

## 9 TRAFFIC IMPACTS

This chapter presents the results of an analysis of the Level of Service (LOS) at ten signalized and two unsignalized intersections in the Mount Pleasant study area. These intersections are listed in Table 1-14. This analyses presented in this report address existing (baseline) conditions, and estimates for a 10 year and 20 year horizons. The network LOS analysis was conducted based on the AM and PM peak periods for specific intersections.

### 9.1 BASIS FOR EXISTING CONDITIONS ANALYSIS

Existing conditions analysis typically involves an analysis of how specific intersections or roadway sections are currently operating, as well as estimates of how the same locations are likely to operate in future years.

Analysis of baseline (currently existing) conditions uses current (existing) roadway geometrics, intersection traffic movement configurations, and the existing traffic control (signals, stop signs, and current traffic demand (traffic volume) data for each location. Existing (current) traffic demand estimates are based on data collected in the field. Because this analysis is intended to assess actual, current conditions, it does not address potential impacts of traffic from developments or projects that are not yet completed.

A similar analysis is being performed to assess how well the existing transportation system (as it is currently configured) is expected to function in the future years, based on projected increases in traffic demand. The analysis conducted for this study will examine: 1) the short term impacts expected by the opening of the DC USA development, and (2) the expected traffic conditions in ten and twenty years.

Projections for future years assume that traffic demand due to local and regional growth will increase at a 1% annual rate. These projections also reflect estimates of additional traffic generated by any planned (and approved) developments in the nearby areas that are likely to affect the study area network.

**The results reported in this draft report are based on traffic projections available in December 2007.** DDOT has undertaken studies to update the estimated traffic impacts in the Columbia Heights area, including the impacts of the DC USA development. The analysis presented in this report will be updated when the results of these current studies are available. Revised results will be reflected in the final report for this project.

### 9.2 LEVEL OF SERVICE ANALYSIS

Signalized and unsignalized intersections were analyzed using Synchro, a traffic signal analysis software program. Synchro estimates the congestion at each signalized intersection, defined by Level of Service (LOS). LOS is a qualitative assessment of road user's perceptions of roadway quality of traffic flow and is represented by the letters A through F. LOS A represents the most favorable conditions and LOS F represents the least favorable. The definition of LOS for

signalized intersections is shown in Table 1-13. LOS C or D are widely regarded as the desirable design objective for urban intersections.<sup>3</sup> It is important to note that the approach Synchro uses for estimating LOS for signalized and unsignalized intersections differs somewhat from the approach presented in the Highway Capacity Manual<sup>(3)</sup>. In this document, the LOS reported for an unsignalized intersection is based on the intersection capacity utilization as computed by Synchro.

**Table 1-13 Definition of Level of Service (LOS) for Signalized Intersections**

LOS	Description	Control Delay Per Vehicle (seconds)
A	Free flow	≤10
B	Stable flow with slight delay	>10 and <20
C	Stable flow with acceptable delay	>20 and <35
D	Approaching unstable flow with tolerable delay	>35 and <55
E	Unstable flow. Congestion with intolerable delay.	>55 and <80
F	Unstable flow. Heavy congestion. Total breakdown with stop-and-go operation.	>80

### 9.3 YEAR 2007

Table 1-14 presents the existing intersection LOS and average vehicle delays at individual intersections during the AM and PM peak periods.

**Table 1-14 Intersection LOS and Average Delay for Existing Conditions**

Intersection	Existing LOS and Average Delay (seconds per vehicle)	
	AM Peak Hr	PM Peak Hr
18 <sup>th</sup> Street, NW and Newton Street, NW	A*	A*
18 <sup>th</sup> Street, NW and Park Road, NW	A/8.0	A/7.7
Mt. Pleasant Street, NW and Irving Street, NW	B/18.9	C/22.9
Mt. Pleasant Street, NW and Harvard Street, NW	F/481.7	F/583.8
Adams Mill Road, NW and Kenyon Street, NW	C/23.4	F/159.5
16 <sup>th</sup> Street, NW and Newton Street, NW	B/11.2	C/28.6
16 <sup>th</sup> Street, NW and Park Road, NW	E/65.7	E/75.5
16 <sup>th</sup> Street, NW and Lamont Street, NW	B/19.0	A/8.8
16 <sup>th</sup> Street, NW and Irving Street, NW	B/14.8	C/22.6
16 <sup>th</sup> Street, NW and Harvard Street, NW	A/3.5	A/6.8
17 <sup>th</sup> Street, NW and Piney Branch Parkway, NW	C*	C*
17 <sup>th</sup> Street, NW, Park Road, NW, and Mt. Pleasant Street, NW	A/8.5	A/7.3

\* An ICU-based LOS (not based on HCM); intersection is unsignalized.

