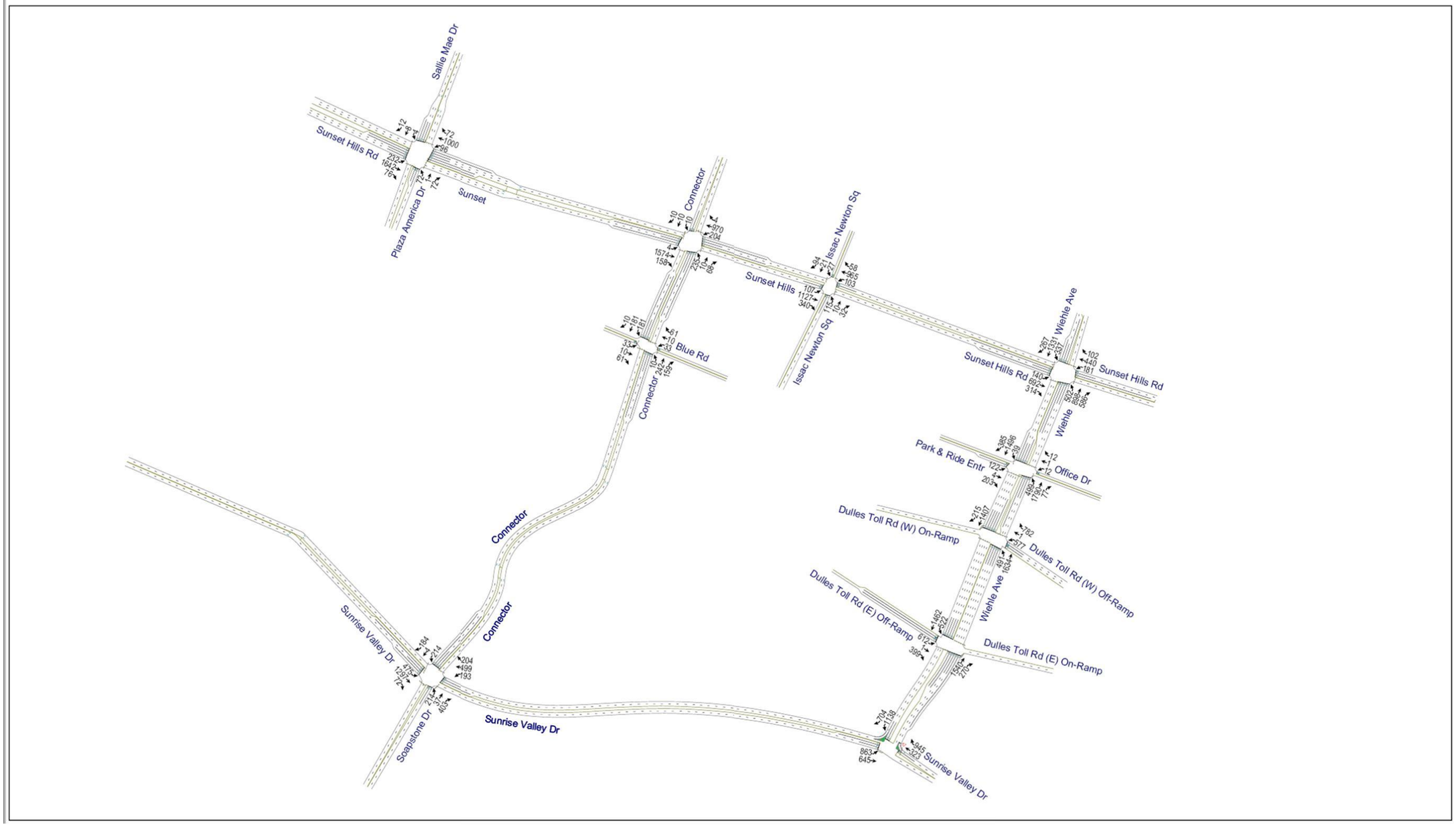

Figure E-5. 2030 AM Peak Hour Movements for Alternative 3D.

