
Corridor Improvements Impact Study

Lake Avenue

Rochester, New York
Monroe County

November, 2012

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EXECUTIVE SUMMARY

The City of Rochester is proposing to reconstruct a portion of Lake Avenue from Merrill Street to 600 feet south of Burley Road in the City of Rochester, Monroe County, New York. Reconstruction of the City Street is anticipated to be completed in 2014. Lake Avenue is on the National Highway system. **Figure 1** identifies the project location.

This Study is intended to evaluate the potential impacts of reducing the number of through lanes along Lake Avenue. This type of roadway modification is referred to as a “Road Diet”, which is defined by converting a four-lane undivided street to a three-lane roadway with bike lanes. Comprised of one-lane in each direction and a two-way left-turn lane, typical benefits of a road diet include speed reduction, reduced collisions, improved mobility and access, and improved quality of life.

This study is intended for review by the City of Rochester, Monroe County Department of Transportation (MCDOT), New York State Department of Transportation (NYS DOT) and any other interested agencies. The procedures used conform to guidelines recommended by the Institute of Transportation Engineers (ITE). The scope and parameters of this study have been developed in consultation with the City of Rochester and MCDOT.

To identify and address the potential transportation impacts of this project, the following tasks were undertaken:

- T.Y. Lin International (TYLI) obtained field data on the existing transportation system. Data collection included information on intersection spacing, roadway geometrics, sight distances, speed limits, pavement conditions, and pavement striping and signing.
- A capacity operations Level of Service (LOS) analysis was performed at the following intersections:
 - Lake Avenue @ Merrill Street (Signalized)
 - Lake Avenue @ Winchester Street (Unsignalized)

- Lake Avenue @ the entrance to Holy Sepulchre Cemetery (Signalized)
- TYLI performed manual turning movement counts at the signalized intersections listed above during the weekday morning peak period and the weekday evening peak period.
- Obtained tube count data within the project area to determine existing daily traffic volumes and speeds along Lake Avenue.
- TYLI estimated the background traffic growth along the Lake Avenue corridor based on a 0.5 percent annual growth rate (per MCDOT) and peak hour traffic volume associated with any known background developments.
- The origin and destination of any background traffic developments was based on existing travel patterns.
- The capacity and Level of Service of the existing roadway system and the impacts of the proposed “Road Diet” were estimated using the traffic modeling software program SYNCHRO 7.0 for the peak hour traffic operation at the intersections listed above for the Existing 2011, ETC and ETC + 20 with and without the proposed roadway improvements (Two Lane and One Lane).
- TYLI performed a three-year accident analysis along the segments of Lake Avenue within the study area for the time period between November 1, 2008 and October 31, 2011.
- A review of MUTCD signal warrants was completed to determine the relevance of the existing traffic signal at the entrance to the Holy Sepulchre Cemetery and at the intersection of Lake Avenue and Merrill Street.



FIGURE 1

LAKE AVENUE IMPROVEMENT PROJECT

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255 EAST AVENUE
ROCHESTER, NY 14604
(585) 512-2000

PROJECT LOCATION MAP

Existing traffic volumes were collected by T.Y. Lin International on Thursday, September 29th, 2012 for the weekday morning and evening peak hours. Tube count data was supplied by MCDOT to determine the Annual Daily Traffic (ADT) volumes, the hourly through volumes, vehicular speeds and vehicle classes along Lake Avenue.

In consideration of the area's growth potential as documented in the MCDOT memo regarding Monroe County Traffic Volume Trends (December 1, 2010), a 0.5% annual growth rate was applied to the existing volumes (**Appendix B**). Additionally, the City of Rochester was contacted to determine any known background developments to include in the background traffic conditions. Two development projects were considered in determining the background traffic for this project. Peak hour traffic impacts associated with the proposed Port of Rochester - Marina Project (located to the north of the project area) and the Eastman Business Park Redevelopment Project (located to the south of the project area) were investigated.

As described in the Draft Environmental Impact Statement (DEIS) for The Port of Rochester - Marina Project, the anticipated Friday evening peak hours occur between 6:30pm and 7:30pm and between 8:30pm and 9:30pm. The peak hours for this development are not consistent with the peak hour periods analyzed for this study. As such, trips from The Port of Rochester project were not added to the background conditions. However, off peak trips from the development are presumed within the 0.5% annual growth rate that has been applied to the corridor for the background conditions.

The existing vacant properties within Kodak Park located just south of the project on Lake Avenue and West Ridge Road are anticipated to be backfilled with businesses within the near future, as Eastman Business Park. Several parcels have recently been backfilled and the remaining sites are currently marketed for sale. Although a traffic study has not been completed for the redevelopment, the anticipated peak hour trips were estimated for the major parcels that are currently marketed for redevelopment using ITE trip rates for office and manufacturing land uses. The building locations were confirmed

with a representative from Kodak's redevelopment team (**Appendix B**) and are included in the Lake Avenue Study as a background development. In addition to the 0.5% annual growth percentage rate, trips estimated for Eastman Business Park were added to the existing traffic volumes to project future 2014 (build) traffic volumes.

Based on the findings of the analysis, a road diet is feasible to reduce traffic speeds within the corridor and to provide a "Gateway" between the Charlotte neighborhoods to the north and the Eastman Kodak neighborhoods to the south.

The following is a summary of findings and the recommended improvements to accommodate the proposed corridor project:

Lake Avenue (Merrill Street to a point 600-ft south of Burley Road)

- Provide one through lane with left turn lanes at the intersections of Lake Avenue/Winchester Street and Lake Avenue/ Holy Sepulchre Cemetery.
- Install 5-ft wide bicycle lanes along both sides of the street.
- Install a 10 ft wide raised median, where appropriate, to separate the travel lanes and to provide a pedestrian refuge area.
- Install pull-off areas for buses at designated bus stops throughout the corridor.
- Install a high visibility pedestrian crosswalk on Lake Avenue at the St. Bernard's Apartment Complex.

Lake Avenue @ Merrill Street

- South of Merrill Street, reduce the southbound lane configuration from 3 lanes to 2 lanes.
- Add lane reduction warning signs to the northbound approach.
- Remove the existing parking along the west side of Lake Avenue between Winchester Street and Merrill Street.

Lake Avenue @ Winchester Street

- Maintain the existing northbound two through-lane configuration.
- Reconfigure the southbound approach from 2-through lanes and an exclusive right-turn lane to one through and one right-turn lane.
- Add lane reduction warning signs to the northbound approach.

Lake Avenue @ Cemetery Entrance

- Reconfigure the northbound and southbound approaches.
- Maintain the presence inductance loops on the cemetery driveways and hold the controller in the Lake Avenue phase until a side approach is triggered.
- Replace the existing span wire traffic signal system with a mast arm system.
- Modify the overall cycle length from 60 seconds to 120 seconds during the AM peak hour and from 65 seconds to 120 seconds during the PM peak hour.

Lake Avenue – 600 feet south of Burley Road

- Maintain the existing street lane geometry.
- Add lane reduction warning signs to the southbound approach.

