APR
Area Plans Review

2008-2009 North County

A P P E N D I X :

Fairfax County Department of Transportation

&

Virginia Department of Transportation (VDOT)

Comments on

Chapter 527 Transportation Impact Analysis for

Plan Amendment S08-III-DS1

County of Fairfax, Virginia

MEMORANDUM

DATE: November 9, 2009

TO: Bernard Suchicital
Policy and Plan Development Branch, FCDPZ

FROM: Leonard Wolfenstein, Chief
Transportation Planning Section, TPD, FCDOT

SUBJECT: North County APR #08-IIII-DS1, Long and Foster

The Fairfax County Department of Transportation (FCDOT) offers the following comments regarding the traffic impact study submitted per the Chapter 527 requirements regarding the proposed changes to the Comprehensive Plan indicated in the subject Area Plan Review (APR) nomination. VDOT has prepared comments, which have been acknowledged in this memo and are attached to the final staff report. FCDOT's comments are as follows:

Current Comprehensive Plan Guidelines and Background Information

- Willard Road as shown on the Fairfax County Transportation Plan Map has been improved to four lanes and most of Lee Road has also been improved to four lanes. There are two portions of Lee Road that are only two lanes (one in each direction). One is just north of the site where the road crosses the Schneider Branch Stream and one is just south of the site across from the Fairfax County Criminal Justice building. The interchange at Willard Road and Sully Road (Route 28) is currently under construction and is anticipated to be completed by the end of 2009. Sully Road is currently six lanes. The Constrained Long Range Plan (CLRP), which has a constrained road network (less than the Fairfax County Transportation Plan Map), assumes this road being improved to eight lanes by 2030 (the horizon year for the traffic analysis).
- The study mentioned that WMATA bus routes 20W, 20X, 12C, 12D, and 12R operate in general proximity to the site. On June 29, 2009 the Fairfax Connector assumed responsibility of all the WMATA 12s and 20s bus routes including the ones mentioned previously. Fairfax Connector bus routes 650 and 651 operate from the Metro Vienna Metro station on Route 50 and along Lee Road in front of the nominated site. Route 651 provides service every 30 minutes during the AM and PM peak hour and Route 650 provides midday and evening service every 60 minutes. The County's Draft Transit Development Plan (TDP) is a comprehensive 10-year plan for bus service (Fairfax Connector and Metrobus) throughout the entire County. The draft plan recommends increasing midday and evening service from every 60 minutes to every 30 minutes. However, funding will be needed for all service improvements.

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- There is currently only one point of vehicle access to the site, which is located on Lee Road at George Carter Way/Lee Road. The Comprehensive Plan states that any access to Land Unit I should be from Lee Road and Penrose Place. Access to Penrose Place would require a significant amount of inter-parcel access and a connection across Schneider Branch Stream. While inter-parcel access is desirable in the future for possible entrance consolidations along Lee Road, this site effectively only has access to Lee Road at the present time. Access to Route 28 and Willard Road would not be encouraged with this nomination.

Traffic Impact Analysis Results from the DS1 Traffic Study
(Includes FCDOT Comments)

- Trip reductions are not assumed in the traffic impact analysis so that vehicular trips are not understated when reviewing the study. Some trip reductions may be realized through use of a Transportation Demand Management (TDM) program, which includes use of the Fairfax Connector bus routes but the amount of reduction that could be achieved is unknown at this time and no reduction was suggested or recommended in the study.
- The traffic study analyzed the nominated density of a 1.0 FAR and a reduced density of 0.70 FAR. Both look at incorporating office and hotel development. The lower density assumes a reduction in office square footage of approximately 490,000 square feet while the hotel square footage is kept the same. The tables below show both the 0.70 FAR and the 1.0 FAR options. However, FCDOT compared the reduced density of 0.70 FAR against the current Comprehensive Plan because the nominator recommended a density of 0.70 FAR in the traffic study. Development at a 1.0 FAR will have greater impacts on the analyzed intersection and road links (segments).
- Tables 1-4 below outlines intersection level of service (LOS), road segment congestion, and total trips for both the 1.0 FAR original proposed density increase and the reduced proposed density increase of 0.70 FAR. All 2030 values assume build-out of the Constrained Long Range Plan (CLRP) transportation network.

