

Madison Avenue Transportation Study

FINAL REPORT
July 2008

Prepared for:
City of Covington

Prepared by:
NKAPC



City of Covington
NKAPC



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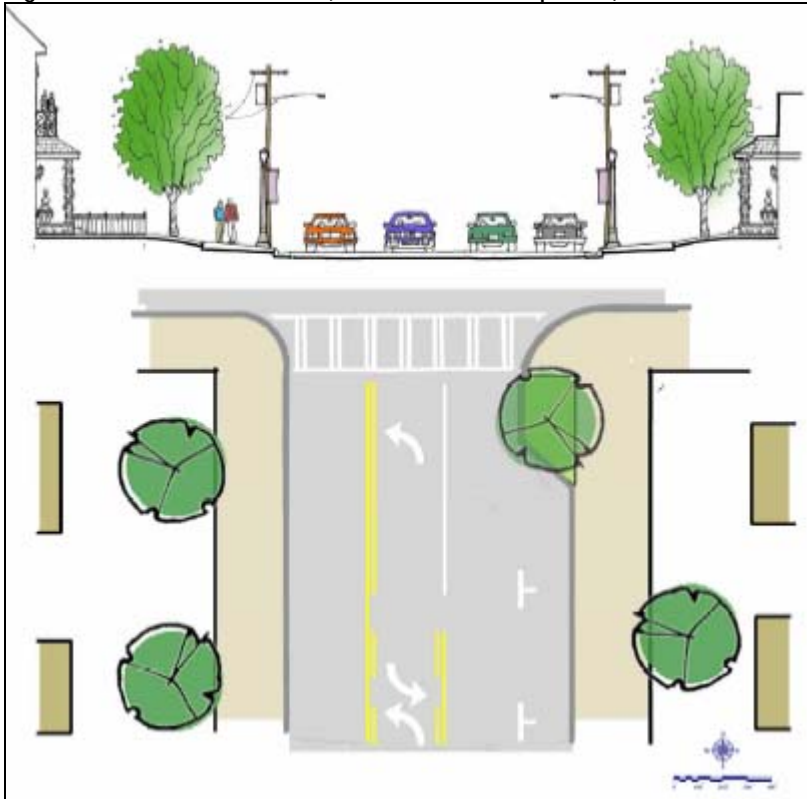


Introduction

The purpose of this document is to present and discuss streetscape alternatives for Madison Avenue in Covington, KY between the 26th Street and 19th Street. This report presents details of potential alternatives, and addresses operational performance, safety performance and evaluates other concerns such as impacts on transit service, on-street parking and pedestrian safety concerns specifically in the area surrounding Holmes High School between 25th Street and 26th Street.

The Madison Avenue Corridor Redevelopment Plan, prepared by The Corradino Group in April 2005, previously evaluated the corridor. The plan recommended that the existing 4-lane cross-section be reconfigured into a 3-lane section with one travel lane in each direction, a center turn lane and parking on one side of the street. **Figure 1** shows the proposed cross section from the redevelopment plan.

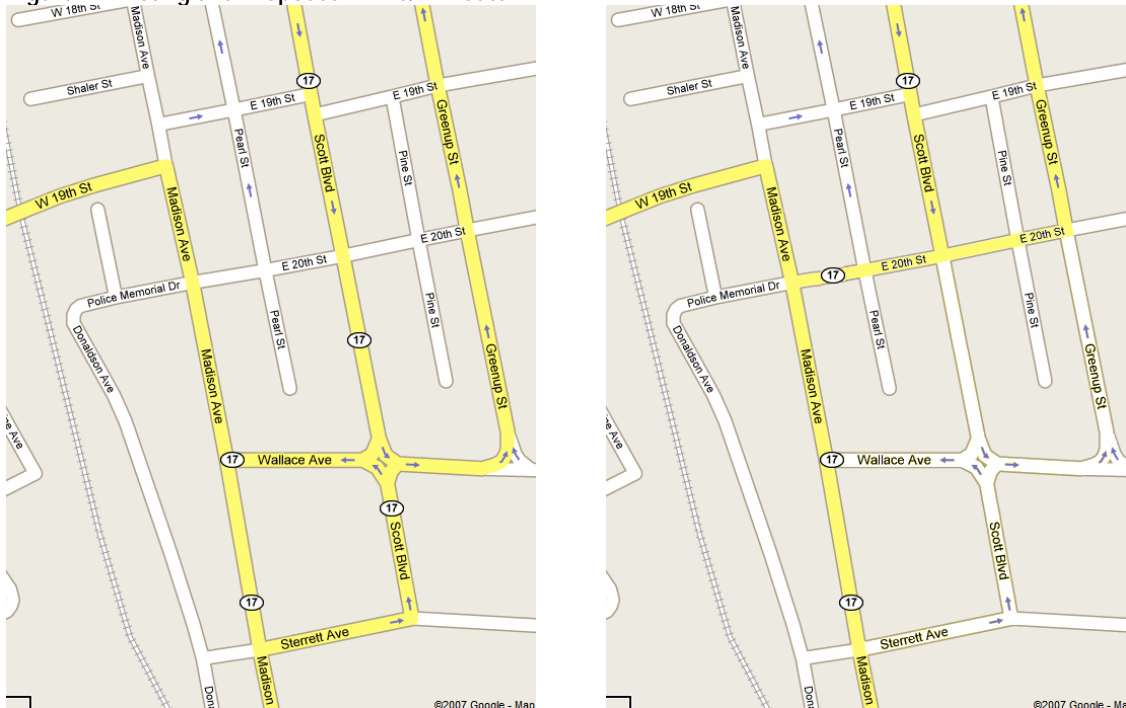
Figure 1: 3-lane Cross Section (The Corradino Group, 2005)



Preliminary analysis of the corridor indicated that the 3-lane section proposed by the corridor redevelopment can operate well on the entire corridor between 12th Street and 26th Street. However, operational problems would be present at the KY 16/17 split at 26th Street with the cross-section, as it would require a reduction in the number of northbound lanes. Therefore, this study aims to identify a transitional cross section for the southern portion of the Madison Avenue corridor between 19th Street and 26th Street and to further development design details of the proposed Form District.

Recent plans by the City of Covington and the Kentucky Transportation Cabinet include rerouting of KY 16/17 off of Sterrett Avenue and Wallace Avenue further to the north to 20th Street. The proposed route will remove traffic from the Wallace Woods neighborhood and redistribute it back onto Madison Avenue to 20th Street. **Figure 2** shows the existing and proposed routing of KY 16/17. In addition to the current rerouting of KY 17, The Austenburg Neighborhood Development Plan, which was adopted by the city of Covington, recommends removal of KY 17 from Scott Street and Greenup Street with KY 17 being routed along Madison Avenue up to 12th Street.

Figure 2: Existing and Proposed KY 16/17 Route



The Steering Committee assembled to guide the Zoning Overlay for the Madison Avenue Corridor identified other concerns in addition to operational issues . These included bus blockages of through traffic on Madison Avenue, and a significant concern for pedestrian safety in the area surrounding Holmes High School. Additionally, on-street parking in the area is at a premium and the proposed streetscape will ultimately affect parking, which must be addressed within the zoning overlay.



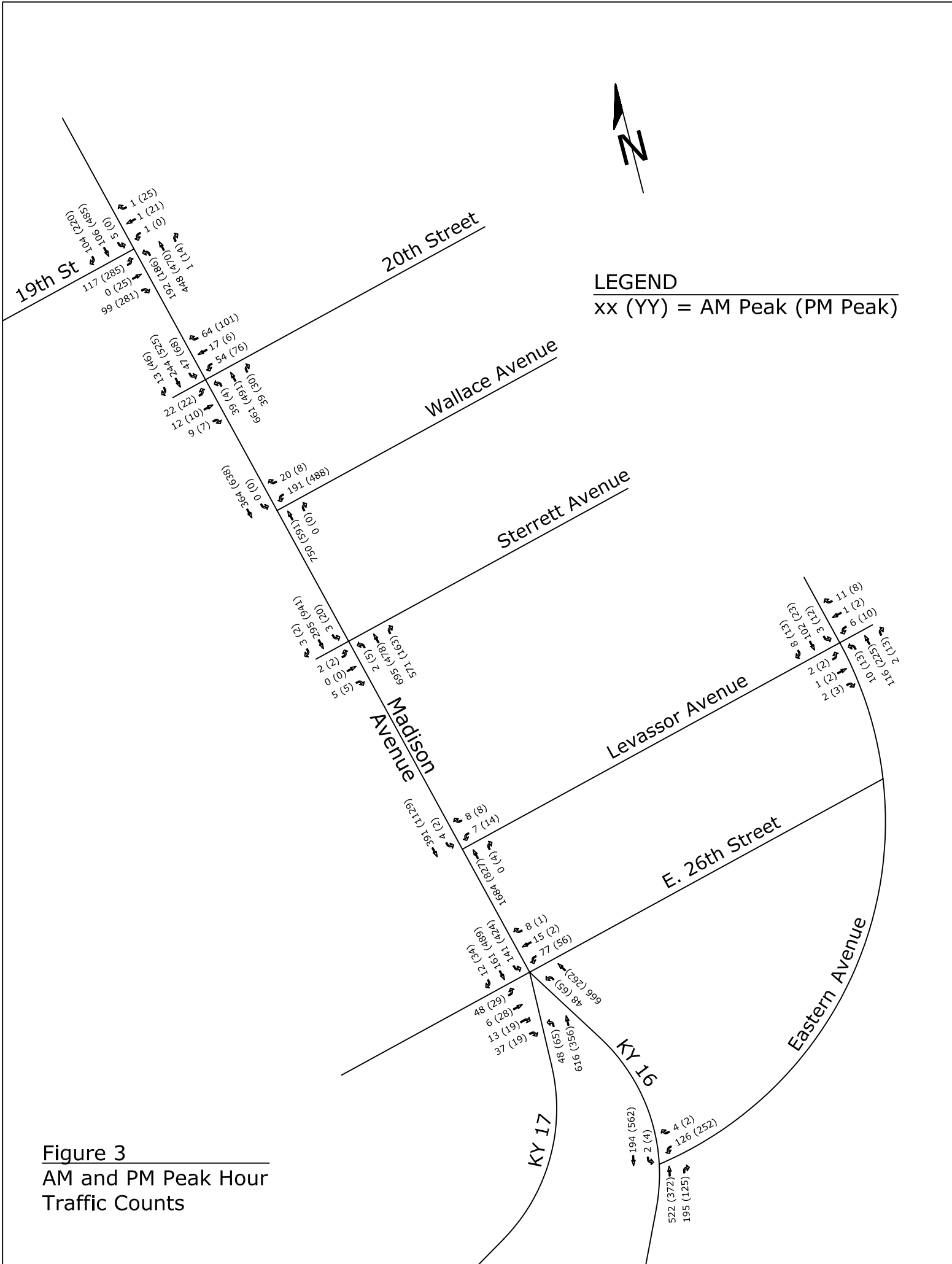
Existing Conditions

Madison Avenue between 19th Street and 26th Street maintains a 4-lane cross section with 2 travel lanes in each direction. The total pavement width through the section is 40 feet, providing for 4 narrow 10-foot lanes. On-street parking in the outside travel lane is permitted north of Sterrett Avenue off of the State maintained route. Parking is time restricted with no parking between 4:00 to 6:00 p.m. Monday through Friday.

Data collected by the Corridor Redevelopment Plan recorded traffic volumes of approximately 20,000 vehicles per day (vpd) south of Sterrett and Wallace Avenues, on the state maintained portion of the corridor. North of Wallace Avenue volumes reduce significantly to approximately 13,500 vpd. As part of this study, updated AM and PM peak hour traffic counts were conducted at the eight major intersections listed below. All counts were conducted on December 18, 2007 between the hours of 7 a.m. and 9 a.m. and 4 p.m. and 6 p.m. **Figure 3** summarizes the peak hour turning movement counts. Raw data collected on the corridor is provided in **Appendix A**.

- Madison Avenue at 26th Street (KY 16/17 Split)
- Madison Avenue at Levassor Avenue
- Madison Avenue at Sterrett Avenue
- Madison Avenue at Wallace Avenue
- Madison Avenue at 20th Street
- Madison Avenue at 19th Street
- Eastern Avenue at James Avenue (KY 16)
- Eastern Avenue at Levassor Avenue





Comparing the collected data to the 2004 counts from the Madison Avenue Redevelopment Plan it is noted that traffic volumes have remained relatively stable. However, turning movements at the critical intersection of Madison Avenue at the KY 16/KY 17 split are shown to increase by approximately 100 vehicles per hour (vph) on KY 16.

Capacity Analysis was conducted for the AM and PM peak hours to estimate existing delays on the corridor. Analysis was conducted using HCM algorithms as applied by Synchro Version 5. The results of the analysis are presented in **Table 1**. The primary capacity constraint on the corridor is the KY 16/17 split at 26th Street. This intersection is a five leg intersection with heavy volumes of traffic on three approaches from southbound Madison Avenue and northbound KY 16 and northbound KY 17 (Madison Avenue). While the intersection is estimated to operate at LOS D based on the capacity analysis, observations in the AM peak indicate that extensive queues and delay may be experienced due to imbalanced lane usage caused by the short length of the second through lanes provided on the KY 16 and KY 17.

Table 1: Existing Conditions LOS Analysis

Intersection	AM Peak		PM Peak	
	LOS	Delay (s)	LOS	Delay (s)
<i>Madison Avenue at 19th Street</i>	A	9.6	C	24.9
<i>Madison Avenue at 20th Street</i>	A	6.6	A	9.2
<i>Madison Avenue at Wallace Avenue</i>	A	8	B	20
<i>Madison Avenue at Sterrett Avenue (Eastbound Left Turn)¹</i>	B	14.2	D	25.2
<i>Madison Avenue at Levassor Avenue (Westbound Left Turn)¹</i>	F	57.2	D	32.5
<i>Madison Avenue at KY 16/17 Split (26th Street)</i>	D	54.1	C	34.1

1: Denotes Unsignalized intersection analysis by controlled approach



Transit Service

TANK provides transit service on Madison Avenue with 3 different routes including the 7, 8 and 33 Routes, as well as a Holmes Special, which provides direct drop off internal to the high school. These routes operate on 30-60 minute headways during the AM and PM peak periods with approximately 6 buses in each direction during a typical peak hour. Bus count data collected between September 2006 and June 2007 was provided by TANK. Based on this data, approximately 8 people get on / off each bus that travels along Madison Avenue between 12th Street and 26th Street.

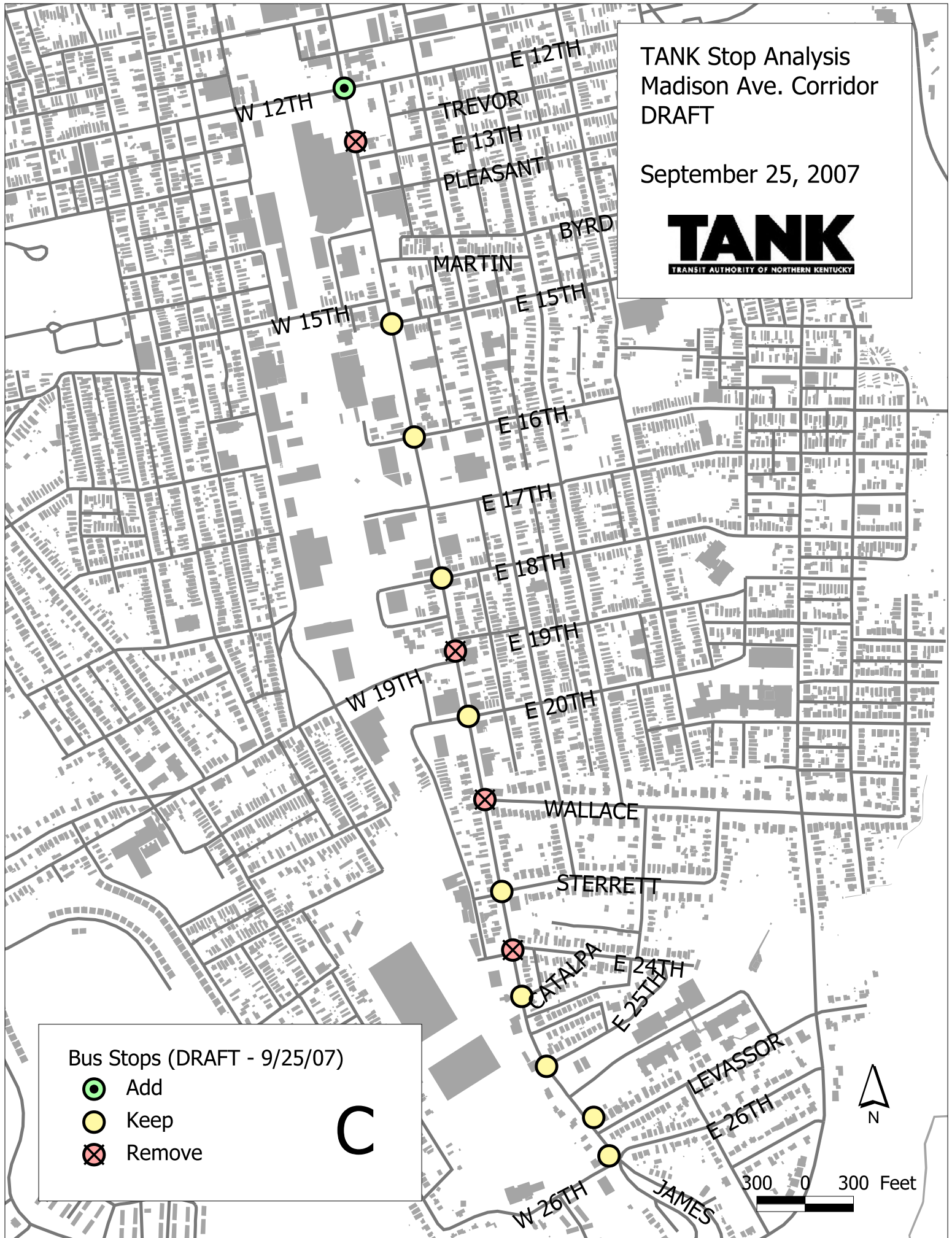
Nine (9) stops are located between 26th Street and 19th Street. A timepoint, where buses may stop to ensure they are not ahead of schedule, is scheduled on the southern part of the corridor at 26th Street and at 20th Street. The stop at 20th Street is observed to be used by more buses each weekday than any other stop based on TANK count data. Residents and adjacent business owners have identified buses as a source of delay on the corridor resulting from stoppages while loading and unloading passengers. Discussion with TANK personnel indicate that this delay may be the result of the timepoint on the corridor where the bus may wait for longer periods of time.