The existing and proposed lane configuration figures are included in Section I and Section II, respectively

I. EXISTING CONDITIONS

A key step in the evaluation of a roadway corridor is the documentation and evaluation of existing conditions. For the Lake Avenue Study, this required the assistance of involved municipalities, Monroe County Department of Transportation (MCDOT), New York State Department of Transportation (NYSDOT) and the City of Rochester. In addition to the 24-hour tube counts provided by MCDOT, accident reports were provided by the City of Rochester to conduct an accident analysis to determine any accident patterns that may be mitigated by new roadway design.

A. Location Description

This study examines the section of Lake Avenue from Merrill Street to a point approximately 600 feet south of Burley Road, in the City of Rochester, New York (**Figure 1**). The 1-mile corridor is located within the northwest quadrant of the City of Rochester and is primarily located with the Charlotte neighborhood (Sector 1). Along the segment's southern limit, a portion of the project is located within the Maplewood neighborhood (Sector 2). A map illustrating the location of the various sectors within the City of Rochester is included in **Appendix A**.

B. Existing Land Use and Zoning

The zoning classification along this portion of Lake Avenue varies. The southern portion near Merrill Street is zoned Low-Density Residential (R-1), and the northern portion near Burley Road is zoned High-Density Residential (R-3). However, a majority of the land within the project area is zoned Open Space (O-S). The Holy Sepulchre Cemetery, characterized by an approximately 6-foot high stone wall is located along both sides of Lake Avenue in this area.



Exhibit 1 - Lake Avenue Project Limits

To the south, the land use along Lake Avenue consists of an urban residential neighborhood and transitions into an industrial area. The developed land to the north consists of residential neighborhoods and local businesses. The Lake Avenue corridor is a major arterial that connects downtown Rochester to residential neighborhoods, to neighborhood commercial districts, and to Lake Ontario at its northernmost point.

C. Environmental Constraints in the Corridor

According to the data provided from each municipality, no environmental constraints are located within the projects limits. The boulevard-like characteristics along the cemetery corridor, with the wide lawns, established tree lines and stone walls along both sides of the road will remain.

D. Population and Employment Projections from Genesee Transportation Council

Growth projections outlined in GTC's 2035 Long Range Transportation Plan (LRTP) for the Genesee-Finger Lakes Region, 2011, were considered for this study. According to the population projection, the City of Rochester is anticipated to continue to grow. However, the senior population is expected to increase by more than 40 percent while the working age demographic is expected to shrink by approximately 10 percent to 15 percent. Overall, in the Lake Avenue corridor the projected population growth rate from 2012 to 2034 is anticipated to be 1.1% total.

E. Recent Development Trends

Eastman Business Park is currently redeveloping the existing vacant properties within Kodak Park which is located just south of the project limits. Vacant parcels along Lake Avenue and West Ridge Road are projected to be backfilled with manufacturing facilities within the near future. Several of the parcels are newly occupied and the remaining sites are currently marketed for sale. A map identifying the proposed redeveloped land is located in **Appendix 'B'**.

F. Roadway Geometry

Lake Avenue is located to the west of and runs parallel to the Genesee River. The principal arterial traverses north-south from Beach Avenue to Lyell Avenue/Smith Street, where the street name changes to State Street. Within the project study area, there are two signalized intersections: one at the main entrance into the Holy Sepulchre Cemetery and one at Merrill Street; and three stop sign controlled side streets.

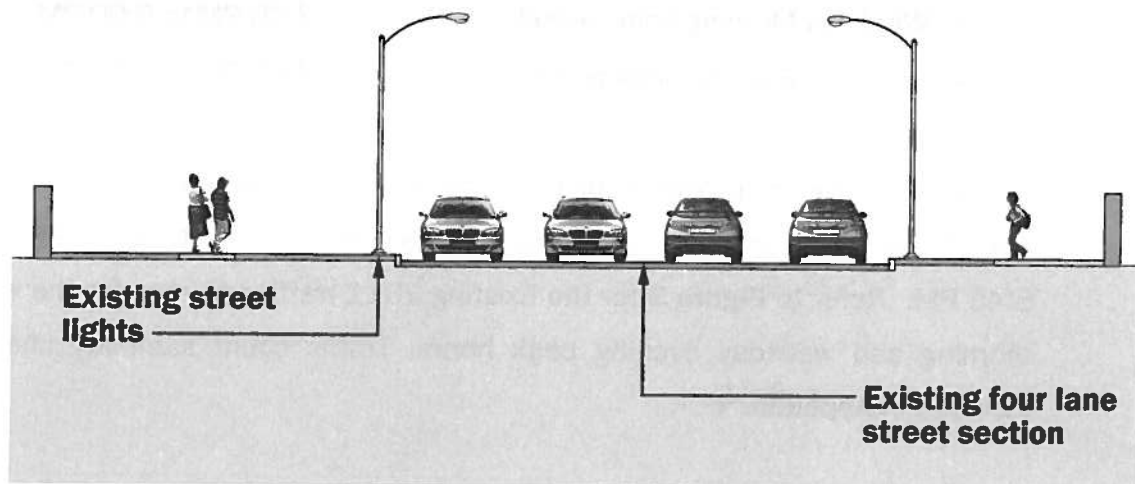


Exhibit 2 - Lake Avenue Existing Lane Configuration (typical)

The roadway section between Merrill Street and Burley Road primarily consists of two lanes in each direction as illustrated in **Exhibit 2**. The pavement sections widens just north of Winchester Street to accommodate left-turn lanes at Winchester Street and Merrill Street, and an additional southbound through lane at Winchester Street. Existing lane geometry along the Lake Avenue project corridor is illustrated in **Figure 2**. The posted speed limit along Lake Avenue within the project limit is 35 MPH.

G. Existing Traffic Volumes

Existing (2011) Traffic Volumes

Manual turning movement counts were performed by TYLI on September 28th and September 29th, 2011 at the following intersections:

- Lake Avenue @ Merrill Street (Signalized)
- Lake Avenue @ the entrance to Holy Sepulchre Cemetery (Signalized)

Traffic counts performed above were taken during the following peak periods:

- Weekday Morning peak period 7:00 PM to 9:00 PM
- Weekday Evening peak period 4:00 PM to 6:00 PM

The weekday morning peak hour generally occurred between 7:15 AM and 8:15 AM. The weekday evening peak hour generally occurred between 4:45 PM and 5:45 PM. Refer to **Figure 3** for the Existing 2011 traffic volumes for the weekday morning and weekday evening peak hours. Traffic count summary sheets are included in **Appendix 'E'**.

Tube count data from November 3rd, 2008 and speed and class reports from June 15th, 2009 to June 18th, 2009 were provided by MCDOT. Based on the data, the estimated annual average daily traffic (AADT) along Lake Avenue was 18,745 and the 85th percentile speed was approximately 48 MPH. The report summary printouts are included in **Appendix 'E'**

NORTHERN PROJECT LIMIT.....