Table 1
Intersection Level of Service (LOS) – With the Proposed Densities of 0.70 and 1.0 FAR

Intersection	2009 Existing	2030 Comp Plan	2030 w/ 0.70 FAR	2030 w/ 1.0 FAR
Sully Road (Rt.28)/ Willard Road	AM - D PM - F	AM - C PM - D	AM - C PM - D	AM - C PM - D
Lee Road/ Willard Road	AM - D PM - C	AM - D PM - E	AM - F PM - F	AM - F PM - F
Lee Road/ George Carter Way * (entrance)	AM - A/C PM - A/F	AM - C PM - C	AM - D PM - D	AM - E PM - F
Lee Road/ Route 50	AM - C PM - D	AM - F PM - F	AM - F PM - F	AM - F PM - F

* Non-signalized intersection only for existing conditions

- The table above shows that the Sully Road/Willard Road and Lee Road/George Carter Way intersections operate at acceptable levels of service under the current Comprehensive Plan. The overall level of service at the Lee Road/George Carter Way intersection still operates acceptably under the 0.70 FAR option; however, certain turning movements outside the site (on Lee Road) begin to experience unacceptable levels of service. Northbound rights into the site in the AM peak hour and southbound lefts into the site in the PM peak hour begin to experience unacceptable level of service delays with the 0.70 FAR option.
- The Lee Road/Route 50 intersection fails under the current Comprehensive Plan and experiences a degradation in overall level of service under the 0.70 FAR option. The overall delay under the current Comprehensive Plan in the AM peak hour is a little under 3 minutes and increases by 5 seconds (3% increase) under the proposed density of 0.70 FAR. The PM peak hour delay under the Comprehensive Plan is approximately 2 minutes and 20 seconds. The proposed density increases the overall delay by approximately 12 seconds (9% increase) in the PM peak hour. Again, there are certain approaches such as the westbound left turn lane from Route 50 to southbound Lee Road that experience a significant increase in delay with this nomination.
- According to the traffic study, the intersection that is most severely impacted by this nomination is Willard Road and Lee Road in the AM and PM peak hours. Under the current Comprehensive Plan the overall intersection level of service in the AM peak hour is D (52 seconds of delay). The 0.70 FAR option would decrease the overall level of

service to an F, which is approximately an 80% increase in delay that is attributed solely to the proposed nomination. The overall intersection level of service in the PM peak hour under the current Comprehensive is an LOS E (one minute delay) and would decrease to an F (almost two minutes in delay) under the 0.70 option or approximately a 70% increase.

- There are several approaches at Lee Road and Willard Road that will experience an increase in delay associated with the nomination. However, one approach is severely impacted by the nomination. It is the southbound left turn lane from Lee Road to eastbound Willard Road. Many of the vehicles exiting the site, according to the traffic study, will turn left onto southbound Lee Road. They then turn left at Lee Road to eastbound Willard Road to access the interchange at Route 28 and Willard Road. The table below highlights the impacts to the left turn lane from southbound Lee Road to eastbound Willard Road associated with the proposed nominations.

Table 2
Level of Service Approach - Left Turn Lane from SB Lee to EB Willard

Density	AM LOS & Delay	% Inc. in Delay	PM LOS & Delay	% Inc. in Delay
Comp Plan	F - (138)	--	E - (79)	--
0.70 FAR	F - (484)	251%	F - (289)	266%
1.0 FAR	F - (545)	295%	F - (472)	497%

Delay (xx) in seconds

- Table 2 shows that under the 0.70 FAR option, the delay in the morning increases from approximately 2 minutes to 8 minutes (251%) in the AM peak hour and from 1 and a half minutes to a little under 5 minutes (266%) in the PM peak hour.

Table 3
2030 Link Analysis – With Comp Plan and Proposed Densities of 0.70 and 1.0 FAR

Roadway	Section	AM/PM Peak Hour	2030 Comp Plan V/C Ratio	2030 0.70 FAR V/C Ratio	2030 1.0 FAR V/C Ratio
EB Willard Road	Lee Rd to Route 28	AM	0.26	0.33	0.35
WB Willard Road	Lee Rd to Route 28	AM	0.98	1.17	1.27
NB Lee Road	Willard Rd to Route 50	AM	0.49	0.85	1.05
SB Lee Road	Willard Rd to Route 50	AM	0.46	0.58	0.61
EB Willard Road	Lee Rd to Route 28	PM	0.65	0.77	0.88
WB Willard Road	Lee Rd to Route 28	PM	0.48	0.56	0.59
NB Lee Road	Willard Rd to Route 50	PM	0.75	0.89	0.94
SB Lee Road	Willard Rd to Route 50	PM	0.97	1.21	1.44

1) Capacity on Willard is 3 lanes per direction (2250 vehicles per hour)
2) Capacity on Lee is 2 lanes per direction (1500 vehicles per hour)

- The link analysis above is from the traffic study and it assumes six lanes on Willard Road. Per the VDOT memorandum (pg.4) on this traffic study and the Fairfax County Transportation Plan Map, this road is only four lanes. Footnote number 1 under Table 3 is based on the Nominator's study. The v/c ratio on Willard Road can be expected to be higher than what is shown in Table 3.
- FCDOT requested that the nominator provide a link capacity analysis on Lee Road and Willard Road. A volume to capacity ratio above 1.0 (highlighted in yellow) means that the roads are saturated with vehicles. The link analysis shows that none of the segments experience a v/c ratio above 1.0 under the current Comprehensive Plan, which means that the road segments are within an acceptable level of service. Under the 0.70 FAR option, westbound Willard in the AM and southbound Lee Road in the PM have v/c ratios above. 1.0. The 1.0 FAR option increases the v/c ratio for all segments and shows that northbound Lee Road in the AM now has a v/c ratio above 1.0.
- VDOT's memorandum dated October 16, 2009 provides additional technical information regarding the traffic impact analysis conducted for this APR nomination.