3D PM

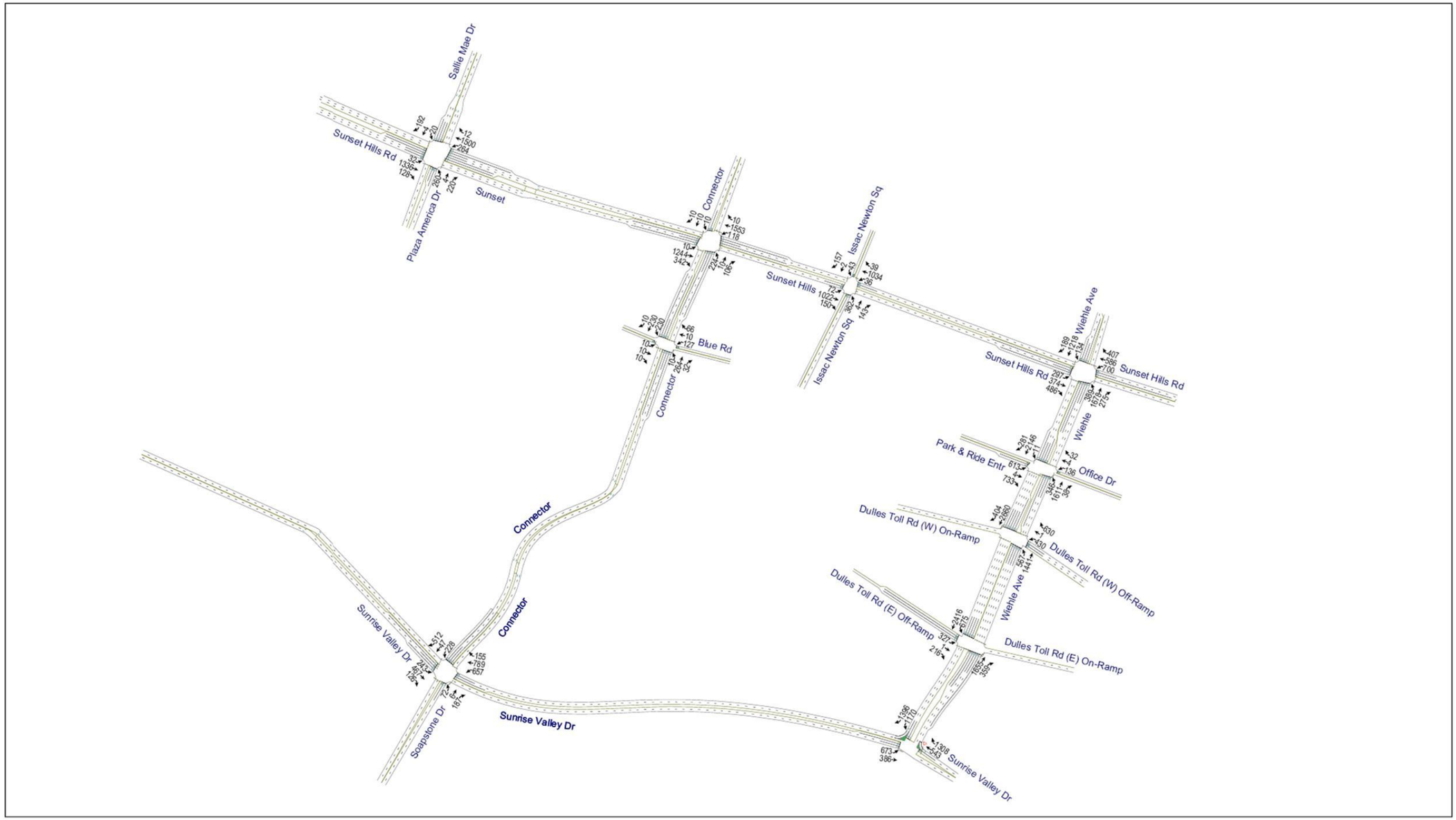

Figure E-6. 2030 PM Peak Hour Movements for Alternative 3D.