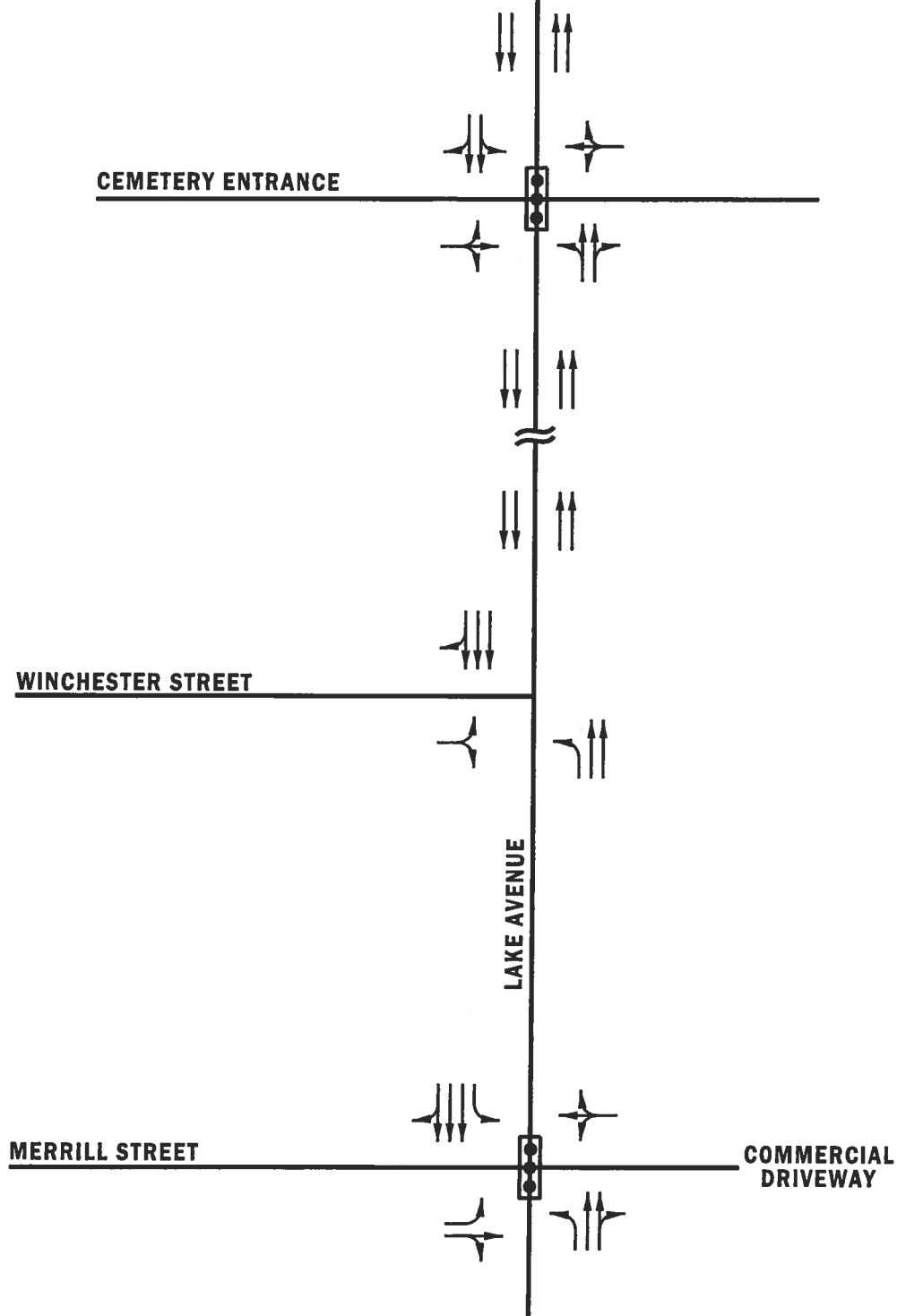


FIGURE 2



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EXISTING LANE CONFIGURATIONS

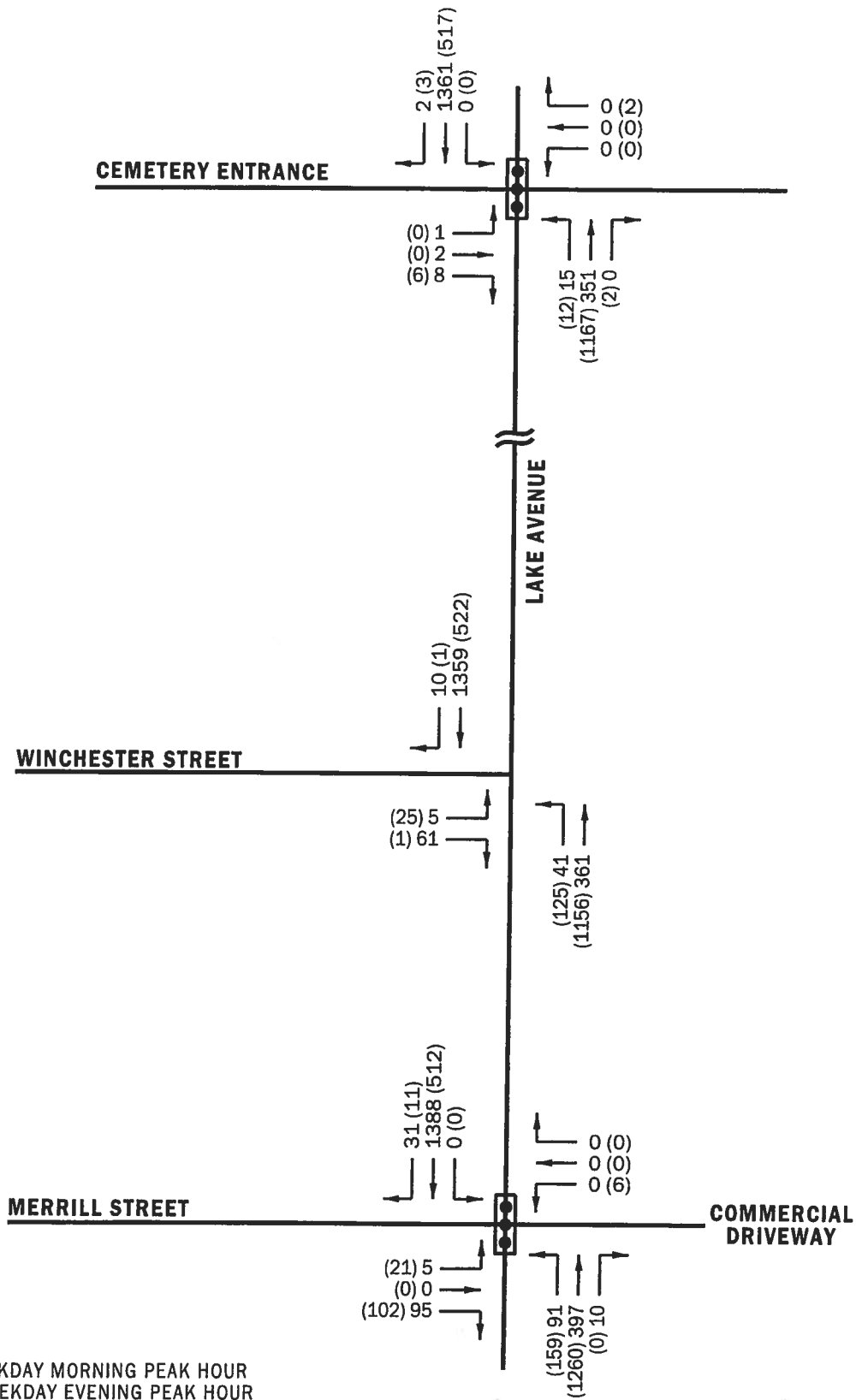


FIGURE 3



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LAKE AVENUE IMPROVEMENT PROJECT

EXISTING 2011 TRAFFIC VOLUMES

H. Buses

The Rochester Genesee Regional Transportation Authority (RGRTA) provides bus service along Lake Avenue. The section of Lake Avenue within the project limits is serviced by RTS route number 1/1X which provides service to and from downtown Rochester. Currently, five bus stops are located along the west side of the street and four bus stops are located along the east side of Lake Avenue. The main bus stop within this section is located on the west side of the street across from the St. Bernard's Park Apartment Complex to supplement the two daily bus stops within the apartment complex. A stone bus shelter is located at the west side stop.