Table 4
Trip Generation – Current Comprehensive Plan vs. Proposed Density Increases

Density	AM Peak	PM Peak	Daily	Percent Inc. Daily Trips
Comp Plan	406	499	3,688	--
0.70 FAR	1,406	1,300	12,734	245%
1.0 FAR	1,899	1,869	15,891	331%

- The above table shows trip generation estimates that could be generated from either of the density increases. It also shows the daily percentage increase of both options above the current Comprehensive Plan.

RECOMMENDATIONS

- While not quantified, the nominator suggested the following mitigation measures:
  - Transportation Demand Management (TDM) program.
  - Shuttle system for Hotel development.
  - Supportive of future transit options that may become available along the Route 28 corridor.
- The road network assumed in the submitted traffic impact analysis, along with the mitigation measures suggested in the traffic study by the nominator, is insufficient to

support a level of development associated with either of the proposed density increases due to the net increase in traffic generated by this development above the 2030 background.

- The nominator states in the traffic study that "no additional roadway geometric improvements are identified that would be the direct responsibility of the Nominator to mitigate." However, the traffic study and points noted above in this memorandum, as well as VDOT comments, show that this nomination would exacerbate intersection level of service (especially at Lee Road and Willard Road) to the point of failure. The nominator should mitigate their impacts to the intersections from their development.
- FCDOT acknowledges that the nominator has provided right-of-way for the Route 28/Willard Road interchange currently under construction, made frontage improvements to Lee Road, and partially funded the signal now in place at the applicant's site entrance. The analysis indicates that additional mitigation would be needed to accommodate the additional 0.35 FAR proposed in the nomination, which is double the current density under the existing Comprehensive Plan.
- Should this nomination be approved, plan language should stipulate the following key conditions:
    - Because of the degradation in the intersection level of service at Willard Road and Lee Road, intersection improvements would be needed at this intersection to mitigate the traffic impacts.
    - As assumed in the submitted traffic analysis and demonstrated with the link analysis, Lee Road would need to be improved to four lanes from Route 50 to Willard Road. Development of this site should be phased with the improvement of Lee Road to four lanes and the above mentioned intersection improvements at Lee Road and Willard Road.
    - A strong and meaningful TDM program must be established and include FCDOT-approved TDM measures. The program should consider but not be limited to the following:
        - Contribution to the increased headways on established Fairfax Connector Routes 650 and 651 and possibly a provision of shuttle service on the Route 28 corridor and/or to the Vienna Metrorail station for all types of development.

Please contact Mike Garcia at Michael.Garcia3@fairfaxcounty.gov or 703-877-5673 should you need further information or clarification of these comments.

cc: Dan Rathbone, FCDOT
Angela Rodeheaver, FCDOT
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October 16, 2009

Ms. Regina Coyle
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Re: Headquarters 2 LLC
Evaluation Report of Traffic Impact Analysis
APR 08-III-DSI

The subject property is located within Land Unit I of the Dulles Suburban Center in Fairfax County, Virginia, and it falls under the jurisdiction of the Bull Run Planning District. The details of land uses within the subject property under existing and proposed comprehensive plan along with the trips involved are presented in Table 1 below:

Table 1: APR Nomination – 08-III-DS1 – Long & Foster Hotels – Land Use and Trip Summary

Nomination (lot size)	**Location of Development**	**Land Use Existing Comp. Plan (SF, # units, etc)**	**Land Use Proposed Comp. Plan By Applicant (SF, # units, etc)**	**Trips: AM / PM / ADT -** Existing Comp. Plan (Proposed Comp. Plan) ***Difference***
APR 08-III-DS1 38.9 Acres / (1,693,504 SF)	East of Sully Road (Route 28), West of Lee Road , North of Willard Road, and South of Lee Jackson Memorial Highway (Route 50) In Fairfax County, VA	592,764 SF of Industrial Park Use (Up to 0.35 FAR)	(Option 1) 1,158,782 SF of General Office, and 834-room Hotel (Up to 1.0 FAR)	406 / 499 / 3,688 (1,899 / 1,869/ 15,891) **1,493 / 1,370/ 12,203**
			(Option 2) 650,816 SF of Office, and 834-room Hotel (Up to 0.7 FAR)	406 / 499 / 3,688 (1,406 / 1,300/ 12,734) **1,000 / 801/ 9,046**

The comprehensive plan amendment application proposes land use development up to 1.0 FAR (Board may allow up to 1.0 FAR through a special exception; report refers to certain grandfathering provisions applying). The Sully District APR Task Force recommended that the applicant add a traffic analysis considering uses up to 0.7 FAR. For the purpose of this review, the nominated land use development with uses up to 1.0 FAR is referred to as Option 1 and the 0.7 FAR nominated development as Option 2.

