

**ST. PAUL'S COLLEGE
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.**

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September 2007

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Section I INTRODUCTION

OVERVIEW

EYA has filed a PUD application to develop approximately 10 acres of land on the 20-acre St. Paul's College campus, generally located east of 4th Street, between Hamlin Street and Jackson Street in the northeast section of Washington, D.C. The site location map is shown on Figure I-1.

As proposed, the development would consist of a maximum of 260 townhouse units. Access to the site would be provided via Jackson Street, Hamlin Street, 5th Street, and 6th Street. The proposed site plan for the development is shown on Figure I-2.

For the purposes of this study, construction of the residential development was assumed to begin in 2009 and be completed by 2014.

STUDY SCOPE

Overview

In order to assess the impacts of the proposed development on the surrounding roadway network, the Applicant commissioned this transportation impact study.

Representatives of the development team met with representatives of the District Department of Transportation (DDOT) to identify the study scope and agree on specific study parameters. A summary of the scope of work is included in Appendix A.

Study Area

The study area was selected based on those intersections that potentially could be affected by the proposed development. The following intersections were selected for detailed analysis:

1. Michigan Avenue/Harewood Road
2. Michigan Avenue/4th Street
3. Franklin Street/4th Street
4. Franklin Street/5th Street
5. Franklin Street/6th Street
6. Franklin Street/7th Street
7. Hamlin Street/7th Street
8. Jackson Street/7th Street
9. Monroe Street/7th Street

Study Objectives and Methodology

The objectives of this study were to: (1) evaluate existing transportation conditions, (2) evaluate future (2014) transportation conditions with and without the proposed redevelopment, and (3) identify transportation impacts related to the proposed development.

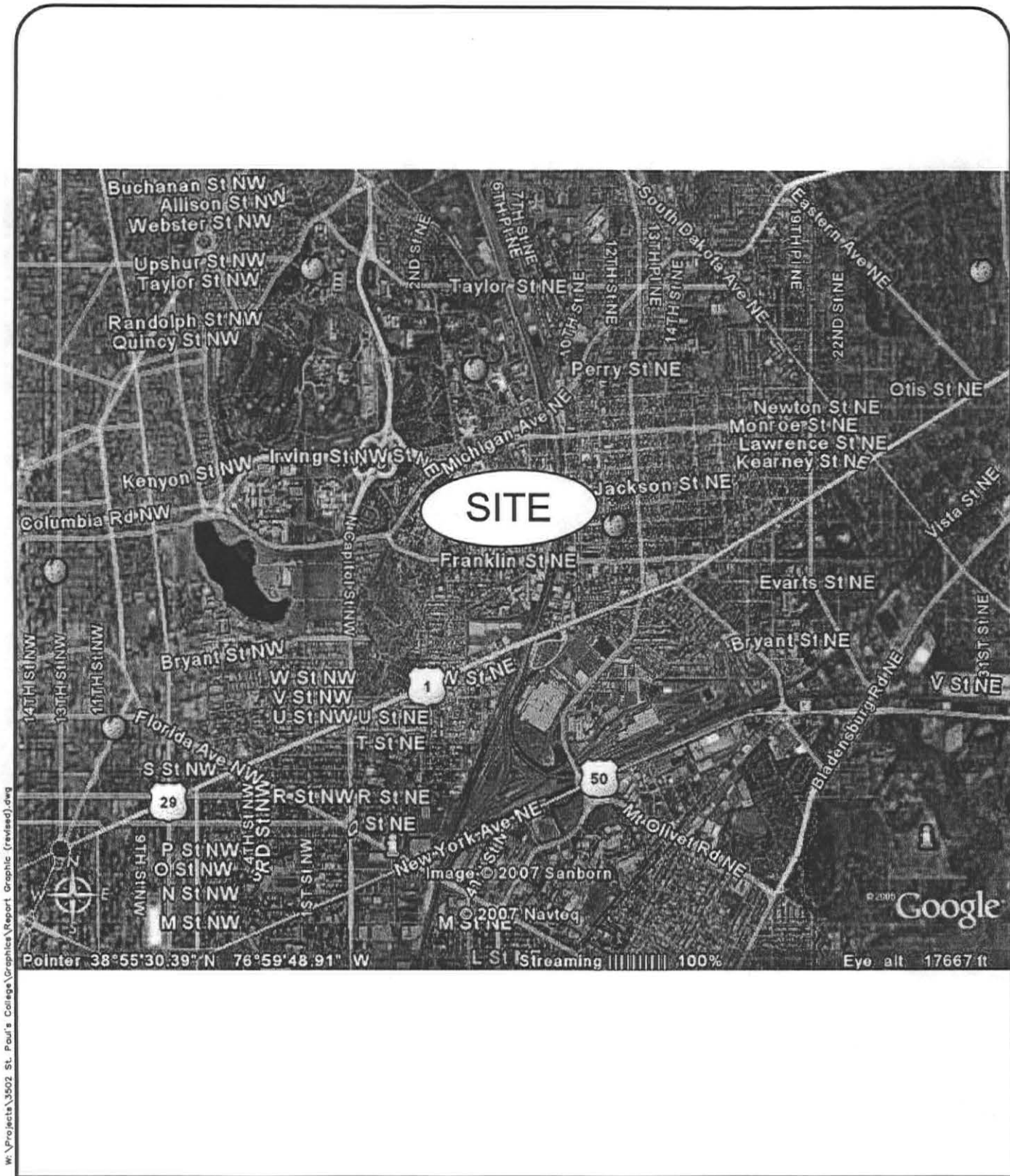
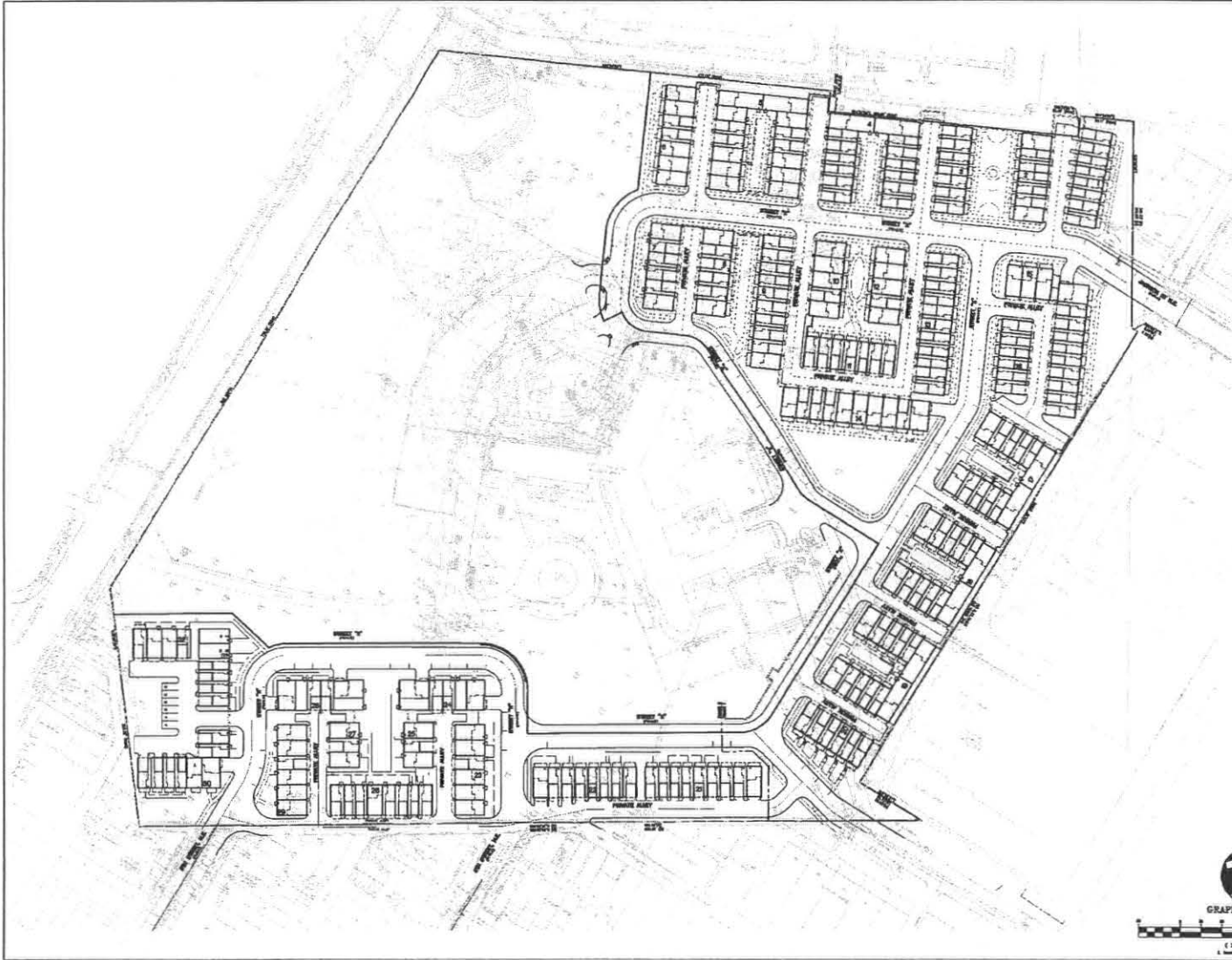


Figure 1-1
Site Location



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 ARCHITECTS
 1403 WASHINGTON BLVD., SUITE 200
 WASHINGTON, D.C. 20004
 TEL: (202) 462-1100
 FAX: (202) 462-1101

SAINT PAUL'S COLLEGE
 TAX LOT 806, SQUARE 3548
 AMT PLAT NO. 2798-C
 WASHINGTON, D.C.

COMPOSITE SITE PLAN

WKA REVISIONS

NO.	DATE	DESCRIPTION
1	JUNE 2007	ISSUED FOR PERMITTING
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Figure 1-2
 Site Plan



Tasks undertaken in this study included the following:

1. Review of development plans provided by EYA.
2. Correspondence with DDOT staff regarding the traffic study scope.
3. A field reconnaissance of existing roadway and intersection geometrics, traffic controls, and speed limits.
4. Turning movement counts at the study intersections during the AM and PM peak periods.
5. Analysis of existing and projected levels of service at the study intersections.
6. Estimation of the number of AM and PM peak hour trips that would be generated by the proposed development and the other planned developments in the area.
7. Recommendation of improvements required to mitigate the impact of the proposed development.