I. Bicycles

According to City of Rochester Bicycle Master Plan Study, completed in 2011, the level of service for bicyclists along Lake Avenue within the project area is 'E'. According to the study, Lake Avenue is recommended as a candidate for on-street bicycle routes. In conjunction with the current Lake Avenue Maintenance and Resurfacing Project (south of the project limits), The City of Rochester is currently planning to install 6-ft wide bicycle lanes along both sides of Lake Avenue south of Merrill Street.

J. Pedestrians

Eight foot concrete sidewalks are located along both sides of Lake Avenue within the project area. Pedestrian crossings are located at each intersection and at a mid-block crossing near the St. Bernard's Park Apartment Complex. Pedestrian signals



are located at the signalized intersections of Lake Avenue at Merrill Street and Lake Avenue at the Cemetery entrance. Additionally, within the project limits, the sidewalk on the east side of

Exhibit 3 - Lake Avenue Existing Sidewalk & Speed

Lake Avenue serves as the City of Rochester's Genesee Riverway Trail. Overall, the multi-use trail is approximately 18 miles long and stretches from Ontario Beach Park to the Erie Canal. In 2011, MCDOT evaluated the pedestrian conditions and activity at the St. Bernard's Park Apartment Complex. The study revealed that no pedestrian related accidents occurred between October 31, 2005 and November 30, 2010 and that the pedestrian count was minimal.

II. FUTURE CONDITIONS

A. Background (Future) Traffic Volumes

Background traffic volumes are a representation of the traffic on the studied roadway during the proposed Estimated Time of Completion (ETC) and the 20 year period thereafter (ETC+20). These volumes are a combination of the existing volumes, the growth rate percentage projected for the area and the volumes anticipated for any proposed or approved projects near Lake Avenue that may impact traffic within the study area. In consideration of the area's growth potential as documented in the MCDOT memo regarding Monroe County Traffic Volume Trends, an annual growth rate of 0.5% was added to the mainline existing traffic volume to calculate growth to 2014 and 2034. The City of Rochester was contacted regarding planned developments within the vicinity of the project area. In addition to the anticipated annual growth rate, two development projects were further investigated:

- Port of Rochester - Marina Project
- The Eastman Business Park Redevelopment Project

As described in the Draft Environmental Impact Statement (DEIS) for The Port of Rochester - Marina Project, project peak hours occurs on Friday evenings between 6:30pm and 7:30pm and between 8:30pm and 9:30pm. The peak hours for this development are not consistent with the peak hour periods analyzed for this study. As such, trips from The Port of Rochester project were not added to the background conditions. However, off peak trips from the development are

presumed within the 0.5% annual growth rate that has been applied to the corridor for the background conditions.

Located to the south of the project area, the land previously occupied by Kodak is currently being developed as Eastman Business Park. As discussed with the City of Rochester and Eastman Development Corporation, a traffic study was not prepared for the redeveloped site. To account for new trips associated with the background development, ITE's Trip Generation, 8th edition was used to determine trip rates for the office and manufacturing land uses that were unoccupied and available at the time the traffic turning movements were collected. The anticipated trips are summarized in **Table 1**. The trip generation spreadsheet and maps identifying the Eastman Development buildings are included in **Appendix 'B'** for Eastman Development.

Table 1: Trip Generation Primary

<u>Trip Type</u>	<u>AM Peak Hour</u>			<u>PM Peak Hour</u>		
	<u>Enter</u>	<u>Exit</u>	<u>Total</u>	<u>Enter</u>	<u>Exit</u>	<u>Total</u>
Office LUC 710	207	28	235	48	236	284
Manufacturing LUC 140	218	61	279	107	190	297
Total	425	89	514	155	426	581

The trips were distributed to the adjacent roadway with consideration of the existing distribution percentages. It is anticipated that during the AM peak hour, approximately 19% of the background development's trips will originate from the north on Lake Avenue and approximately 7% of the background development's trips will exit to the north from Eastman Business Park. During the PM peak hour, approximately 7% of the background development's trips are anticipated to originate from the north and approximately 20% of the background development's exiting trips are anticipated to travel northbound on Lake Avenue within the project limits. Refer to **Figure 4A** and **Figure 4B** for the resulting Eastman Development

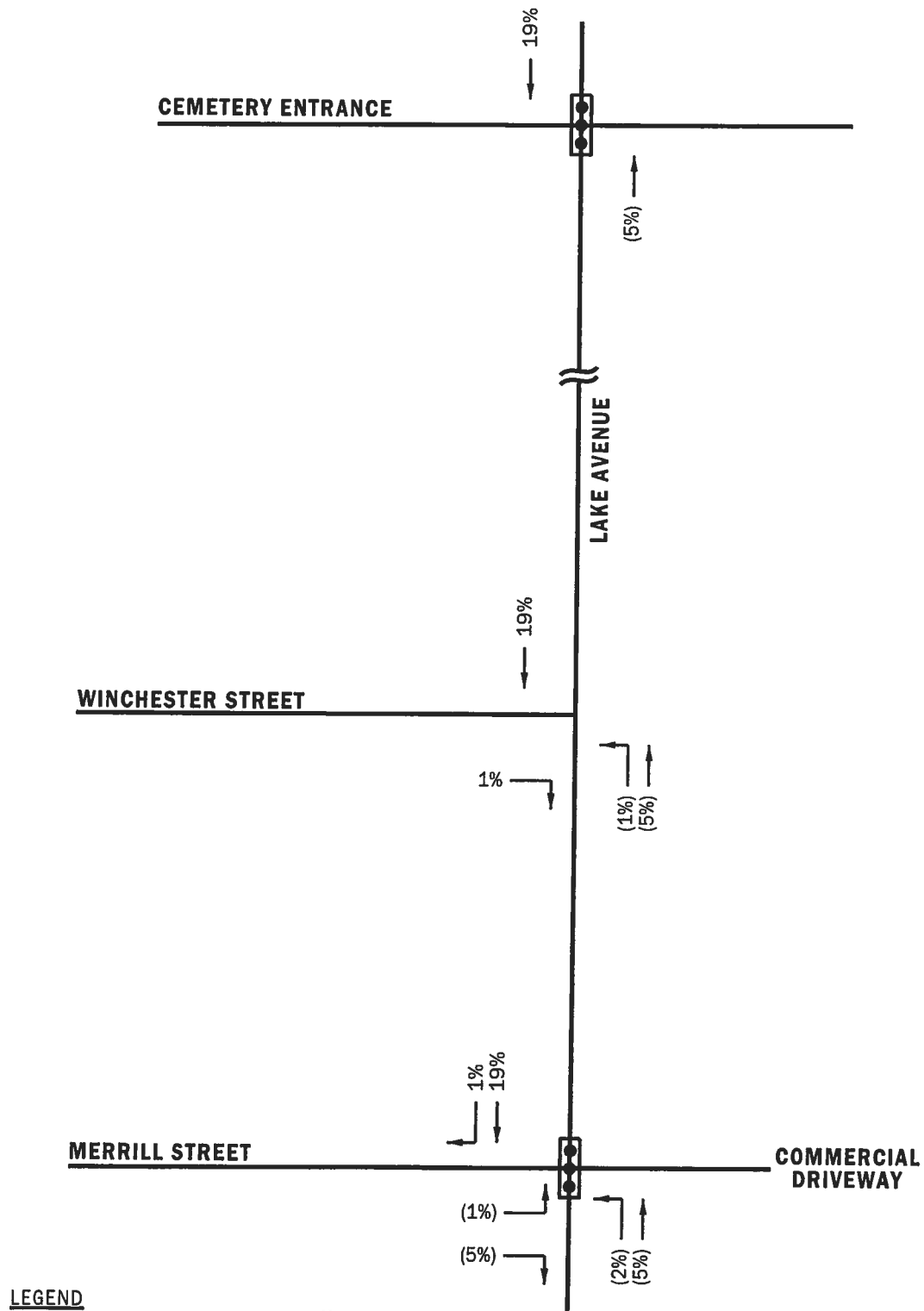
trip distribution percentages along Lake Avenue for the weekday morning and weekday evening peak hours, respectively.