In summary, the proposed property will generate a significant volume of traffic: 1,493 / 1,370 additional AM / PM weekday peak hour trips (total, both directions) for Option 1, and 1,000 / 801 additional AM / PM weekday peak hour trips for Option 2. These volumes are significant: approximately equivalent to the capacity of up to 2-lanes of a Minor Arterial Type B roadway facility or 3-lanes of an Urban Collector facility.

Even with the roadway improvements identified in the Constrained Long Range Plan (CLRP), numerous roadway links and multiple intersections within the study area will fail (LOS F; v/c ratio > 1.0) in 2030 with the traffic generated by the existing Comprehensive Plan. The proposed APR Nomination would add even more traffic volume to these failing roads and intersections, but no additional capacity improvements are recommended in the study.

STUDY AREA, ANALYSIS SCENARIOS, ASSUMPTIONS

The study intersections and roadway links analyzed in the study and approved by Fairfax County Department of Transportation (FCDOT) are presented below (as shown in Page 3 of TIA Report). AM and PM peak periods were analyzed for this study.

Four (4) Study Intersections:

- Route 28 / Willard Road –Signalized
- Willard Road / Lee Road – Signalized
- Route 50 / Lee Road – Signalized
- Lee Road / George Carter Way (site entrance) – Unsignalized

Two (2) Study Roadway Segments:

- Willard Road east of Lee Road and west of Route 28 (4-lane divided highway)
- Lee Road north of Willard Road and south of Route 50 (variable width)

- *Roadway Segment Level of Service Volumes:* FCDOT provided the LOS - Volume boundary information.
- *Future year of analysis:* Year 2030. FCDOT provided the 2030 travel demand forecasts, output of the Fairfax County travel demand model, which is based on MWCOG/TPB's 2030 Constrained Long Range Plan (CLRP) transportation network. To those volumes, the applicant added traffic associated with the subject nomination (Options 1 and 2), as well as one out-of-turn nomination (see below).
- *Scenarios Analyzed:* Intersection and roadway segment analyses were requested by FCDOT:
    - 2009 Existing Conditions
    - 2030 Future Conditions (Existing Comprehensive Plan)
    - 2030 Future Conditions with only the Subject Nomination – Options 1 and 2
    - 2030 Future Conditions with all relevant Nominations in the Dulles Suburban Center –Options 1 and 2
- *Future Network - Proffered/planned Improvements:* These are listed below under "Overview of Key Findings", subsection 2.

OVERVIEW OF KEY FINDINGS

1. **Summary of Application:** Table 2 presents the summary of trips generated under the existing Comprehensive plan, the proposed Comprehensive plan, and zoning development characterized as "by-right" in the application (BOS special exceptions may apply). The proposed comprehensive plan amendment includes traffic analyses for each of the two proposed development options. Option 1 refers to the developer's application to amend the existing comprehensive plan that allows 0.35 FAR of industrial use and private open space to a 1.0 FAR of hotel and a mix of office and

industrial/flex uses. Option 2 is based on the Sully District APR Task Force recommendation to increase the existing comprehensive plan land use intensity of 0.35 FAR to 0.7 FAR of office/hotel uses. The site is allowed by-right zoning development of 1.0 FAR.

Table 2: APR Nomination – 08-III-DS1 – Long & Foster Hotels – Land Use and Trip Summary

Land Use (ITE Land Use Code)	Net New Trips						
	AM Peak Hour			PM Peak Hour			ADT
	IN	OUT	TOTAL	IN	OUT	TOTAL	TOTAL
Existing Comprehensive Plan (Industrial/Flex Uses at 0.35 FAR)							
Industrial Park (130)	333	73	**406**	105	394	**499**	**3,688**
Option I – Nomination as Submitted (1.0 FAR)							
Hotel (310)	346	221	**567**	261	231	**492**	**7,091**
Office (710)	1,172	160	**1,332**	234	1,143	**1,377**	**8,800**
Total	**1,518**	**381**	**1,899**	**495**	**1,374**	**1,869**	**15,891**
Trip Increase (Net New Trips)	1,185	308	**1,493**	390	980	**1,370**	**12,203**
Option 2 – (0.7 FAR)							
Hotel (310)	346	221	**567**	261	231	**492**	**7,091**
Office (710)	739	100	**839**	137	670	**808**	**5643**
Total	**1,085**	**322**	**1,406**	**398**	**902**	**1,300**	**12,734**
Trip Increase (Net New Trips)	752	249	1,000	293	507	801	9,046
"By-Right" with Development – (1.0 FAR Office Uses; BOS special exception)							
Office	1,587	217	**1,084**	336	1,640	**1,976**	**11,785**

In Summary, the proposed property will generate a significant volume of traffic: 1,493 / 1,370 additional AM / PM weekday peak hour trips (total, both directions) for Option 1, and 1,000 / 801 additional AM / PM weekday peak hour trips for Option 2. These volumes are significant: approximately equal to the capacity of up to 2-lanes of a Minor Arterial Type B roadway facility or 3-lanes of an Urban Collector facility. This broad comparison represents a planning level measure of the impact of the nomination to the surrounding local road network.