The conclusions and recommendations of this study are as follows:

1. Currently, all study intersections operate at acceptable levels of service (i.e. LOS D or better), with the exception of the following intersections:
 - Michigan Avenue/Harewood Road
 - Michigan Avenue/4th Street
 - Franklin Street/4th Street
 - Franklin Street/6th Street
 - 7th Street/Monroe Street
2. Under background conditions (with pipeline developments), the following intersections have lane groups that would operate deficiently under background conditions:
 - Michigan Avenue/Harewood Road
 - Michigan Avenue/4th Street
 - Franklin Street/4th Street
 - Franklin Street/5th Street
 - Franklin Street/6th Street
 - Franklin Street/7th Street
 - 7th Street/Monroe Street
3. The proposed development is anticipated to generate an estimated 72 AM peak hour vehicular trips and 86 PM peak hour vehicular trips
4. According to the DCMR, 251 on-site parking spaces would be required for the residential development. The proposed development would provide 542 parking spaces.
5. The increase in traffic at the study intersections is expected to have little effect on traffic operations and could be offset by minor timing adjustments at a few signalized intersections.
6. The peak hour traffic signal warrant is not met at the Franklin Street/6th Street intersection under the projected total future traffic volumes during the AM and PM peak hours.
7. Sufficient gaps in the traffic along Franklin Street are available to accommodate vehicles turning from either 5th Street or 6th Street.
8. The following improvements would be required to offset the impact of the proposed development:
 - At the Michigan Avenue/Harewood Road intersection, slight adjustments to the green times during the AM and PM peak hours;
 - At the Michigan Avenue/4th Street intersection, slight adjustments to the green times during the AM peak hour;
 - At the 7th Street/Monroe Street intersection, slight adjustments to the green times during the PM peak hour.
9. Consideration should be given to installing signs to help lower speeds and updating pavement markings (specifically crosswalks) on Franklin Street
10. Background traffic growth, including traffic associated with the pipeline developments, can be accommodated with the following improvements. These improvements are **not** necessary to mitigate the impact of the proposed development.
 - Restriction of on-street parking on the west side of 4th Street between Franklin Street and Evarts Street during the AM and PM peak periods
 - Minor adjustments to the signal timings at the Franklin Street/7th Street intersection during the AM and PM peak periods.
 - Restriping of Monroe Street to provide four travel lanes between Michigan Avenue and 8th Street. Restriction of on-street parking would be required on the south side of Monroe Street east of its intersection with Michigan Avenue and west of its intersection with 8th Street during the AM and PM peak periods.

Section 2 EXISTING CONDITIONS

LAND USE

The subject site is located in Ward 5, which is located in the northeast quadrant of the City and is generally located east of 4th Street, between Hamlin Street and Jackson Street

A portion of the 20-acre site currently is occupied by the St. Paul's College. The site is zoned R-5-A (Residence District), which permits matter-of-right development of single-family residential uses for detached and semi-detached dwellings

The area surrounding the site is comprised of educational, institutional, and residential uses. The Catholic University of America, the Theological College, the Holy Redeemer College, and the Basilica of the National Shrine of the Immaculate Conception are located to the north of the subject site. Trinity College is located to the west of the subject site. Residential uses are located to the south and east of the site

TRANSPORTATION FACILITIES

Roadway Network

Regional access to the site would be provided via Michigan Avenue, Rhode Island Avenue, and North Capitol Street. Franklin Street, Monroe Street, Hamlin Street, Jackson Street, 4th Street, 5th Street, 6th Street, and 7th Street provide local vehicular access. A description of roadways in the immediate study area is provided below. The existing lane use and traffic control for each study intersection is shown on Figure 2-1

Michigan Avenue is a six-lane, undivided minor arterial with a posted speed limit of 25 miles per hour (mph) in the vicinity of the site. The intersections of Michigan Avenue with Harewood Road and 4th Street are controlled by traffic signals. Between Harewood Road and McCormack Road, Michigan Avenue carries an average daily traffic volume of 35,300 vehicles per day (vpd).¹

Franklin Street is a two-lane minor arterial. A 25-mph speed limit is posted in the vicinity of the site. Between 4th Street and 12th Street, Franklin Street carries an average daily traffic volume of 11,100 vpd.²

Harewood Road is a four-lane minor arterial with a posted speed limit of 30-mph within the site vicinity. The Michigan Avenue/Harewood Road intersection is controlled by a traffic signal. Harewood Road carries an average daily traffic volume of 5,400 vpd north of Michigan Avenue.³

Hamlin Street is a two-lane local roadway. The intersection of Hamlin Street and 7th Street is STOP-controlled.

Jackson Street is a two-lane local roadway. The intersection of Jackson Street and 7th Street is All-Way STOP-controlled.

Monroe Street is a two-lane minor arterial. The Monroe Street/7th Street intersection is controlled by a traffic signal. Monroe Street carries an average daily traffic volume of 14,200 vpd east of 7th Street.⁴

4th Street is a four-lane minor arterial with a posted speed limit of 25-mph in the vicinity of the site. The intersections of 4th Street with Michigan Avenue, Harewood Road, and Franklin Street are controlled by traffic signals. Between Michigan Avenue and Franklin Street, 4th Street carries an average daily traffic volume ranging from 8,400 to 14,600 vpd.⁵

5th Street is a two-lane local roadway. The intersection of 5th Street and Franklin Street is STOP-controlled

6th Street is a two-lane local roadway. The Franklin Street/6th Street intersection is STOP-controlled

7th Street is a two-lane collector roadway with a posted speed limit of 25-mph within the site vicinity. The Franklin Street/7th Street intersection is controlled by a traffic signal.

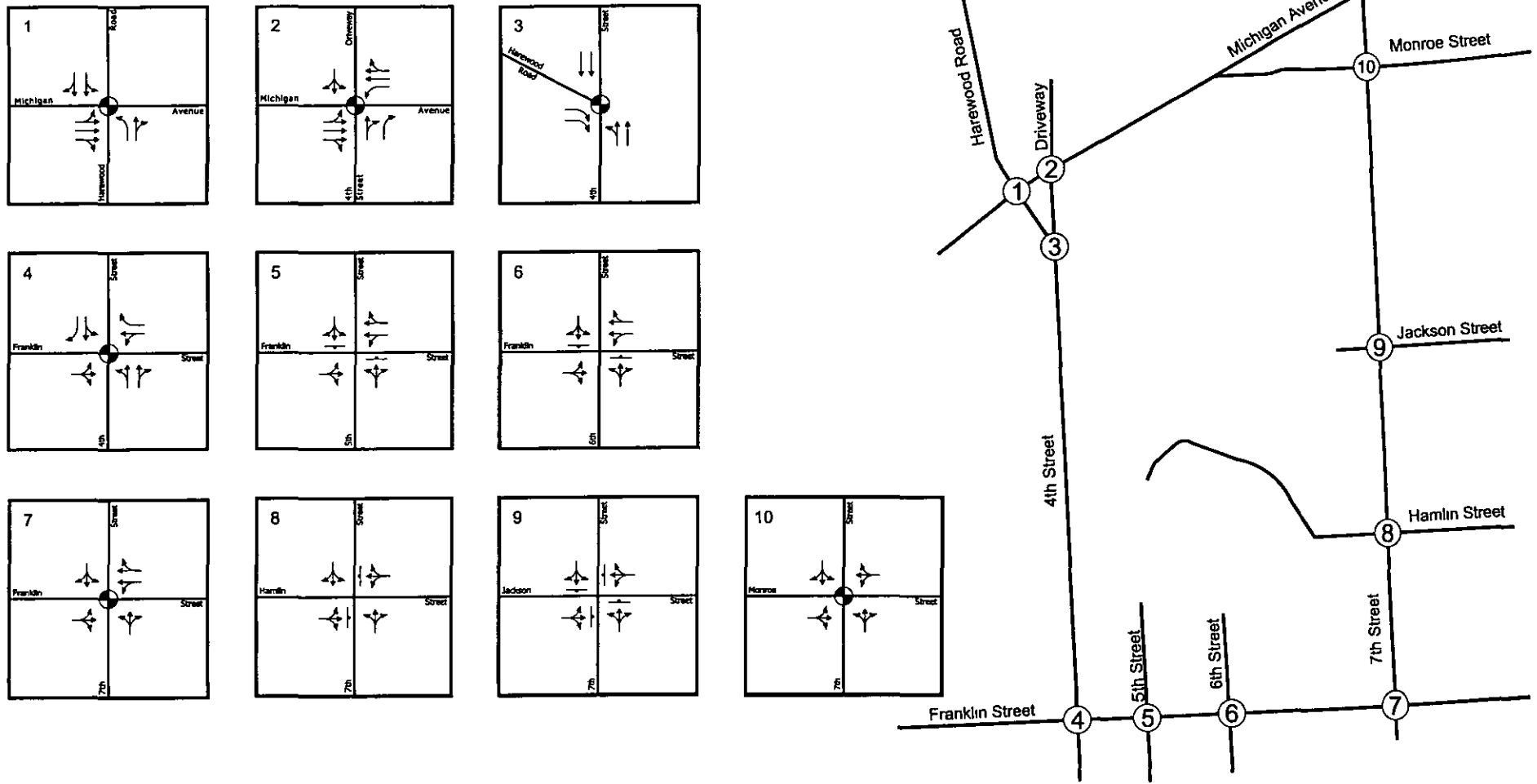


Figure 2-1
Existing Lane use and Traffic Control

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Public Transportation Facilities and Services

The subject site is located approximately ½-mile from the Brookland-CUA Metro Station and less than ¼-mile from the Rhode Island Metro Station

The Red line provides service at both the Brookland-CUA Metro Station and the Rhode Island Metro Station

The area also is served by several Metrobus routes, as shown on Figure 2-2. The North Capitol Street Line (Metrobus Route 80), Hospital Center Line (Metrobus Route D8), Rhode Island Avenue Line (Metrobus Route G8), Brookland-Potomac Park Line (Metrobus Route H1), and Crosstown Line (Metrobus Routes H2, H3, and H4) provide bus service in the study area, as described below.

The North Capitol Street Line (Metrobus Route 80) currently provides bus service in the immediate study area. Bus stops are located on Michigan Avenue at its intersection with 4th Street and on Monroe Street at its intersection with 7th Street. Route 80 provides service to the Fort Totten Metro Station, the Brookland-CUA Metro Station, the Gallery Place-Chinatown Metro Station, the McPherson Square Metro Station, and the Farragut North and West Metro Stations.

The Hospital Center Line (Metrobus Route D8) also provides service in the area with stops located on Franklin Street at its intersections with 4th Street, 5th Street, and 6th Street. The route provides service to the Rhode Island Metro Station.

The Rhode Island Avenue Line (Metrobus Route G8) also provides bus service in the immediate study area. Bus stops are located on 7th Street at its intersections with Franklin Street, Hamlin Street, Jackson Street, and Monroe Street. Route G8 provides service to the Brookland-CUA Metro Station, the Shaw-Howard University Metro Station, and the Farragut North and West Metro Stations.

The Brookland-Potomac Park Line (Metrobus Route H1) also provides service in the area with stops located on Michigan Avenue at its intersection with 4th Street and on Monroe Street at its intersection with 7th Street. The route provides service to the Brookland-CUA Metro Station, the Columbia Heights Metro Station, the Dupont Circle Metro Station, and the Foggy Bottom-GWU station.

The Crosstown Line (Metrobus Routes H2, H3, and H4) also provides bus service in the immediate study area. Bus stops are located on Michigan Avenue at its intersection with 4th Street and on Monroe Street at its intersection with 7th Street. Route H2 provides service to the Brookland-CUA Metro Station, the Columbia Heights Metro Station, the Cleveland Park Metro Station, and the Van Ness-UDC Metro Station. Routes H3 and H4 provide service to the Brookland-CUA Metro Station, the Columbia Heights Metro Station, the Cleveland Park Metro Station, and the Tenleytown-AU Metro Station.

Pedestrian Routes

Within the study area, sidewalks are present along both sides of Michigan Avenue, along both sides of Harewood Road, along both sides of 4th Street north of its intersection with Harewood Road, along both sides of Franklin Street, along both sides of 7th Street, and along both sides of Monroe Street. Pedestrian signals with marked crosswalks are located at the Michigan Avenue/Harewood Road, the Michigan Avenue/4th Street, the Franklin Street/7th Street, and the 7th Street/Monroe Street intersections.