At the request of the Madison Avenue Form District Steering Committee TANK conducted a preliminary analysis of the nine stops on the corridor. Based on this analysis 3 stops in the study area have been identified for removal and consolidation with other stops. **Figure 4** shows those identified as potential for removal and consolidation.



TANK Stop Analysis
Madison Ave. Corridor
DRAFT

September 25, 2007



Bus Stops (DRAFT - 9/25/07)

- Add
- Keep
- Remove

C



300 0 300 Feet

Parking

This section of the corridor serves a mixed use of adjacent land uses including commercial/retail and single family residential homes. Commercial activities are primarily located to the south and provide adequate off-street parking to serve business activities. Residential properties to the north typically have little to no driveways and rely upon on-street parking on Madison Avenue. Under the current configuration approximately 1,800 linear feet of parking is present on both sides of the street providing approximately 90 parking spaces.

Pedestrian Activity

As noted above the steering committee identified pedestrian movements in the vicinity of Holmes High School as a primary concern on the corridor. Field visits and pedestrian counts were conducted to document the extent of pedestrian activity in the area. During a typical weekday in September, 72 pedestrians were observed to cross Madison Avenue at unmarked crossings between 25th Street and 26th Street during a 30 minute period from 3:00 to 3:30 p.m. The pedestrian count did not include the high number of pedestrians crossing at the signalized crosswalk at 26th Street. This represents a high level of pedestrian activity and site observations indicated that the pedestrians often mix with high speed vehicular traffic that presents a potentially unsafe condition. The majority of pedestrian movements were observed to originate at the main Holmes High School entrance on Madison Avenue.

In addition to pedestrian safety issues noted above, other safety concerns were noted on the corridor by the steering committee. The main concern identified was at the horizontal curve on Madison Avenue north of 25th Street. This curve was noted as potentially hazardous due to the narrow lanes widths (10 foot), in conjunction with the presence of heavy vehicles including buses and commercial trucks. Utility poles on the corridor exacerbate this hazard, especially when located with little to no offset to the traffic lanes. The utility pole on the inside of the curve has evidence of possible vehicular strikes.



Future Conditions

The plan to redirect KY 16/17 traffic from the Wallace Woods Neighborhood, will significantly affect traffic volumes north of Wallace Avenue to 20th Street. To accurately assess these conditions, traffic volumes entering and exiting the major access points of the Wallace Woods Neighborhood were collected at Wallace Avenue and Sterrett Avenue.

Current studies by the Wallace Woods Neighborhood Association to implement traffic calming measures within the neighborhood have the potential to redirect this cut-through traffic from Eastern Avenue back onto Madison Avenue further impacting future operations. Therefore, traffic volumes were collected on Eastern Avenue at James Avenue (KY 16), and Levassor Avenue to determine the amount of traffic traveling through the Wallace Woods Neighborhood via Eastern Avenue.

The traffic volumes collected and summarized in Figure 3, were then redistributed onto the network to reflect the anticipated conditions as a result of the changes identified above. The redistribution relocated traffic from Sterrett and Wallace Avenues onto 20th Street and reduced the amount of northbound and southbound traffic on Eastern Avenue coming to/from south of KY 16. The redistributed traffic volumes are shown in **Figure 5**.





LEGEND

xx (YY) = AM Peak (PM Peak)

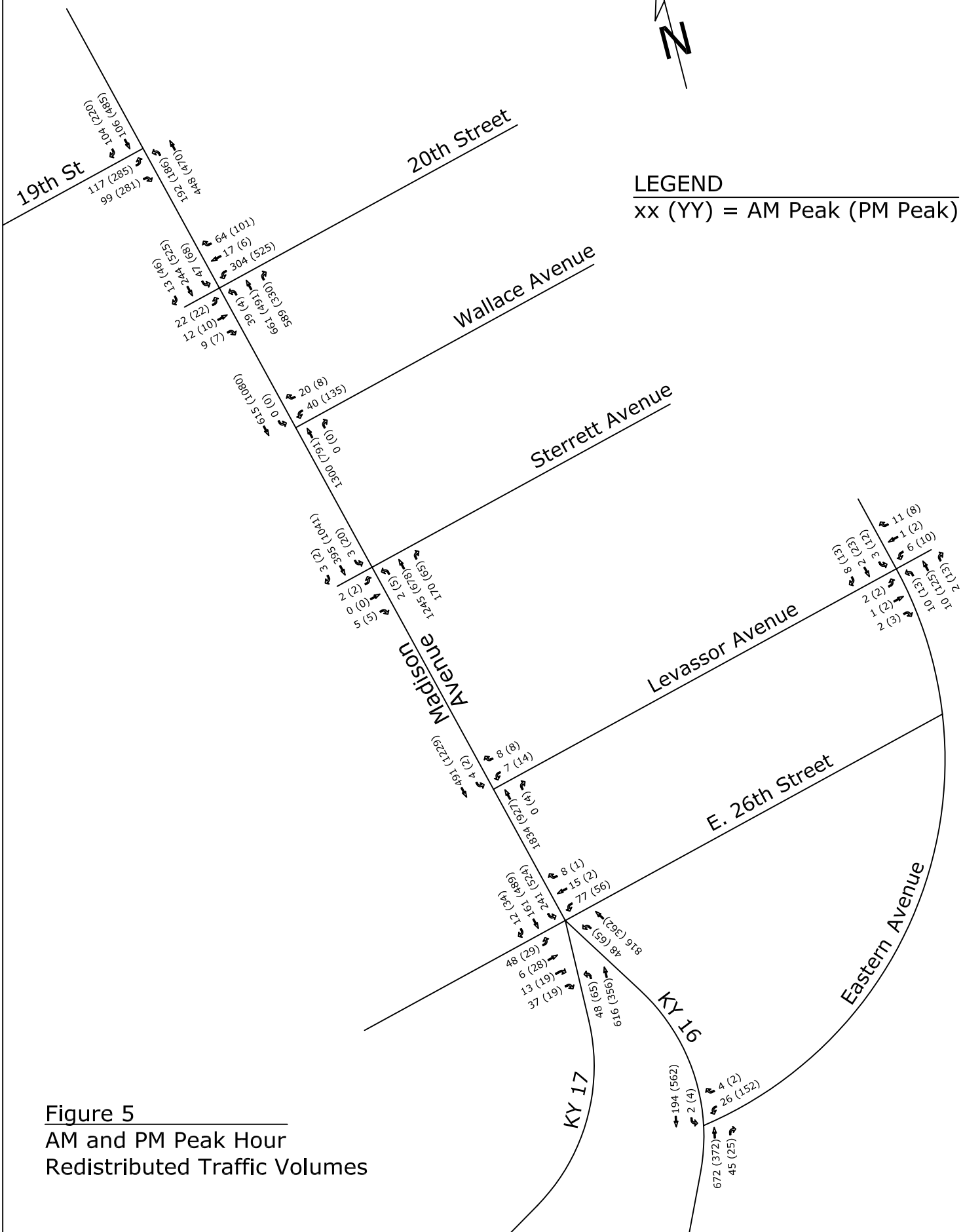


Figure 5
 AM and PM Peak Hour
 Redistributed Traffic Volumes

Alternatives

Several cross-section alternatives have been developed to serve the mobility needs of vehicles and pedestrians on the Madison Avenue corridor, as well as provide an infrastructure that supports the goals of the form district overlay. As the primary north-south roadway into the city, Madison Avenue serves as a major activity center for businesses and residents. The Madison Avenue form district overlay will encourage further activity through mixed uses and open building form. As a result, many competing interests are present on the corridor. This includes, vehicular, bicycle, pedestrian and parking activities. All of these factors must be properly balanced to provide a successful corridor for travel, work and life.

All alternatives proposed were developed to make use of the existing pavement width of 40 feet on Madison Avenue. Widening was not considered due to the density of development on the corridor, and the prohibitive cost of providing significant roadway widening. Each of these alternatives achieves a different balance between vehicular operations, pedestrian activities and on-street parking. A discussion of each alternative is presented below and a comparison of each alternative to the various needs is presented in Table 3 at the end of this section.

Detailed capacity analysis of each alternative is briefly presented in the following sections, but a full comparison of capacity analysis is provided in **Appendix B**.

Alternative 1: 4-lane

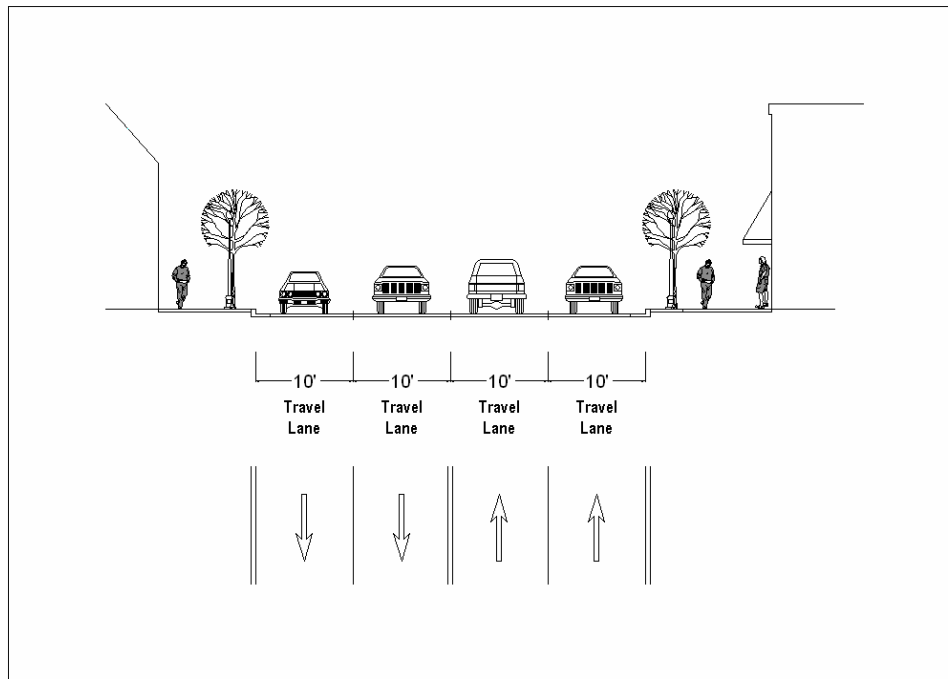
Alternative 1 maintains the existing 4-lane cross-section of Madison Avenue. As under the current conditions, time restricted parking would be maintained in the outer lane of traffic in each direction. Parking restrictions should however be revised to include the restriction of parking on the northbound direction (east side) of Madison Avenue during the AM peak period between the hours of 7 a.m. and 9 a.m. Based on the capacity analysis this period represents the highest level of congestion at the intersection of Madison Avenue at 26th Street (KY 16/17 Split) and requires two northbound lanes. It is recommended that the time restriction be carried to 20th Street where KY 17 is rerouted to Scott and Greenup Streets. Terminating the second lane by permitting parking before 20th Street may result in traffic entering onto Sterrett or Wallace Avenues to access KY 17.

In addition to the parking restrictions, minor modifications to the existing configuration are proposed to improve operations on Madison Avenue. Most significantly is the elimination of the northbound right turn lane at Sterrett Avenue. This turn lane was initially provided to accommodate turning traffic onto the previous KY 17 route. The rerouting of KY 17 to 20th Street negates the need for this turn lane. In its current configuration, the turn lane encourages traffic to utilize the Sterrett Avenue as the preferred route to Greenup and Scott Streets



for KY 17 traffic. Removing this turn lane and providing one for the northbound approach at 20th Street would direct KY 17 traffic along its intended route. Providing a right turn lane at 20th Street would also provide the opportunity to drop the second northbound lane to match the 3-lane section at 19th Street. This would allow for a correction of the offset geometry at the intersection of Madison Avenue and 19th Street.

Figure 6: Alternative 1 Cross-Section



Alternative 2: 2 + 1 Lanes

Alternative 2 would implement the alternative proposed by the Madison Avenue corridor redevelopment plan. Under this alternative permanent parking would be provided on the east side of Madison Avenue only. One travel lane would be provided in each direction on Madison Avenue. A center median lane would be provided that could be used as an exclusive left turn lane at intersections, a continuous two-way left turn lane or a pedestrian refuge at select locations.

Vehicular operations on Madison Avenue are expected to operate with acceptable levels of service on the corridor. However, delay would be expected to be higher than that experienced by Alternative 1. The primary increase in delay would be due to increased congestion during the AM peak period at the KY 16/17 split at 26th Street. In order to provide a 3-lane section with one lane northbound on Madison Avenue, it would be necessary to reduce the number of northbound lanes on KY 16 and KY 17 at this intersection. Due to the high concentration of directional traffic entering the city during the AM peak, increased delays and congestion is expected to result. However, during off-peak and PM peak periods, the intersection is shown to operate with acceptable levels of



delay. The remaining intersections on the corridor are expected to operate with minimal delay due to the lower volume of traffic on the side streets. The permanent reduction in the number of lanes would decrease vehicular speeds on the corridor.

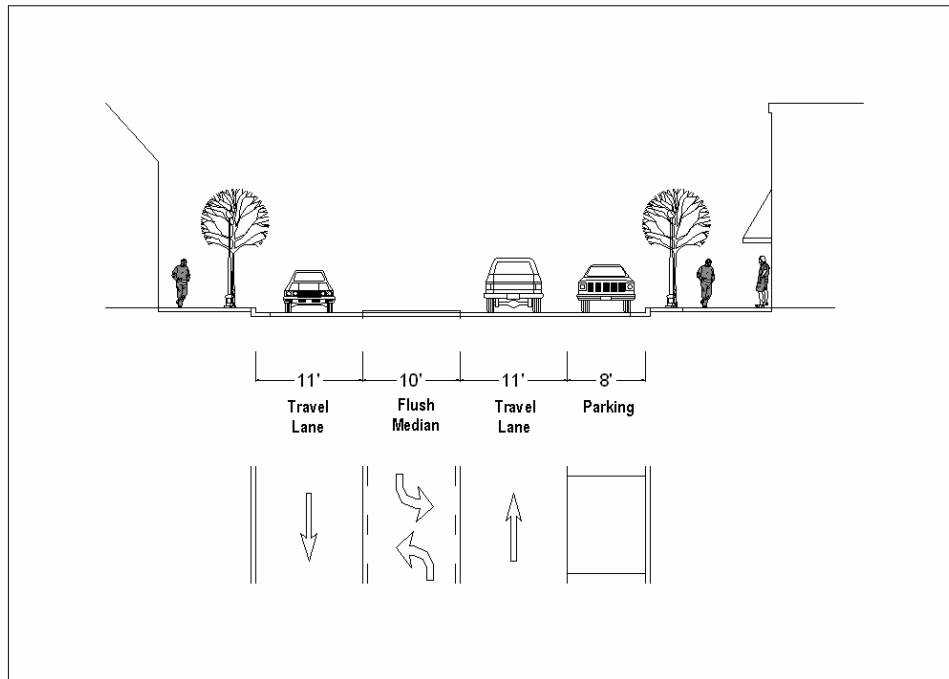
Providing parking on the east side would provide on-street parking in front of residences that do not have adequate off-street parking. On the southern end of the study area, the west side of Madison Avenue is primarily occupied with commercial uses with off-street parking facilities. Residences on the west side of Madison Avenue north of 24th Street have off-street parking opportunities in the form of detached garages on Donaldson Avenue; however, it is noted that many of these garages are currently rented out and not used by residents. Permanent parking would be removed south of 20th Street to allow for an exclusive right turn lane onto 20th Street accommodating traffic following KY 17. Additionally, the existing right turn lane at Sterrett Avenue would be removed. As a result of this plan on-street parking would be reduced to 68 spaces on the east side of Madison Avenue, compared to the existing 90 spaces. However, this parking would be permanent and would not have time restrictions as would be necessary under Alternative 1.

The permanent reduction of the number of lanes may also increase the likelihood that TANK buses unloading and offloading passengers may block traffic for a short period of time. Permanent bus pullouts would be provided by removing parking where higher delays may be expected; such as at scheduled time points on the route.

By providing a permanent parking area on the eastside of Madison Avenue it will also be possible to provide curb extensions at pedestrian activity areas. Curb extensions can be used to 1) increase the visibility of pedestrians crossing the street and 2) reduce the amount of pavement width that a pedestrian must cross. In addition, the presence of the center median lane provides the opportunity to provide a refuge to further serve pedestrians.



Figure 7: Alternative 2 Cross-Section



Alternative 3: 3 Lane

Alternative 3 aims to reduce the delay at the KY 16/17 split associated with Alternative 2. In order to relieve this point of congestion 2 through lanes would be provided in the northbound direction. This will allow for 2 northbound lanes on KY 16 and KY 17 at the intersection. The 2 northbound lanes would be carried throughout the study area to 19th Street. Terminating the second northbound lane prior to the rerouting of KY 17 has the potential to direct a large portion of traffic into the adjacent neighborhood streets. A single lane would be provided in the southbound direction and permanent on-street parking would be provided on the east side of Madison Avenue.

Vehicular operations on Madison Avenue are expected to operate with acceptable levels of service on the corridor. This configuration can provide delays equal to Alternative 1 at the KY 16/KY 17 at 26th Street. The permanent reduction in the number of lanes for the southbound direction would decrease vehicular speeds, with possible interference with left turning vehicles due to the absence of a left turn lane.

Providing this configuration can provide delays equal to Alternative 1 at this key intersection. The two northbound lanes would be carried throughout the study area to 19th Street. Terminating the second northbound lane prior to the rerouting of KY 17 has the potential to direct a large portion of traffic into the adjacent neighborhood streets. Dropping the third lane at 19th Street would also



provide the opportunity to drop the second northbound lane in order to match the 3-lane section at 19th Street.