**Capacity is defined by Fairfax County DOT as vehicles per hour (vph) representing the following LOS D/E boundaries: 1,200 vph for a Major arterial, 750-900 vph for a Minor Arterial and 500 vph for a Collector Road. Although some of these broad capacity estimates may be somewhat high, the analysis on overall impact applies.*

2. Assumed Transportation Network Improvements

The application identifies the following roadway improvement projects within the study area:

- Completion of Route 28 / Willard Road interchange (this interchange is currently under construction and should be completed fall 2009).
- Expansion of Willard Road as a six-lane, divided section between Lee Road and the Dulles Expo (This assumption appears incorrect. Interchange construction is almost complete with Willard Road consisting of dual lefts,

2 through lanes and 1 right turn lane in each direction --both eastbound and westbound).

- Widen Lee Road to four lanes from Willard Road to Route 50 (this is partially completed)
- Construct a dual westbound left-turn at the intersection of Willard Road and Lee Road (currently a very short left turn bay exists). This improvement is not detailed within the report but is shown in TIA Figure 4-2.
- Signalize the site entrance intersection of Lee Road at George Carter Way (site visit revealed that this signal is currently in place).

3. Impact on Selected Elements of Transportation System

As a result of the comprehensive plan amendments, the addition of new trips from either option (1.0 FAR or 0.7 FAR) is noted to have significant impacts on the study intersections.

- *Intersections (Tables 4-1, 4-5, 4-8, and 4-11, Results of Intersection Analysis in the TIA):*
  - Route 28 / Willard Road: This signalized intersection currently operates at LOS D/F in the AM/PM peak hours. Roadway improvements are nearly completed to replace this intersection with a grade-separated interchange. The interchange project is expected to be complete in the fall of 2009. For all 2030 conditions, the intersection is analyzed as a single point urban interchange (SPUI). All signalized portions of the SPUI are projected to operate at LOS C/D in the AM/PM peak hours, for all 2030 scenarios.
  - Willard Road / Lee Road: This signalized intersection currently operates at LOS D/C in the AM/PM peak hours. The intersection degrades to LOS E under the 2030 existing comprehensive plan and then to LOS F under the 2030 comprehensive plan amendment, including both Options 1 and 2. No modifications were applied to the signal timings to improve traffic operations.

    As mentioned, the improvement of a dual westbound left-turn along Willard Road is shown in TIA Figure 4-2, and is consistent with observed field conditions (improvement associated with Route 28/ Willard Road interchange project).
  - Route 50 / Lee Road: This signalized intersection currently operates at LOS C/D in the AM/PM peak hours. The signal degrades to LOS F for 2030 comprehensive plan conditions, and the proposed APR nominations further increase overall control delays.
  - Lee Road / George Carter Way: This formerly unsignalized intersection operated at LOS A in both peak hours. A traffic signal was proffered for this location (per field observations, signal is currently operational). With signalization, this intersection is projected to operate acceptably (LOS D or better) for existing comprehensive plan conditions and for proposed comprehensive plan amendment Option 2 conditions. The intersection is projected to operate at LOS E/**F** in the AM/**PM** peak hours for proposed

comprehensive plan amendment **Option 1 conditions**. No modifications were applied to the signal timings to improve traffic operations.

- *Roadway Segments (Tables 4-6, 4-9, and 4-12, Results of Link Analysis in the TIA):*

Four directional roadway links were analyzed based on Fairfax County link capacity estimates. In 2030, additional trips from the nominated development scenarios cause at least one of the four directional roadway links to exceed the roadway capacity. In 2030 the roadway links listed below exceed capacity under the peak hours noted:

2030 Existing Comprehensive Plan

- Westbound Willard Road - between Lee Road and Route 28 (AM peak)

2030 Proposed Comprehensive Plan - Option 1

- Northbound Lee Road - between Willard Road and Route 50 (AM peak)
- Eastbound Willard Road - between Lee Road and Route 28 (PM peak)
- Southbound Lee Road - between Willard Road and Route 50 (PM peak)

2030 Proposed Comprehensive Plan - Option 2

- Eastbound Willard Road - between Lee Road and Route 28 (PM peak)
- Southbound Lee Road - between Willard Road and Route 50 (PM peak)

Based on the link capacity thresholds provided by Fairfax County Transportation division, the roadways classified as Minor Arterial Type B would experience LOS D or E when serving at least 750 vehicles per hour per directional lane. Considering the traffic generated by the APR nomination S08-III-DS1, the Willard Road segments analyzed would need to be widened from four to six lanes in 2030, regardless of any modifications to the comprehensive plan. Lee Road would need to be widened from four to six lanes in 2030 only if the comprehensive plan were revised (under either proposed option).