Crosswalks also are present at the following unsignalized intersections:

- Franklin Street/6th Street
- 7th Street/Hamlin Street
- 7th Street/Jackson Street

These crosswalks should be updated and repainted to increase visibility to motorists



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Figure 2-2
Metrobus Routes

▲ Represents Metrolink Stops



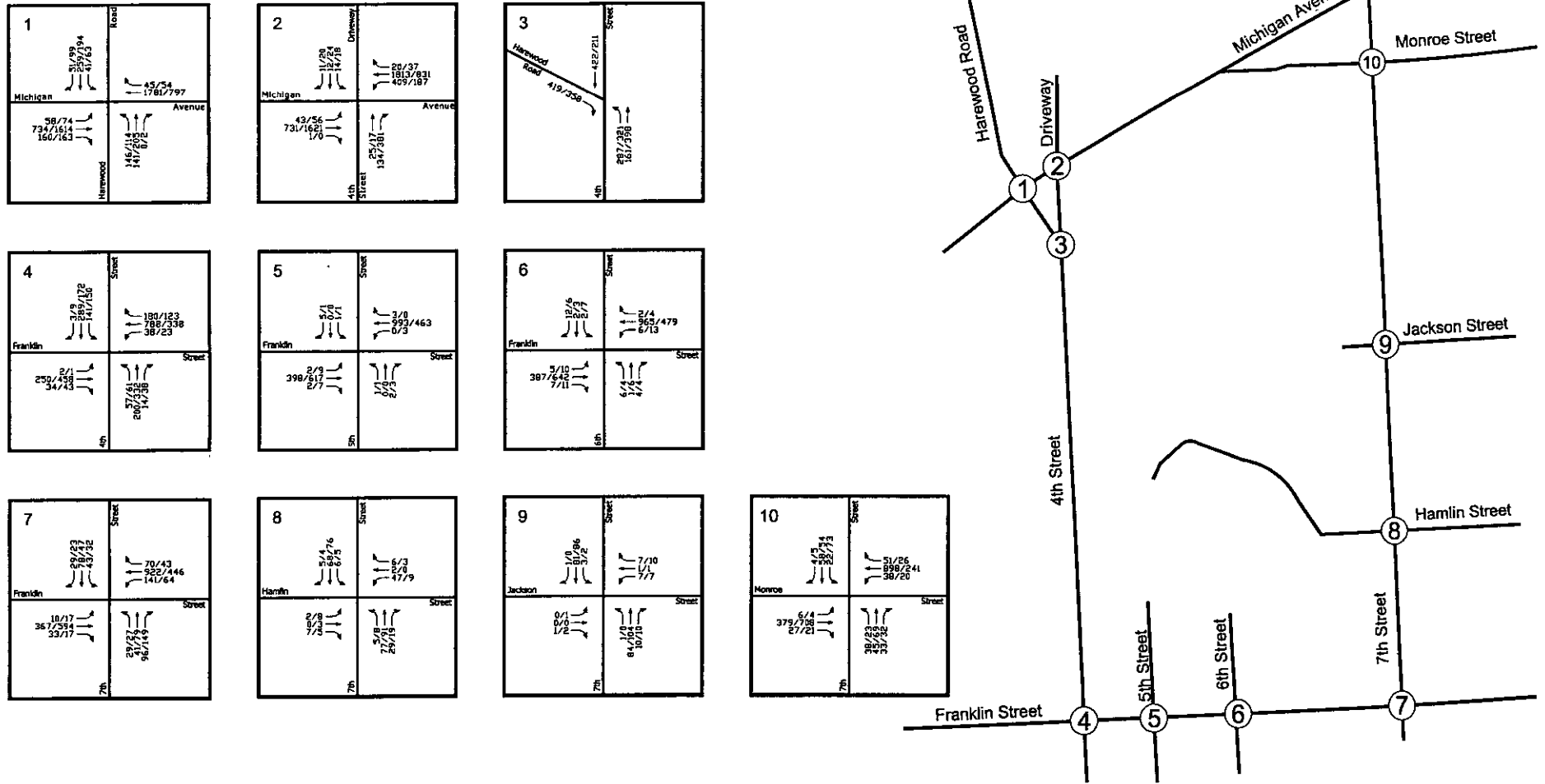


Figure 2-3
Existing Peak Hour Traffic Volumes

All Peak Hour
PM Peak Hour
006/000



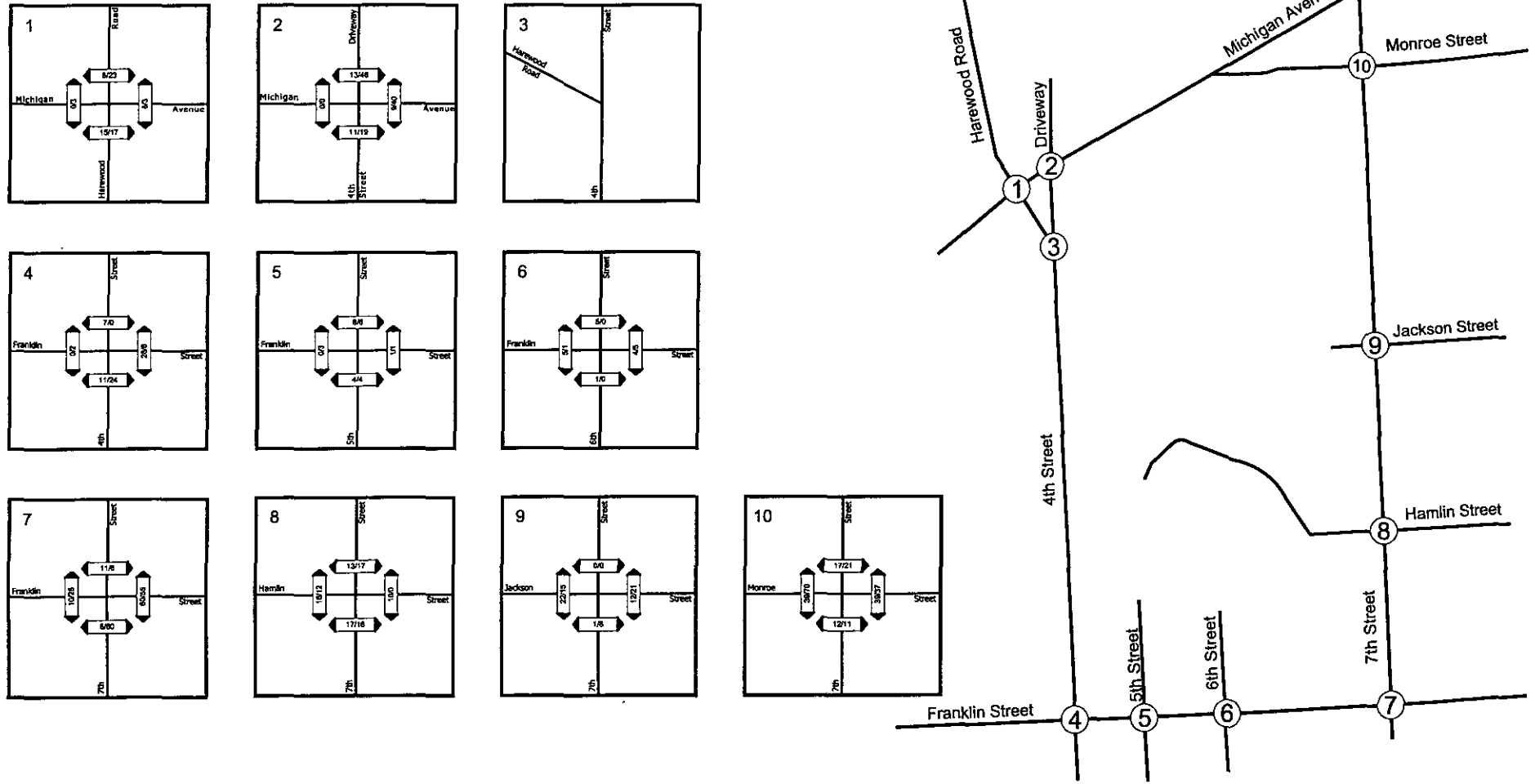


Figure 2-4
Pedestrian Peak Hour Volumes

AM PEAK HOUR
PM PEAK HOUR
000/000



Table 2-1
 Existing Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Harewood Road		
EBLTR	E (68.0)	F (117.0)
WBTR	E (66.7)	A (6.2)
NBL	D (54.5)	D (40.1)
NBTR	C (27.9)	C (32.8)
SBLTR	C (30.1)	C (30.3)
OVERALL	E (61.2)	E (72.2)
Michigan Avenue/4th Street		
EBLTR	A (4.3)	E (60.4)
WBL	D (43.1)	D (39.3)
WBTR	F (89.6)	B (16.1)
NBTR	C (29.9)	D (42.2)
NBR	B (14.7)	B (18.2)
SBLTR	C (30.0)	C (30.8)
OVERALL	E (59.0)	D (42.8)
4th Street/Harewood Road		
EBR	A (8.4)	B (16.9)
NBLT	A (1.8)	A (3.8)
SBT	A (3.1)	A (4.6)
OVERALL	A (4.4)	A (7.6)
Franklin Street/4th Street		
EBLTR	B (14.2)	B (18.4)
WBLT	C (27.7)	B (10.2)
WBR	A (1.1)	A (5.4)
NBLTR	C (25.5)	C (30.7)
SBLT	F (117.3)	F (164.7)
SBR	C (24.1)	B (18.9)
OVERALL	D (42.4)	D (45.8)
Franklin Street/5th Street		
EBLTR	A [0.1]	A [0.2]
WBLTR	A [0.0]	A [0.2]
NBLTR	B [13.2]	C [18.4]
SBLTR	C [15.5]	D [27.2]
Franklin Street/6th Street		
EBLTR	A [0.2]	A [0.3]
WBLTR	A [0.2]	A [0.7]
NBLTR	C [17.7]	D [33.3]
SBLTR	C [18.1]	E [45.9]
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

Table 2-1 (continued)
 Existing Levels of Service

Approach	AM Peak	PM Peak
Franklin Street/7th Street		
EBLTR	C (27.3)	C (21.8)
WBLTR	C (21.5)	A (9.3)
NBLTR	C (31.0)	D (44.2)
SBLTR	C (32.1)	C (33.5)
OVERALL	C (24.5)	C (21.8)
7th Street/Hamlin Street		
EBLTR	A [9.4]	B [10.0]
WBLTR	B [10.8]	A [10.0]
NBLTR	A [0.4]	A [0.6]
SBLTR	A [0.6]	A [0.5]
7th Street/Jackson Street		
EBLTR	A [6.8]	A [7.1]
WBLTR	A [7.6]	A [7.3]
NBLTR	A [7.7]	A [7.7]
SBLTR	A [7.8]	A [7.7]
OVERALL	A [7.7]	A [7.7]
7th Street/Monroe Street		
EBLTR	E (58.9)	F (282.6)
WBLTR	F (624.5)	D (46.0)
NBLTR	A (9.2)	A (9.0)
SBLTR	A (8.4)	A (9.0)
OVERALL	F (401.7)	F (174.7)
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

Crash Data Analysis

Crash data from January 1, 2001 to December 31, 2005 were obtained from DDOT for the study intersections and have been included in Appendix F. The number of crashes is shown in Table 2-2. No crash data were available for the Franklin Street/5th Street intersection.

Generally speaking, at signalized intersections, rear-end collisions are not uncommon, which is reflected in the signalized intersection data shown in Table 2-2. At the Michigan Avenue/Harewood Road and Franklin Street/4th Street intersections (both of which are signalized), angle and left-turn collisions account for 40 to 50 percent of the crashes at these intersections. This *may* be attributable to red light violations; however, detailed information, including causal factors, is not available.