4D AM

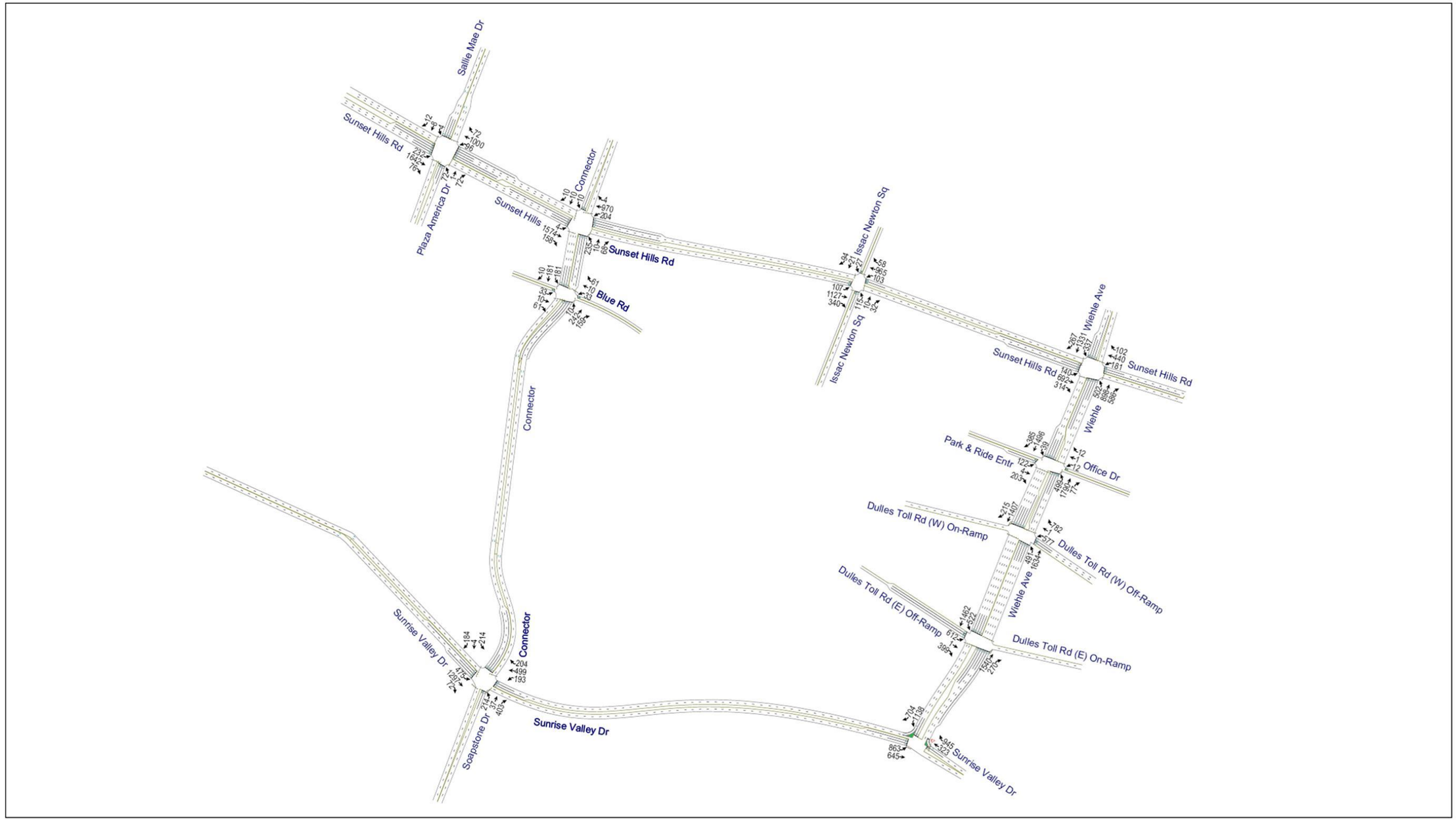

Figure E-7. 2030 AM Peak Hour Movements for Alternative 4D.