4. TIA Discrepancies

The following are discrepancies identified during the technical review that could affect the results of the analyses:

- The widening of Route 28 to 10 lanes with provision for High Occupancy Vehicle lanes (HOV) is referred to in study as being funded (p. 3): although the reference is consistent with the Fairfax County Comprehensive Plan, this improvement is not funded or planned for funding (the applicable COG/TPB Constrained Long Range Plan improvement is listed as "VA 28, widen to 8 lanes, with interchanges, 2015").
- The roadway classifications used in the report were verified from the FHWA functional classification system. The classifications documented in

the TIS report for Route 28, Lee Road, and Willard Road are not in conformance with the Federal Aid System. According to the Fairfax County roadway classification database, both Willard Road and Lee Road are classified as Urban Collectors instead of Minor Arterial Type B, as assumed for the analysis. According to FCDOT link capacity criteria, an Urban Collector roadway is classified as LOS D or E for a roadway capacity of 500 vph, instead of the 750 vph capacity considered in the link analysis for Lee Road and Willard Road. However, due to the traffic volumes along this link, the change in criteria would not significantly change the results for either link.

- There are significant volume imbalances at the ramps of the Route 28/Willard Road interchange. Volumes also do not balance on Willard Road between Route 28 and Lee Road, and this segment currently has no access points or median breaks. This could affect intersection and roadway link results if traffic volumes are balanced for the new geometry.

5. Improvements / Recommendations

In addition to the proposed improvements in the long range plans (CLRP and Comprehensive Plan), the following roadway improvements / measures are recommended in the application (but not proffered) or should be considered to accommodate the 2030 future traffic. Review comments are included where applicable:

- Implementation of a Transportation Demand Management (TDM) program to mitigate the impact on the surrounding transportation network during peak periods. The details of the proposed TDM were not provided. However, a TDM program for the site should be designed and implemented to help reduce auto trips particularly during peak periods, and help mitigate the substantial impact.

- Implementation of a shuttle bus service to and from Dulles Airport and the nominated land use would be considered.

- The current Fairfax County comprehensive plan has designated the Route 28 corridor as an Enhanced Public Transit Corridor, which may include bus transit, including feeder bus option, park and ride sites, transit service and support facilities, etc. Comprehensive Plan language for the area indicates that "the intersection of Willard Road with Lee Road or Route 28 should be considered as a location for a future transit stop" (Area III, page 120, included in TIA report Appendix C). To mitigate the site's impact, the development should not only support transit service but also be designed in a way that is compatible with future transit services that become available along Sully Road.

- The heavy left turn volumes generated by the site for the southbound Lee Road to eastbound Willard Road movement, added to the already heavy 2030 Existing Comprehensive Plan assignments for the same location, will create very congested conditions and require special treatment. This is particularly true under Option 1 conditions (PM volumes here are projected to be 26% higher than for Option 2). Other locations where congestion is anticipated to increase substantially are noted in the next section.

- Of the two options analyzed in the study, Option 2 (overall FAR of 0.70) is preferable due to lower impact to the transportation system that is shown to experience failure in 2030 at several locations.

TIS TECHNICAL REVIEW ELEMENTS

The review performed for this Comprehensive Plan Amendment is limited to the level of detail provided by the applicant. Any issues identified during this review would need further explanation, revision, or greater analysis during subsequent stages of the Chapter 527 process, should the proposed nomination be approved; some of the details below are provided for consideration at that stage. If the application proceeds forward to the Traffic Impact Analysis phase, VDOT reserves the right to recommend modifications to assumptions used in these analyses.

- Peak Hour Factors (PHF): Although the PHF values were not specified in the TIA, a review of the data and analyses for the study indicated that existing PHF values were used as calculated from existing traffic count data. PHF values for all 2030 scenarios were set at a default of 0.92. Since the range of existing PHF fell between 0.90 to 0.98, the default value is considered appropriate.

- Trip Generation: The trip generation analysis was conducted using the methodology provided in the ITE *Trip Generation Manual* (Ed. 8) published by the Institute of Transportation Engineers (ITE). The manual provides a regression equation and/or an average trip rate for each land use for a weekday, AM peak, and PM peak trips estimation. The ITE also provides guidelines in Chapter 3 of the *Trip Generation Handbook* for estimating the number of trips either using a regression equation or by an average rate for a particular land use. Chapter 527 regulations require using these guidelines for estimating the trip rates. For the use of a regression equations, ITE guidelines state that a regression equation be used if the following conditions are satisfied:
    - Size of the site is within the range of the data
    - Sufficient numbers of data points are available
    - Regression equation is provided