<sup>3</sup> Highway Capacity Manual, Transportation Research Board, Washington, DC, 2000.

Ten of the 12 intersections studied currently operate at LOS D or better during the morning and 9 during evening peak periods (as shown in Figures I-25 and I-26). Intersections that are operating at LOS E or F are:

- 16<sup>th</sup> Street, NW and Park Road, NW (morning and evening peak periods)
- Mt. Pleasant Street, NW and Harvard Street, NW (morning and evening peak period)
- Adams Mill Road, NW and Kenyon Street, NW (evening peak period)

The intersection of Park Road, NW and 16<sup>th</sup> Street, NW currently operates with an overall LOS E during both the AM and PM peak periods. The northbound and southbound approaches of the intersection do not experience significant delay. LOS on northbound and southbound approaches during AM/PM peak periods was found to be B/C and D/B, respectively. Through and left-turning traffic on the westbound approach of Park Street, NW, experience the most delay. Since, the northbound and southbound approaches handle significantly higher traffic volume than the westbound. The current signal timing provides longer green interval for these high-volume approaches. This strategy minimizes overall intersection delay, but results in proportionally longer delays for the westbound approach.

The intersection of Harvard Street, NW and Mt. Pleasant Street, NW currently operates with a LOS F during both the AM and PM peak periods. The exceptionally long delay experienced by the southbound approach is largely due to the existing signal timing and shared lane configuration. The traffic on Mt. Pleasant Street, NW moving south or making a right turn on to Harvard Street, NW shares a single lane at this intersection. The turning movement data collected for this intersection shows that the number of vehicles on the southbound approach is comparable with the number of vehicles using the eastbound and westbound approaches. However, the existing signal timing allocates significantly less green time for the southbound approach, resulting in very heavy delays for southbound vehicles on Mt. Pleasant Street.

The intersection of Adams Mill Road, NW and Kenyon Street, NW performs reasonably well during the AM peak period with an overall intersection LOS C. During the PM peak period, the southbound traffic on Adams Mill Road turning left on to either Kenyon Street, NW or Irving Street, NW experience significant delay. The existing signal timing is responsible for the heavy delays. The turning movement data collected at the intersection shows that the volume of traffic turning left from the southbound Adams Mill Road during the PM peak period is higher than the AM peak volume. The existing signal timing, however, allocates considerably shorter green interval for the protected left turning movements from the southbound approach during the PM peak as compared with AM peak period.