4D PM

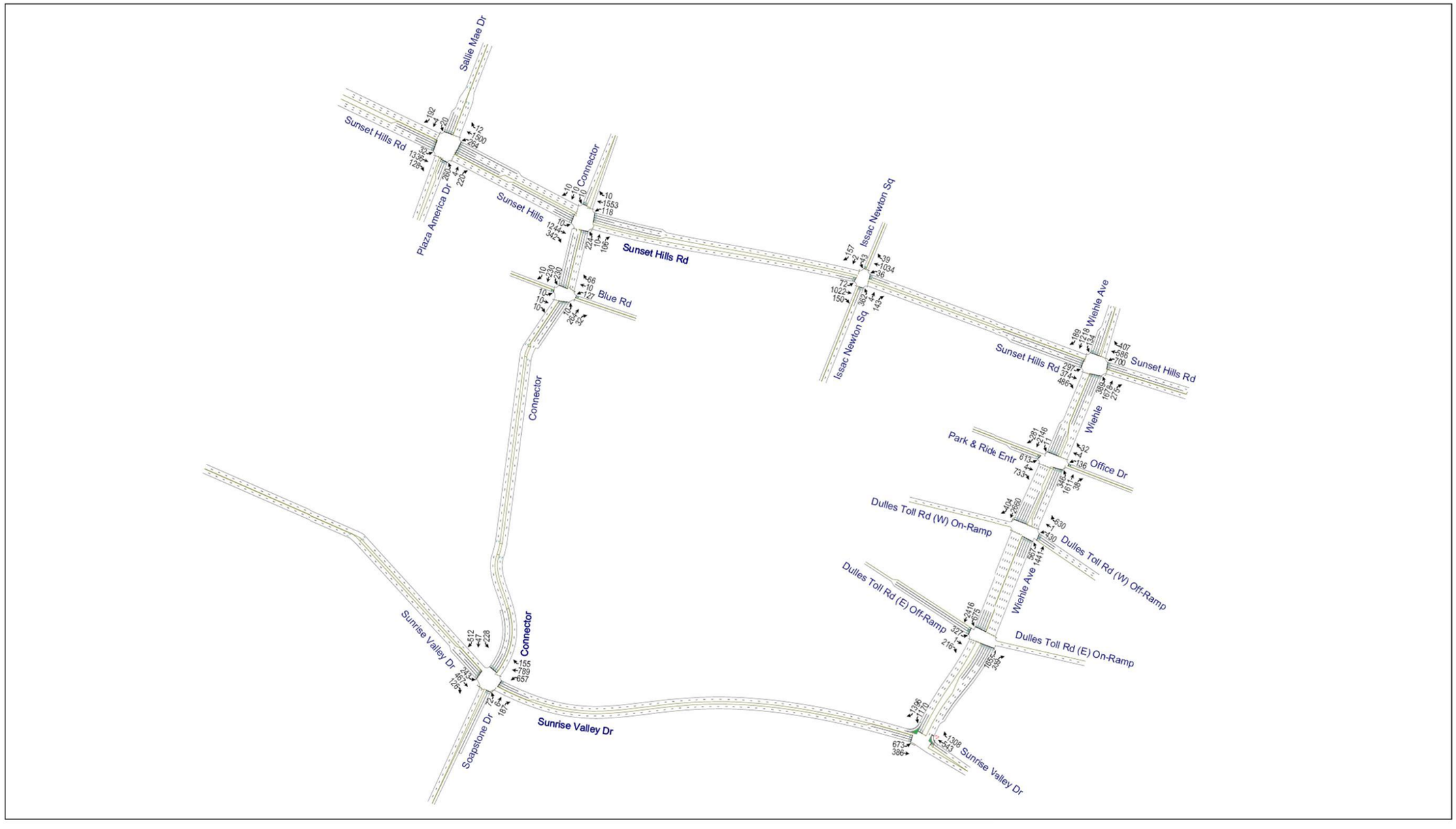

Figure E-8. 2030 PM Peak Hour Movements for Alternative 4D.