At unsignalized intersections, signalization may be justified if the following conditions are met:⁷

1. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
2. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
3. For each of any 8 hours of an average day, the vehicles per hour (vph) on the mainline and the higher volume side street meet minimum thresholds, which are included in Appendix F.

At the Franklin Street/6th Street intersection, there have been fewer than five crashes of the type susceptible to correction by signalization during each of the five years. Additionally, the volume of traffic on 6th Street, at its intersection with Franklin Street, is significantly below the threshold required for signalization. Therefore, signalization would not be warranted.

At the Franklin Street/6th Street intersection, 45 percent of the crashes were right angle crashes. This *may* be attributable to a large tree located on the northeast quadrant of the intersection restricting the sight distance for drivers waiting to turn on to Franklin Street.

As shown in Table 2-2, no crashes were reported at the 7th Street/Jackson Street intersection. The 7th Street/Hamlin Street intersection experiences an average of less than one crash per year.

Vehicular Speed Analysis

Speed studies were conducted along Franklin Street between its intersections with 5th Street and 6th Street and along 7th Street between its intersections with Jackson Street and Hamlin Street. The studies were conducted in all lanes and in both directions. The posted speed limit is 25 miles per hour (mph) along these sections of roadway.

The studies began on Tuesday, July 3, 2007 at 12:00 AM and ended on Wednesday, July 4, 2007 at 12:00 AM.

The average speed along Franklin Street was 31 mph and the 85th percentile speed in the three lanes varied from 33.54 to 41.51 mph.

The average speed along 7th Street was 26 mph and the 85th percentile speed in the two lanes varied from 32.52 to 33.52 mph.

Table 2-2
 Crash Data Summary

Intersection	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Pedestrian	Backing	Non-Collision	Other	Total
Michigan Avenue/Harewood Road														
2001	3	1	0	4	2	2	0	2	0	0	0	0	0	14
2002	4	1	0	1	0	1	0	1	0	0	0	0	0	8
2003	0	0	0	1	1	0	1	0	0	0	1	0	0	5
2004	2	0	0	2	0	0	0	1	0	0	0	0	0	5
2005	6	3	0	3	5	0	0	2	0	0	0	0	0	21
Michigan Avenue/4th Street														
2001	1	0	0	3	1	1	0	0	0	1	0	0	0	7
2002	0	0	0	0	0	1	0	1	0	0	0	0	0	2
2003	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2004	3	0	0	3	1	1	1	0	0	0	0	0	0	9
2005	1	0	2	0	1	0	0	0	0	0	1	0	0	5
Franklin Street/4th Street														
2001	2	1	0	2	0	0	0	0	0	0	0	0	0	5
2002	2	2	0	1	1	0	1	0	0	0	0	0	0	7
2003	0	1	1	1	1	0	0	0	1	0	1	0	0	6
2004	4	1	0	3	0	0	0	0	0	2	0	0	0	10
2005	1	2	0	1	1	0	0	0	0	0	0	0	0	6
Franklin Street/6th Street														
2001	2	1	0	0	0	1	1	0	0	0	0	0	0	5
2002	2	0	0	0	0	0	0	0	0	0	0	0	0	2
2003	1	2	0	0	0	0	0	0	0	1	0	0	0	4
2004	1	0	0	1	0	0	1	1	0	0	0	0	0	4
2005	3	0	0	1	0	0	1	0	0	0	0	0	0	5

Table 2-2 (continued)
 Crash Data Summary

Intersection	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Pedestrian	Backing	Non-Collision	Other	Total
Franklin Street/7th Street														
2001	2	2	0	1	0	0	0	0	0	0	0	0	0	5
2002	0	0	0	1	0	0	0	0	0	0	0	0	0	2
2003	0	0	0	2	0	0	0	0	0	0	0	0	0	2
2004	0	1	0	2	1	1	0	0	0	1	0	0	0	7
2005	1	0	1	3	3	0	0	0	0	0	0	0	0	9
7th Street/Hamlin Street														
2001	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	1	0	0	0	0	0	1	0	0	0	0	0	0	2
7th Street/Jackson Street														
2001	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7th Street/Monroe Street														
2001	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2005	1	0	1	1	0	0	0	0	0	0	0	0	0	3

Vehicle Gap Study

A gap study was conducted on Thursday, June 28, 2007 at the intersection of Franklin Street and 5th Street. The purpose of the gap study was to address DDOT concerns regarding the egress of vehicles turning on to Franklin Street from the southbound approach of 5th Street and the delay the vehicles would experience as a result of traffic congestion along Franklin Street.

The number of gaps between the vehicles that were traveling in the eastbound and westbound directions of Franklin Street was observed. A summary of the vehicle gaps observed during the AM and PM peak hours is shown on Table 2-3.

As shown in Table 2-3, the number of gaps greater than 6 seconds per 15-minute interval varies from 10 to 20 gaps during the AM peak hour. During the PM peak hour, the number of gaps greater than 6 seconds per 15-minute interval varies from 15 to 20 gaps.

As shown on Figure 2-3, minimal traffic currently is turning from 5th Street and 6th Street onto Franklin Street. Six vehicles turn onto Franklin Street from the southbound approach of 5th Street during the AM peak hour and two vehicles turn onto Franklin Street from the southbound approach of 5th Street during the PM peak hour. During both the AM and PM peak hours, 16 vehicles turn onto Franklin Street from the southbound approach of 6th Street. As such, a maximum of 4 vehicles turn onto Franklin Street every 15 minutes. Therefore, sufficient gaps in the traffic along Franklin Street are available to accommodate vehicles turning from either 5th Street or 6th Street. Gaps are facilitated by traffic signals at the adjacent intersections. That is, motorists utilize the gap in traffic streams due to vehicles stopped at the signals at the Franklin Street/4th Street and Franklin Street/7th Street intersections.

Table 2-3
 Vehicle Gap Summary

Time Interval	gap ≤ 2 seconds	2 seconds < gap ≤ 4 seconds	4 seconds < gap ≤ 6 seconds	gap > 6 seconds (5-minute interval)	gap > 6 seconds (15-minute interval)
7:45 – 7:50 AM	60	17	6	8	20
7:50 – 7:55 AM	53	17	9	7	
7:55 – 8:00 AM	85	35	3	5	
8:00 – 8:05 AM	70	27	7	4	12
8:05 – 8:10 AM	59	36	7	3	
8:10 – 8:15 AM	62	34	8	5	
8:15 – 8:20 AM	39	41	3	4	11
8:20 – 8:25 AM	40	36	6	5	
8:25 – 8:30 AM	49	30	8	2	
8:30 – 8:35 AM	44	29	6	4	11
8:35 – 8:40 AM	58	21	8	4	
8:40 – 8:45 AM	71	23	8	3	
Total	690	346	79	54	
5:00 – 5:05 PM	48	13	13	8	17
5:05 – 5:10 PM	37	17	13	3	
5:10 – 5:15 PM	54	21	9	6	
5:15 – 5:20 PM	58	22	9	6	17
5:20 – 5:25 PM	46	30	10	4	
5:25 – 5:30 PM	49	17	6	7	
5:30 – 5:35 PM	53	25	7	6	20
5:35 – 5:40 PM	35	17	6	7	
5:40 – 5:45 PM	51	25	7	7	
5:45 – 5:50 PM	51	17	6	6	20
5:50 – 5:55 PM	51	17	8	6	
5:55 – 6:00 PM	50	15	10	8	
Total	583	236	104	74	

Section 3 FUTURE BACKGROUND CONDITIONS

LAND USE

In addition to the St Paul's College residential development, three other developments are planned in and around the study area and were considered as part of the background traffic growth.

Catholic University of America occupies a 140-acre tract of land situated in northeast Washington D.C. The property generally is bounded by the WMATA/CSX railroad corridor to the east, Michigan Avenue to the south, Harewood Road to the west, and Taylor Street to the north.

According to the Catholic University of America Campus Master Plan Update - Traffic Impact Assessment,⁸ student enrollment for the University was 4,357 students for the 2001-2002 school year. According to the 1992 Catholic University Campus Master Plan, the student enrollment was envisioned to be 7,500 in the year 2012. As part of the process for updating the University Campus Master Plan, the University commissioned a traffic impact study evaluating the impact of the increase in student enrollment from 4,357 students to 7,500 students.

The Catholic University of America also proposes to construct approximately 600 residential units and 80,000 SF of retail on slightly more than 8 acres of property south of Michigan Avenue, on the west side of the Brookland-CUA Metro Station ("South Campus").

The Rhode Island Avenue Gateway development is proposed near the intersection of 4th Street and Rhode Island Avenue. The proposed development will consist of a 170-unit residential building with 3,000 SF of ground floor retail. The development is expected to be completed by 2008.

The location of each pipeline development is shown in Appendix G.

FUTURE BACKGROUND TRAFFIC FORECASTS

In order to account for regional traffic growth outside the immediate site vicinity, a 1.0 percent growth rate, compounded annually, was applied to the baseline traffic volumes. The resulting volumes are shown on Figure 3-1.

Additionally, traffic volumes from the three pipeline developments previously described were included in the future traffic forecasts. The number of trips that would be generated by these pipeline developments was estimated based on the Institute of Transportation Engineers' (ITE) Trip Generation,⁹ except for the trip generation for Catholic University Master Plan, which was taken from the traffic impact study, as noted below.

The increase in student enrollment at the Catholic University is projected to generate an additional 483 AM peak hour trips and an additional 582 PM peak hour trips, based on the Catholic University of America Campus Master Plan Update - Traffic Impact Assessment.¹⁰

The Catholic University South Campus development is projected to generate 404 AM peak hour trips and 863 PM peak hour trips, based on standard ITE rates/equations, as shown in Table 3-1.

Existing bus service in the vicinity, with bus stops proximate to the proposed Catholic University South Campus development, provides access to the nearby Brookland – CUA Metro Station. Therefore, a portion of the generated trips would be made via public transit. An estimated 35 percent of the trips generated by the proposed residential component would be non-auto trips.

Non-auto trips are projected to account for 93 AM peak hour trips and 113 PM peak hour trips, as shown in Table 3-1.

Taking into account the non-auto mode share, the Catholic University South Campus development would generate an estimated 311 AM peak hour external vehicular trips and 750 PM peak hour external vehicular trips, as shown on Table 3-1.