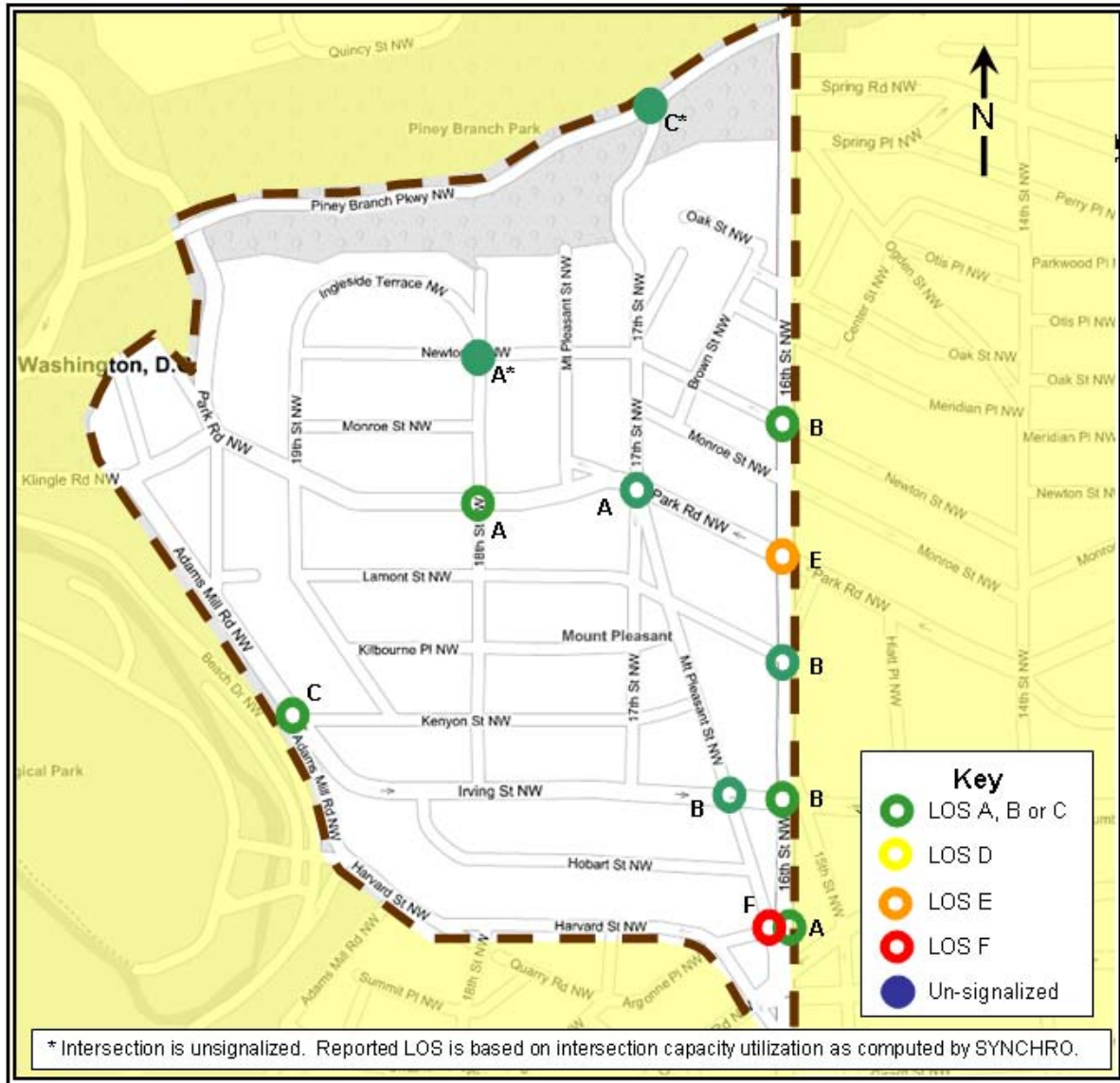