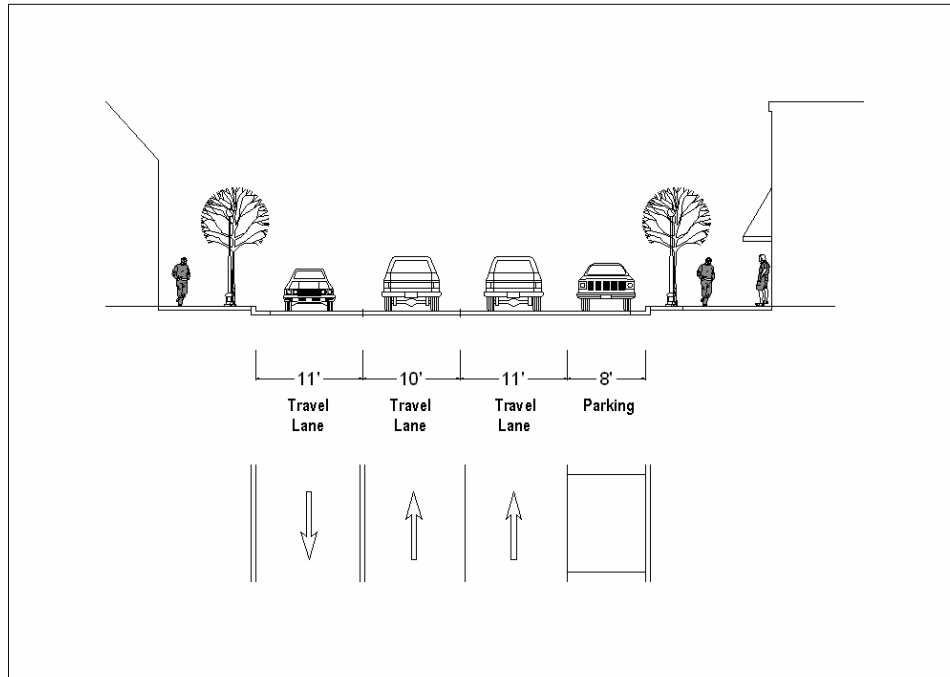
Permanent parking would be provided on the east side of Madison Avenue. This provides on-street parking in front of residences that do not have adequate off-street parking. On the southern end of the study area, the west side of Madison Avenue is primarily occupied with commercial uses with off-street parking facilities. Residences on the west side of Madison Avenue north of 24th Street have off-street parking opportunities in the form of detached garages on Donaldson Avenue; however, it is noted that many of these garages are currently rented out and not used by residents. Permanent parking would be removed south of 20th Street to allow for an exclusive right turn lane onto 20th Street accommodating traffic following KY 17. Additionally the existing right turn lane at Sterrett Avenue would be removed. As a result of this plan on-street parking would be reduced to 68 spaces on the east side of Madison Avenue, compared to the existing 90 spaces. However, this parking would be permanent and would not have time restrictions as would be necessary under Alternative 1.

The permanent reduction of the number of lanes in the southbound direction may also increase the likelihood that TANK buses unloading and offloading passengers may block traffic for a short period of time. Permanent bus pullouts may be provided by removing parking where higher delays may be expected; such as at scheduled time points on the route.

By providing a permanent parking area on the eastside of Madison Avenue it will also be possible to provide curb extensions at pedestrian activity areas. Curb extensions can be used to 1) increase the visibility of pedestrians crossing the street and 2) reduce the amount of pavement width that a pedestrian must cross.



Figure 8: Alternative 3 Cross-Section



Holmes High School Pedestrian Crossing Alternatives

As noted above one of the primary concerns raised by the Zoning Overlay Steering Committee and the project team, was the high number of pedestrian crossings in front of Holmes High School. During a 30 minute period over 70 mid-block pedestrian crossings were observed. The high speed differential between lanes on Madison Avenue, where one vehicle may be slowed or stopped, while the other is free-flowing, complicated these crossings. Several alternatives may be used to reduce speeds through the area and increase pedestrian safety. Potential alternatives are listed below.

- Upgrade Existing School Zone Signing with active Flashers.
- Provide a delineated mid-block crossing at the Holmes High School Entrance on Madison Avenue.
- Remove the existing signal at Madison Avenue and 25th Street and install a pedestrian actuated signal at the mid-block crossing.
- Reduce the number of through lanes on Madison Avenue in order to provide an improved and wider median refuge island.

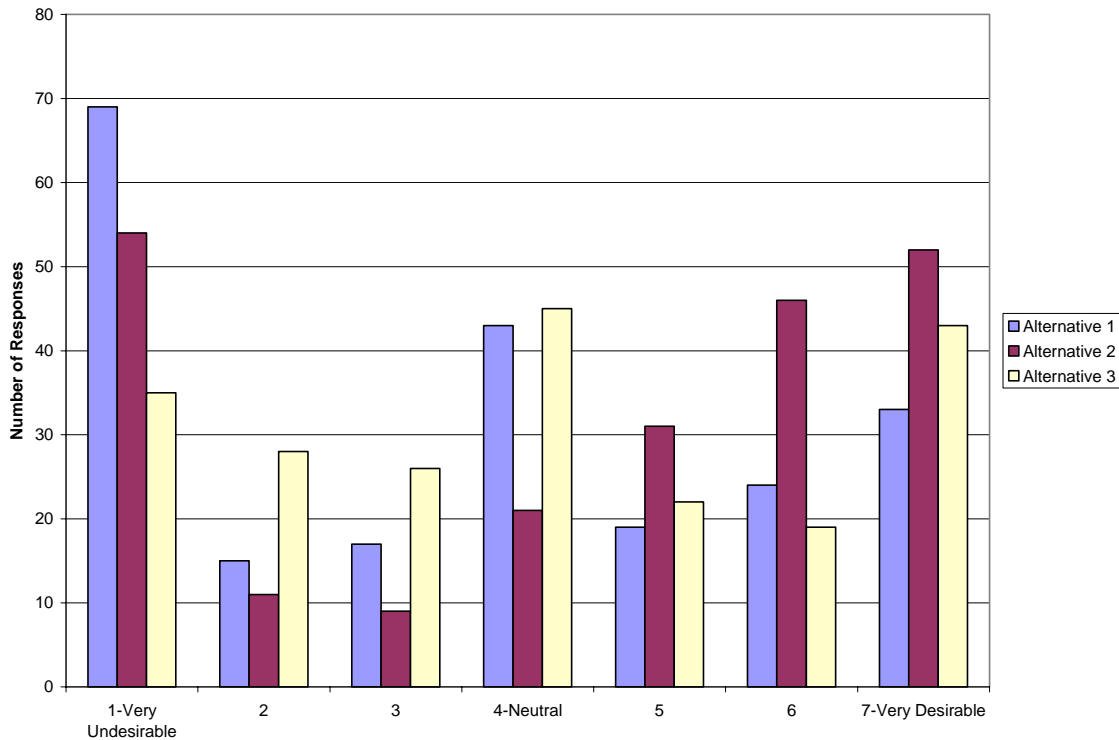
The preferred alternative for this location would be a combination of all of the above identified options.



Public Involvement

Due to the myriad of trade-offs and impacts associated with each of the proposed alternatives that may affect the lives of those who live and work on the Madison Avenue Corridor, public input was sought to evaluate the alternatives. Public input was gathered through the public meeting and online visual preference survey conducted for the form district overlay. Each of the alternatives were first presented with advantages and disadvantages of each alternative discussed. Participants were then asked to rate each of the alternatives on a scale of 1 to 7 in terms of the alternatives appropriateness for the Madison Avenue Corridor. For the purposes of the survey a rating of 1 was described as very undesirable, 4 neutral and 7 being very desirable. This survey allows for the understanding of how the participants view the alternatives, as well as how they prioritize the many issues on the corridor. **Figure 9** below summarizes the number of responses for each alternative.

Figure 9: Public Rating by Alternative



As can be seen from the figure, Alternative 2 had the highest “desirable” ratings with over 57 percent of respondents identifying the alternative as desirable with a rating of five (5) or greater. While this alternative had the second highest “very undesirable” rating it had the lowest overall undesirable score with only 32 percent of respondents identifying the alternative as undesirable. Alternative 2 also had the highest average score of 4.3, compared to 3.8 for Alternative 3 and 3.5 for Alternative 1. **Table 2** summarizes the desirable, undesirable and neutral responses for all three alternatives.



Table 2: Public Involvement Response Summary

Rating	Alternative 1	Alternative 2	Alternative 3
Undesirable	44.7%	32.7%	39.4%
Neutral	19.0%	9.3%	19.9%
Desirable	33.6%	57.1%	37.2%

In addition to the alternatives described above a two-lane alternative with one lane in each direction and permanent parking on one side was also evaluated; however as this alternative was shown to achieve minimal levels of mobility it was dropped from consideration. This alternative was also the poorest rated alternative by the public with an average rating of 2.85 with over 65 percent rating this alternative as undesirable.

Examining the alternatives and the ratings provided through the public involvement process, it is possible to begin understanding the prioritization of the public. Reducing the number of travel lanes in order to better accommodate pedestrians forsaking some vehicular mobility appears to be a reasonable trade-off that the public may make. However, the poor ratings of the two-lane analysis indicate that vehicular access must be maintained at minimum level. Furthermore there appears to be a preference for those alternatives that provide less but permanent parking as opposed to parking restricted by time of day.

Table 3 summarizes the evaluation of each alternative against the many competing interests on the corridor.



Table 3: Alternative Evaluation

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Average Speed <i>AM Peak</i> <i>(PM Peak)</i>	18 mph (18 mph)	9 mph (15 mph)	18 mph (18 mph)
KY 16/17 Intersection Level of Service / Delay <i>AM Peak</i> <i>(PM Peak)</i>	D / 45.9 (D / 35.7)	F / >80 (D / 52.0)	D / 42.0 (C / 34.2)
Lane Width	10 ft	11 ft	11 ft
Safety Performance	Crash performance is anticipated to be similar to existing conditions	Crashes with parked cars may be reduced due to the removal of parking. Sideswipe crashes may also decrease due to the reduced # of lanes, improved speed consistency and increased lane width. Rear end crashes may increase at the KY 16/17 split due to increased congestion levels.	Crashes with parked cars are expected to be reduced due to the removal of intermittent parking. Sideswipe crashes may be reduced due to the wider lane width.
Pedestrian Accommodation	Pedestrian accommodation will be similar to existing conditions	Total crossing distance will be reduced from 40 ft to 32 feet with the potential for a median refuge at specific location in the center median lane. Bulb outs or curb extensions may also be used to increase visibility of pedestrian at major intersections.	Total crossing distance will be reduced from 40 ft to 32 feet. Bulb outs or curb extensions may also be used to increase visibility of pedestrian at major intersections.
Holmes High School Crossing	Would accommodate mid-block crossing and maintain existing narrow median. Will not reduce crossing width.	Would accommodate mid-block crossing and will reduce crossing width and provide improved median refuge.	Would accommodate mid-block crossing and provide a marginally wider median. Will not reduce crossing width.
Parking (Estimated Number of On-Street Spaces)	90 spaces	68 spaces	68 spaces
Public Involvement (Average Public Score; Scale of 1 to 7)	3.50	4.35	3.87



Recommendation

Based upon the analysis presented above, Alternative 3 is recommended for implementation on the Madison Avenue Corridor. This alternative strikes a balance between pedestrian and vehicular mobility and provides a proper transition between the southern section of the corridor and the proposed 3-lane section north of 19th Street. This alternative is also highly rated by the public as gathered through the public involvement survey.

A plan view of the entire study area for the recommended alternative is provided in **Appendix C**.



Appendix A

Peak Hour Traffic Counts



TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Madison @ KY 16 KY 17 AM
Site Code : 12180720
Start Date : 12/18/2007
Page No : 3

Start Time	Madison Ave From North					East 26th St From East					KY 16 / 17 From South					West 26th St. From West					Int. Total
	Right	Thru to KY 16	Left	Thru to KY 17	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru from KY 17	Left	Thru from KY 16	App. Total	Right to KY 17	Thru	Left	To KY 16	App. Total	
Peak Hour Analysis From 07:00 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	3	28	0	29	60	2	0	22	0	24	0	165	11	115	291	9	2	3	2	16	391
07:15 AM	3	30	0	34	67	2	0	21	0	23	0	167	12	115	294	10	4	4	2	20	404
07:30 AM	2	47	0	49	98	2	8	21	0	31	0	137	11	213	361	8	0	17	7	32	522
07:45 AM	4	36	0	49	89	2	7	13	0	22	0	147	14	223	384	10	0	24	2	36	531
Total Volume	12	141	0	161	314	8	15	77	0	100	0	616	48	666	1330	37	6	48	13	104	1848
% App. Total	3.8	44.9	0	51.3		8	15	77	0		0	46.3	3.6	50.1		35.6	5.8	46.2	12.5		
PHF	.750	.750	.000	.821	.801	1.000	.469	.875	.000	.806	.000	.922	.857	.747	.866	.925	.375	.500	.464	.722	.870

Peak Hour Analysis From 07:00 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM					07:00 AM					07:00 AM					07:00 AM					
+0 mins.	2	47	0	49	98	2	0	22	0	24	0	165	11	115	291	9	2	3	2	16	
+15 mins.	4	36	0	49	89	2	0	21	0	23	0	167	12	115	294	10	4	4	2	20	
+30 mins.	2	35	0	43	80	2	8	21	0	31	0	137	11	213	361	8	0	17	7	32	
+45 mins.	1	36	0	44	81	2	7	13	0	22	0	147	14	223	384	10	0	24	2	36	
Total Volume	9	154	0	185	348	8	15	77	0	100	0	616	48	666	1330	37	6	48	13	104	
% App. Total	2.6	44.3	0	53.2		8	15	77	0		0	46.3	3.6	50.1		35.6	5.8	46.2	12.5		
PHF	.563	.819	.000	.944	.888	1.000	.469	.875	.000	.806	.000	.922	.857	.747	.866	.925	.375	.500	.464	.722	

Groups Printed- Unshifted

Start Time	Madison Ave. From North					East 19th St. From East					Madison Ave From South					West 19th St. From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	17	23	3	0	43	0	0	0	0	0	1	107	50	0	158	19	0	21	0	40	241
07:15 AM	26	25	0	0	51	1	0	1	0	2	0	106	50	0	156	23	0	28	0	51	260
07:30 AM	28	28	1	0	57	0	0	0	0	0	0	116	47	0	163	25	0	31	0	56	276
07:45 AM	33	30	1	0	64	0	1	0	0	1	0	119	45	0	164	32	0	37	0	69	298
Total	104	106	5	0	215	1	1	1	0	3	1	448	192	0	641	99	0	117	0	216	1075
08:00 AM	38	33	0	0	71	1	1	0	0	2	0	113	43	0	156	35	0	42	0	77	306
08:15 AM	41	36	2	0	79	0	0	0	0	0	0	116	46	0	162	36	0	38	0	74	315
08:30 AM	36	40	0	0	76	1	0	1	0	2	0	111	57	0	168	34	0	36	0	70	316
08:45 AM	33	38	1	0	72	0	0	0	0	0	0	119	46	0	165	41	0	44	0	85	322
Total	148	147	3	0	298	2	1	1	0	4	0	459	192	0	651	146	0	160	0	306	1259
Grand Total	252	253	8	0	513	3	2	2	0	7	1	907	384	0	1292	245	0	277	0	522	2334
Apprch %	49.1	49.3	1.6	0		42.9	28.6	28.6	0		0.1	70.2	29.7	0		46.9	0	53.1	0		
Total %	10.8	10.8	0.3	0	22	0.1	0.1	0.1	0	0.3	0	38.9	16.5	0	55.4	10.5	0	11.9	0	22.4	

TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Madison @ 20th St AM
Site Code : 12180720
Start Date : 12/18/2007
Page No : 3

Start Time	Madison Ave From North					East 20th St From East					Madison Ave From South					West 20th St From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:15 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	3	55	11	0	69	15	4	10	0	29	8	154	1	0	163	1	3	4	0	8	269
07:45 AM	3	58	13	0	74	16	4	13	0	33	10	168	2	0	180	2	2	4	0	8	295
08:00 AM	4	63	11	0	78	16	5	16	0	37	10	170	1	0	181	3	4	6	0	13	309
08:15 AM	3	68	12	0	83	17	4	15	0	36	11	169	1	0	181	3	3	8	0	14	314
Total Volume	13	244	47	0	304	64	17	54	0	135	39	661	5	0	705	9	12	22	0	43	1187
% App. Total	4.3	80.3	15.5	0		47.4	12.6	40	0		5.5	93.8	0.7	0		20.9	27.9	51.2	0		
PHF	.813	.897	.904	.000	.916	.941	.850	.844	.000	.912	.886	.972	.625	.000	.974	.750	.750	.688	.000	.768	.945

Peak Hour Analysis From 07:15 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:45 AM					07:30 AM					07:30 AM					08:00 AM				
+0 mins.	3	58	13	0	74	15	4	10	0	29	8	154	1	0	163	3	4	6	0	13
+15 mins.	4	63	11	0	78	16	4	13	0	33	10	168	2	0	180	3	3	8	0	14
+30 mins.	3	68	12	0	83	16	5	16	0	37	10	170	1	0	181	2	1	3	0	6
+45 mins.	5	51	14	0	70	17	4	15	0	36	11	169	1	0	181	3	5	5	0	13
Total Volume	15	240	50	0	305	64	17	54	0	135	39	661	5	0	705	11	13	22	0	46
% App. Total	4.9	78.7	16.4	0		47.4	12.6	40	0		5.5	93.8	0.7	0		23.9	28.3	47.8	0	
PHF	.750	.882	.893	.000	.919	.941	.850	.844	.000	.912	.886	.972	.625	.000	.974	.917	.650	.688	.000	.821

TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Eastern@LevassorAM
Site Code : 01290801
Start Date : 1/29/2008
Page No : 3

Start Time	Eastern Ave From North					Leavessor Ave From East					Eastern Ave From South					Levassor Ave From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	22	0	0	23	3	1	1	0	5	1	29	3	0	33	1	1	1	0	3	64
08:00 AM	1	26	1	0	28	3	0	1	0	4	0	33	3	0	36	0	0	0	0	0	68
08:15 AM	4	25	0	0	29	4	0	1	0	5	1	29	3	0	33	0	0	0	0	0	67
08:30 AM	2	29	0	0	31	1	0	3	0	4	0	25	1	0	26	1	0	1	0	2	63
Total Volume	8	102	1	0	111	11	1	6	0	18	2	116	10	0	128	2	1	2	0	5	262
% App. Total	7.2	91.9	0.9	0		61.1	5.6	33.3	0		1.6	90.6	7.8	0		40	20	40	0		
PHF	.500	.879	.250	.000	.895	.688	.250	.500	.000	.900	.500	.879	.833	.000	.889	.500	.250	.500	.000	.417	.963