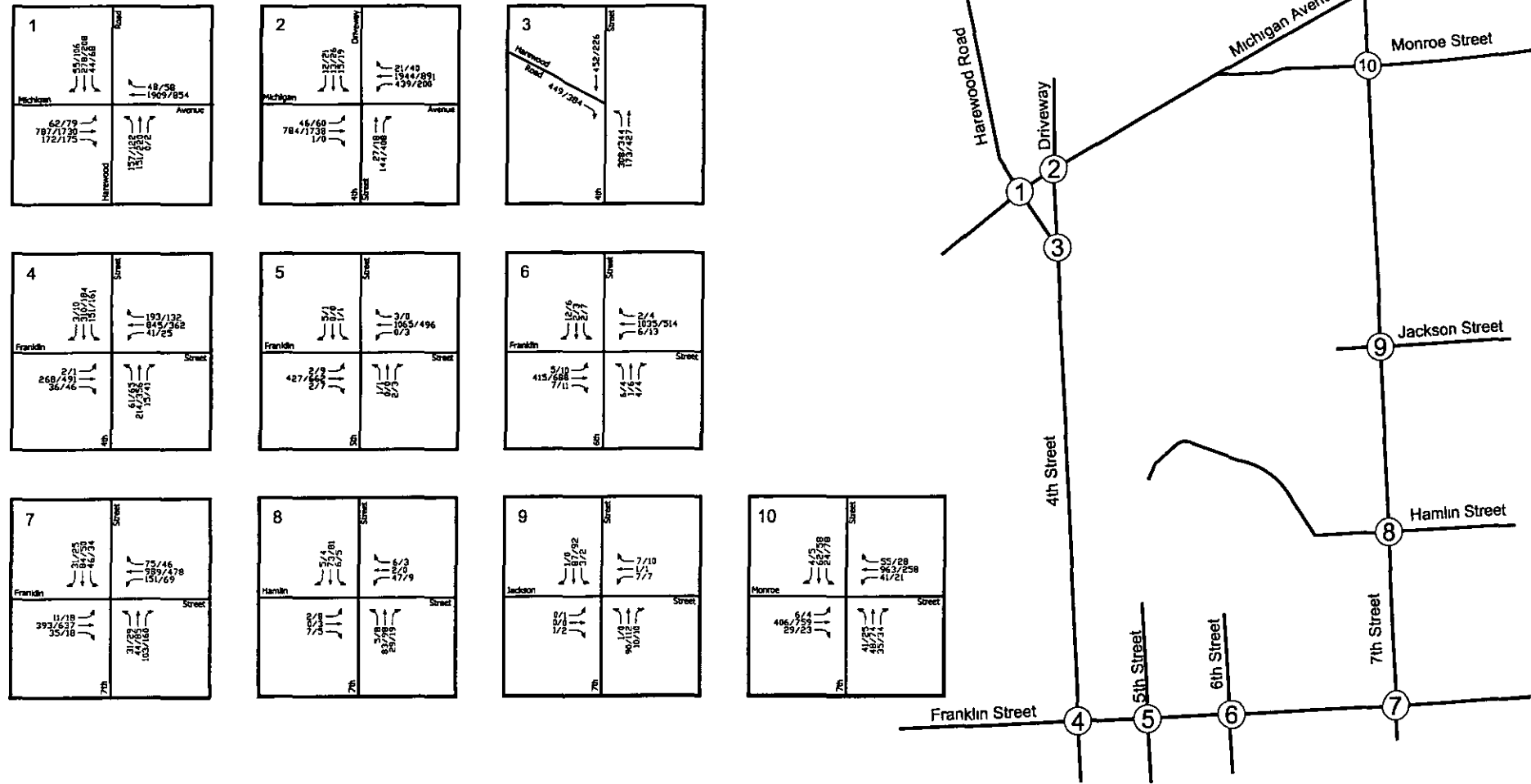


Figure 3-1
Existing Peak Hour Traffic Volumes with Regional Growth

AM Peak 120K
PM Peak 120K
000/000

North

Table 3-1
 Pipeline Development Trip Generation Summary

Land Use	Land Use Code	Size	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Catholic University Master Plan								
<i>Number of Additional Students</i>		3,143 Additional Students	341	142	483	256	326	582
Catholic University South Campus								
<i>Residential Condominium/Townhouse</i>	230	350 DU	24	117	141	113	55	168
Transit Reduction			8	41	49	40	19	59
External Vehicle Trips			16	76	92	73	36	109
<i>Apartment</i>	220	250 DU	25	101	126	101	54	155
Transit Reduction			9	35	44	35	19	54
External Vehicle Trips			16	66	82	66	35	101
<i>Shopping Center</i>	820	80,000 SF	84	53	137	259	281	540
<i>Total Vehicle Trips</i>			133	271	404	473	390	863
Total Transit Reduction			17	76	93	75	38	113
Total External Vehicle Trips			116	195	311	398	352	750
Rhode Island Avenue Gateway								
<i>Residential Condominium/Townhouse</i>	230	170 DU	13	66	79	62	31	93
Transit Reduction			5	23	28	22	11	33
External Vehicle Trips			8	43	51	40	20	60
<i>Specialty Retail Center</i>	814	3,000 SF	5	6	11	13	16	29
<i>Total Vehicle Trips</i>			18	72	90	75	47	122
Total Transit Reduction			5	23	28	22	11	33
Total External Vehicle Trips			13	49	62	53	36	89

The Rhode Island Avenue Gateway development is projected to generate 209 AM peak hour trips and 122 PM peak hour trips, based on standard ITE rates/equations, as shown in Table 3-1.

Existing bus service in the vicinity, with bus stops proximate to the proposed Rhode Island Avenue Gateway development, provides access to the nearby Rhode Island Metro Station and the Brookland – CUA Metro Station. Therefore, a portion of the generated trips would be made via public transit. An estimated 35 percent of the trips generated by the proposed residential component would be non-auto trips.

Non-auto trips are projected to account for 28 AM peak hour trips and 33 PM peak hour trips, as shown in Table 3-1.

Taking into account the non-auto mode share, the Rhode Island Avenue Gateway development would generate an estimated 181 AM peak hour external vehicular trips and 89 PM peak hour external vehicular trips, as shown on Table 3-1.

The traffic assignments associated with each of the pipeline developments are included in Appendix G. The combined peak hour site trips associated with the pipelines is shown on Figure 3-2.

The factored traffic volumes shown on Figure 3-1 were combined with the pipeline developments traffic assignments shown on Figure 3-2 to yield the 2014 future background traffic forecasts shown on Figure 3-3.

OPERATIONAL ANALYSIS

Capacity/level of service (LOS) analyses were conducted at the study intersections based on the existing lane use and traffic control shown on Figure 2-1, future background traffic forecasts shown on Figure 3-3, and existing DDOT traffic signal timings provided in Appendix C.

The Synchro results for the 2014 background conditions without the proposed development are presented in Appendix H and summarized in Table 3-2.

As shown in Table 3-2, the following intersections would operate at acceptable levels of service (i.e. LOS D or better) under background conditions and have additional capacity to accommodate increases in traffic:

- 4th Street/Harewood Road
- Hamlin Street/7th Street
- Jackson Street/7th Street

Each lane group at these intersections would operate at a LOS D or better during both the AM and PM peak hours

As shown in Table 3-2, the following intersections have lane groups that would operate deficiently under background conditions:

- Michigan Avenue/Harewood Road
- Michigan Avenue/4th Street
- Franklin Street/4th Street
- Franklin Street/5th Street
- Franklin Street/6th Street
- Franklin Street/7th Street
- 7th Street/Monroe Street

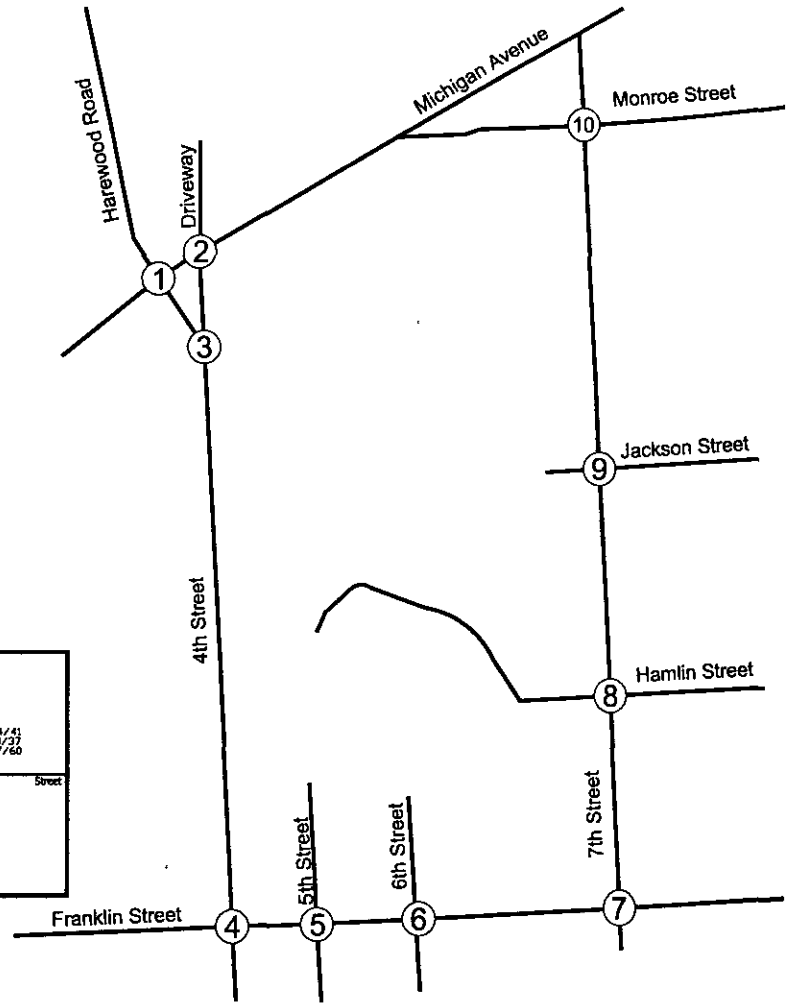
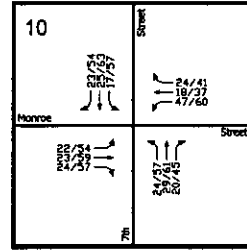
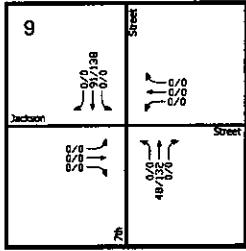
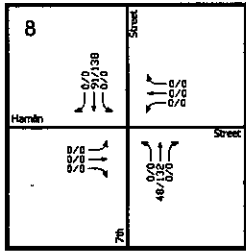
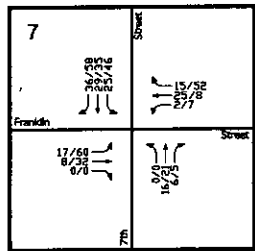
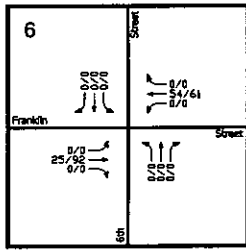
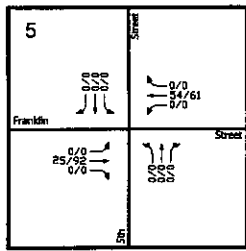
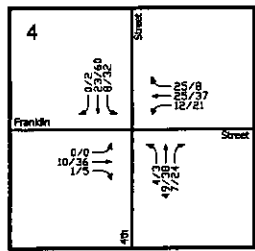
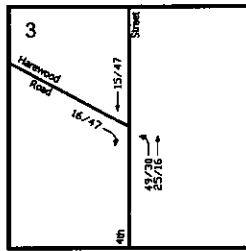
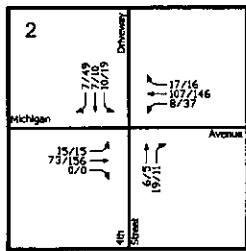
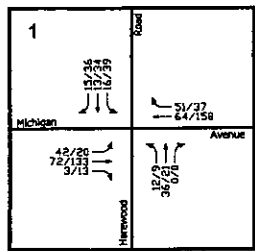