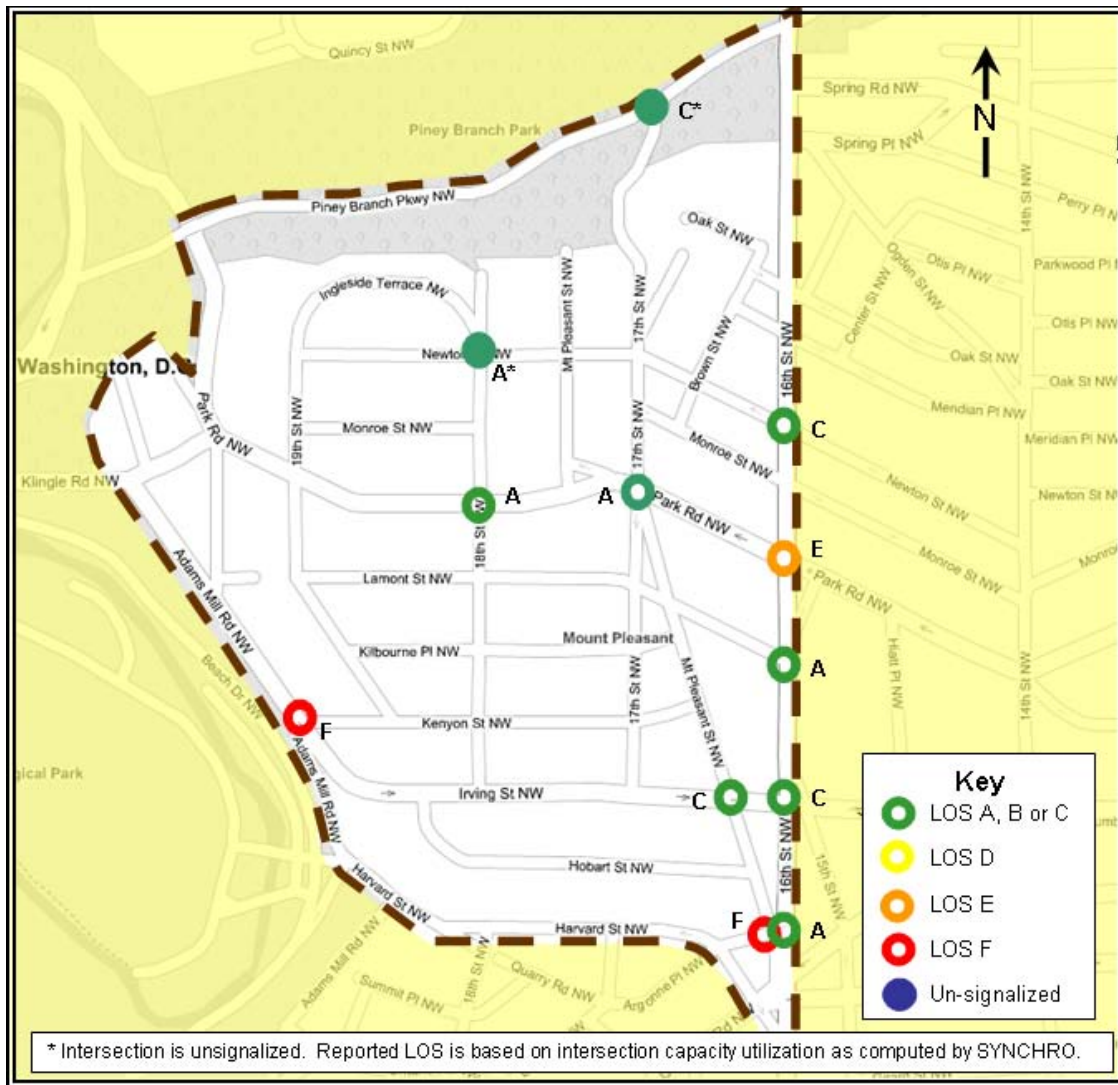