Peak Hour Analysis From 07:00 AM to 08:30 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:45 AM					07:45 AM					07:30 AM					07:00 AM				
+0 mins.	1	22	0	0	23	3	1	1	0	5	0	25	1	0	26	1	0	1	0	2
+15 mins.	1	26	1	0	28	3	0	1	0	4	1	29	3	0	33	0	0	0	0	0
+30 mins.	4	25	0	0	29	4	0	1	0	5	0	33	3	0	36	0	0	1	0	1
+45 mins.	2	29	0	0	31	1	0	3	0	4	1	29	3	0	33	1	1	1	0	3
Total Volume	8	102	1	0	111	11	1	6	0	18	2	116	10	0	128	2	1	3	0	6
% App. Total	7.2	91.9	0.9	0		61.1	5.6	33.3	0		1.6	90.6	7.8	0		33.3	16.7	50	0	
PHF	.500	.879	.250	.000	.895	.688	.250	.500	.000	.900	.500	.879	.833	.000	.889	.500	.250	.750	.000	.500

TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Madison @ KY 16 KY 17 PM
Site Code : 12180721
Start Date : 12/18/2007
Page No : 3

Start Time	Madison Ave From North					26th St From East					KY 16 / KY 17 From South					26th St From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	17	96	0	110	223	1	1	16	0	18	0	80	20	65	165	9	7	7	0	23	429
04:15 PM	5	116	0	125	246	0	1	8	0	9	0	88	11	47	146	6	4	4	0	14	415
04:30 PM	9	114	0	130	253	0	0	17	0	17	0	105	21	75	201	8	11	4	0	23	494
04:45 PM	3	98	0	124	225	0	0	15	0	15	0	83	13	75	171	6	6	4	0	16	427
Total Volume	34	424	0	489	947	1	2	56	0	59	0	356	65	262	683	29	28	19	0	76	1765
% App. Total	3.6	44.8	0	51.6		1.7	3.4	94.9	0		0	52.1	9.5	38.4		38.2	36.8	25	0		
PHF	.500	.914	.000	.940	.936	.250	.500	.824	.000	.819	.000	.848	.774	.873	.850	.806	.636	.679	.000	.826	.893

Peak Hour Analysis From 04:00 PM to 05:00 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM					04:00 PM					04:15 PM					04:15 PM				
+0 mins.	17	96	0	110	223	1	1	16	0	18	0	88	11	47	146	6	4	4	0	14
+15 mins.	5	116	0	125	246	0	1	8	0	9	0	105	21	75	201	8	11	4	0	23
+30 mins.	9	114	0	130	253	0	0	17	0	17	0	83	13	75	171	6	6	4	0	16
+45 mins.	3	98	0	124	225	0	0	15	0	15	0	94	16	58	168	7	10	10	0	27
Total Volume	34	424	0	489	947	1	2	56	0	59	0	370	61	255	686	27	31	22	0	80
% App. Total	3.6	44.8	0	51.6		1.7	3.4	94.9	0		0	53.9	8.9	37.2		33.8	38.8	27.5	0	
PHF	.500	.914	.000	.940	.936	.250	.500	.824	.000	.819	.000	.881	.726	.850	.853	.844	.705	.550	.000	.741

TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Madison @ Sterrett Ave PM
Site Code : 12180741
Start Date : 12/18/2007
Page No : 3

Start Time	Madison Ave From North					Sterrett Ave. From East					Madison Ave From South					Sterrett Ave. From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	1	243	6	0	250	0	0	0	0	0	35	113	3	0	151	2	0	0	0	2	403
04:30 PM	0	240	6	0	246	0	0	0	0	0	39	121	2	0	162	2	0	0	0	2	410
04:45 PM	1	241	4	0	246	0	0	0	0	0	41	124	0	0	165	0	0	0	0	0	411
05:00 PM	0	217	4	0	221	0	0	0	0	0	48	120	0	0	168	1	0	2	0	3	392
Total Volume	2	941	20	0	963	0	0	0	0	0	163	478	5	0	646	5	0	2	0	7	1616
% App. Total	0.2	97.7	2.1	0		0	0	0	0	0	25.2	74	0.8	0		71.4	0	28.6	0		
PHF	.500	.968	.833	.000	.963	.000	.000	.000	.000	.000	.849	.964	.417	.000	.961	.625	.000	.250	.000	.583	.983

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:15 PM					04:00 PM					05:00 PM					04:00 PM				
+0 mins.	1	243	6	0	250	0	0	0	0	0	48	120	0	0	168	1	0	2	0	3
+15 mins.	0	240	6	0	246	0	0	0	0	0	52	117	0	0	169	2	0	0	0	2
+30 mins.	1	241	4	0	246	0	0	0	0	0	59	117	0	0	176	2	0	0	0	2
+45 mins.	0	217	4	0	221	0	0	0	0	0	47	121	0	0	168	0	0	0	0	0
Total Volume	2	941	20	0	963	0	0	0	0	0	206	475	0	0	681	5	0	2	0	7
% App. Total	0.2	97.7	2.1	0		0	0	0	0	0	30.2	69.8	0	0		71.4	0	28.6	0	
PHF	.500	.968	.833	.000	.963	.000	.000	.000	.000	.000	.873	.981	.000	.000	.967	.625	.000	.250	.000	.583

TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Madison @ 19th St PM

Site Code : 12180771

Start Date : 12/18/2007

Page No : 3

Start Time	Madison Ave From North					19th St. From East					Madison Ave From South					19th St. From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	60	109	0	0	169	6	6	0	0	12	4	113	39	0	156	66	6	43	0	115	452
05:15 PM	67	119	0	0	186	7	6	0	0	13	3	116	47	0	166	67	7	50	0	124	489
05:30 PM	49	123	0	0	172	7	5	0	0	12	5	116	48	0	169	71	7	52	0	130	483
05:45 PM	44	134	0	0	178	5	4	0	0	9	2	125	52	0	179	77	5	56	0	138	504
Total Volume	220	485	0	0	705	25	21	0	0	46	14	470	186	0	670	281	25	201	0	507	1928
% App. Total	31.2	68.8	0	0		54.3	45.7	0	0		2.1	70.1	27.8	0		55.4	4.9	39.6	0		
PHF	.821	.905	.000	.000	.948	.893	.875	.000	.000	.885	.700	.940	.894	.000	.936	.912	.893	.897	.000	.918	.956

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM					04:45 PM					05:00 PM					05:00 PM				
+0 mins.	60	109	0	0	169	6	3	0	0	9	4	113	39	0	156	66	6	43	0	115
+15 mins.	67	119	0	0	186	6	6	0	0	12	3	116	47	0	166	67	7	50	0	124
+30 mins.	49	123	0	0	172	7	6	0	0	13	5	116	48	0	169	71	7	52	0	130
+45 mins.	44	134	0	0	178	7	5	0	0	12	2	125	52	0	179	77	5	56	0	138
Total Volume	220	485	0	0	705	26	20	0	0	46	14	470	186	0	670	281	25	201	0	507
% App. Total	31.2	68.8	0	0		56.5	43.5	0	0		2.1	70.1	27.8	0		55.4	4.9	39.6	0	
PHF	.821	.905	.000	.000	.948	.929	.833	.000	.000	.885	.700	.940	.894	.000	.936	.912	.893	.897	.000	.918

TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Madison @ 20th St PM
Site Code : 12180761
Start Date : 12/18/2007
Page No : 3

Start Time	Madsion Ave From North					20th St. From East					Madsion Ave From South					20th St. From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:15 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	12	119	15	0	146	24	2	17	0	43	7	119	1	0	127	2	1	5	0	8	324
05:15 PM	13	132	17	0	162	26	3	19	0	48	8	121	1	0	130	2	2	6	0	10	350
05:30 PM	10	134	17	0	161	25	2	17	0	44	6	120	0	0	126	1	4	7	0	12	343
05:45 PM	11	140	19	0	170	26	1	23	0	50	9	131	2	0	142	2	3	4	0	9	371
Total Volume	46	525	68	0	639	101	8	76	0	185	30	491	4	0	525	7	10	22	0	39	1388
% App. Total	7.2	82.2	10.6	0		54.6	4.3	41.1	0		5.7	93.5	0.8	0		17.9	25.6	56.4	0		
PHF	.885	.938	.895	.000	.940	.971	.667	.826	.000	.925	.833	.937	.500	.000	.924	.875	.625	.786	.000	.813	.935

Peak Hour Analysis From 04:15 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM					05:00 PM					05:00 PM									
+0 mins.	12	119	15	0	146	24	2	17	0	43	7	119	1	0	127	2	1	5	0	8
+15 mins.	13	132	17	0	162	26	3	19	0	48	8	121	1	0	130	2	2	6	0	10
+30 mins.	10	134	17	0	161	25	2	17	0	44	6	120	0	0	126	1	4	7	0	12
+45 mins.	11	140	19	0	170	26	1	23	0	50	9	131	2	0	142	2	3	4	0	9
Total Volume	46	525	68	0	639	101	8	76	0	185	30	491	4	0	525	7	10	22	0	39
% App. Total	7.2	82.2	10.6	0		54.6	4.3	41.1	0		5.7	93.5	0.8	0		17.9	25.6	56.4	0	
PHF	.885	.938	.895	.000	.940	.971	.667	.826	.000	.925	.833	.937	.500	.000	.924	.875	.625	.786	.000	.813

TrafficWise

1000 Whispering Oak Dr.
Bardstown, KY 40004

kyplaner@bardstowncable.net
502-266-6084

File Name : Eastern@LevassorPM
Site Code : 01290802
Start Date : 1/29/2008
Page No : 3

Start Time	Eastern Ave From North					Leavessor Ave From East					Eastern Ave From South					Levassor Ave From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	2	51	2	0	55	1	1	1	0	3	3	56	3	0	62	1	1	0	0	2	122
05:00 PM	5	51	4	0	60	0	0	4	0	4	3	60	4	0	67	1	1	1	0	3	134
05:15 PM	2	62	4	0	68	4	1	4	0	9	4	57	3	0	64	1	0	1	0	2	143
05:30 PM	4	66	2	0	72	3	0	1	0	4	3	52	1	0	56	0	0	0	0	0	132
Total Volume	13	230	12	0	255	8	2	10	0	20	13	225	11	0	249	3	2	2	0	7	531
% App. Total	5.1	90.2	4.7	0		40	10	50	0		5.2	90.4	4.4	0		42.9	28.6	28.6	0		
PHF	.650	.871	.750	.000	.885	.500	.500	.625	.000	.556	.813	.938	.688	.000	.929	.750	.500	.500	.000	.583	.928

Peak Hour Analysis From 04:00 PM to 05:30 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM					04:45 PM					04:45 PM					04:15 PM				
+0 mins.	2	51	2	0	55	1	1	1	0	3	3	56	3	0	62	1	0	1	0	2
+15 mins.	5	51	4	0	60	0	0	4	0	4	3	60	4	0	67	0	1	1	0	2
+30 mins.	2	62	4	0	68	4	1	4	0	9	4	57	3	0	64	1	1	0	0	2
+45 mins.	4	66	2	0	72	3	0	1	0	4	3	52	1	0	56	1	1	1	0	3
Total Volume	13	230	12	0	255	8	2	10	0	20	13	225	11	0	249	3	3	3	0	9
% App. Total	5.1	90.2	4.7	0		40	10	50	0		5.2	90.4	4.4	0		33.3	33.3	33.3	0	
PHF	.650	.871	.750	.000	.885	.500	.500	.625	.000	.556	.813	.938	.688	.000	.929	.750	.750	.750	.000	.750

Appendix B

Operational Analysis



Capacity Analysis

Intersection capacity analysis was conducted for the 6 study intersections on the Madison Avenue corridor. Capacity analysis was conducted using *2000 Highway Capacity Manual* (HCM) methodologies as applied by Synchro version 5.0. HCM methodologies evaluate intersection operations in terms of Levels of Service (LOS). LOS is a function of the delay at the intersection and ranges from 'A' (no delay) to 'F' (failing). Separate LOS definitions are applied to unsignalized and signalized intersection operations. **Tables B-1 and B-2** describe the intersection Level-of-Service definitions by average control delay per vehicle and its characteristics for unsignalized and signalized intersection operations, respectively. These criteria are applied to individual movements and the entire intersection in the same way.

Table B-1: Unsignalized Intersection Level-of-Service Descriptions

Level of Service	Average Delay (Sec/veh)	Description
A	< 5.0	Little or no delay.
B	5.1 to 10.0	Short traffic delays.
C	10.1 to 20.0	Average traffic delays.
D	20.1 to 30.0	Long traffic delays.
E	30.1 to 45.0	Very long traffic delays.
F	> 45.0	Volume exceeds capacity.

Table B-2: Signalized Intersection Level-of-Service Descriptions

Level of Service	Average Delay (Sec/veh)	Description
A	≤ 01	Very low delay. Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.
B	> 10 and < 20	Occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A
C	> 20 and < 35	Higher delays result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. Significant numbers of vehicles stop although many still pass through the intersection without stopping.
D	> 35 and < 55	Longer delays may result from unfavorable progression, long cycle lengths and/or high volume to capacity (v/c) ratios. Many vehicles stop and the proportion of vehicles not stopping declines.
E	> 55 and < 80	Considered to be the limit of acceptable delay, these high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	Considered to be unacceptable to most drivers, this condition often occurs with oversaturation. It may also occur at high v/c ratios below 1.00 with many individual cycle failures.



Capacity analysis was conducted for the AM and PM peak hours based on the redistributed volumes summarized in Figure 4. .

A PHF of 0.92 was used for all analysis scenarios. The PHF is used as a measure of flow intensity, and relates the total hourly volume to the peak 15 minute flow. A PHF can range from 1.0 indicating even flow throughout the hour and 0.25, indicating all total hourly traffic volumes occur during a single 15 minute period.

Signalized intersection analysis assumed an optimum cycle length as determined by Synchro algorithms.

Table B-3 summarizes the signalized and unsignalized LOS analysis for all scenarios evaluated. Output from the analysis is provided in this Appendix.



Table B-3: Capacity Analysis Summary







Intersection	Analysis Period	Alternative 1		Alternative 2		Alternative 2	
		LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Madison Avenue at 19th Street	AM Peak	B	12.4	B	16	B	11.7
	PM Peak	C	23.4	C	32.5	C	27.5
Madison Avenue at 20th Street	AM Peak	B	15.7	C	20.7	A	8
	PM Peak	C	27.3	C	29.2	A	9
Madison Avenue at Wallace Avenue	AM Peak	A	2.4	A	4.9	B	10.1
	PM Peak	A	6.5	A	9.8	C	21.8
Madison Avenue at Sterrett Avenue (Eastbound Left Turn) ¹	AM Peak	B	14.8	D	29.5	B	14.1
	PM Peak	C	24.4	F	>80	E	40.3
Madison Avenue at Levassor Avenue (Westbound Left Turn) ¹	AM Peak	F	>80	F	>80	F	79.8
	PM Peak	E	41.4	F	>80	F	>80
Madison Avenue at KY 16/17 Split (26th Street)	AM Peak	D	45.9	F	>80	D	42.0
	PM Peak	D	35.7	D	52.0	C	34.2

Note 1: Denotes Unsignalized intersection analysis by controlled approach









HCM Unsignalized Intersection Capacity Analysis
 2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	7	8	1684	0	4	391
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	8	9	1830	0	4	425
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	2052	915			1830	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2052	915			1830	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	97			99	
cM capacity (veh/h)	47	275			330	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	1220	610	146	283	
Volume Left	8	0	0	4	0	
Volume Right	9	0	0	0	0	
cSH	85	1700	1700	330	1700	
Volume to Capacity	0.19	0.72	0.36	0.01	0.17	
Queue Length (ft)	17	0	0	1	0	
Control Delay (s)	57.2	0.0	0.0	0.7	0.0	
Lane LOS	F			A		
Approach Delay (s)	57.2	0.0		0.2		
Approach LOS	F					
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	60.6%		ICU Level of Service		B	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Flt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3539			3539
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3539			3539
Volume (vph)	191	20	750	0	0	364
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	22	815	0	0	396
Lane Group Flow (vph)	208	22	815	0	0	396
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	14.6	14.6	65.4			65.4
Effective Green, g (s)	15.6	15.6	66.4			66.4
Actuated g/C Ratio	0.17	0.17	0.74			0.74
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	307	274	2611			2611
v/s Ratio Prot	c0.12		c0.23			0.11
v/s Ratio Perm		0.01				
v/c Ratio	0.68	0.08	0.31			0.15
Uniform Delay, d1	34.8	31.2	4.0			3.5
Progression Factor	1.00	1.00	0.33			0.76
Incremental Delay, d2	5.8	0.1	0.2			0.1
Delay (s)	40.7	31.3	1.6			2.8
Level of Service	D	C	A			A
Approach Delay (s)	39.8		1.6			2.8
Approach LOS	D		A			A
Intersection Summary						
HCM Average Control Delay			8.0	HCM Level of Service		A
HCM Volume to Capacity ratio			0.38			
Actuated Cycle Length (s)			90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			40.7%	ICU Level of Service	A	
c Critical Lane Group						













HCM Unsignalized Intersection Capacity Analysis
 4: Sterrett & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Volume (veh/h)	2	0	5	0	0	0	695	571	3	295	3	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	2	0	5	0	0	0	755	621	3	321	3	3
Pedestrians	1											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)	565											
pX, platoon unblocked												
vC, conflicting volume	1084	1705	163	929	1086	755	324			1376		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1084	1705	163	929	1086	755	324			1376		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	100	100	100	100			99		
cM capacity (veh/h)	170	90	852	220	214	351	1233			494		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	0	755	621	164	164						
Volume Left	2	0	0	0	3	0						
Volume Right	5	0	0	621	0	3						
cSH	398	1700	1700	1700	494	1700						
Volume to Capacity	0.02	0.00	0.44	0.37	0.01	0.10						
Queue Length (ft)	1	0	0	0	0	0						
Control Delay (s)	14.2	0.0	0.0	0.0	0.3	0.0						
Lane LOS	B	A			A							
Approach Delay (s)	14.2	0.0	0.0			0.2						
Approach LOS	B	A										
Intersection Summary												
Average Delay	0.1											
Intersection Capacity Utilization	60.8%		ICU Level of Service				B					