Refer to **Figures 5A and 5B** for the resulting Eastman Development traffic volumes for the weekday morning and weekday evening peak hours, respectively. Details of the Eastman Development building locations considered in the Lake Avenue analysis are included in **Appendix B**.

B. Future (Build) Traffic Volumes

Future ETC (2014) Traffic Volumes and Future ETC+20 (2034) Traffic Volumes

The future traffic volumes were applied to the analysis without roadway improvements (two lanes in each direction) for the year 2014. Additionally, the future traffic volumes for the Future ETC and Future ETC + 20 conditions were analyzed for the section of Lake Avenue with “Road Diet” improvements (one lane in each direction). **Figure 6 and Figure 7** identifies the future 2014 and future 2034 total traffic volumes for the weekday morning and weekday evening peak hours. The proposed lane geometry along the Lake Avenue project corridor is illustrated in **Figure 9** and conceptual lane reduction plan sheets are included in **Appendix H**.



LEGEND
 XX - ENTERING EASTMAN DEVELOPMENT TRIPS
 (XX) - EXITING EASTMAN DEVELOPMENT TRIPS

FIGURE 4A



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LAKE AVENUE IMPROVEMENT PROJECT

**EASTMAN DEVELOPMENT
 APPROXIMATE TRIP DISTRIBUTION %
 WEEKDAY MORNING PEAK HOUR**

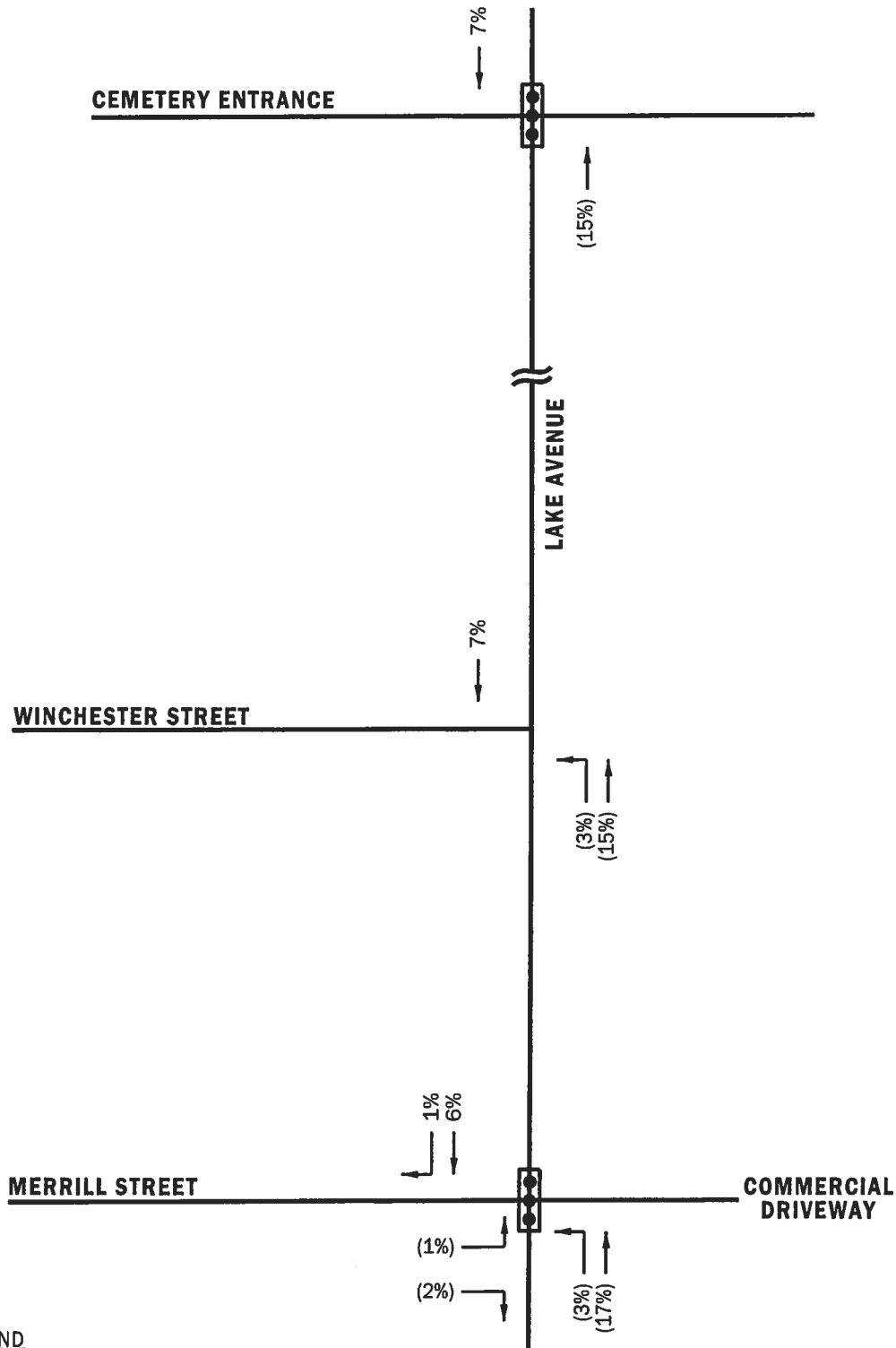


FIGURE 4B

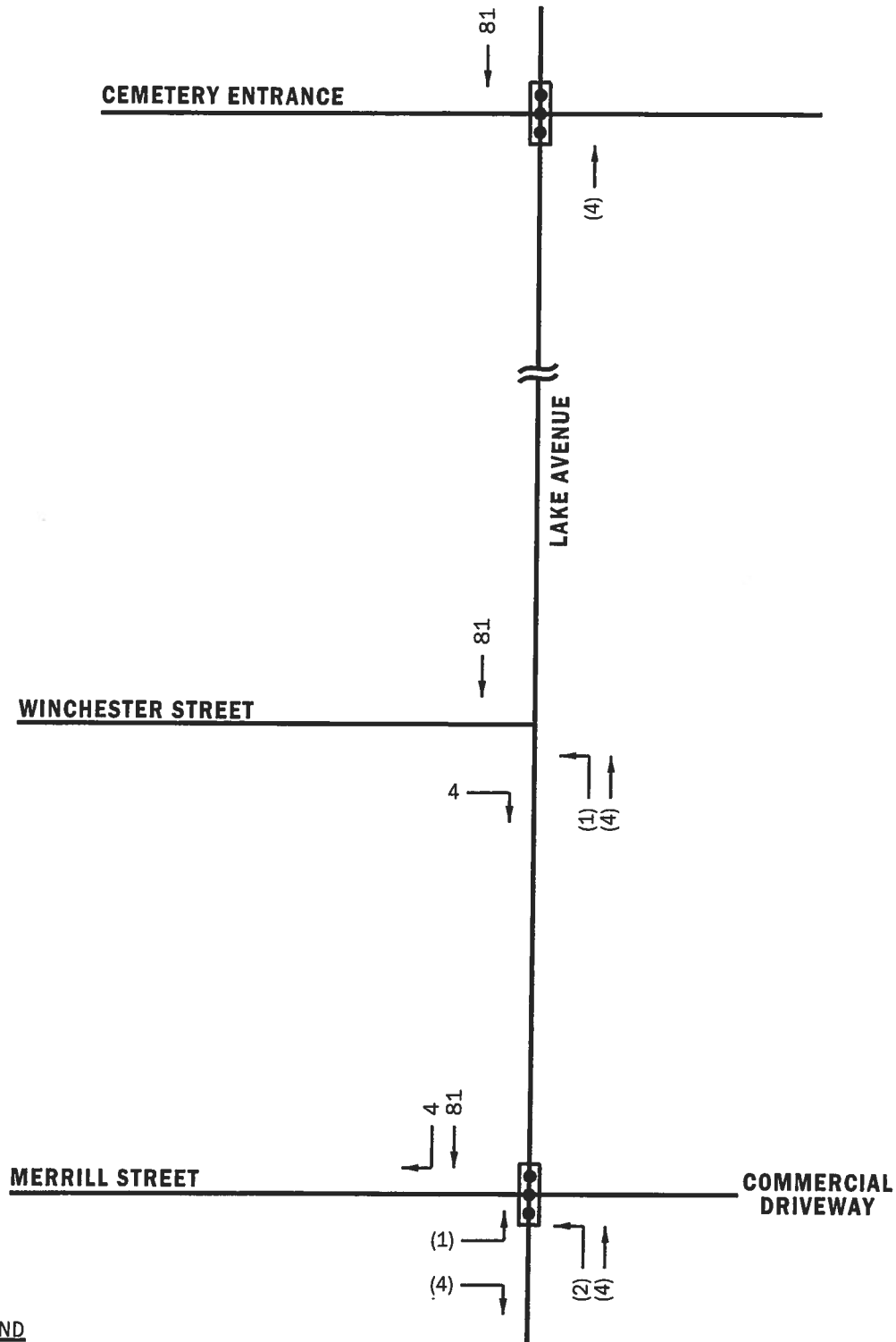


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LAKE AVENUE IMPROVEMENT PROJECT