Figure 1-25 Level of Service for Baseline Traffic During Morning Peak Period



*Figure 1-26 Level of Service for Baseline Traffic During the Evening Peak Period*

### 9.4 TRAFFIC IMPACTS-10 YEAR HORIZON

A regional growth rate of one percent for 10 years was applied to current traffic volumes, which includes projected traffic from the proposed developments in the study area. The levels of service for the intersections in the area were determined for the morning and evening peak periods as shown in and Figure 1-27 and Figure 1-28, respectively. The levels of service for eight intersections remained at LOS D or better. The intersections with LOS E or worse are:

- 16<sup>th</sup> Street NW and Park Road NW (morning and evening peak periods)
- Mt. Pleasant Street NW and Harvard Street NW (morning and evening peak period)
- Adams Mill Road NW and Kenyon Street NW (evening peak period), and
- 16<sup>th</sup> Street NW and Irving Street NW (morning peak period)

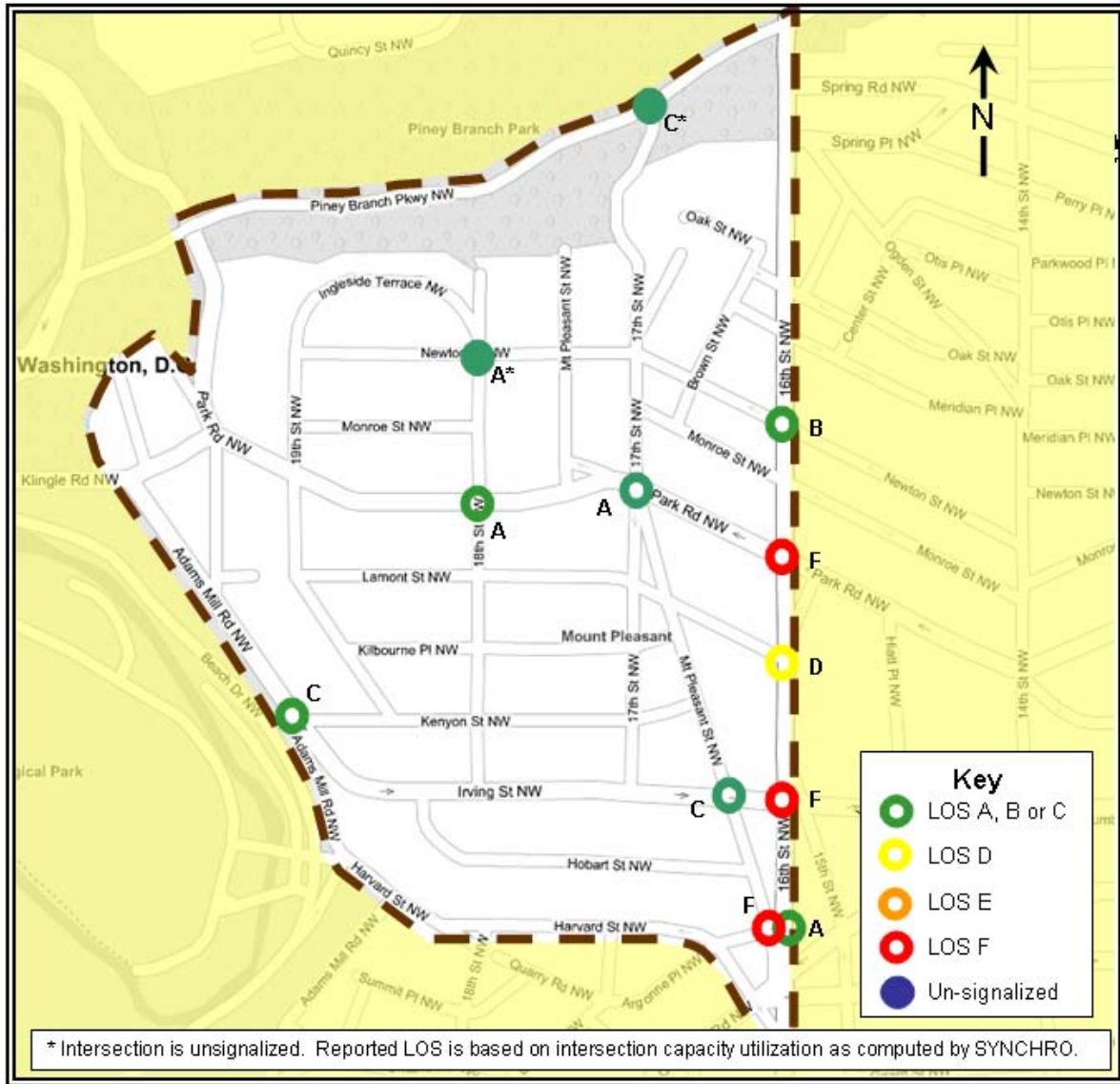


Figure 1-27 Level of Service for 10-Year Horizon During Morning Peak Period

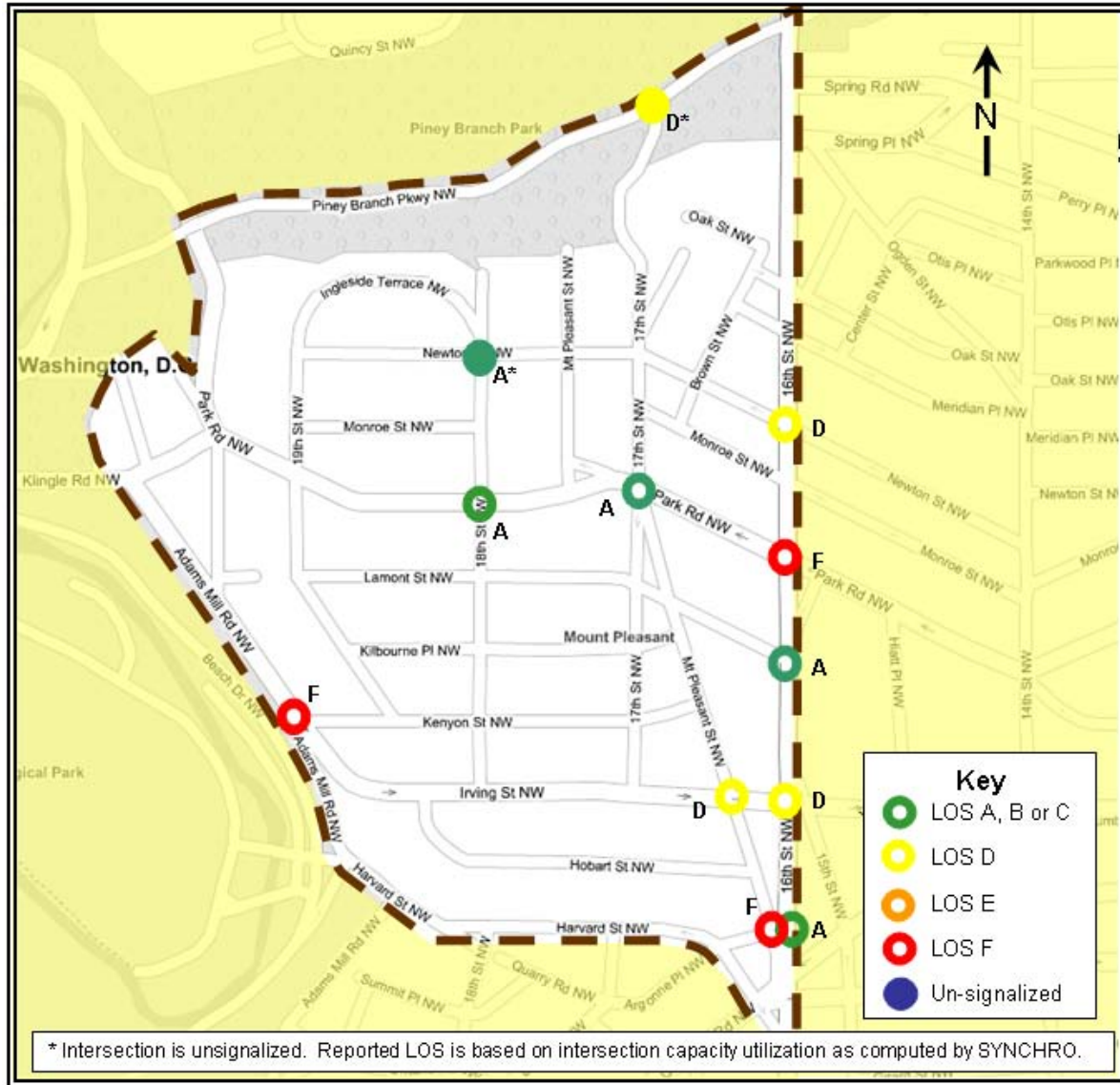


Figure 1-28 Level of Service for 10-Year Horizon During Evening Peak

### 9.5 IMPACTS IN 20-YEAR HORIZONS

A growth rate of one percent for 20 years was applied to the current traffic volumes, which includes projected traffic from the proposed developments in the study area. The levels of service for the intersections in the area were determined for the morning and evening peak periods as shown in Figure 1-29 and Figure 1-30. The levels of service for a number of intersections on 16<sup>th</sup> Street became LOS E or worse.