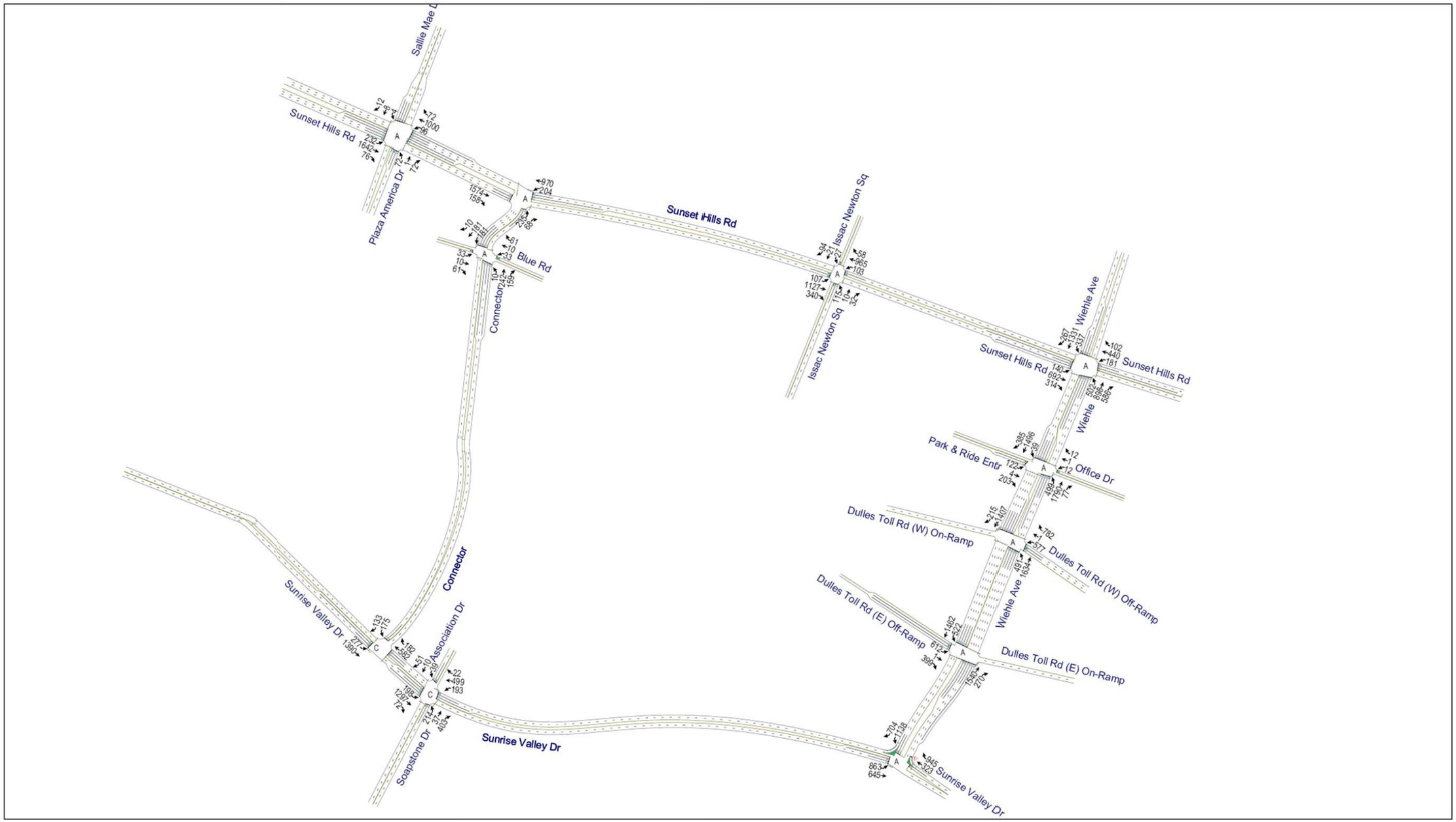

Figure E-9. 2030 AM Peak Hour Movements for Alternative 5C.