**EASTMAN DEVELOPMENT
 APPROXIMATE TRIP DISTRIBUTION %
 WEEKDAY EVENING PEAK HOUR**



LEGEND

XX - ENTERING EASTMAN DEVELOPMENT TRIPS
(XX) - EXITING EASTMAN DEVELOPMENT TRIPS

FIGURE 5A

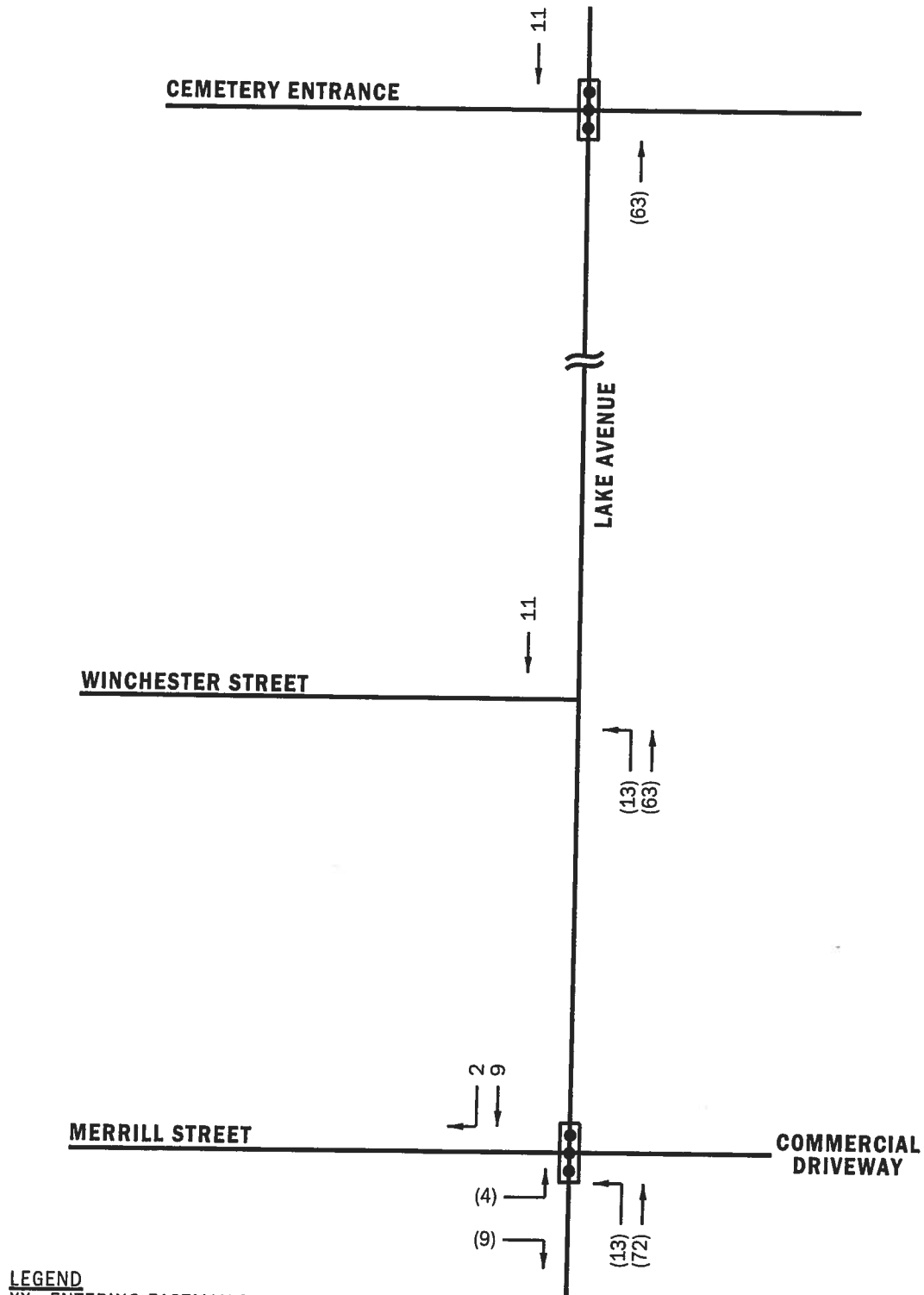


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LAKE AVENUE IMPROVEMENT PROJECT

**EASTMAN DEVELOPMENT
APPROXIMATE TRIP DISTRIBUTION
WEEKDAY MORNING**



LEGEND
 XX - ENTERING EASTMAN DEVELOPMENT TRIPS
 (XX) - EXITING EASTMAN DEVELOPMENT TRIPS

FIGURE 5B



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LAKE AVENUE IMPROVEMENT PROJECT

**EASTMAN DEVELOPMENT
 APPROXIMATE TRIP DISTRIBUTION
 WEEKDAY EVENING**

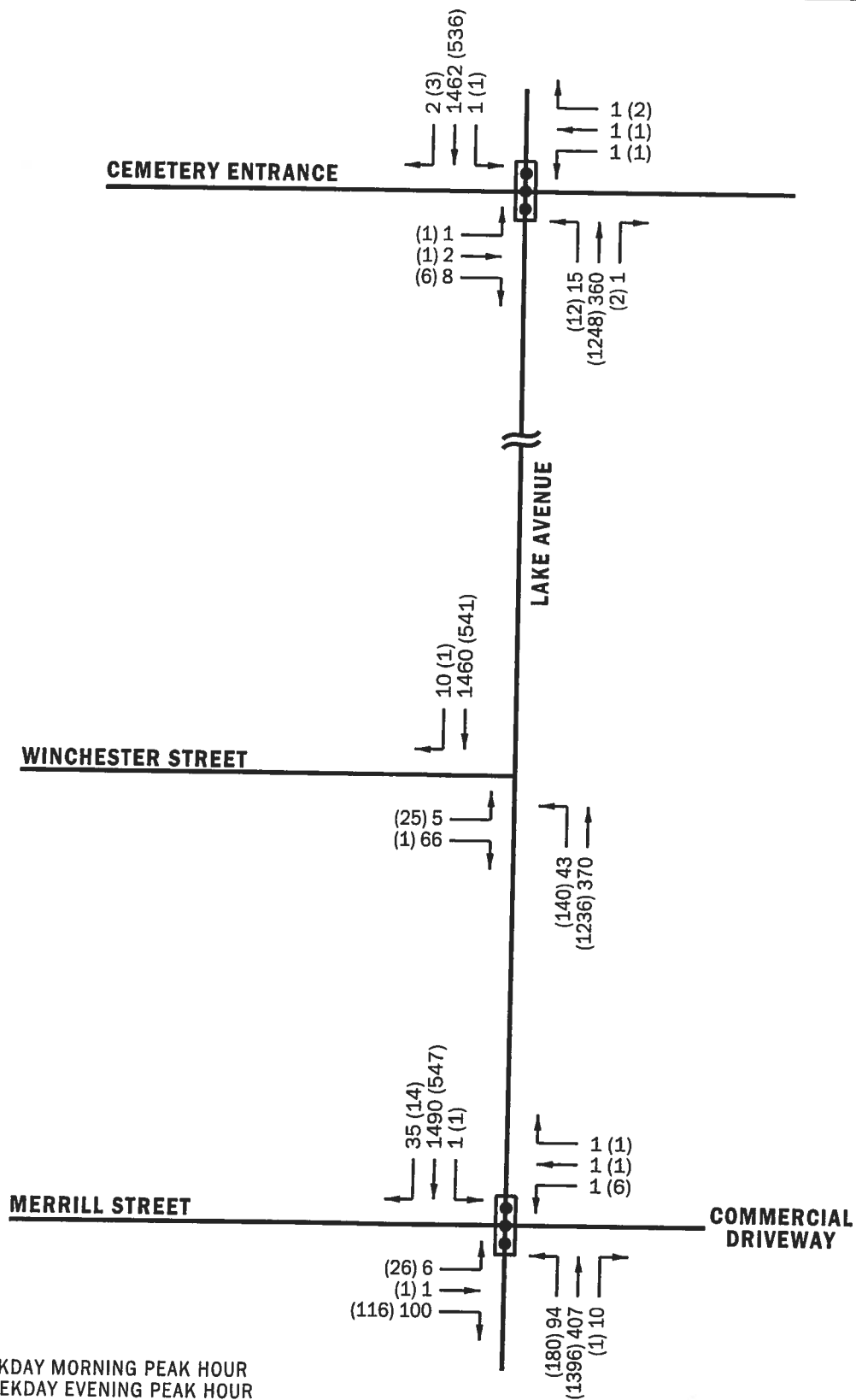


FIGURE 6



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LAKE AVENUE IMPROVEMENT PROJECT