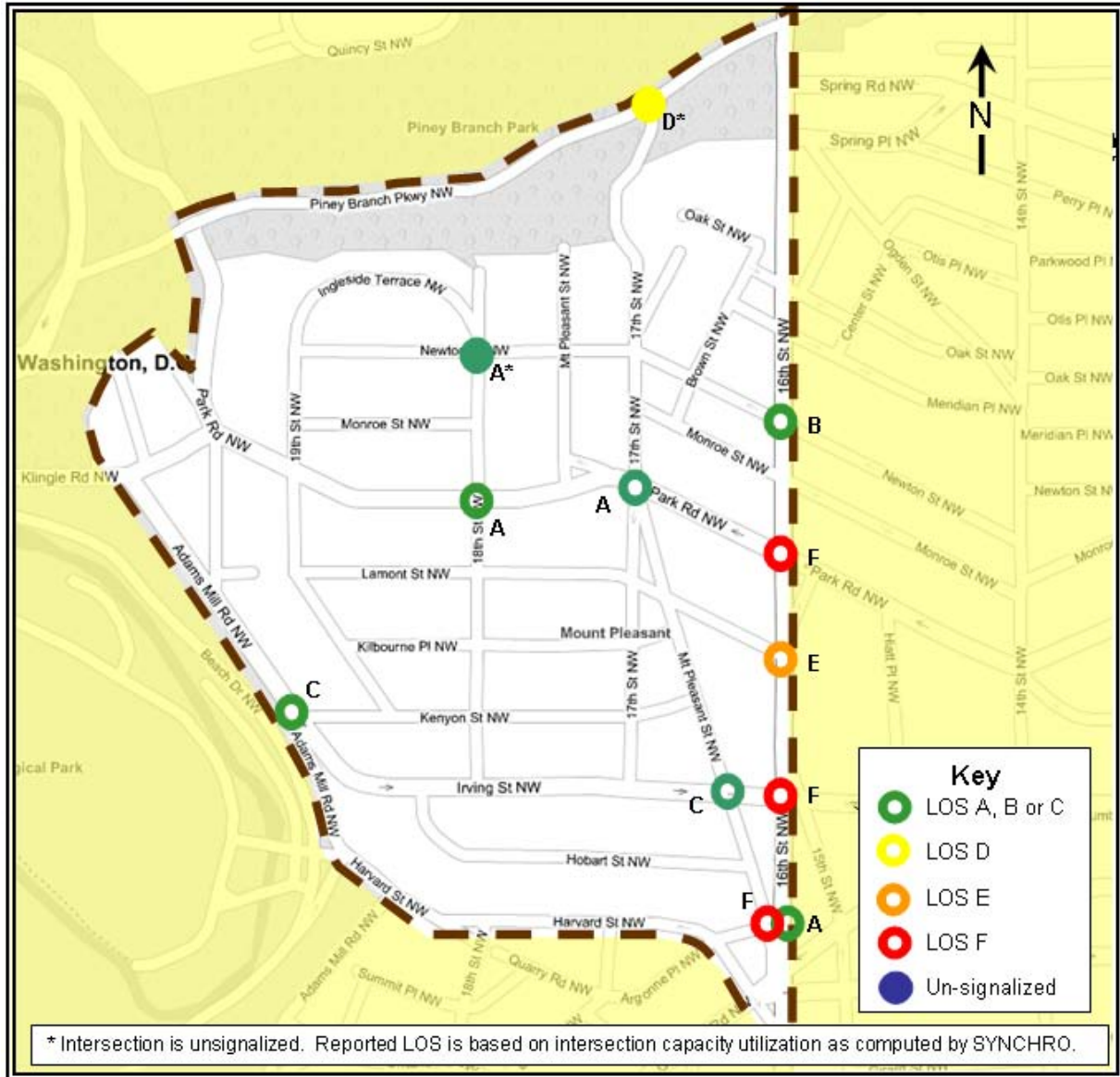


Figure 1-29 Level of Service for 20-Year Horizon during Morning Peak Period

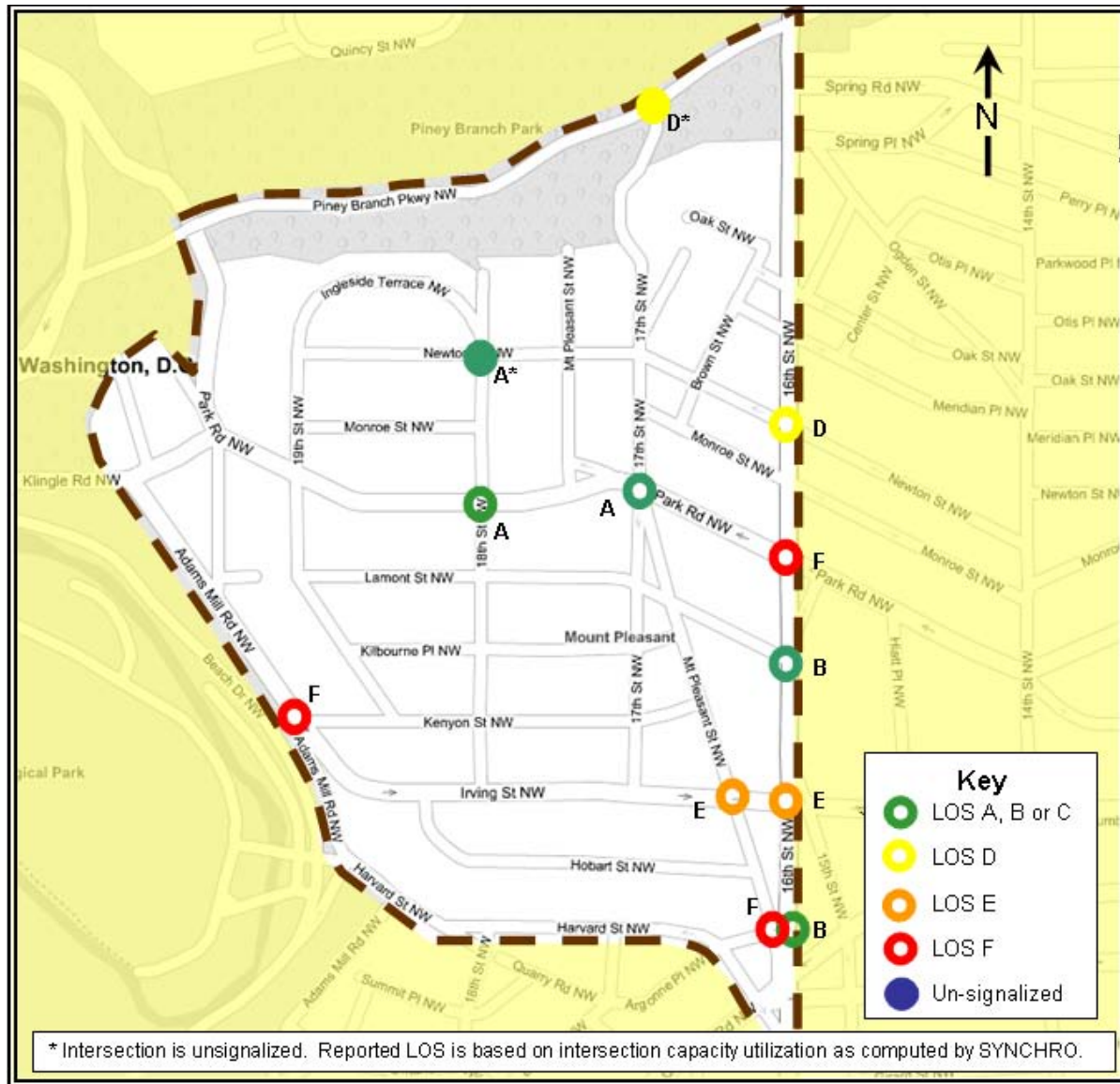


Figure 1-30 Level of Service for 20-Year Horizon during Evening Peak Period

## 9.6 SUMMARY

Table 1-15 presents a summary of the intersection LOS for existing conditions in 2007 and for 10-and 20-year horizons. A comparison indicates that the intersection LOS of 16<sup>th</sup> and Irving Streets will degrade to LOS E at 10-year (for morning peak) and 20-year (for afternoon peak) horizons. Similarly, the intersection LOS of 16<sup>th</sup> and Lamont Streets will degrade to LOS E at 20-year (for morning peak) horizon.

**Table 1-15 LOS Summary for Existing Conditions, 10-Year and 20-Year Horizons**

Intersection	AM LOS			PM LOS		
	2007	10-Year Horizon	20-Year Horizon	2007	10-Year Horizon	20-Year Horizon