Figure 3-2
Pipeline Developments Traffic Assignments

AM P.M. H.R.P.
PM P.M. H.R.P.
000/000



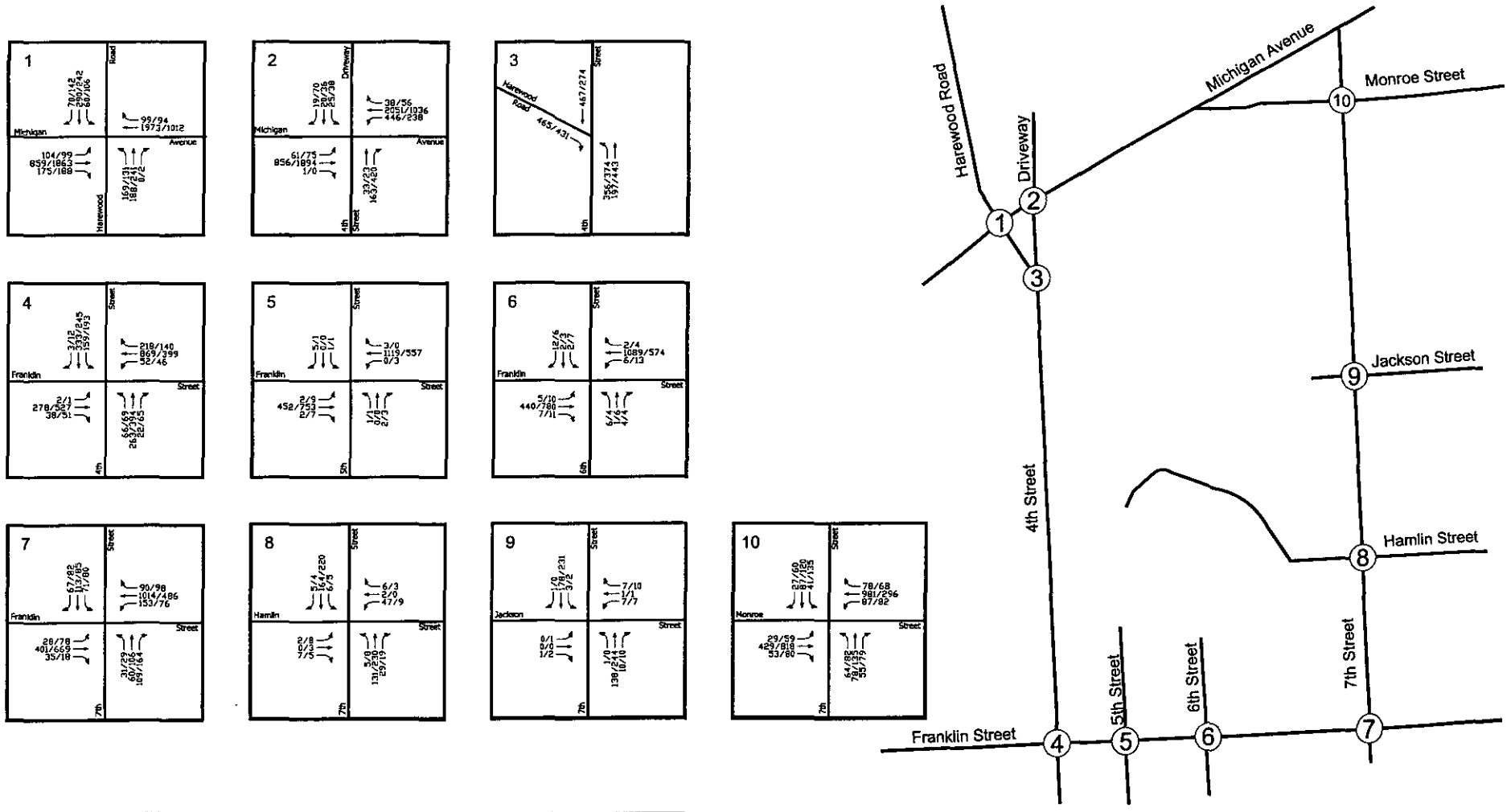


Figure 3-3
2014 Future Background Peak Hour Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000/000



Table 3-2
 Background Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Harewood Road		
EBLTR	F (153.0)	F (288.4)
WBTR	F (137.4)	A (8.1)
NBL	F (108.2)	E (73.8)
NBTR	C (27.7)	D (37.2)
SBLTR	C (32.6)	D (38.9)
OVERALL	F (124.4)	F (161.9)
Michigan Avenue/4th Street		
EBLTR	A (5.2)	F (168.7)
WBL	E (79.5)	E (75.1)
WBTR	F (157.5)	B (18.8)
NBTR	C (25.6)	D (47.8)
NBR	B (13.6)	C (23.1)
SBLTR	C (31.0)	D (37.6)
OVERALL	F (100.9)	F (100.8)
4th Street/Harewood Road		
EBR	A (5.6)	B (17.1)
NBLT	A (1.8)	A (5.7)
SBT	A (2.7)	A (4.7)
OVERALL	A (3.3)	A (8.7)
Franklin Street/4th Street		
EBLTR	B (16.6)	C (22.7)
WBLT	E (64.3)	B (11.0)
WBR	A (1.2)	A (3.6)
NBLTR	C (29.4)	D (43.1)
SBLT	F (244.3)	F (489.9)
SBR	C (24.5)	B (15.7)
OVERALL	F (84.8)	F (119.5)
Franklin Street/5th Street		
EBLTR	A [0.1]	A [0.3]
WBLTR	A [0.0]	A [0.2]
NBLTR	B [14.1]	D [26.4]
SBLTR	C [17.7]	F [51.7]
Franklin Street/6th Street		
EBLTR	A [0.3]	A [0.3]
WBLTR	A [0.2]	A [0.8]
NBLTR	C [19.9]	F [66.3]
SBLTR	C [21.6]	F [134.9]
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

Table 3-2 (continued)
 Background Levels of Service

Approach	AM Peak	PM Peak
Franklin Street/7th Street		
EBLTR	D (51.9)	F (87.8)
WBLTR	C (31.8)	B (10.4)
NBLTR	C (33.8)	E (58.8)
SBLTR	D (47.3)	F (136.0)
OVERALL	D (38.1)	E (63.5)
7th Street/Hamlin Street		
EBLTR	B [10.2]	B [12.5]
WBLTR	B [12.6]	B [12.7]
NBLTR	A [0.3]	A [0.3]
SBLTR	A [0.3]	A [0.2]
7th Street/Jackson Street		
EBLTR	A [7.1]	A [7.8]
WBLTR	A [7.9]	A [8.0]
NBLTR	A [8.2]	A [9.3]
SBLTR	A [8.7]	A [9.2]
OVERALL	A [8.4]	A [9.2]
7th Street/Monroe Street		
EBLTR	F (231.1)	F (605.5)
WBLTR	F (1115.8)	F (640.3)
NBLTR	B (11.1)	A (14.0)
SBLTR	A (9.3)	B (13.2)
OVERALL	F (696.6)	F (433.6)
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

Section 4
SITE ANALYSIS

OVERVIEW

The proposed development would consist of a maximum of 260 townhouse units. Access to the site would be provided via Jackson Street, Hamlin Street, 5th Street, and 6th Street.

To accommodate the proposed development, EYA has filed a PUD application with the District of Columbia Zoning Commission. As part of the PUD, the site would be rezoned from R-5-A to R-5-B. The R-5-B district permits a maximum floor area ratio (FAR) of 1.8 and a maximum height of 50 feet.

TRIP GENERATION ANALYSIS

The number of trips anticipated to be generated by the proposed residential development at full build-out (260 townhouses) was estimated based on ITE's Trip Generation.¹¹ Land Use Code 230, Residential Condominium/Townhouse, was used with the number of dwelling units as the independent variable.

The proposed development is projected to generate a total of 111 AM peak hour trips, 132 PM peak hour trips, and 1,446 daily trips at project build-out, as shown in Table 4-1.

Table 4-1
 Site Trip Generation Summary

Land Use	AM Peak			PM Peak			ADT
	In	Out	Total	In	Out	Total	
St. Paul's College Residential Development							
Total Trips	19	92	111	88	44	132	1,446
Transit Reduction	7	32	39	31	15	46	506
Vehicle Trips	12	60	72	57	29	86	940

A portion of the trips generated by the proposed residential development would be made via non-auto modes of transportation. The percentage of site-generated trips that would utilize public transportation is dependent on the proximity of the site to transit stops and the degree to which the use of public transit is encouraged, such as by implementation of a transportation demand management (TDM) program.

According to WMATA's 2005 Ridership Survey, the transit mode share for residential developments is related to the distance from the development to the nearest transit station. Based on the Ridership Survey, the non-auto mode split for the subject site was estimated to be 50 percent. Data from the U.S. Census Bureau,¹² substantiate this estimation. Data from eight census tracts surrounding the subject site indicate that 44 percent of persons currently residing in the study area utilize non-auto modes of transportation to get to work, as shown in Table 4-2.

However, in order to provide a conservative analysis and based on conversations with DDOT staff, a 35 percent non-auto mode split was assumed for the subject site.

Table 4-2
 U.S. Census Bureau Data
 Journey to Work

Total - All Census Tracts	Total	Percent
	8,509	100%
Car, Truck, or Van		
Drove Alone	3,629	42.6%
Carpooled	1,098	12.9%
Total	4,727	56%
Public Transportation		
Bus	984	11.6%
Streetcar	7	0.1%
Subway	1,678	19.7%
Railroad	49	0.6%
Ferryboat	0	0.0%
Taxicab	84	1.0%
Total	2,802	33%
Other		
Motorcycle	0	0.0%
Bicycle	27	0.3%
Walked	651	7.7%
Other means	29	0.3%
Stayed Home	273	3.2%
Total	980	11%

Non-auto trips are projected to account for 39 AM peak hour trips and 46 PM peak hour trips, as shown in Table 4-1.

Taking into account the non-auto mode share, the proposed development would generate an estimated 72 AM peak hour vehicular trips and 86 PM peak hour vehicular trips, as shown on Table 4-1.

SITE TRIP DISTRIBUTION

The distribution of peak hour trips generated by the proposed development was based on existing traffic patterns in the study area and the premise that commuters will select routes that minimize travel time.

An estimated 25 percent of the site-generated traffic would approach/depart the site to/from the northwest on Michigan Avenue via 4th Street.

Approximately five percent of site-generated traffic would approach/depart the site to/from the northwest on Harewood Road via 4th Street.

An estimated 28 percent would approach/depart the site to/from the northeast on Michigan Avenue via 7th Street, while an estimated 11 percent would approach/depart the site to/from the northeast on Monroe Street via 7th Street.

Approximately nine percent of site-generated traffic would approach/depart the site to/from the southwest on Franklin Street. An estimated six percent would approach/depart the site to/from the southwest on 4th Street.

An estimated three percent would approach/depart the site to/from the southeast on 7th Street, while an estimated 13 percent would approach/depart the site to/from the southeast on Franklin Street.

SITE TRAFFIC ASSIGNMENTS

The site-generated traffic volumes were assigned to the public roadway network according to the directional distribution described above. The resulting site traffic assignments are shown on Figure 4-1.

PEDESTRIAN ACCESS

Due to the development's proximity to the Brookland-CUA Metro Station and the Rhode Island Metro Station, pedestrian accommodations will be essential. Pedestrian activity will be promoted and facilitated by connecting sidewalks within the proposed development to existing sidewalks along the surrounding roadways.

PARKING REQUIREMENTS

According to the District of Columbia Municipal Regulations (DCMR),¹³ one parking space for each 1 dwelling unit is required in the R-5-B zoning district. Therefore, a total of 251 parking spaces is required for the St. Paul's College residential development. The proposed development would provide a total of 542 parking spaces. As proposed, 468 parking spaces would be provided for residents. In addition, 74 on-street parking spaces would be provided.