HCM Signalized Intersection Capacity Analysis
6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		4.0				4.0	
Lane Util. Factor	1.00				1.00		1.00				0.95	
Frt	0.97				1.00		0.85				0.99	
Flt Protected	0.98				0.96		1.00				0.99	
Satd. Flow (prot)	1764				1794		1583				3490	
Flt Permitted	0.81				0.82		1.00				0.78	
Satd. Flow (perm)	1461				1533		1583				3229	
Volume (vph)	22	12	9	54	17	64	39	661	39	47	244	13
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	13	10	59	18	70	42	718	42	51	265	14
Lane Group Flow (vph)	0	47	0	0	77	70	0	802	0	0	330	0
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	8.2				8.2		8.2		71.8		71.8	
Effective Green, g (s)	9.2				9.2		9.2		72.8		72.8	
Actuated g/C Ratio	0.10				0.10		0.10		0.81		0.81	
Clearance Time (s)	5.0				5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0				3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	149				157		162		2612		2227	
v/s Ratio Prot												
v/s Ratio Perm	0.03				c0.05		0.04		c0.25		0.12	
v/c Ratio	0.32				0.49		0.43		0.31		0.15	
Uniform Delay, d1	37.5				38.2		37.9		2.2		1.9	
Progression Factor	1.00				1.00		1.00		0.07		0.95	
Incremental Delay, d2	1.2				2.4		1.8		0.3		0.1	
Delay (s)	38.7				40.6		39.8		0.4		1.9	
Level of Service	D				D		D		A		A	
Approach Delay (s)	38.7				40.2				0.4		1.9	
Approach LOS	D				D				A		A	
Intersection Summary												
HCM Average Control Delay	6.6		HCM Level of Service		A							
HCM Volume to Capacity ratio	0.33											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	50.4%		ICU Level of Service		A							
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.85	1.00	1.00	0.93	
Fl _t Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	3276	
Fl _t Permitted	0.95	1.00	0.57	1.00	1.00	
Satd. Flow (perm)	1770	1583	1064	1863	3276	
Volume (vph)	117	99	192	448	106	104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	108	209	487	115	113
Lane Group Flow (vph)	127	108	209	487	228	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.2	11.2	68.8	68.8	58.6	
Effective Green, g (s)	12.2	12.2	69.8	69.8	59.6	
Actuated g/C Ratio	0.14	0.14	0.78	0.78	0.66	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	240	215	874	1445	2169	
v/s Ratio Prot	c0.07		0.02	c0.26	0.07	
v/s Ratio Perm		0.07	0.17			
v/c Ratio	0.53	0.50	0.24	0.34	0.11	
Uniform Delay, d ₁	36.2	36.1	2.7	3.1	5.5	
Progression Factor	1.00	1.00	0.29	0.24	1.00	
Incremental Delay, d ₂	2.1	1.8	0.1	0.6	0.1	
Delay (s)	38.3	37.9	0.9	1.4	5.6	
Level of Service	D	D	A	A	A	
Approach Delay (s)	38.1			1.2	5.6	
Approach LOS	D			A	A	
Intersection Summary						
HCM Average Control Delay			9.6	HCM Level of Service		A
HCM Volume to Capacity ratio			0.37			
Actuated Cycle Length (s)			90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			39.3%	ICU Level of Service	A	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0				4.0	
Lane Util. Factor	1.00						1.00				*0.88	
Flt	0.93						0.99				1.00	
Flt Protected	0.98						0.96				1.00	
Satd. Flow (prot)	1693						1774				3263	
Flt Permitted	0.98						0.70				1.00	
Satd. Flow (perm)	1693						1297				3263	
Volume (vph)	48	0	13	37	5	77	15	8	48	616	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	0	14	40	5	84	16	9	52	670	5	29
Lane Group Flow (vph)	0	106	0	0	0	0	114	0	0	727	0	0
Turn Type	Split				Split		Perm			custom		Perm
Protected Phases	4	4			8		8			10	10	
Permitted Phases							8			10	10	6
Actuated Green, G (s)	8.3						10.8				17.0	
Effective Green, g (s)	9.3						11.8				18.0	
Actuated g/C Ratio	0.10						0.13				0.20	
Clearance Time (s)	5.0						5.0				5.0	
Vehicle Extension (s)	3.0						3.0				3.0	
Lane Grp Cap (vph)	175						170				653	
v/s Ratio Prot	c0.06										c0.22	
v/s Ratio Perm							c0.09					
v/c Ratio	0.61						0.67				1.11	
Uniform Delay, d1	38.6						37.2				36.0	
Progression Factor	1.00						1.00				1.00	
Incremental Delay, d2	5.8						9.9				70.6	
Delay (s)	44.4						47.2				106.6	
Level of Service	D						D				F	
Approach Delay (s)	44.4						47.2				106.6	
Approach LOS	D						D				F	
Intersection Summary												
HCM Average Control Delay	54.1		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	82.0%		ICU Level of Service		D							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue







5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Flt	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1843		1770	2787
Flt Permitted	0.84	1.00		0.60	1.00
Satd. Flow (perm)	1562	1843		1122	2787
Volume (vph)	141	161	12	48	666
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	175	13	52	724
Lane Group Flow (vph)	182	188	0	52	724
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	33.9	33.9		33.9	33.9
Effective Green, g (s)	34.9	34.9		34.9	34.9
Actuated g/C Ratio	0.39	0.39		0.39	0.39
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	606	715		435	1081
v/s Ratio Prot	0.10		c0.26		
v/s Ratio Perm	0.12		0.05		
v/c Ratio	0.30	0.26		0.12	0.67
Uniform Delay, d1	19.1	18.8		17.7	22.8
Progression Factor	0.83	0.80		1.00	1.00
Incremental Delay, d2	0.3	0.2		0.6	3.3
Delay (s)	16.0	15.2		18.2	26.1
Level of Service	B	B		B	C
Approach Delay (s)	15.6		25.6		
Approach LOS	B		C		
Intersection Summary					

HCM Unsignalized Intersection Capacity Analysis







2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	14	8	827	0	2	1129
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	15	9	899	0	2	1227
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	1517	449			899	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1517	449			899	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	86	98			100	
cM capacity (veh/h)	110	557			751	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	24	599	300	411	818	
Volume Left	15	0	0	2	0	
Volume Right	9	0	0	0	0	
cSH	155	1700	1700	751	1700	
Volume to Capacity	0.15	0.35	0.18	0.00	0.48	
Queue Length (ft)	13	0	0	0	0	
Control Delay (s)	32.5	0.0	0.0	0.1	0.0	
Lane LOS	D			A		
Approach Delay (s)	32.5	0.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	44.5%		ICU Level of Service		A	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Flt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3539			3539
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3539			3539
Volume (vph)	488	8	591	0	0	638
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	530	9	642	0	0	693
Lane Group Flow (vph)	530	9	642	0	0	693
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	35.4	35.4	64.6			64.6
Effective Green, g (s)	36.4	36.4	65.6			65.6
Actuated g/C Ratio	0.33	0.33	0.60			0.60
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	586	524	2111			2111
v/s Ratio Prot	c0.30		0.18			c0.20
v/s Ratio Perm		0.01				
v/c Ratio	0.90	0.02	0.30			0.33
Uniform Delay, d1	35.1	24.8	10.9			11.1
Progression Factor	1.00	1.00	0.65			0.55
Incremental Delay, d2	17.4	0.0	0.4			0.4
Delay (s)	52.5	24.8	7.5			6.6
Level of Service	D	C	A			A
Approach Delay (s)	52.1		7.5			6.6
Approach LOS	D		A			A
Intersection Summary						
HCM Average Control Delay			20.0	HCM Level of Service		B
HCM Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			110.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			55.2%	ICU Level of Service	A	
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
4: Sterrett & Madison Avenue













5/6/2008

Movement												
Lane Configurations												
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Volume (veh/h)	2	0	5	0	0	0	0	478	163	20	941	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	2	0	5	0	0	0	0	520	177	22	1023	2
Pedestrians	1											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)	565											
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	1587	1764	514	1081	1588	520	1025			697		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1556	1747	402	1012	1557	520	952			697		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	99	100	100	100	100			98		
cM capacity (veh/h)	70	77	555	175	101	501	667			895		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	0	520	177	533	514						
Volume Left	2	0	0	0	22	0						
Volume Right	5	0	0	177	0	2						
cSH	186	1700	1700	1700	895	1700						
Volume to Capacity	0.04	0.00	0.31	0.10	0.02	0.30						
Queue Length (ft)	3	0	0	0	2	0						
Control Delay (s)	25.2	0.0	0.0	0.0	0.7	0.0						
Lane LOS	D	A			A							
Approach Delay (s)	25.2	0.0	0.0	0.3								
Approach LOS	D	A										
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	53.3%				ICU Level of Service				A			

HCM Signalized Intersection Capacity Analysis







6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		4.0				4.0	
Lane Util. Factor	1.00				1.00		1.00				0.95	
Fr _t	0.97				1.00		0.85				0.99	
Fl _t Protected	0.97				0.96		1.00				0.99	
Satd. Flow (prot)	1767				1781		1583				3482	
Fl _t Permitted	0.81				0.77		1.00				0.82	
Satd. Flow (perm)	1466				1440		1583				2873	
Volume (vph)	22	10	7	76	6	101	4	491	30	68	525	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	11	8	83	7	110	4	534	33	74	571	50
Lane Group Flow (vph)	0	43	0	0	90	110	0	571	0	0	695	0
Turn Type	Perm		Perm		Perm		Perm				Perm	
Protected Phases	4				8				2		6	
Permitted Phases	4			8			8	2			6	
Actuated Green, G (s)	11.6				11.6		11.6		88.4		88.4	
Effective Green, g (s)	12.6				12.6		12.6		89.4		89.4	
Actuated g/C Ratio	0.11				0.11		0.11		0.81		0.81	
Clearance Time (s)	5.0				5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0				3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	168				165		181		2715		2335	
v/s Ratio Prot												
v/s Ratio Perm	0.03				0.06		c0.07		0.17		c0.24	
v/c Ratio	0.26				0.55		0.61		0.21		0.30	
Uniform Delay, d ₁	44.4				46.0		46.3		2.3		2.5	
Progression Factor	1.00				1.00		1.00		0.50		0.45	
Incremental Delay, d ₂	0.8				3.7		5.7		0.2		0.3	
Delay (s)	45.2				49.6		52.0		1.3		1.4	
Level of Service	D				D		D		A		A	
Approach Delay (s)	45.2				51.0				1.3		1.4	
Approach LOS	D				D				A		A	
Intersection Summary												
HCM Average Control Delay	9.2				HCM Level of Service				A			
HCM Volume to Capacity ratio	0.34											
Actuated Cycle Length (s)	110.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	57.0%				ICU Level of Service				A			
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Flt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	3374	
Flt Permitted	0.95	1.00	0.27	1.00	1.00	
Satd. Flow (perm)	1770	1583	508	1863	3374	
Volume (vph)	285	281	186	470	485	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	305	202	511	527	239
Lane Group Flow (vph)	310	305	202	511	766	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	23.9	23.9	77.1	76.1	49.1	
Effective Green, g (s)	24.9	24.9	77.1	77.1	50.1	
Actuated g/C Ratio	0.23	0.23	0.70	0.70	0.46	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	401	358	620	1306	1537	
v/s Ratio Prot	0.18		0.07	c0.27	c0.23	
v/s Ratio Perm		c0.19	0.16			
v/c Ratio	0.77	0.85	0.33	0.39	0.50	
Uniform Delay, d1	39.9	40.8	13.9	6.8	21.1	
Progression Factor	1.00	1.00	0.30	0.25	1.00	
Incremental Delay, d2	9.0	17.4	0.3	0.9	1.2	
Delay (s)	48.9	58.2	4.4	2.6	22.3	
Level of Service	D	E	A	A	C	
Approach Delay (s)	53.5			3.1	22.3	
Approach LOS	D			A	C	
Intersection Summary						
HCM Average Control Delay			24.9	HCM Level of Service		C
HCM Volume to Capacity ratio			0.55			
Actuated Cycle Length (s)			110.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			60.6%	ICU Level of Service	B	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0				4.0	
Lane Util. Factor	1.00						1.00				*0.88	
Flt	0.95						1.00				1.00	
Flt Protected	0.98						0.95				0.99	
Satd. Flow (prot)	1735						1774				3248	
Flt Permitted	0.98						0.66				0.99	
Satd. Flow (perm)	1735						1221				3248	
Volume (vph)	29	28	19	19	56	56	2	1	65	356	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	30	21	21	61	61	2	1	71	387	5	29
Lane Group Flow (vph)	0	104	0	0	0	0	125	0	0	463	0	0
Turn Type	Split				Split		Perm			custom		Perm
Protected Phases	4	4			8		8			10	10	
Permitted Phases							8			10	10	6
Actuated Green, G (s)	11.2						14.2				17.6	
Effective Green, g (s)	12.2						15.2				18.6	
Actuated g/C Ratio	0.11						0.14				0.17	
Clearance Time (s)	5.0						5.0				5.0	
Vehicle Extension (s)	3.0						3.0				3.0	
Lane Grp Cap (vph)	192						169				549	
v/s Ratio Prot	c0.06										c0.14	
v/s Ratio Perm							c0.10					
v/c Ratio	0.54						0.74				0.84	
Uniform Delay, d1	46.3						45.5				44.3	
Progression Factor	1.00						1.00				1.00	
Incremental Delay, d2	3.1						15.5				11.3	
Delay (s)	49.4						61.0				55.6	
Level of Service	D						E				E	
Approach Delay (s)	49.4						61.0				55.6	
Approach LOS	D						E				E	
Intersection Summary												
HCM Average Control Delay	34.1				HCM Level of Service		C					
HCM Volume to Capacity ratio	0.72											
Actuated Cycle Length (s)	110.0				Sum of lost time (s)		16.0					
Intersection Capacity Utilization	80.0%				ICU Level of Service		D					
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue







5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Flt	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1845		1770	2787
Flt Permitted	0.97	1.00		0.29	1.00
Satd. Flow (perm)	1800	1845		542	2787
Volume (vph)	424	489	34	65	262
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	532	37	71	285
Lane Group Flow (vph)	490	569	0	71	285
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	47.0	47.0		47.0	47.0
Effective Green, g (s)	48.0	48.0		48.0	48.0
Actuated g/C Ratio	0.44	0.44		0.44	0.44
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	785	805		237	1216
v/s Ratio Prot	c0.31		0.10		
v/s Ratio Perm	0.27		0.13		
v/c Ratio	0.62	0.71	0.30		
Uniform Delay, d1	24.0	25.3	20.1		
Progression Factor	0.91	0.90	1.00		
Incremental Delay, d2	1.5	2.7	3.2		
Delay (s)	23.3	25.5	23.3		
Level of Service	C	C	C		
Approach Delay (s)	24.5		20.6		
Approach LOS	C		C		
Intersection Summary					

HCM Unsignalized Intersection Capacity Analysis







2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	7	8	1834	0	4	491
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	8	9	1993	0	4	534
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	2269	997			1993	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2269	997			1993	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	96			98	
cM capacity (veh/h)	34	243			285	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	1329	664	182	356	
Volume Left	8	0	0	4	0	
Volume Right	9	0	0	0	0	
cSH	62	1700	1700	285	1700	
Volume to Capacity	0.26	0.78	0.39	0.02	0.21	
Queue Length (ft)	23	0	0	1	0	
Control Delay (s)	82.3	0.0	0.0	0.7	0.0	
Lane LOS	F			A		
Approach Delay (s)	82.3	0.0		0.2		
Approach LOS	F					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	65.1%		ICU Level of Service		B	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Flt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3539			3539
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3539			3539
Volume (vph)	40	20	1300	0	0	615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	22	1413	0	0	668
Lane Group Flow (vph)	43	22	1413	0	0	668
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	7.0	7.0	103.0			103.0
Effective Green, g (s)	8.0	8.0	104.0			104.0
Actuated g/C Ratio	0.07	0.07	0.87			0.87
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	118	106	3067			3067
v/s Ratio Prot	c0.02		c0.40			0.19
v/s Ratio Perm		0.01				
v/c Ratio	0.36	0.21	0.46			0.22
Uniform Delay, d1	53.6	53.0	1.8			1.3
Progression Factor	1.00	1.00	0.27			0.41
Incremental Delay, d2	1.9	1.0	0.4			0.2
Delay (s)	55.5	54.0	0.9			0.7
Level of Service	E	D	A			A
Approach Delay (s)	55.0		0.9			0.7
Approach LOS	D		A			A
Intersection Summary						
HCM Average Control Delay			2.4	HCM Level of Service		A
HCM Volume to Capacity ratio			0.45			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			49.1%	ICU Level of Service	A	
c Critical Lane Group						













HCM Unsignalized Intersection Capacity Analysis
4: Sterrett & Madison Avenue

5/6/2008

Movement													
Lane Configurations													
Sign Control	Stop		Stop		Free			Free					
Grade	0%		0%		0%			0%					
Volume (veh/h)	2	0	5	0	0	0	0	1245	170	3	395	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (veh/h)	2	0	5	0	0	0	0	1353	185	3	429	3	
Pedestrians								1					
Lane Width (ft)								12.0					
Walking Speed (ft/s)								4.0					
Percent Blockage								0					
Right turn flare (veh)													
Median type	None				None								
Median storage (veh)													
Upstream signal (ft)											565		
pX, platoon unblocked													
vC, conflicting volume	1114	1976	217	1673	1885	769	433				1538		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1114	1976	217	1673	1885	769	433				1538		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1		
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2		
p0 queue free %	99	100	99	100	100	100	100				99		
cM capacity (veh/h)	162	61	786	62	69	344	1123				428		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	8	0	902	636	218	218							
Volume Left	2	0	0	0	3	0							
Volume Right	5	0	0	185	0	3							
cSH	374	1700	1700	1700	428	1700							
Volume to Capacity	0.02	0.00	0.53	0.37	0.01	0.13							
Queue Length (ft)	2	0	0	0	1	0							
Control Delay (s)	14.8	0.0	0.0	0.0	0.3	0.0							
Lane LOS	B	A					A						
Approach Delay (s)	14.8	0.0	0.0			0.2							
Approach LOS	B	A											
Intersection Summary													
Average Delay			0.1										
Intersection Capacity Utilization			53.3%		ICU Level of Service			A					