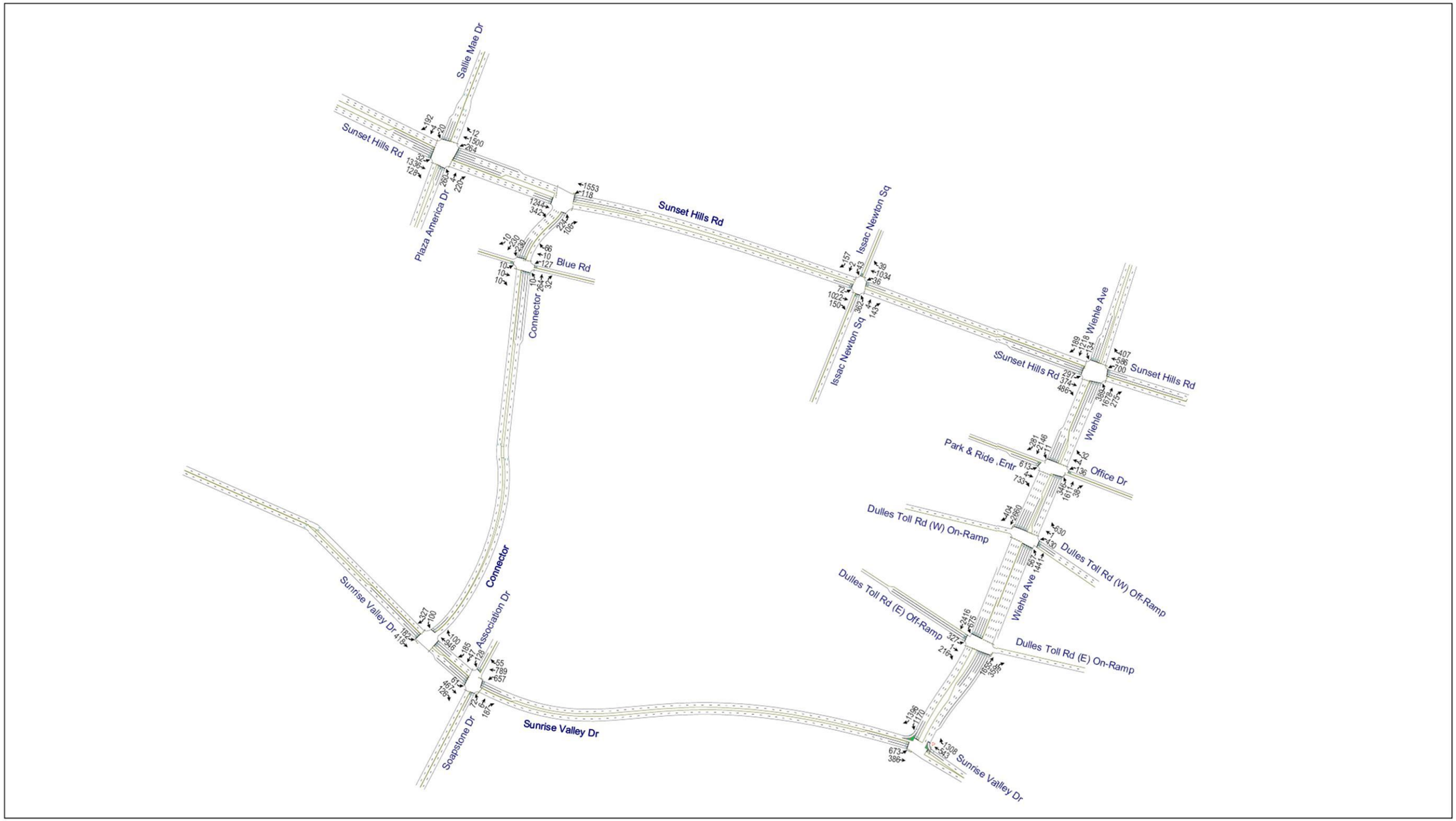

Figure E-10. 2030 PM Peak Hour Movements for Alternative 5C.