  If any of the above condition is not satisfied, the guidelines recommend other measures. For the trip generation analysis in this study, the guidelines provided by the ITE *Trip Generation Handbook* for the use of a regression equation are satisfied and have been followed for all land uses for a weekday, AM, and the PM peak conditions **except for the following land uses and traffic conditions**:
    - Hotel (LU Code 310): For the AM and PM peak hour conditions, the size of the site (834 rooms) is outside the range of the data provided (500 rooms). In this case, the ITE guidelines specify collecting local data to determine the trip generation rate.
    - Hotel (LU Code 310): For the weekday traffic conditions, less than 20 data are provided. In this case, ITE recommends several criteria for using the average rate, the regression equation or the average weighted lines if either or both of following two guidelines are satisfied:

- R^2 for the regression equation is greater than or equal to 0.75 and the line corresponding to the regression equation is within the cluster of data points at the size of the development.
- The standard deviation is less than or equal to 110 percent of the average weighted rate, and the line corresponding the weighted rate is within the cluster of data points at the size of the development.

Since neither of the above two criteria are satisfied for the hotel land use for weekday traffic conditions, the ITE specifies collecting local data to determine the trip generation rate.

- Offices (LU Code 710): For the weekday traffic the size of the site being within the range of the data is not satisfied for the By-Right Development scenario. The 1,693, 504 SF of area falls outside the data range of 1,300,000 SF area. In such cases the ITE guidelines recommend collecting the local data.

- Trip Distribution and Trip Assignment: The traffic impact study states that the trip distribution and traffic assignments were based on the existing travel patterns, the premise that motorists will select travel paths that reduces commute time, and from the signal warrant study for Lee Road at George Carter Way. The scope of work agreement shows different directional distribution percentages for the Office and Hotel developments. It can be inferred from the trip distribution data that less than 30 percent of the site trips will use Route 50. Considering the land uses along Route 50 and its function as a major thoroughfare in the locality, the 30 percent of site trips assigned to Route 50 appears to be low. VDOT reserved the right to recommend revisions to these assumptions at later land development stages.
- Planned Improvements: Besides a proffered improvement to signalize the site entrance and the roadway improvements planned in the Fairfax County Constrained Long Range Plan, no additional improvements were considered. The Consultant assumed that Willard Road would be widened from four lanes to six lanes: the number of through lanes consistent through the section is only four lanes.
- Existing Conditions Analysis: The TIS indicates that the peak hours occurred during 7:45 to 8:45 AM and 4:45 to 5:45 PM.
  - A comparison of the 2009 traffic count data and the related traffic volumes modeled for the existing traffic conditions indicate some discrepancies between peak hour volumes depicted in Figure 4-3 (Existing Peak Hour Traffic Volumes) and volumes modeled in Synchro for the capacity analysis. In Figure 4-3, the highest hourly volumes for each of the study intersections are shown, but these did not always match the peak hour traffic volumes shown in the Synchro reports.
  - Some inconsistencies were also found in lane geometry and traffic control. The traffic study did not include any road link analysis based on the 2009 existing traffic conditions.

- o analysis results indicates that all the study intersections operate acceptably (LOS D or better) under existing conditions, with the exception of the intersection of Route 28 at Willard Road during the PM peak hour (improvements under construction).

- Analysis of Future Background With and Without Site: Table 3 shows the degradation in the levels of service of all study intersection for all analysis scenarios.

Table 3: Summary Table for Levels of Service

Description of LOS and Delay	2009 Existing		2030 Exist. Comp Plan		2030 Proposed Comp Plan- Option 1- (1.0 FAR)		2030 Proposed Comp Plan- Option 2- (0.7 FAR)		2030 All Relevant APR Nominations (1.0 FAR)		2030 All Relevant APR Nominations (0.7 FAR)	
	A	P	AM	PM	A	P	A	P	AM	PM	AM	PM
Route 28 / Willard Rd	D *	***F****	C	D	C	D	C	D	C	D	C	D
Willard Rd / Lee Road	D	C	D	***E***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***
Route 50 / Lee Rd	C	D	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***
Lee Rd / George Carter Way	A	A	C	C	***E***	***F***	D	D	***E***	***F***	D	D

- Capacity: Intersection lane groups identified as experiencing control delays in excess of 180 seconds have been listed below:

  2030 Existing Comprehensive Plan

  1. EBL – Willard Road at Lee Road during PM peak hour
  2. SBLTR – Route 50 at Lee Road during PM peak hour

  2030 Comprehensive Plan Amendment (Option 1)

  1. NBT and SBL – Willard Road at Lee Road during AM peak hour
  2. SBL – Willard Road at Lee Road during PM peak hour
  3. SBL – Lee Road at George Carter Way during PM peak hour
  4. EBT and WBL – Route 50 at Lee Road during AM peak hour
  5. EBT and NBR– Route 50 at Lee Road during PM peak hour

- Recommended Improvements/ Mitigation measures: The study included consideration to implement TDM programs and provisions for access to future public transit services along Route 28. There were no roadway improvements proposed in the report except for the proffered signal at the site intersection of Lee