18 <sup>th</sup> Street, NW and Newton Street, NW	A*	A*	A*	A*	A*	A*
18 <sup>th</sup> Street, NW and Park Road, NW	A	A	A	A	A	A
Mt. Pleasant Street, NW and Irving Street, NW	B	C	C	C	D	E
Mt. Pleasant Street, NW and Harvard Street, NW	F	F	F	F	F	F
Adams Mill Road, NW and Kenyon Street, NW	C	C	C	F	F	F
16 <sup>th</sup> Street, NW and Newton Street, NW	B	B	B	C	D	D
16 <sup>th</sup> Street, NW and Park Road, NW	E	F	F	E	F	F
16 <sup>th</sup> Street, NW and Lamont Street, NW	B	D	E <sup>‡</sup>	A	A	B
16 <sup>th</sup> Street, NW and Irving Street, NW	B	F <sup>‡</sup>	F	C	D	E <sup>‡</sup>
16 <sup>th</sup> Street, NW and Harvard Street, NW	A	A	A	A	A	A
17 <sup>th</sup> Street, NW and Piney Branch Parkway, NW	C*	C*	D*	C*	D*	D*
17 <sup>th</sup> Street, NW, Park Road, NW, and Mt. Pleasant Street, NW	A	A	A	A	A	A

\* An ICU-based LOS (not based on HCM); intersection is un-signalized.

‡ Intersection LOS dropping to E from a better LOS