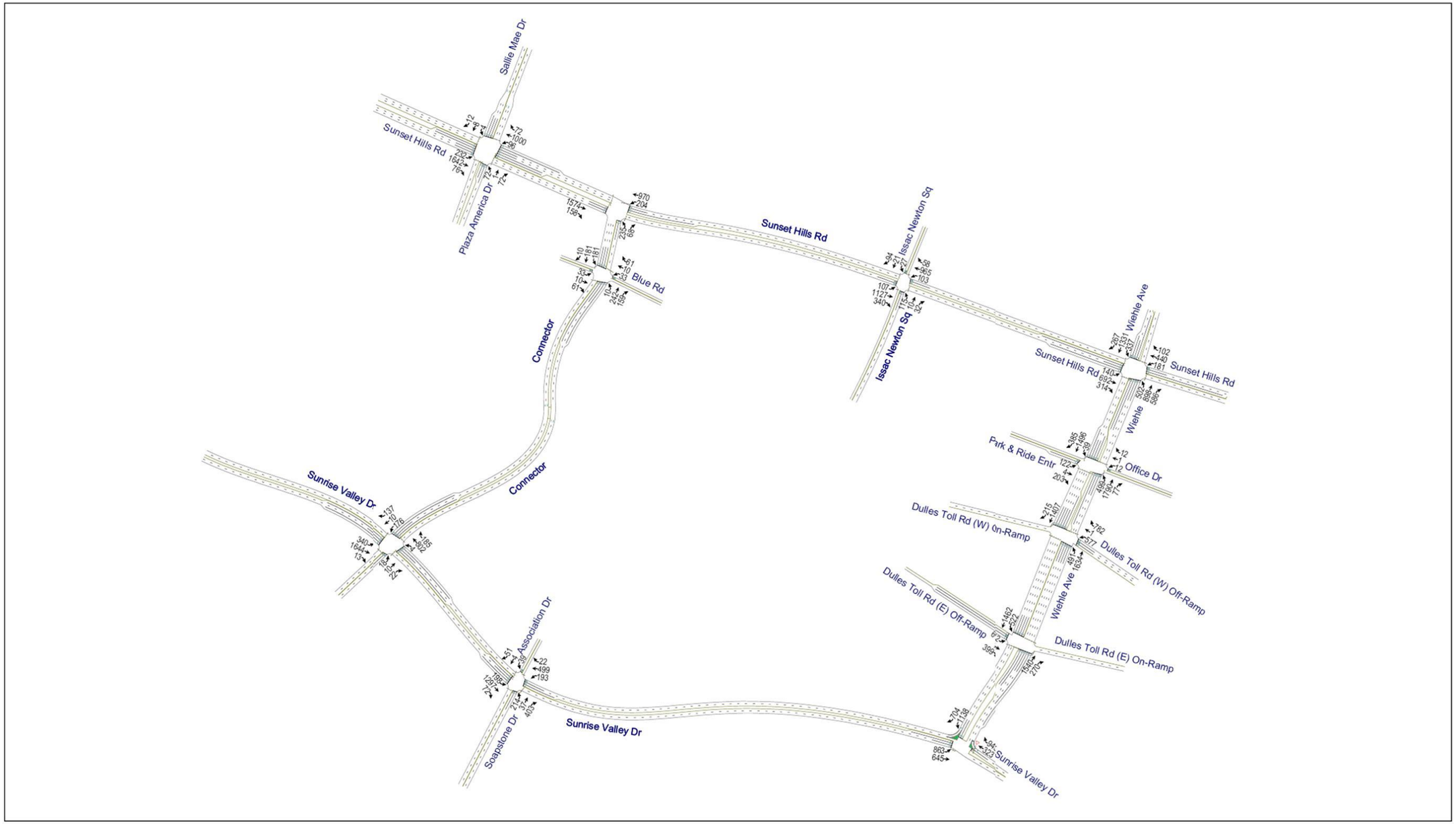

Figure E-11. 2030 AM Peak Hour Movements for Alternative 6E.