Road at George Carter Way (currently operational). No additional turn lane improvements were proposed for the study intersections, even though some of the turning traffic volumes exceed the thresholds for turn lanes based on VDOT's *Roadway Design Manual* and AASHTO's *A Policy on Geometric Design of Highways and Streets* (AASHTO Green Book). Subsequent phases of land development process would need to identify additional specific improvements (such as additional turn lane capacity) to mitigate the impacts identified,

SUMMARY OF SELECTED RESULTS

Intersection Capacity Analysis: Capacity analyses were performed for four study intersections. A review of the capacity analysis results in Tables 4-5 and 4-8 for the 2030 future scenarios revealed that the LOS results for many of the lane groups deteriorated even after implementing the future CLRP improvements and without any signal timing optimization. For example, doubling the WBL lane capacity at the Willard Road at Lee Road intersection did not improve the LOS.

The comprehensive plan amendment causes significant impacts to LOS for all the study intersections, except for the grade-separated interchange that is projected to operate at acceptable levels for all 2030 scenarios studied. Table 4 presents a summary of traffic impacts. The TIS did not include analyses of 2030 with improvements to mitigate traffic impacts.

Table 4: Summary Table for Intersection Capacity Analysis

Description of LOS and Delay	2009 Existing		2030 Existing Comp Plan		2030 Proposed Comp. Plan (Option 1)		2030 Proposed Comp. Plan (Option 2)	
	AM	PM	AM	PM	AM	PM	AM	PM
No. of Intersections at LOS "A"–"D"	4	3	2	2	2	2	1	2
No. of Intersections at LOS "E"	-	-	1[1]	1	-	-	1	-
No. of Intersections at LOS "F"	-	1	1	1	2	2	2	2
Number of Lane Groups with major Control Delays (i.e. Delay > 180 sec)	-	2	-	2	3	5	4	6

Roadway Link Analysis: Two roadway segments were analyzed in each direction to determine capacity under three scenarios. Table 5 presents the summary of results based on the v/c ratios. The Willard Road and Lee Road segments currently operate within capacity for both AM and PM peak hours. Several capacity limitations are shown for the 2030 conditions analyzed.

[1] *Revised results based on reviewing Synchro reports in Appendix H.*

Table 5: Summary of Roadway Link Capacity Analysis								
Description based on Volume to Capacity Ratio Threshold	**2009 Existing***		**2030 Existing Comp Plan**		**2030 Proposed Comp. Plan *(Option 1)***		**2030 Proposed Comp. Plan *(Option 2)***	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
No. of Links at v/C ratio ≤ 0.9	4	4	3	3	2	2	3	3
No. of Links at v/C ratio <0.9 and ≤ 1.0	-	-	1	1	-	1	-	-
No. of Links at v/C ratio > 1.0	-	-	-	-	2	1	1	1

**Analysis was performed by this review, since the TIS did not include link analysis for 2009 Existing conditions.*

It was determined from reviewing the analysis worksheets that Willard Road was considered as a six-lane facility instead of a four-lane cross-section. Additionally, the subject roadway segment showed a loss of 916 vph and 316 vph in the westbound and eastbound directions, respectively. This segment has no access points (i.e., sources or sinks) or median breaks to account for this volume loss. The details of the link analysis are discussed below:

Existing Conditions:

Since the TIS did not include any link analysis for 2009 existing conditions, this review analyzed the links to provide a base for comparison. Currently, all of the links operate within their capacity.

If Willard Road is analyzed as a four-lane road instead of the six-lane road assumption, Table 6 summarizes the list of failing roadway links for the three scenarios.

Table 6: Summary Table for Roadway Link Analysis				
Directional Roadway Link	**Currently Failing**	**Failing in 2030 w/ Existing Comp Plan**	**Failing in 2030 w/ Proposed Comp. Plan *(Option 1)***	**Failing in 2030 w/ Proposed Comp. Plan *(Option 2)***
Willard Road between Lee Road and Route 28 Interchange -- Eastbound	-	-	PM	PM
Willard Road between Lee Road and Route 28 Interchange -- Westbound	-	AM	AM	AM
Lee Road between Route 50 and Willard Road – Northbound	-	-	AM	-
Lee Road between Route 50 and Willard Road – Southbound	-	-	PM	PM

The above 3 tables denote the large additional impact on the road network of the proposed Comp. Plan amendment options, especially Option 2, which in turn is supportive of the lower development levels. Every step to reduce auto trips should be pursued, including implementation of TDM measures and incentives for transit usage. Development phasing should be coordinated with implementation of planned improvements (such as completion of 4-laning of Lee Road).

It should be noted that the very large left turn volumes noted in the analysis particularly in the PM peak (out of site at George Carter Way, and total Southbound Lee Road at Willard Road), will be difficult to accommodate even with double left turn bays.

If you have any questions, please call me at (703) 383-2059.

Sincerely,

Peter K. Gerner, P.E.
Transportation Engineer

cc: Angela Rodeheaver
Michael Garcia