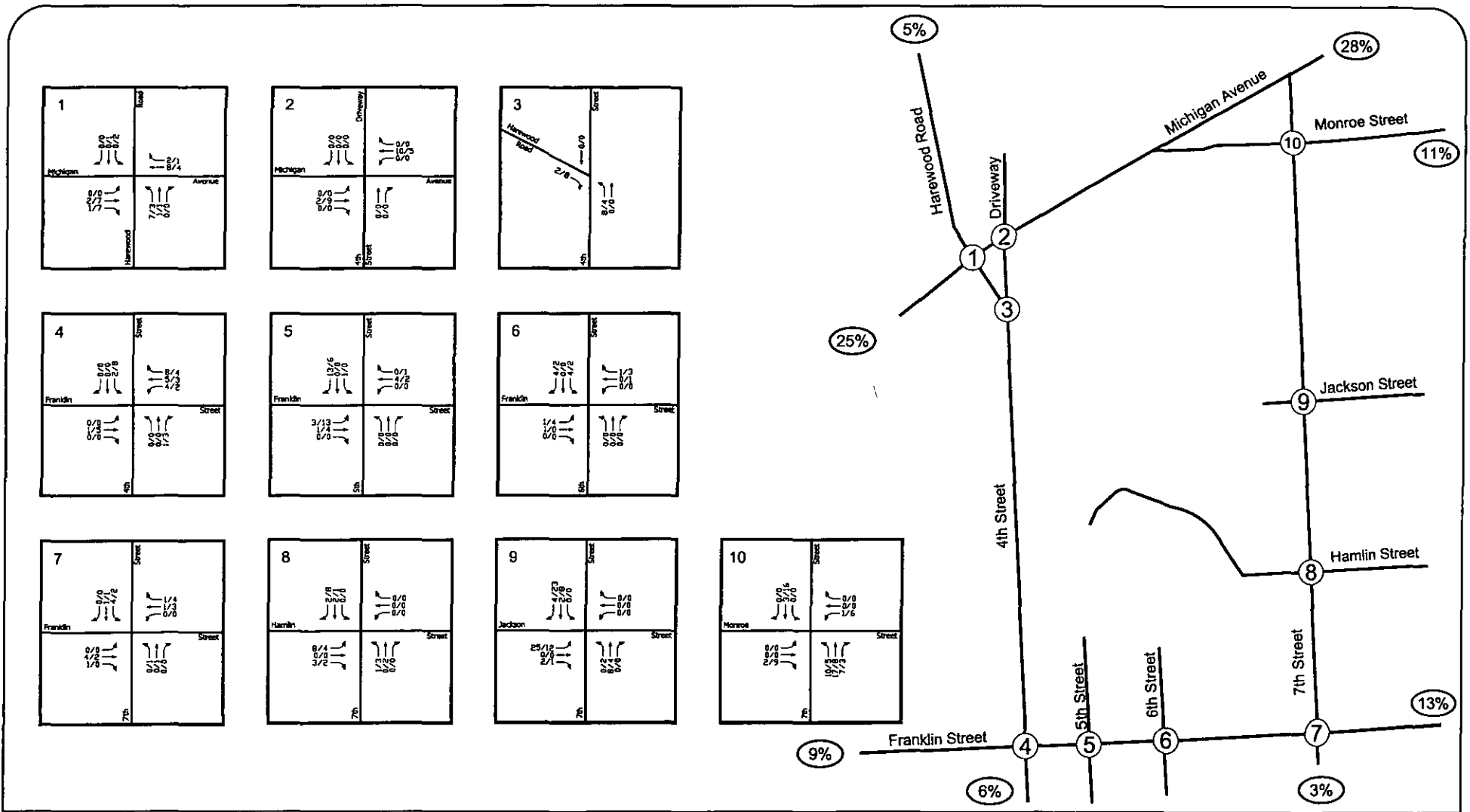



Figure 4-1
Site Distribution and Assignments


 North
 All PEAK HOUR
 PM PEAK HOUR
 000/000

Section 5 TOTAL FUTURE CONDITIONS

TOTAL FUTURE TRAFFIC FORECASTS

Total future traffic forecasts with the proposed development were determined by combining the 2014 background traffic forecasts shown in Figure 3-3 with the site traffic volumes shown on Figure 4-1 to yield the 2014 total future traffic forecasts shown on Figure 5-1.

OPERATIONAL ANALYSIS

A future conditions capacity analysis, with the proposed development, was performed at the study intersections utilizing 2014 projected total future traffic volumes shown on Figure 5-1, existing lane configurations and traffic controls shown on Figure 2-1, and existing DDOT traffic signal timings included in Appendix C. The analysis is summarized in Table 5-2 and the results are included in Appendix I.

As shown in Table 5-2, under 2014 conditions with the proposed residential development, the levels of service would be consistent with the levels of service under background conditions, except as outlined below:

- At the Michigan Avenue/Harewood Road intersection, the northbound left-turn movement would continue to fail with an increase in delay over 10 percent during the AM peak hour and would drop from a LOS E under background conditions to a LOS F under total future conditions during the PM peak hour.
- At the Michigan Avenue/4th Street intersection, the westbound left-turn movement would drop from a LOS E under background conditions to a LOS F under total future conditions during the AM peak hour.
- At the Franklin Street/6th Street intersection, the southbound approach would continue to fail with an increase in delay over 10 percent during the PM peak hour.
- At the 7th Street/Monroe Street intersection, the westbound approach would continue to fail with an increase in delay over 10 percent during the PM peak hour.

PROPORTIONAL IMPACT ANALYSIS

In order to determine the amount of traffic on the surrounding roadways that is attributable to the proposed development, a proportional impact assessment was conducted. That is, the total future traffic volumes were compared to the background traffic volumes to determine the impact of adding the residential site trips to the study intersections. Table 5-1 displays the results of the proportional impact analysis.

Table 5-1
 Proportional Impact Analysis

Intersection	AM Peak	PM Peak
Michigan Avenue/Harewood Road	< 1%	< 1%
Michigan Avenue/4 th Street	< 1%	< 1%
4 th Street/Harewood Road	< 1%	< 1%
Franklin Street/4 th Street	< 1%	1.1%
Franklin Street/5 th Street	1.3%	1.9%
Franklin Street/6 th Street	< 1%	< 1%
Franklin Street/7 th Street	< 1%	< 1%
7 th Street/Hamlin Street	4.0%	3.7%
7 th Street/Jackson Street	10.8%	8.9%
7 th Street/Monroe Street	1.9%	2.3%

Site impacts of five percent or less are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent are generally considered moderate and minor effects on traffic operations and delays could be expected. Site impacts of more than 15 percent are generally considered significant.¹⁴

As shown in Table 5-1, the proportional impact at the majority of the intersections is expected to be insignificant.

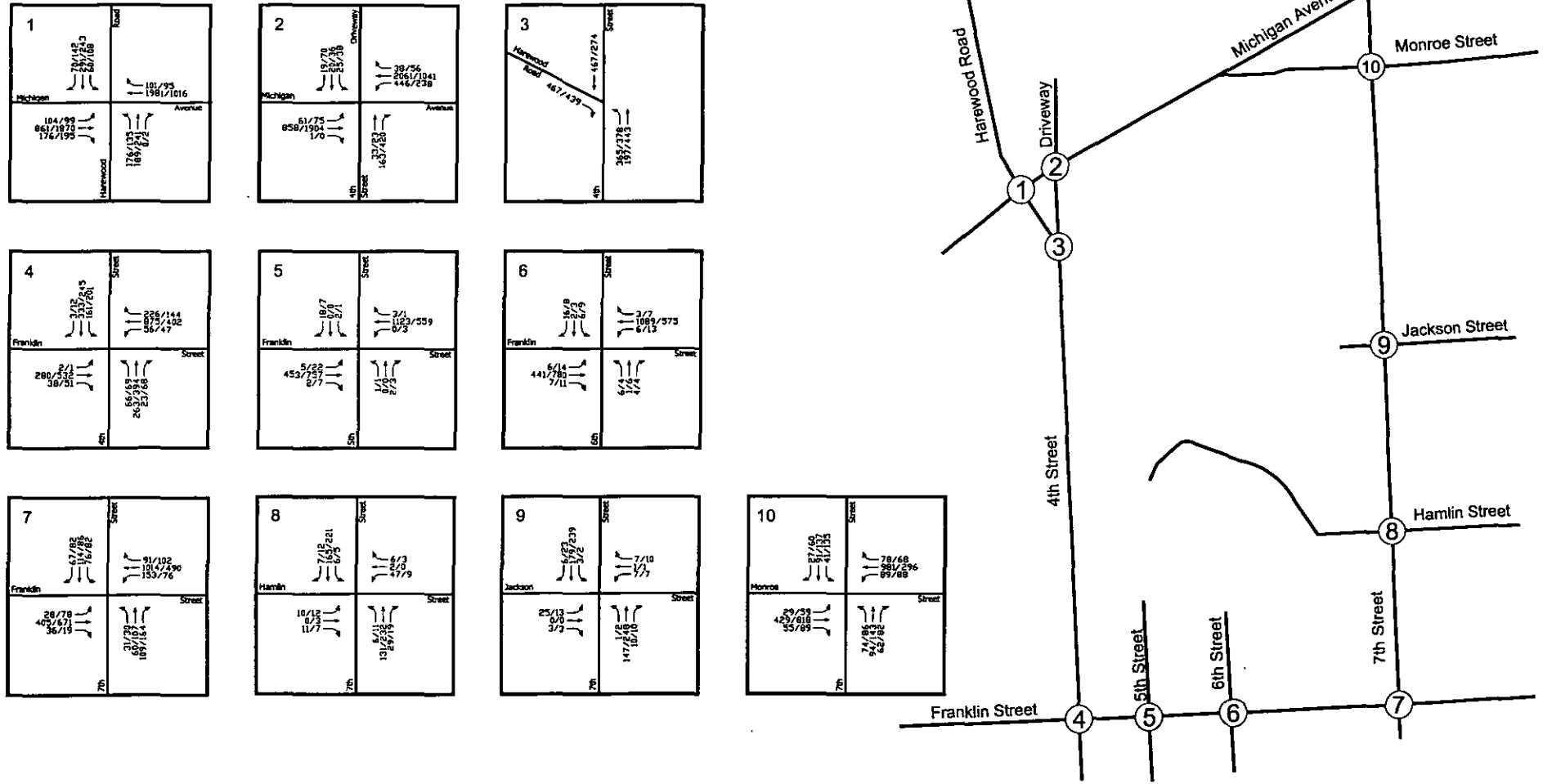


Figure 5-1
2014 Total Future Peak Hour Traffic Forecasts

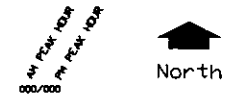


Table 5-2
 Total Future Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Harewood Road		
EBLTR	F (154.6)	F (293.5)
WBTR	F (140.0)	A (8.1)
NBL	F (120.0)	F (81.4)
NBTR	C (27.9)	D (37.2)
SBLTR	C (32.7)	D (39.2)
OVERALL	F (126.7)	F (164.9)
Michigan Avenue/4th Street		
EBLTR	A (5.3)	F (171.9)
WBL	F (80.3)	E (75.2)
WBTR	F (160.2)	B (18.9)
NBTR	C (25.8)	D (48.0)
NBR	B (13.6)	C (23.3)
SBLTR	C (31.0)	D (37.6)
OVERALL	F (102.7)	F (102.5)
4th Street/Harewood Road		
EBR	A (5.6)	B (17.1)
NBLT	A (1.7)	A (5.7)
SBT	A (2.7)	A (4.7)
OVERALL	A (3.2)	A (8.8)
Franklin Street/4th Street		
EBLTR	B (17.0)	C (23.0)
WBLT	E (71.0)	B (11.0)
WBR	A (1.2)	A (3.6)
NBLTR	C (29.5)	D (44.4)
SBLT	F (248.3)	F (516.6)
SBR	C (24.5)	B (16.2)
OVERALL	F (88.1)	F (126.0)
Franklin Street/5th Street		
EBLTR	A [0.3]	A [0.7]
WBLTR	A [0.0]	A [0.2]
NBLTR	B [14.5]	D [28.1]
SBLTR	C [15.6]	C [22.4]
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