HCM Signalized Intersection Capacity Analysis
 6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		0.95	
Flt		0.97		1.00	0.88			1.00	0.85		0.99	
Flt Protected		0.98		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1764		1770	1640			1858	1583		3490	
Flt Permitted		0.86		0.76	1.00			0.96	1.00		0.74	
Satd. Flow (perm)		1561		1409	1640			1795	1583		2609	
Volume (vph)	22	12	9	304	17	64	39	661	589	47	244	13
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	13	10	330	18	70	42	718	640	51	265	14
Lane Group Flow (vph)	0	47	0	330	88	0	0	760	640	0	330	0
Turn Type		Perm		Perm			Perm		Perm	Perm		
Protected Phases		4		8	8		2	2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		31.9		31.9	31.9			78.1	78.1		78.1	
Effective Green, g (s)		32.9		32.9	32.9			79.1	79.1		79.1	
Actuated g/C Ratio		0.27		0.27	0.27			0.66	0.66		0.66	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		428		386	450			1183	1043		1720	
v/s Ratio Prot					0.05							
v/s Ratio Perm		0.03		0.23				0.42	0.40		0.13	
v/c Ratio		0.11		0.85	0.20			0.64	0.61		0.19	
Uniform Delay, d1		32.6		41.3	33.4			12.1	11.7		8.0	
Progression Factor		1.00		1.00	1.00			0.30	0.25		0.98	
Incremental Delay, d2		0.1		16.6	0.2			2.5	2.5		0.2	
Delay (s)		32.7		57.9	33.6			6.1	5.4		8.1	
Level of Service		C		E	C			A	A		A	
Approach Delay (s)		32.7			52.8			5.8			8.1	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay			15.7			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			84.4%			ICU Level of Service				D		
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Flt	1.00	0.85	1.00	1.00	0.93	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	3276	
Flt Permitted	0.95	1.00	0.58	1.00	1.00	
Satd. Flow (perm)	1770	1583	1086	1863	3276	
Volume (vph)	117	99	192	448	106	104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	108	209	487	115	113
Lane Group Flow (vph)	127	108	209	487	228	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.2	13.2	96.8	96.8	86.7	
Effective Green, g (s)	14.2	14.2	97.8	97.8	87.7	
Actuated g/C Ratio	0.12	0.12	0.82	0.82	0.73	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	209	187	920	1518	2394	
v/s Ratio Prot	c0.07		0.01	c0.26	0.07	
v/s Ratio Perm		0.07	0.17			
v/c Ratio	0.61	0.58	0.23	0.32	0.10	
Uniform Delay, d1	50.3	50.1	2.4	2.8	4.7	
Progression Factor	1.00	1.00	0.12	0.12	1.00	
Incremental Delay, d2	4.9	4.3	0.1	0.5	0.1	
Delay (s)	55.2	54.3	0.4	0.8	4.8	
Level of Service	E	D	A	A	A	
Approach Delay (s)	54.8			0.7	4.8	
Approach LOS	D			A	A	
Intersection Summary						
HCM Average Control Delay			12.4	HCM Level of Service		B
HCM Volume to Capacity ratio			0.36			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			39.3%	ICU Level of Service	A	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0				4.0	
Lane Util. Factor	1.00						1.00				*0.88	
Flt	0.93						0.99				1.00	
Flt Protected	0.98						0.96				1.00	
Satd. Flow (prot)	1693						1774				3263	
Flt Permitted	0.98						0.70				1.00	
Satd. Flow (perm)	1693						1297				3263	
Volume (vph)	48	0	13	37	5	77	15	8	48	616	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	0	14	40	5	84	16	9	52	670	5	29
Lane Group Flow (vph)	0	106	0	0	0	0	114	0	0	727	0	0
Turn Type	Split				Split		Perm			custom	Perm	
Protected Phases	4	4			8		8			10	10	
Permitted Phases							8			10	10	6
Actuated Green, G (s)	11.2						13.7				27.6	
Effective Green, g (s)	12.2						14.7				28.6	
Actuated g/C Ratio	0.10						0.12				0.24	
Clearance Time (s)	5.0						5.0				5.0	
Vehicle Extension (s)	3.0						3.0				3.0	
Lane Grp Cap (vph)	172						159				778	
v/s Ratio Prot	c0.06										c0.22	
v/s Ratio Perm							c0.09					
v/c Ratio	0.62						0.72				0.93	
Uniform Delay, d1	51.7						50.6				44.8	
Progression Factor	1.00						1.00				1.00	
Incremental Delay, d2	6.4						14.3				18.1	
Delay (s)	58.1						64.9				62.9	
Level of Service	E						E				E	
Approach Delay (s)	58.1						64.9				62.9	
Approach LOS	E						E				E	
Intersection Summary												
HCM Average Control Delay	45.9		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	93.7%		ICU Level of Service		E							
c Critical Lane Group												







HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Flt	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1843		1770	2787
Flt Permitted	0.74	1.00		0.46	1.00
Satd. Flow (perm)	1376	1843		865	2787
Volume (vph)	241	161	12	48	816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	262	175	13	52	887
Lane Group Flow (vph)	291	188	0	52	887
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5
Effective Green, g (s)	48.5	48.5		48.5	48.5
Actuated g/C Ratio	0.40	0.40		0.40	0.40
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	556	745		350	1126
v/s Ratio Prot	0.10		c0.32		
v/s Ratio Perm	0.21		0.06		
v/c Ratio	0.52	0.25		0.15	0.79
Uniform Delay, d1	27.0	23.7		22.7	31.3
Progression Factor	1.21	1.21		1.00	1.00
Incremental Delay, d2	0.9	0.2		0.9	5.6
Delay (s)	33.7	28.9		23.6	36.9
Level of Service	C	C		C	D
Approach Delay (s)	31.8		36.1		
Approach LOS	C		D		
Intersection Summary					







HCM Unsignalized Intersection Capacity Analysis
 2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	14	8	927	0	2	1229
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	15	9	1008	0	2	1336
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	1680	504			1008	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1680	504			1008	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	98			100	
cM capacity (veh/h)	85	513			683	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	24	672	336	447	891	
Volume Left	15	0	0	2	0	
Volume Right	9	0	0	0	0	
cSH	122	1700	1700	683	1700	
Volume to Capacity	0.20	0.40	0.20	0.00	0.52	
Queue Length (ft)	17	0	0	0	0	
Control Delay (s)	41.4	0.0	0.0	0.1	0.0	
Lane LOS	E			A		
Approach Delay (s)	41.4	0.0		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	47.6%		ICU Level of Service		A	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Flt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3539			3539
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3539			3539
Volume (vph)	135	8	791	0	0	1080
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	9	860	0	0	1174
Lane Group Flow (vph)	147	9	860	0	0	1174
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	14.2	14.2	95.8			95.8
Effective Green, g (s)	15.2	15.2	96.8			96.8
Actuated g/C Ratio	0.13	0.13	0.81			0.81
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	224	201	2855			2855
v/s Ratio Prot	c0.08		0.24			c0.33
v/s Ratio Perm		0.01				
v/c Ratio	0.66	0.04	0.30			0.41
Uniform Delay, d1	49.9	46.0	3.0			3.4
Progression Factor	1.00	1.00	0.67			0.80
Incremental Delay, d2	6.8	0.1	0.3			0.3
Delay (s)	56.7	46.1	2.2			3.0
Level of Service	E	D	A			A
Approach Delay (s)	56.1		2.2			3.0
Approach LOS	E		A			A
Intersection Summary						
HCM Average Control Delay			6.5	HCM Level of Service		A
HCM Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			47.2%	ICU Level of Service	A	
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 4: Sterrett & Madison Avenue













5/6/2008

Movement												
Lane Configurations												
Sign Control	Stop		Stop		Free			Free				
Grade	0%		0%		0%			0%				
Volume (veh/h)	2	0	5	0	0	0	0	678	65	20	1041	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	2	0	5	0	0	0	0	737	71	22	1132	2
Pedestrians	1											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)												565
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92	0.92						
vC, conflicting volume	1545	1984	568	1388	1949	404	1134			808		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1505	1982	445	1335	1945	404	1059			808		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	99	100	100	100	100			97		
cM capacity (veh/h)	75	54	516	100	57	596	602			813		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	0	491	316	588	568						
Volume Left	2	0	0	0	22	0						
Volume Right	5	0	0	71	0	2						
cSH	193	1700	1700	1700	813	1700						
Volume to Capacity	0.04	0.00	0.29	0.19	0.03	0.33						
Queue Length (ft)	3	0	0	0	2	0						
Control Delay (s)	24.4	0.0	0.0	0.0	0.7	0.0						
Lane LOS	C	A			A							
Approach Delay (s)	24.4	0.0	0.0	0.4								
Approach LOS	C	A										
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	48.3%			ICU Level of Service				A				

HCM Signalized Intersection Capacity Analysis







6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		0.95	
Flt		0.97		1.00	0.86			1.00	0.85		0.99	
Flt Protected		0.97		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)		1767		1770	1600			1862	1583		3482	
Flt Permitted		0.86		0.73	1.00			1.00	1.00		0.72	
Satd. Flow (perm)		1553		1358	1600			1855	1583		2520	
Volume (vph)	22	10	7	525	6	101	4	491	330	68	525	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	11	8	571	7	110	4	534	359	74	571	50
Lane Group Flow (vph)	0	43	0	571	117	0	0	538	359	0	695	0
Turn Type	Perm		Perm			Perm		Perm		Perm		
Protected Phases	4		8			8		2		6		
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		52.8		52.8	52.8			57.2	57.2		57.2	
Effective Green, g (s)		53.8		53.8	53.8			58.2	58.2		58.2	
Actuated g/C Ratio		0.45		0.45	0.45			0.49	0.49		0.49	
Clearance Time (s)		5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		696		609	717			900	768		1222	
v/s Ratio Prot				0.07								
v/s Ratio Perm		0.03		0.42				0.29	0.23		0.28	
v/c Ratio		0.06		0.94	0.16			0.60	0.47		0.57	
Uniform Delay, d1		18.8		31.5	19.7			22.4	20.6		22.0	
Progression Factor		1.00		1.00	1.00			0.51	1.13		0.77	
Incremental Delay, d2		0.0		22.1	0.1			2.8	2.0		1.8	
Delay (s)		18.8		53.6	19.8			14.3	25.3		18.7	
Level of Service		B		D	B			B	C		B	
Approach Delay (s)		18.8		47.8				18.7	18.7			
Approach LOS		B		D				B	B			
Intersection Summary												
HCM Average Control Delay	27.3			HCM Level of Service				C				
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)				8.0				
Intersection Capacity Utilization	96.1%			ICU Level of Service				E				
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Flt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	3374	
Flt Permitted	0.95	1.00	0.30	1.00	1.00	
Satd. Flow (perm)	1770	1583	559	1863	3374	
Volume (vph)	285	281	186	470	485	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	305	202	511	527	239
Lane Group Flow (vph)	310	305	202	511	766	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	25.7	25.7	84.3	84.3	73.2	
Effective Green, g (s)	26.7	26.7	85.3	85.3	74.2	
Actuated g/C Ratio	0.22	0.22	0.71	0.71	0.62	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	394	352	469	1324	2086	
v/s Ratio Prot	0.18		0.03	c0.27	0.23	
v/s Ratio Perm		c0.19	c0.28			
v/c Ratio	0.79	0.87	0.43	0.39	0.37	
Uniform Delay, d1	44.0	44.9	6.7	6.9	11.3	
Progression Factor	1.00	1.00	1.86	0.19	1.00	
Incremental Delay, d2	10.0	19.5	0.6	0.8	0.5	
Delay (s)	53.9	64.4	13.0	2.1	11.8	
Level of Service	D	E	B	A	B	
Approach Delay (s)	59.1			5.2	11.8	
Approach LOS	E			A	B	
Intersection Summary						
HCM Average Control Delay			23.4	HCM Level of Service		C
HCM Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			60.6%	ICU Level of Service	B	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0		4.0			
Lane Util. Factor	1.00						1.00		*0.88			
Flt	0.95						1.00		1.00			
Flt Protected	0.98						0.95		0.99			
Satd. Flow (prot)	1735						1774		3248			
Flt Permitted	0.98						0.66		0.99			
Satd. Flow (perm)	1735						1221		3248			
Volume (vph)	29	28	19	19	56	56	2	1	65	356	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	30	21	21	61	61	2	1	71	387	5	29
Lane Group Flow (vph)	0	104	0	0	0	0	125	0	0	463	0	0
Turn Type	Split				Split		Perm	custom				Perm
Protected Phases	4	4			8		8	10		10		
Permitted Phases							8	10		10		6
Actuated Green, G (s)	11.7						14.7		18.6			
Effective Green, g (s)	12.7						15.7		19.6			
Actuated g/C Ratio	0.11						0.13		0.16			
Clearance Time (s)	5.0						5.0		5.0			
Vehicle Extension (s)	3.0						3.0		3.0			
Lane Grp Cap (vph)	184						160		531			
v/s Ratio Prot	c0.06								c0.14			
v/s Ratio Perm							c0.10					
v/c Ratio	0.57						0.78		0.87			
Uniform Delay, d1	51.0						50.5		49.0			
Progression Factor	1.00						1.00		1.00			
Incremental Delay, d2	3.9						21.5		14.6			
Delay (s)	55.0						72.0		63.6			
Level of Service	D						E		E			
Approach Delay (s)	55.0						72.0		63.6			
Approach LOS	D						E		E			
Intersection Summary												
HCM Average Control Delay	35.7		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	86.8%		ICU Level of Service		D							
c Critical Lane Group												







HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Flt	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1845		1770	2787
Flt Permitted	0.96	1.00		0.22	1.00
Satd. Flow (perm)	1797	1845		409	2787
Volume (vph)	524	489	34	65	362
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	570	532	37	71	393
Lane Group Flow (vph)	599	569	0	71	393
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	55.0	55.0		55.0	55.0
Effective Green, g (s)	56.0	56.0		56.0	56.0
Actuated g/C Ratio	0.47	0.47		0.47	0.47
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	839	861		191	1301
v/s Ratio Prot		0.31			0.14
v/s Ratio Perm	0.33			0.17	
v/c Ratio	0.71	0.66		0.37	0.30
Uniform Delay, d1	25.6	24.7		20.6	19.9
Progression Factor	0.89	0.89		1.00	1.00
Incremental Delay, d2	2.8	1.8		5.5	0.6
Delay (s)	25.5	23.8		26.1	20.5
Level of Service	C	C		C	C
Approach Delay (s)	24.7			21.3	
Approach LOS	C			C	
Intersection Summary					







HCM Unsignalized Intersection Capacity Analysis
 2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Volume (veh/h)	7	8	1834	0	4	491
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	8	9	1993	0	4	534
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	2536	1993			1993	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2536	1993			1993	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	74	89			98	
cM capacity (veh/h)	30	76			288	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	16	1993	4	534		
Volume Left	8	0	4	0		
Volume Right	9	0	0	0		
cSH	44	1700	288	1700		
Volume to Capacity	0.37	1.17	0.02	0.31		
Queue Length (ft)	32	0	1	0		
Control Delay (s)	129.3	0.0	17.7	0.0		
Lane LOS	F		C			
Approach Delay (s)	129.3	0.0	0.1			
Approach LOS	F					
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	114.9%		ICU Level of Service		G	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Flt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	1863			1863
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	1863			1863
Volume (vph)	40	20	1300	0	0	615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	22	1413	0	0	668
Lane Group Flow (vph)	43	22	1413	0	0	668
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	7.8	7.8	132.2			132.2
Effective Green, g (s)	8.8	8.8	133.2			133.2
Actuated g/C Ratio	0.06	0.06	0.89			0.89
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	104	93	1654			1654
v/s Ratio Prot	c0.02		c0.76			0.36
v/s Ratio Perm		0.01				
v/c Ratio	0.41	0.24	0.85			0.40
Uniform Delay, d1	68.1	67.4	3.9			1.5
Progression Factor	1.00	1.00	0.74			0.61
Incremental Delay, d2	2.7	1.3	0.6			0.7
Delay (s)	70.8	68.7	3.5			1.6
Level of Service	E	E	A			A
Approach Delay (s)	70.1		3.5			1.6
Approach LOS	E		A			A
Intersection Summary						
HCM Average Control Delay			4.9	HCM Level of Service		A
HCM Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			150.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			84.4%	ICU Level of Service	D	
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 4: Sterrett & Madison Avenue













5/6/2008

Movement													
Lane Configurations													
Sign Control	Stop		Stop		Free			Free		Free			
Grade	0%		0%		0%			0%		0%			
Volume (veh/h)	2	0	5	0	0	0	0	1245	170	3	395	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (veh/h)	2	0	5	0	0	0	0	1353	185	3	429	3	
Pedestrians	1												
Lane Width (ft)	12.0												
Walking Speed (ft/s)	4.0												
Percent Blockage	0												
Right turn flare (veh)													
Median type	None				None								
Median storage (veh)													
Upstream signal (ft)	565												
pX, platoon unblocked													
vC, conflicting volume	1883	1976	432	1888	1885	1446	433			1538			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1883	1976	432	1888	1885	1446	433			1538			
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	96	100	99	100	100	100	100			99			
cM capacity (veh/h)	54	62	623	53	70	162	1127			432			
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2								
Volume Total	8	0	1538	3	433								
Volume Left	2	0	0	3	0								
Volume Right	5	0	185	0	3								
cSH	155	1700	1700	432	1700								
Volume to Capacity	0.05	0.00	0.90	0.01	0.25								
Queue Length (ft)	4	0	0	1	0								
Control Delay (s)	29.5	0.0	0.0	13.4	0.0								
Lane LOS	D	A		B									
Approach Delay (s)	29.5	0.0	0.0	0.1									
Approach LOS	D	A											
Intersection Summary													
Average Delay	0.1												
Intersection Capacity Utilization	92.4%				ICU Level of Service				E				