6E PM

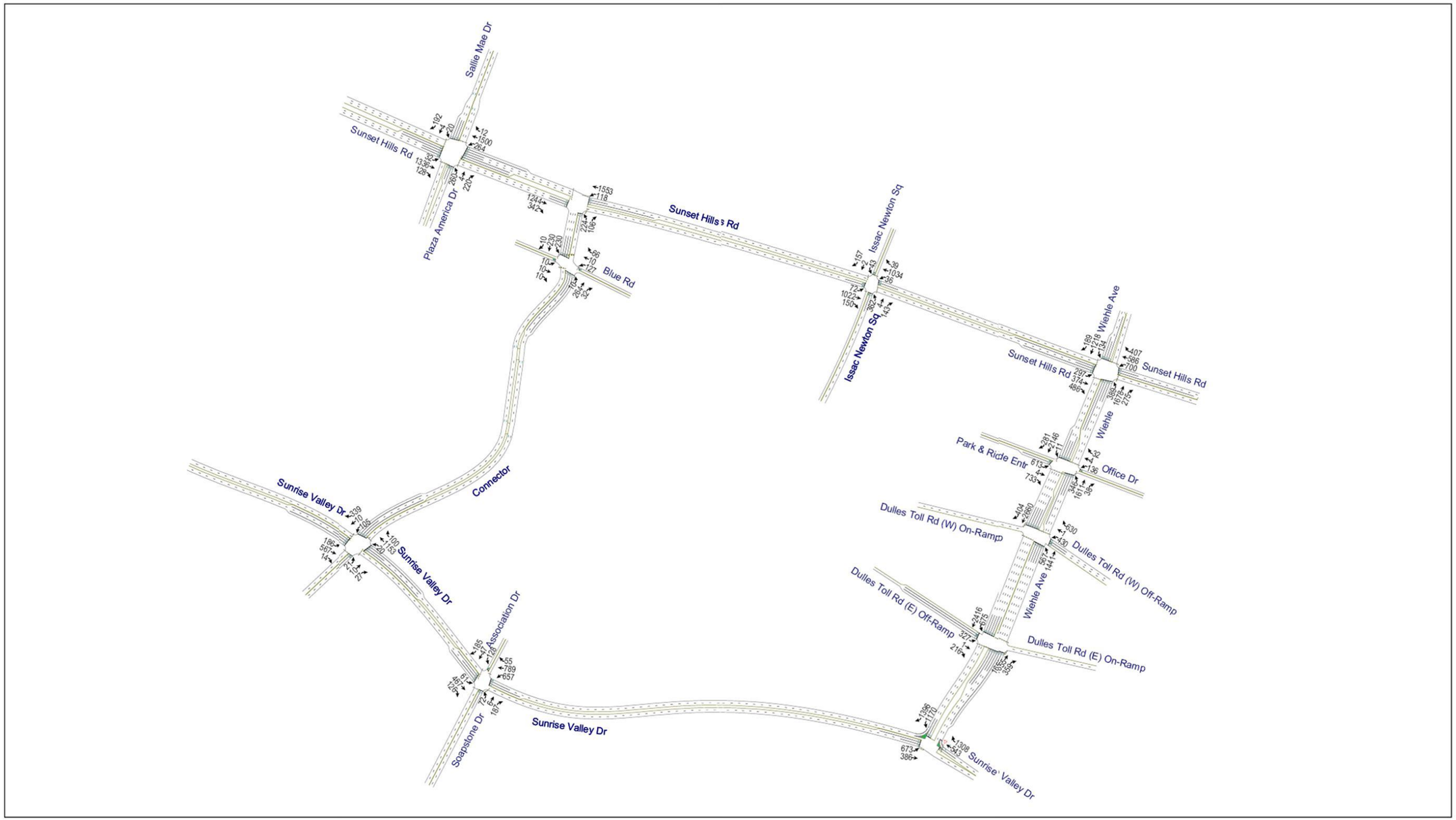

Figure E-12. 2030 PM Peak Hour Movements for Alternative 6E.