Table 5-2 (continued)
 Total Future Levels of Service

Approach	AM Peak	PM Peak
Franklin Street/6th Street		
EBLTR	A [0.3]	A [0.4]
WBLTR	A [0.2]	A [0.8]
NBLTR	C [20.2]	F [68.8]
SBLTR	D [28.7]	F [161.1]
Franklin Street/7th Street		
EBLTR	D (53.7)	F (90.5)
WBLTR	C (32.2)	B (10.4)
NBLTR	C (33.8)	E (60.2)
SBLTR	D (51.1)	F (147.8)
OVERALL	D (39.2)	E (66.2)
7th Street/Hamlin Street		
EBLTR	B [10.9]	B [12.8]
WBLTR	B [12.8]	B [12.9]
NBLTR	A [0.3]	A [0.4]
SBLTR	A [0.3]	A [0.2]
7th Street/Jackson Street		
EBLTR	A [8.1]	A [8.4]
WBLTR	A [8.0]	A [8.2]
NBLTR	A [8.5]	A [9.6]
SBLTR	A [8.8]	A [9.6]
OVERALL	A [8.6]	A [9.5]
7th Street/Monroe Street		
EBLTR	F (233.3)	F (613.0)
WBLTR	F (1130.9)	F (726.4)
NBLTR	B (12.0)	A (14.6)
SBLTR	A (9.4)	B (13.6)
OVERALL	F (694.0)	F (451.3)
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

IMPROVEMENT ANALYSIS

An incremental series of improvements were evaluated to determine the level of improvements necessary to offset the impact of the additional traffic generated as a result of the proposed development. The incremental series of improvements included evaluation of peak hour traffic signal warrants and adjustments to signal timings.

PEAK HOUR WARRANT ANALYSIS

In accordance with the Manual on Uniform Traffic Control Devices (MUTCD)¹⁵ an evaluation of the peak hour traffic signal warrant was conducted for the Franklin Street/6th Street intersection. This analysis showed that the peak hour traffic signal warrant would not be met during the AM and PM peak hours under the projected total future traffic volumes. The traffic signal warrant analysis is included in Appendix J.

OPERATIONAL ANALYSIS WITH INCREMENTAL IMPROVEMENTS

A future conditions capacity analysis, with improvements, was performed at the study intersections utilizing the lane use and traffic controls shown on Figure 2-1 and the 2014 projected total future traffic volumes shown on Figure 5-1.

The following improvements would be required to offset the impact of the proposed development:

- At the Michigan Avenue/Harewood Road intersection, slight adjustments to the green times during the AM and PM peak hours would be required to mitigate the increase in delay for the northbound left-turn movement.
- At the Michigan Avenue/4th Street intersection, slight adjustments to the green times during the AM peak hour would be required to mitigate the increase in delay for the westbound left-turn movement.
- At the 7th Street/Monroe Street intersection, slight adjustments to the green times during the PM peak hour would be required to mitigate the increase in delay for the westbound approach.

As stated previously, the southbound approach at the Franklin Street/6th Street intersection would experience an increase in delay over 10 percent during the PM peak hour under total future conditions and would not warrant signalization. Therefore, given that the southbound approach is failing under background conditions and that the approach is a driveway approach, the delay shown was deemed acceptable for total future conditions.

Table 5-3 summarizes the results of the analysis. Level of service reports for total future conditions with improvements are provided in Appendix K.

Table 5-3
 Total Future with Improvements Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Harewood Road		
EBLTR	F (154.6)	F (295.9)
WBTR	F (149.2)	A (8.3)
NBL	F (101.5)	E (70.0)
NBTR	C (26.0)	D (35.7)
SBLTR	C (31.4)	D (37.1)
OVERALL	F (130.5)	F (165.6)
Michigan Avenue/4th Street		
EBLTR	A (5.3)	F (171.8)
WBL	E (69.5)	E (75.2)
WBTR	F (149.5)	B (18.9)
NBTR	B (23.1)	D (47.2)
NBR	B (13.6)	C (23.4)
SBLTR	C (31.9)	D (37.4)
OVERALL	F (95.3)	F (102.4)
4th Street/Harewood Road		
EBR	A (5.6)	B (17.1)
NBLT	A (1.7)	A (5.7)
SBT	A (2.9)	A (4.7)
OVERALL	A (3.3)	A (8.8)
Franklin Street/4th Street		
EBLTR	B (17.0)	C (23.0)
WBLT	E (71.0)	B (11.1)
WBR	A (1.2)	A (3.6)
NBLTR	C (29.5)	D (44.4)
SBLT	F (248.7)	F (516.5)
SBR	C (24.5)	B (15.6)
OVERALL	F (88.2)	F (126.0)
Franklin Street/5th Street		
EBLTR	A [0.3]	A [0.7]
WBLTR	A [0.0]	A [0.2]
NBLTR	B [14.5]	D [28.1]
SBLTR	C [15.6]	C [22.4]
Franklin Street/6th Street		
EBLTR	A [0.3]	A [0.4]
WBLTR	A [0.2]	A [0.8]
NBLTR	C [20.2]	F [68.8]
SBLTR	D [28.7]	F [161.1]
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

Table 5-3 (continued)
 Total Future with Improvements Levels of Service

Approach	AM Peak	PM Peak
Franklin Street/7th Street		
EBLTR	D (53.7)	F (90.5)
WBLTR	C (32.2)	B (10.4)
NBLTR	C (33.8)	E (60.2)
SBLTR	D (51.1)	F (147.8)
OVERALL	D (39.2)	E (66.1)
7th Street/Hamlin Street		
EBLTR	B [10.9]	B [12.8]
WBLTR	B [12.8]	B [12.9]
NBLTR	A [0.3]	A [0.4]
SBLTR	A [0.3]	A [0.2]
7th Street/Jackson Street		
EBLTR	A [8.1]	A [8.4]
WBLTR	A [8.0]	A [8.2]
NBLTR	A [8.5]	A [9.6]
SBLTR	A [8.8]	A [9.6]
OVERALL	A [8.6]	A [9.5]
7th Street/Monroe Street		
EBLTR	F (233.3)	F (576.1)
WBLTR	F (1130.9)	F (692.2)
NBLTR	B (12.0)	B (15.3)
SBLTR	A (9.4)	B (14.4)
OVERALL	F (694.0)	F (426.7)
[23.3] = unsignalized intersection control delay in sec/veh (23.3) = signalized intersection control delay in sec/veh		

Section 6
TOTAL FUTURE CONDITIONS
WITH ADDITIONAL
IMPROVEMENTS

OPERATIONAL ANALYSIS

A capacity/level of service analysis was undertaken to determine the improvements necessary to attain an overall LOS D or better for intersections that are projected to operate at an overall LOS E or F without the proposed development. The 2014 projected total future traffic volumes shown on Figure 5-1 were used for this analysis. The total future analysis with improvements for the intersections analyzed is shown in Table 6-1. The analysis is summarized in Appendix L.

A series of incremental analyses were undertaken to determine improvements necessary to attain an overall LOS D. These analyses are summarized below.

- Restriction of on-street parking on the west side of 4th Street between Franklin Street and Evarts Street during the AM and PM peak periods. An estimated 15 parking spaces would be lost during the peak periods.
- Minor adjustments to the signal timings at the Franklin Street/7th Street intersection during the AM and PM peak periods.
- Restriping of Monroe Street to provide four travel lanes between Michigan Avenue and 8th Street. Restriction of on-street parking would be required on the south side of Monroe Street east of its intersection with Michigan Avenue and west of its intersection with 8th Street during the AM and PM peak periods. An estimated 28 parking spaces would be lost during the peak periods.

Table 6-1
 Total Future with Improvements Levels of Service with Additional Improvements

Approach	AM Peak	PM Peak
Franklin Street/4th Street		
EBLTR	B (17.0)	C (23.0)
WBLT	E (71.6)	B (11.1)
WBR	A (3.7)	A (4.0)
NBLTR	C (26.7)	C (34.0)
SBLTR	C (34.3)	D (36.3)
OVERALL	D (42.7)	C (24.8)
Franklin Street/7th Street		
EBLTR	D (48.0)	E (73.0)
WBLTR	C (32.5)	B (11.1)
NBLTR	C (33.8)	D (54.4)
SBLTR	D (51.1)	F (116.3)
OVERALL	D (38.1)	D (54.8)
7th Street/Monroe Street		
EBLTR	B (14.5)	D (36.0)
WBLTR	C (32.5)	C (27.5)
NBLTR	C (31.6)	C (23.9)
SBLTR	C (23.2)	C (23.3)
OVERALL	C (27.2)	C (30.2)
(23.3) = signalized intersection control delay in sec/veh		

Section 7 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this study are as follows:

1. Currently, all study intersections operate at acceptable levels of service (i.e. LOS D or better), with the exception of the following intersections.
 - Michigan Avenue/Harewood Road
 - Michigan Avenue/4th Street
 - Franklin Street/4th Street
 - Franklin Street/6th Street
 - 7th Street/Monroe Street
2. Under background conditions (with pipeline developments), the following intersections have lane groups that would operate deficiently under background conditions:
 - Michigan Avenue/Harewood Road
 - Michigan Avenue/4th Street
 - Franklin Street/4th Street
 - Franklin Street/5th Street
 - Franklin Street/6th Street
 - Franklin Street/7th Street
 - 7th Street/Monroe Street
3. The proposed development is anticipated to generate an estimated 72 AM peak hour vehicular trips and 86 PM peak hour vehicular trips.
4. According to the DCMR, 251 on-site parking spaces would be required for the residential development. The proposed development would provide 542 parking spaces.
5. The increase in traffic at the study intersections is expected to have little effect on traffic operations and could be offset by minor timing adjustments at a few signalized intersections.
6. The peak hour traffic signal warrant is not met at the Franklin Street/6th Street intersection under the projected total future traffic volumes during the AM and PM peak hours
7. Sufficient gaps in the traffic along Franklin Street are available to accommodate vehicles turning from either 5th Street or 6th Street.
8. The following improvements would be required to offset the impact of the proposed development:
 - At the Michigan Avenue/Harewood Road intersection, slight adjustments to the green times during the AM and PM peak hours;
 - At the Michigan Avenue/4th Street intersection, slight adjustments to the green times during the AM peak hour;
 - At the 7th Street/Monroe Street intersection, slight adjustments to the green times during the PM peak hour.
9. Consideration should be given to installing signs to help lower speeds and updating pavement markings (specifically crosswalks) on Franklin Street
10. Background traffic growth, including traffic associated with the pipeline developments, can be accommodated with the following improvements. These improvements are **not** necessary to mitigate the impact of the proposed development
 - Restriction of on-street parking on the west side of 4th Street between Franklin Street and Evarts Street during the AM and PM peak periods.
 - Minor adjustments to the signal timings at the Franklin Street/7th Street intersection during the AM and PM peak periods
 - Restriping of Monroe Street to provide four travel lanes between Michigan Avenue and 8th Street. Restriction of on-street parking would be required on the south side of Monroe Street east of its intersection with Michigan Avenue and west of its intersection with 8th Street during the AM and PM peak periods.

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