HCM Signalized Intersection Capacity Analysis







6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Flt	0.97		1.00		0.88		1.00		1.00		0.99	
Flt Protected	0.98		0.95		1.00		0.95		1.00		0.95	
Satd. Flow (prot)	1764		1770		1640		1770		1863		1583	
Flt Permitted	0.86		0.74		1.00		0.56		1.00		0.29	
Satd. Flow (perm)	1552		1380		1640		1045		1863		1583	
Volume (vph)	22	12	9	304	17	64	39	661	589	47	244	13
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	13	10	330	18	70	42	718	640	51	265	14
Lane Group Flow (vph)	0	47	0	330	88	0	42	718	640	51	279	0
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	38.7		38.7		38.7		101.3		101.3		101.3	
Effective Green, g (s)	39.7		39.7		39.7		102.3		102.3		102.3	
Actuated g/C Ratio	0.26		0.26		0.26		0.68		0.68		0.68	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	411		365		434		713		1271		1080	
v/s Ratio Prot					0.05		0.39				0.15	
v/s Ratio Perm	0.03		0.24				0.04		0.40		0.10	
v/c Ratio	0.11		0.90		0.20		0.06		0.56		0.14	
Uniform Delay, d1	41.8		53.3		42.9		7.9		12.3		8.4	
Progression Factor	1.00		1.00		1.00		0.68		0.63		0.44	
Incremental Delay, d2	0.1		24.8		0.2		0.1		1.0		1.3	
Delay (s)	41.9		78.1		43.1		5.5		8.8		6.9	
Level of Service	D		E		D		A		A		A	
Approach Delay (s)	41.9				70.7				7.8		9.1	
Approach LOS	D				E				A		A	
Intersection Summary												
HCM Average Control Delay			20.7		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			69.5%		ICU Level of Service				B			
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.85	1.00	1.00	0.93	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1738	
Flt Permitted	0.95	1.00	0.59	1.00	1.00	
Satd. Flow (perm)	1770	1583	1100	1863	1738	
Volume (vph)	117	99	192	448	106	104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	108	209	487	115	113
Lane Group Flow (vph)	127	108	209	487	228	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	15.2	15.2	124.8	124.8	114.3	
Effective Green, g (s)	16.2	16.2	125.8	125.8	115.3	
Actuated g/C Ratio	0.11	0.11	0.84	0.84	0.77	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	191	171	952	1562	1336	
v/s Ratio Prot	c0.07		0.01	c0.26	0.13	
v/s Ratio Perm		0.07	0.17			
v/c Ratio	0.66	0.63	0.22	0.31	0.17	
Uniform Delay, d1	64.3	64.0	2.3	2.6	4.6	
Progression Factor	1.00	1.00	0.14	0.15	1.00	
Incremental Delay, d2	8.4	7.4	0.1	0.5	0.3	
Delay (s)	72.7	71.4	0.4	0.8	4.9	
Level of Service	E	E	A	A	A	
Approach Delay (s)	72.1			0.7	4.9	
Approach LOS	E			A	A	
Intersection Summary						
HCM Average Control Delay			16.0	HCM Level of Service		B
HCM Volume to Capacity ratio			0.35			
Actuated Cycle Length (s)			150.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			41.6%	ICU Level of Service	A	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0		4.0			
Lane Util. Factor	1.00						1.00		*0.88			
Fr _t	0.93						0.99		1.00			
Fl _t Protected	0.98						0.96		1.00			
Satd. Flow (prot)	1693						1774		1632			
Fl _t Permitted	0.98						0.70		1.00			
Satd. Flow (perm)	1693						1297		1632			
Volume (vph)	48	0	13	37	5	77	15	8	48	616	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	0	14	40	5	84	16	9	52	670	5	29
Lane Group Flow (vph)	0	106	0	0	0	0	114	0	0	727	0	0
Turn Type	Split				Split		Perm	custom				Perm
Protected Phases	4	4			8		8	10		10		
Permitted Phases							8	10		10		6
Actuated Green, G (s)	12.7						15.1		41.0			
Effective Green, g (s)	13.7						16.1		42.0			
Actuated g/C Ratio	0.09						0.11		0.28			
Clearance Time (s)	5.0						5.0		5.0			
Vehicle Extension (s)	3.0						3.0		3.0			
Lane Grp Cap (vph)	155						139		457			
v/s Ratio Prot	c0.06								c0.45			
v/s Ratio Perm							c0.09					
v/c Ratio	0.68						0.82		1.59			
Uniform Delay, d ₁	66.1						65.5		54.0			
Progression Factor	1.00						1.00		1.00			
Incremental Delay, d ₂	11.8						30.5		276.1			
Delay (s)	77.8						96.1		330.1			
Level of Service	E						F		F			
Approach Delay (s)	77.8						96.1		330.1			
Approach LOS	E						F		F			
Intersection Summary												
HCM Average Control Delay	242.7		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.38											
Actuated Cycle Length (s)	150.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	135.8%		ICU Level of Service		H							
c Critical Lane Group												







HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Flt	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1843		1770	1393
Flt Permitted	0.31	1.00		0.46	1.00
Satd. Flow (perm)	576	1843		858	1393
Volume (vph)	241	161	12	48	816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	262	175	13	52	887
Lane Group Flow (vph)	291	188	0	52	887
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	61.2	61.2		61.2	61.2
Effective Green, g (s)	62.2	62.2		62.2	62.2
Actuated g/C Ratio	0.41	0.41		0.41	0.41
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	239	764		356	578
v/s Ratio Prot	0.10		c0.64		
v/s Ratio Perm	0.51		0.06		
v/c Ratio	1.22	0.25		0.15	1.53
Uniform Delay, d1	43.9	28.6		27.4	43.9
Progression Factor	0.83	0.98		1.00	1.00
Incremental Delay, d2	128.9	0.2		0.9	249.2
Delay (s)	165.5	28.3		28.2	293.1
Level of Service	F	C		C	F
Approach Delay (s)	111.6		278.4		
Approach LOS	F		F		
Intersection Summary					







HCM Unsignalized Intersection Capacity Analysis
 2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Volume (veh/h)	14	8	927	0	2	1229
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	15	9	1008	0	2	1336
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	2348	1008			1008	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2348	1008			1008	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	62	97			100	
cM capacity (veh/h)	40	292			688	
Direction, Lane #						
	WB 1	NB 1	SB 1	SB 2		
Volume Total	24	1008	2	1336		
Volume Left	15	0	2	0		
Volume Right	9	0	0	0		
cSH	58	1700	688	1700		
Volume to Capacity	0.41	0.59	0.00	0.79		
Queue Length (ft)	39	0	0	0		
Control Delay (s)	106.0	0.0	10.3	0.0		
Lane LOS	F		B			
Approach Delay (s)	106.0	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay	1.1					
Intersection Capacity Utilization	80.3%		ICU Level of Service		D	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Fr _t	1.00	0.85	1.00			1.00
Fl _t Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	1863			1863
Fl _t Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	1863			1863
Volume (vph)	135	8	791	0	0	1080
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	9	860	0	0	1174
Lane Group Flow (vph)	147	9	860	0	0	1174
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	16.1	16.1	113.9			113.9
Effective Green, g (s)	17.1	17.1	114.9			114.9
Actuated g/C Ratio	0.12	0.12	0.82			0.82
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	216	193	1529			1529
v/s Ratio Prot	c0.08		0.46			c0.63
v/s Ratio Perm		0.01				
v/c Ratio	0.68	0.05	0.56			0.77
Uniform Delay, d ₁	58.8	54.3	4.2			6.1
Progression Factor	1.00	1.00	0.64			0.66
Incremental Delay, d ₂	8.5	0.1	1.3			2.6
Delay (s)	67.3	54.4	4.0			6.6
Level of Service	E	D	A			A
Approach Delay (s)	66.6		4.0			6.6
Approach LOS	E		A			A
Intersection Summary						
HCM Average Control Delay			9.8	HCM Level of Service		A
HCM Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			140.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			76.6%	ICU Level of Service	C	
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
4: Sterrett & Madison Avenue













5/6/2008

Movement												
Lane Configurations												
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Volume (veh/h)	2	0	5	0	0	0	678	65	20	1041	2	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	2	0	5	0	0	0	737	71	22	1132	2	2
Pedestrians	1											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)											565	
pX, platoon unblocked	0.21	0.21	0.21	0.21	0.21		0.21					
vC, conflicting volume	1948	1984	1134	1954	1949	772	1134			808		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	5427	5591	1624	5452	5432	772	1624			808		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	80	100	100	100	100			97		
cM capacity (veh/h)	0	0	27	0	0	399	86			818		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	8	0	808	22	1134							
Volume Left	2	0	0	22	0							
Volume Right	5	0	71	0	2							
cSH	0	1700	1700	818	1700							
Volume to Capacity	87.23	0.00	0.48	0.03	0.67							
Queue Length (ft)	Err	0	0	2	0							
Control Delay (s)	Err	0.0	0.0	9.5	0.0							
Lane LOS	F	A		A								
Approach Delay (s)	Err	0.0	0.0	0.2								
Approach LOS	F	A										
Intersection Summary												
Average Delay	38.7											
Intersection Capacity Utilization	69.7%				ICU Level of Service				B			

HCM Signalized Intersection Capacity Analysis







6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Flt	0.97		1.00		0.86		1.00		1.00		0.99	
Flt Protected	0.97		0.95		1.00		0.95		1.00		0.95	
Satd. Flow (prot)	1767		1770		1600		1770		1863		1583	
Flt Permitted	0.85		0.73		1.00		0.23		1.00		0.30	
Satd. Flow (perm)	1543		1358		1600		425		1863		1583	
Volume (vph)	22	10	7	525	6	101	4	491	330	68	525	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	11	8	571	7	110	4	534	359	74	571	50
Lane Group Flow (vph)	0	43	0	571	117	0	4	534	359	74	621	0
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	60.9		60.9		60.9		69.1		69.1		69.1	
Effective Green, g (s)	61.9		61.9		61.9		70.1		70.1		70.1	
Actuated g/C Ratio	0.44		0.44		0.44		0.50		0.50		0.50	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	682		600		707		213		933		793	
v/s Ratio Prot			0.07				0.29				c0.34	
v/s Ratio Perm	0.03		c0.42				0.01		0.23		0.13	
v/c Ratio	0.06		0.95		0.17		0.02		0.57		0.45	
Uniform Delay, d1	22.4		37.6		23.5		17.6		24.5		22.6	
Progression Factor	1.00		1.00		1.00		0.58		0.57		0.83	
Incremental Delay, d2	0.0		25.2		0.1		0.1		2.2		1.6	
Delay (s)	22.4		62.8		23.6		10.4		16.2		20.3	
Level of Service	C		E		C		B		B		C	
Approach Delay (s)	22.4				56.1				17.8			
Approach LOS	C				E				B			
Intersection Summary												
HCM Average Control Delay			29.2		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			140.0		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			84.7%		ICU Level of Service				D			
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1784	
Flt Permitted	0.95	1.00	0.21	1.00	1.00	
Satd. Flow (perm)	1770	1583	395	1863	1784	
Volume (vph)	285	281	186	470	485	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	305	202	511	527	239
Lane Group Flow (vph)	310	305	202	511	766	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	28.7	28.7	102.3	101.3	82.3	
Effective Green, g (s)	29.7	29.7	102.3	102.3	83.3	
Actuated g/C Ratio	0.21	0.21	0.73	0.73	0.60	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	375	336	436	1361	1061	
v/s Ratio Prot	0.18		c0.05	0.27	c0.43	
v/s Ratio Perm		c0.19	0.29			
v/c Ratio	0.83	0.91	0.46	0.38	0.72	
Uniform Delay, d1	52.7	53.8	28.8	7.0	20.1	
Progression Factor	1.00	1.00	0.51	0.19	1.00	
Incremental Delay, d2	13.8	26.9	0.7	0.7	4.3	
Delay (s)	66.5	80.7	15.3	2.1	24.4	
Level of Service	E	F	B	A	C	
Approach Delay (s)	73.6			5.8	24.4	
Approach LOS	E			A	C	
Intersection Summary						
HCM Average Control Delay			32.5	HCM Level of Service		C
HCM Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			140.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			80.7%	ICU Level of Service	D	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0		4.0		4.0	
Lane Util. Factor	1.00						1.00		1.00		*0.88	
Frt	0.95						1.00		1.00		0.85	
Flt Protected	0.98						0.95		0.95		1.00	
Satd. Flow (prot)	1735						1774		1770		1639	
Flt Permitted	0.98						0.66		0.95		1.00	
Satd. Flow (perm)	1735						1221		1770		1639	
Volume (vph)	29	28	19	19	56	56	2	1	65	356	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	30	21	21	61	61	2	1	71	387	5	29
Lane Group Flow (vph)	0	104	0	0	0	0	125	0	71	387	5	0
Turn Type	Split				Split		Perm	custom		Perm		Perm
Protected Phases	4	4			8		8	10		10		
Permitted Phases							8	10		10		6
Actuated Green, G (s)	12.6						15.5		33.0		33.0	
Effective Green, g (s)	13.6						16.5		34.0		34.0	
Actuated g/C Ratio	0.10						0.12		0.24		0.24	
Clearance Time (s)	5.0						5.0		5.0		5.0	
Vehicle Extension (s)	3.0						3.0		3.0		3.0	
Lane Grp Cap (vph)	169						144		430		384	
v/s Ratio Prot	c0.06								0.04		c0.24	
v/s Ratio Perm							c0.10				0.00	
v/c Ratio	0.62						0.87		0.17		0.97	
Uniform Delay, d1	60.7						60.7		41.8		52.5	
Progression Factor	1.00						1.00		1.00		1.00	
Incremental Delay, d2	6.5						38.7		0.2		37.6	
Delay (s)	67.2						99.3		42.0		90.2	
Level of Service	E						F		D		F	
Approach Delay (s)	67.2						99.3		82.2			
Approach LOS	E						F		F			
Intersection Summary												
HCM Average Control Delay	52.0		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	140.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	104.8%		ICU Level of Service		F							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue







5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Flt	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1845		1770	1393
Flt Permitted	0.91	1.00		0.18	1.00
Satd. Flow (perm)	1702	1845		326	1393
Volume (vph)	524	489	34	65	362
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	570	532	37	71	393
Lane Group Flow (vph)	599	569	0	71	393
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	58.9	58.9		58.9	58.9
Effective Green, g (s)	59.9	59.9		59.9	59.9
Actuated g/C Ratio	0.43	0.43		0.43	0.43
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	728	789		139	596
v/s Ratio Prot		0.31			0.28
v/s Ratio Perm	0.35			0.22	
v/c Ratio	0.82	0.72		0.51	0.66
Uniform Delay, d1	35.4	33.1		29.3	31.9
Progression Factor	1.01	1.02		1.00	1.00
Incremental Delay, d2	5.9	2.6		12.8	5.6
Delay (s)	41.6	36.4		42.1	37.6
Level of Service	D	D		D	D
Approach Delay (s)		39.1		38.3	
Approach LOS		D		D	
Intersection Summary					

HCM Unsignalized Intersection Capacity Analysis







2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Volume (veh/h)	7	8	1684	0	4	391
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	8	9	1830	0	4	425
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	2264	915			1830	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2264	915			1830	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	97			99	
cM capacity (veh/h)	34	275			330	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	16	1220	610	4	425	
Volume Left	8	0	0	4	0	
Volume Right	9	0	0	0	0	
cSH	64	1700	1700	330	1700	
Volume to Capacity	0.26	0.72	0.36	0.01	0.25	
Queue Length (ft)	22	0	0	1	0	
Control Delay (s)	79.8	0.0	0.0	16.1	0.0	
Lane LOS	F			C		
Approach Delay (s)	79.8	0.0		0.2		
Approach LOS	F					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	60.6%		ICU Level of Service		B	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			1.00
Flt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3539			1863
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3539			1863
Volume (vph)	191	20	750	0	0	364
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	22	815	0	0	396
Lane Group Flow (vph)	208	22	815	0	0	396
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	16.6	16.6	83.4			83.4
Effective Green, g (s)	17.6	17.6	84.4			84.4
Actuated g/C Ratio	0.16	0.16	0.77			0.77
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	283	253	2715			1429
v/s Ratio Prot	c0.12		c0.23			0.21
v/s Ratio Perm		0.01				
v/c Ratio	0.73	0.09	0.30			0.28
Uniform Delay, d1	44.0	39.4	3.9			3.8
Progression Factor	1.00	1.00	0.35			0.74
Incremental Delay, d2	9.5	0.1	0.2			0.5
Delay (s)	53.5	39.5	1.6			3.3
Level of Service	D	D	A			A
Approach Delay (s)	52.2		1.6			3.3
Approach LOS	D		A			A
Intersection Summary						
HCM Average Control Delay			10.1	HCM Level of Service		B
HCM Volume to Capacity ratio			0.38			
Actuated Cycle Length (s)			110.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			40.7%	ICU Level of Service	A	
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 4: Sterrett & Madison Avenue













5/6/2008

Movement												
Lane Configurations												
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Volume (veh/h)	2	0	5	0	0	0	695	571	3	295	3	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	2	0	5	0	0	0	755	621	3	321	3	3
Pedestrians	1											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)	565											
pX, platoon unblocked												
vC, conflicting volume	1084	1705	323	1089	1086	755	324			1376		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1084	1705	323	1089	1086	755	324			1376		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	100	100	100	100			99		
cM capacity (veh/h)	193	91	717	190	215	408	1236			498		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	0	755	621	3	324						
Volume Left	2	0	0	0	3	0						
Volume Right	5	0	0	621	0	3						
cSH	404	1700	1700	1700	498	1700						
Volume to Capacity	0.02	0.00	0.44	0.37	0.01	0.19						
Queue Length (ft)	1	0	0	0	0	0						
Control Delay (s)	14.1	0.0	0.0	0.0	12.3	0.0						
Lane LOS	B	A			B							
Approach Delay (s)	14.1	0.0	0.0			0.1						
Approach LOS	B	A										
Intersection Summary												
Average Delay	0.1											
Intersection Capacity Utilization	55.1%		ICU Level of Service				A					

HCM Signalized Intersection Capacity Analysis







6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00				1.00		1.00		0.95		1.00	
Fr _t	0.97				1.00		0.85		0.99		1.00	
Fl _t Protected	0.98				0.96		1.00		1.00		0.95	
Satd. Flow (prot)	1764				1794		1583		3502		1770	
Fl _t Permitted	0.81				0.80		1.00		0.92		0.34	
Satd. Flow (perm)	1463				1488		1583		3237		639	
Volume (vph)	22	12	9	54	17	64	39	661	39	47	244	13
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	13	10	59	18	70	42	718	42	51	265	14
Lane Group Flow (vph)	0	47	0	0	77	70	0	802	0	51	279	0
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	9.1				9.1		9.1		90.9		90.9	
Effective Green, g (s)	10.1				10.1		10.1		91.9		91.9	
Actuated g/C Ratio	0.09				0.09		0.09		0.84		0.84	
Clearance Time (s)	5.0				5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0				3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	134				137		145		2704		534	
v/s Ratio Prot											0.15	
v/s Ratio Perm	0.03				c0.05		0.04		c0.25		0.08	
v/c Ratio	0.35				0.56		0.48		0.30		0.10	
Uniform Delay, d ₁	46.9				47.8		47.5		2.0		1.6	
Progression Factor	1.00				1.00		1.00		0.06		1.06	
Incremental Delay, d ₂	1.6				5.2		2.5		0.3		0.4	
Delay (s)	48.5				53.0		50.0		0.4		2.1	
Level of Service	D				D		D		A		A	
Approach Delay (s)	48.5				51.6				0.4		2.1	
Approach LOS	D				D				A		A	
Intersection Summary												
HCM Average Control Delay	8.2		HCM Level of Service		A							
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	110.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	50.4%		ICU Level of Service		A							
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.85	1.00	1.00	0.93	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1738	
Flt Permitted	0.95	1.00	0.58	1.00	1.00	
Satd. Flow (perm)	1770	1583	1083	1863	1738	
Volume (vph)	117	99	192	448	106	104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	108	209	487	115	113
Lane Group Flow (vph)	127	108	209	487	228	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	12.6	12.6	87.4	87.4	77.1	
Effective Green, g (s)	13.6	13.6	88.4	88.4	78.1	
Actuated g/C Ratio	0.12	0.12	0.80	0.80	0.71	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	219	196	910	1497	1234	
v/s Ratio Prot	c0.07		0.01	c0.26	0.13	
v/s Ratio Perm		0.07	0.17			
v/c Ratio	0.58	0.55	0.23	0.33	0.18	
Uniform Delay, d1	45.5	45.3	2.5	2.9	5.3	
Progression Factor	1.00	1.00	0.29	0.24	1.00	
Incremental Delay, d2	3.7	3.3	0.1	0.6	0.3	
Delay (s)	49.2	48.7	0.9	1.3	5.7	
Level of Service	D	D	A	A	A	
Approach Delay (s)	48.9			1.1	5.7	
Approach LOS	D			A	A	
Intersection Summary						
HCM Average Control Delay			11.7	HCM Level of Service		B
HCM Volume to Capacity ratio			0.36			
Actuated Cycle Length (s)			110.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			41.6%	ICU Level of Service	A	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0		4.0			
Lane Util. Factor	1.00						1.00		*0.88			
Flt	0.93						0.99		1.00			
Flt Protected	0.98						0.96		1.00			
Satd. Flow (prot)	1693						1774		3263			
Flt Permitted	0.98						0.70		1.00			
Satd. Flow (perm)	1693						1297		3263			
Volume (vph)	48	0	13	37	5	77	15	8	48	616	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	0	14	40	5	84	16	9	52	670	5	29
Lane Group Flow (vph)	0	106	0	0	0	0	114	0	0	727	0	0
Turn Type	Split				Split		Perm	custom				Perm
Protected Phases	4	4			8		8	10		10		
Permitted Phases							8	10		10		6
Actuated Green, G (s)	10.7						13.3		25.6			
Effective Green, g (s)	11.7						14.3		26.6			
Actuated g/C Ratio	0.11						0.13		0.24			
Clearance Time (s)	5.0						5.0		5.0			
Vehicle Extension (s)	3.0						3.0		3.0			
Lane Grp Cap (vph)	180						169		789			
v/s Ratio Prot	c0.06								c0.22			
v/s Ratio Perm							c0.09					
v/c Ratio	0.59						0.67		0.92			
Uniform Delay, d1	46.9						45.6		40.7			
Progression Factor	1.00						1.00		1.00			
Incremental Delay, d2	4.9						10.2		16.0			
Delay (s)	51.7						55.8		56.7			
Level of Service	D						E		E			
Approach Delay (s)	51.7						55.8		56.7			
Approach LOS	D						E		E			
Intersection Summary												
HCM Average Control Delay	42.0		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	110.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	82.0%		ICU Level of Service		D							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue







5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Fr _t	1.00	0.99		1.00	0.85
Fl _t Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1843		1770	2787
Fl _t Permitted	0.79	1.00		0.58	1.00
Satd. Flow (perm)	1480	1843		1090	2787
Volume (vph)	141	161	12	48	666
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	175	13	52	724
Lane Group Flow (vph)	182	188	0	52	724
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	40.4	40.4		40.4	40.4
Effective Green, g (s)	41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.38	0.38		0.38	0.38
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	557	694		410	1049
v/s Ratio Prot	0.10		c0.26		
v/s Ratio Perm	0.12		0.05		
v/c Ratio	0.33	0.27		0.13	0.69
Uniform Delay, d ₁	24.4	23.8		22.5	28.9
Progression Factor	1.11	1.11		1.00	1.00
Incremental Delay, d ₂	0.3	0.2		0.6	3.7
Delay (s)	27.5	26.8		23.1	32.6
Level of Service	C	C		C	C
Approach Delay (s)	27.1		32.0		
Approach LOS	C		C		
Intersection Summary					

HCM Unsignalized Intersection Capacity Analysis







2: Levassor Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Volume (veh/h)	14	8	827	0	2	1129
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	15	9	899	0	2	1227
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	200					
pX, platoon unblocked						
vC, conflicting volume	2130	449			899	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2130	449			899	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	64	98			100	
cM capacity (veh/h)	42	557			751	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	24	599	300	2	1227	
Volume Left	15	0	0	2	0	
Volume Right	9	0	0	0	0	
cSH	64	1700	1700	751	1700	
Volume to Capacity	0.37	0.35	0.18	0.00	0.72	
Queue Length (ft)	35	0	0	0	0	
Control Delay (s)	91.9	0.0	0.0	9.8	0.0	
Lane LOS	F			A		
Approach Delay (s)	91.9	0.0		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay	1.0					
Intersection Capacity Utilization	74.6%		ICU Level of Service		C	













HCM Signalized Intersection Capacity Analysis
 3: Wallace Avenue & Madison Avenue

5/6/2008

Movement						
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			1.00
Flt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3539			1863
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3539			1863
Volume (vph)	488	8	591	0	0	638
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	530	9	642	0	0	693
Lane Group Flow (vph)	530	9	642	0	0	693
Turn Type	Perm					
Protected Phases	8		2			6
Permitted Phases	8					
Actuated Green, G (s)	36.0	36.0	64.0			64.0
Effective Green, g (s)	37.0	37.0	65.0			65.0
Actuated g/C Ratio	0.34	0.34	0.59			0.59
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	595	532	2091			1101
v/s Ratio Prot	c0.30		0.18			c0.37
v/s Ratio Perm		0.01				
v/c Ratio	0.89	0.02	0.31			0.63
Uniform Delay, d1	34.6	24.4	11.2			14.7
Progression Factor	1.00	1.00	0.63			0.74
Incremental Delay, d2	15.5	0.0	0.4			2.6
Delay (s)	50.0	24.4	7.5			13.4
Level of Service	D	C	A			B
Approach Delay (s)	49.6		7.5			13.4
Approach LOS	D		A			B
Intersection Summary						
HCM Average Control Delay			21.8	HCM Level of Service		C
HCM Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			110.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			72.6%	ICU Level of Service	C	
c Critical Lane Group						













HCM Unsignalized Intersection Capacity Analysis
 4: Sterrett & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Volume (veh/h)	2	0	5	0	0	0	478	163	20	941	2	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	2	0	5	0	0	0	520	177	22	1023	2	2
Pedestrians	1											
Lane Width (ft)	12.0											
Walking Speed (ft/s)	4.0											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)											565	
pX, platoon unblocked	0.77	0.77	0.77	0.77	0.77		0.77					
vC, conflicting volume	1587	1764	1025	1592	1588	520	1025			697		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1766	1998	1033	1773	1768	520	1033			697		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	97	100	100	100	100			98		
cM capacity (veh/h)	49	45	216	47	62	556	515			899		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	0	520	177	22	1025						
Volume Left	2	0	0	0	22	0						
Volume Right	5	0	0	177	0	2						
cSH	110	1700	1700	1700	899	1700						
Volume to Capacity	0.07	0.00	0.31	0.10	0.02	0.60						
Queue Length (ft)	5	0	0	0	2	0						
Control Delay (s)	40.3	0.0	0.0	0.0	9.1	0.0						
Lane LOS	E	A			A							
Approach Delay (s)	40.3	0.0	0.0		0.2							
Approach LOS	E	A										
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	64.0%				ICU Level of Service				B			







HCM Signalized Intersection Capacity Analysis
6: 20th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0				4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00				1.00		1.00		0.95		1.00	
Flt	0.97				1.00		0.85		0.99		1.00	
Flt Protected	0.97				0.96		1.00		1.00		0.95	
Satd. Flow (prot)	1767				1781		1583		3507		1770	
Flt Permitted	0.81				0.77		1.00		0.95		0.44	
Satd. Flow (perm)	1469				1438		1583		3341		813	
Volume (vph)	22	10	7	76	6	101	4	491	30	68	525	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	11	8	83	7	110	4	534	33	74	571	50
Lane Group Flow (vph)	0	43	0	0	90	110	0	571	0	74	621	0
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	11.8				11.8		11.8		88.2		88.2	
Effective Green, g (s)	12.8				12.8		12.8		89.2		89.2	
Actuated g/C Ratio	0.12				0.12		0.12		0.81		0.81	
Clearance Time (s)	5.0				5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0				3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	171				167		184		2709		659	
v/s Ratio Prot											c0.34	
v/s Ratio Perm	0.03				0.06		c0.07		0.17		0.09	
v/c Ratio	0.25				0.54		0.60		0.21		0.11	
Uniform Delay, d1	44.2				45.8		46.2		2.4		2.2	
Progression Factor	1.00				1.00		1.00		0.19		0.44	
Incremental Delay, d2	0.8				3.3		5.1		0.2		0.3	
Delay (s)	45.0				49.1		51.3		0.6		1.2	
Level of Service	D				D		D		A		A	
Approach Delay (s)	45.0				50.3				0.6		1.8	
Approach LOS	D				D				A		A	
Intersection Summary												
HCM Average Control Delay	9.0		HCM Level of Service		A							
HCM Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	110.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	70.6%		ICU Level of Service		C							
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 9: 19th Street & Madison Avenue

5/6/2008

Movement	 EBL	 EBR	 NBL	 NBT	 SBT	 SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Fr _t	1.00	0.85	1.00	1.00	0.96	
Fl _t Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1784	
Fl _t Permitted	0.95	1.00	0.20	1.00	1.00	
Satd. Flow (perm)	1770	1583	381	1863	1784	
Volume (vph)	285	281	186	470	485	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	305	202	511	527	239
Lane Group Flow (vph)	310	305	202	511	766	0
Turn Type	Perm pm+pt					
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	22.7	22.7	78.3	77.3	62.3	
Effective Green, g (s)	23.7	23.7	78.3	78.3	63.3	
Actuated g/C Ratio	0.22	0.22	0.71	0.71	0.58	
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	381	341	410	1326	1027	
v/s Ratio Prot	0.18		c0.05	0.27	c0.43	
v/s Ratio Perm		c0.19	0.30			
v/c Ratio	0.81	0.89	0.49	0.39	0.75	
Uniform Delay, d ₁	41.0	41.9	24.8	6.3	17.4	
Progression Factor	1.00	1.00	0.39	0.33	1.00	
Incremental Delay, d ₂	12.5	24.4	0.9	0.8	4.9	
Delay (s)	53.5	66.3	10.6	2.9	22.3	
Level of Service	D	E	B	A	C	
Approach Delay (s)	59.9			5.1	22.3	
Approach LOS	E			A	C	
Intersection Summary						
HCM Average Control Delay			27.5	HCM Level of Service		C
HCM Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			110.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization			80.7%	ICU Level of Service	D	
c Critical Lane Group						






HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement												
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0						4.0				4.0	
Lane Util. Factor	1.00						1.00		*0.88			
Flt	0.95						1.00		1.00			
Flt Protected	0.98						0.95		0.99			
Satd. Flow (prot)	1735						1774		3248			
Flt Permitted	0.98						0.66		0.99			
Satd. Flow (perm)	1735						1221		3248			
Volume (vph)	29	28	19	19	56	56	2	1	65	356	5	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	30	21	21	61	61	2	1	71	387	5	29
Lane Group Flow (vph)	0	104	0	0	0	0	125	0	0	463	0	0
Turn Type	Split				Split		Perm	custom				Perm
Protected Phases	4	4			8		8	10		10		
Permitted Phases							8	10		10		6
Actuated Green, G (s)	11.2						14.2		17.6			
Effective Green, g (s)	12.2						15.2		18.6			
Actuated g/C Ratio	0.11						0.14		0.17			
Clearance Time (s)	5.0						5.0		5.0			
Vehicle Extension (s)	3.0						3.0		3.0			
Lane Grp Cap (vph)	192						169		549			
v/s Ratio Prot	c0.06								c0.14			
v/s Ratio Perm							c0.10					
v/c Ratio	0.54						0.74		0.84			
Uniform Delay, d1	46.3						45.5		44.3			
Progression Factor	1.00						1.00		1.00			
Incremental Delay, d2	3.1						15.5		11.3			
Delay (s)	49.4						61.0		55.6			
Level of Service	D						E		E			
Approach Delay (s)	49.4						61.0		55.6			
Approach LOS	D						E		E			
Intersection Summary												
HCM Average Control Delay	34.2		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.72											
Actuated Cycle Length (s)	110.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	80.0%		ICU Level of Service		D							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: 26th Street & Madison Avenue

5/6/2008

Movement	 SBL	 SBT	 SBR	 NWL	 NWR
Lane Configurations					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	*0.88
Flt	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1845		1770	2787
Flt Permitted	0.97	1.00		0.29	1.00
Satd. Flow (perm)	1800	1845		542	2787
Volume (vph)	424	489	34	65	262
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	532	37	71	285
Lane Group Flow (vph)	490	569	0	71	285
Turn Type	Perm		custom		
Protected Phases	6		2		
Permitted Phases	6		2		
Actuated Green, G (s)	47.0	47.0		47.0	47.0
Effective Green, g (s)	48.0	48.0		48.0	48.0
Actuated g/C Ratio	0.44	0.44		0.44	0.44
Clearance Time (s)	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	785	805		237	1216
v/s Ratio Prot	c0.31		0.10		
v/s Ratio Perm	0.27		0.13		
v/c Ratio	0.62	0.71		0.30	0.23
Uniform Delay, d1	24.0	25.3		20.1	19.5
Progression Factor	0.93	0.93		1.00	1.00
Incremental Delay, d2	1.3	2.4		3.2	0.5
Delay (s)	23.7	25.8		23.3	19.9
Level of Service	C	C		C	B
Approach Delay (s)	24.8		20.6		
Approach LOS	C		C		
Intersection Summary					

Appendix C
Recommended Alternative





19th Street

20th Street

Madison Avenue Transportation Study
Recommended Alternative
19th Street to Wallace Avenue
Sheet 1 of 4



Wallace Ave

Sterrett Ave

Madison Avenue Transportation Study
Recommended Alternative
Wallace Avenue to Sterrett Avenue
Sheet 2 of 4



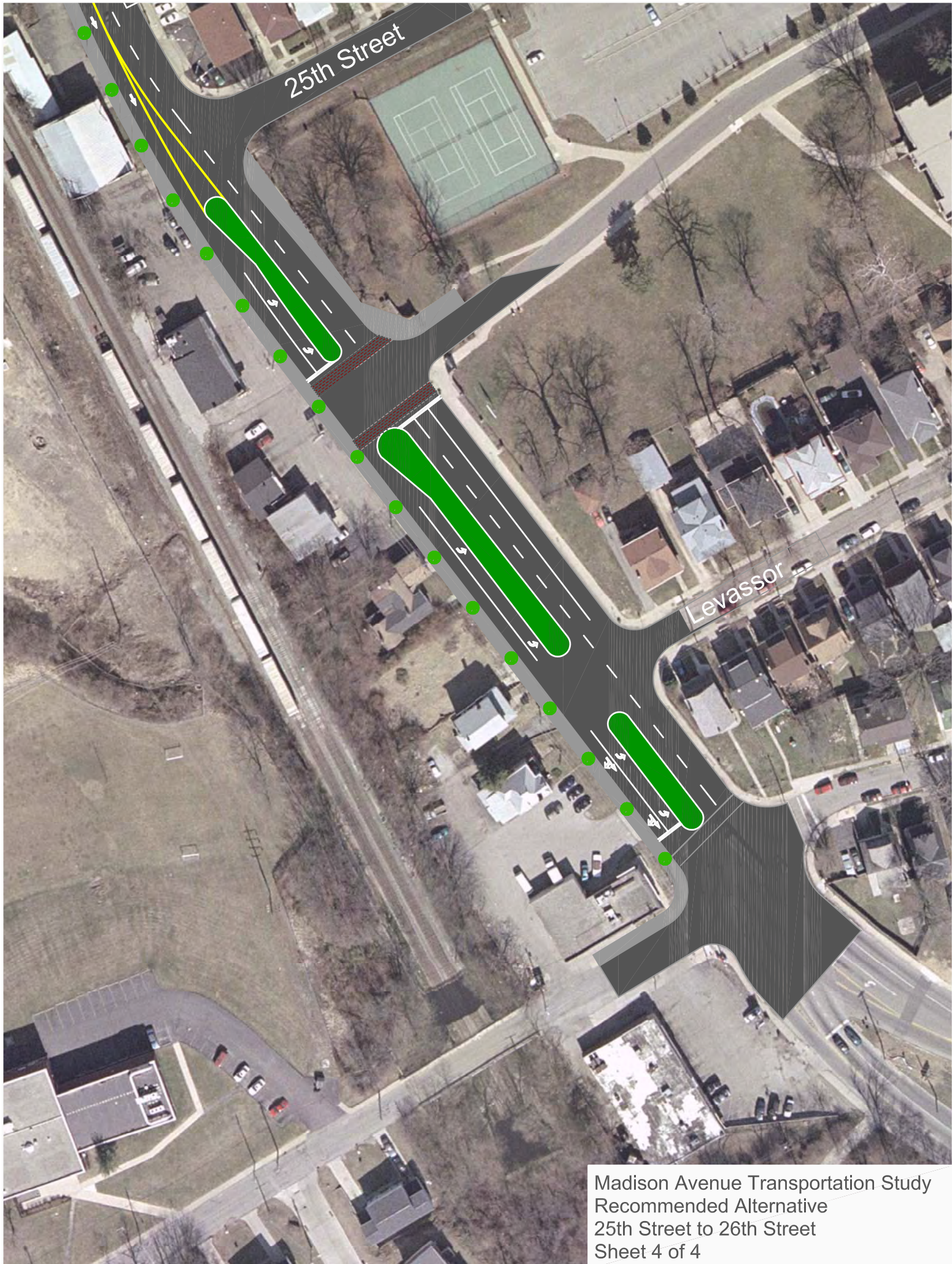
24th Street

Catalpa Street

Holmesdale Court

25th Street

Madison Avenue Transportation Study
Recommended Alternative
24th Street to 25th Street
Sheet 3 of 4



Madison Avenue Transportation Study
Recommended Alternative
25th Street to 26th Street
Sheet 4 of 4