FUTURE 2014 TRAFFIC VOLUMES

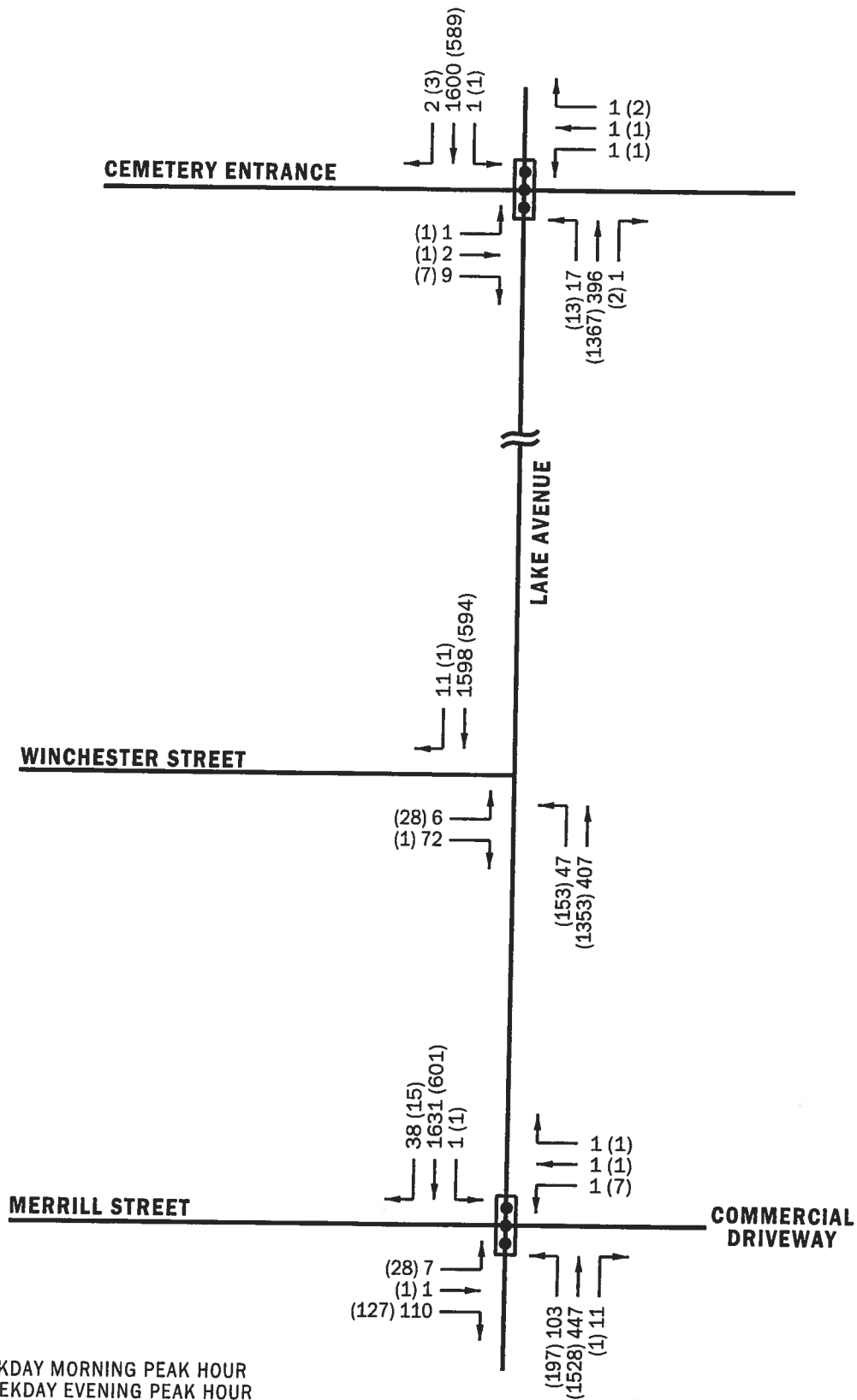


FIGURE 7



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LAKE AVENUE IMPROVEMENT PROJECT

FUTURE 2034 TRAFFIC VOLUMES

NORTHERN PROJECT LIMIT

CEMETERY ENTRANCE

WINCHESTER STREET

LAKE AVENUE

MERRILL STREET

COMMERCIAL
DRIVEWAY

FIGURE 9



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LAKE AVENUE IMPROVEMENT PROJECT

FUTURE (PROPOSED) LANE CONFIGURATIONS

III. TRAFFIC OPERATIONS & ARTERIAL ANALYSIS

A. Intersection Analysis

The Level of Service (LOS) analysis methodology for analyzing signalized and unsignalized intersections is documented in the Highway Capacity Manual (Transportation Research Board, Washington, D.C., 2000). The traffic-software Synchro 7 build 759, was used to analyze the studied intersections. Levels range from 'A' to 'F', with 'A' describing traffic operations with little or no delay, and 'F' describing traffic operations with long delays. Levels of Service for signalized and unsignalized intersections are expressed in terms of average control delay in seconds per vehicle. Full definitions of LOS for signalized and unsignalized intersections are included in **Appendix 'C'**.

Table 2 presents a summary of the weekday morning and weekday evening peak hour intersection capacity analysis results for the Existing 2011 (two lane), Future Background 2014 (two lane), Future Build 2014 (one lane), and Future Build 2034 (one lane) traffic conditions. The impacts of the proposed improvements at the studied intersections were assessed by comparing the Levels of Service (LOS) for the future background (two lanes) traffic condition per Highway Capacity Manual (HCM) with those for future build (one lane) traffic. The HCM, Timing and Queue printouts from Synchro are provided in **Appendix 'D'**.

Table 2: Level of Service Summary

	Existing 2011 Two		Background 2014		Future 2014 One		Future 2034 One	
Intersection	Lanes		Two Lanes		Lane		Lane	
Approach	AM	PM	AM	PM	AM	PM	AM	PM
Lake Avenue & Merrill Street								
EB L	D (54)	D (51)	D (54)	D (55)	D (54)	D (55)	D (53)	D (55)
EB TR	D (54)	D (50)	D (53)	D (53)	D (53)	D (53)	D (53)	D (52)
WB LTR	D (54)	D (50)	D (54)	D (53)	D (54)	D (53)	D (54)	D (53)
NB L	A (4)	A (2)	A (5)	A (3)	B (10)	A (3)	B (19)	A (4)
NB T TR	A (3)	A (3)	A (3)	A (5)	A (3)	A (5)	A (3)	A (6)
SB L	A (4)	A (8)	A (4)	B (10)	A (5)	A (10)	A (6)	B (12)
SB T TR	A (7)	A (9)	A (7)	B (12)	A (9)	B (13)	B (15)	B (15)
OVERALL	A (9)	A (8)	A (9)	B (11)	B (10)	B (11)	B (15)	B (12)
Lake Avenue & Winchester Street (Unsignalized)								
EB LR	C (19)	E (45)	C (21)	F (50)	D (28)	F (50)	E (36)	F (65)
NB L	B (14)	A (9)	C (15)	A (9)	C (15)	A (9)	C (17)	A (10)
OVERALL	N/A		N/A		N/A		N/A	
Lake Avenue & Holy Sepulchre Cemetery								
EB LTR	C (27)	C (31)	C (27)	C (31)	D (55)	E (57)	D (55)	E (57)
WB LTR	C (27)	C (31)	C (27)	C (31)	E (55)	E (57)	E (55)	E (57)
NB LT TR	A (2)	A (3)	A (2)	A (3)	-	-	-	-
NB L	-	-	-	-	C (21)	A (1)	C (24)	A (1)
NB TR	-	-	-	-	A (4)	A (7)	A (2)	B (14)
SB LT TR	A (4)	A (1)	A (5)	A (1)	-	-	-	-
SB L	-	-	-	-	A (1)	A (1)	A (1)	A (1)
SB TR	-	-	-	-	C (32)	A (2)	E (64)	A (2)
OVERALL	A (4)	A (2)	A (5)	A (2)	C (26)	A (6)	D (49)	B (11)

Key: Letters represent Levels of Service (LOS); Numbers represent seconds of delay

Lake Avenue & Merrill Street

This intersection is signalized and currently operates at an overall LOS 'A' during the weekday morning and weekday evening peak hours. This intersection is anticipated to continue to operate at LOS 'A' during the weekday morning and



Exhibit 4 - Lake Avenue & Merrill Street, Existing Conditions

weekday evening peak hours for background and future 2014 and 2034 conditions. All approaches currently operate at an acceptable LOS 'D' or better for the peak hour studied, with the exception of the eastbound left turn movement which operates at LOS 'E' during the weekday evening peak hour. These movements will continue to operate at these levels for background and full-build conditions.

Lake Avenue & Winchester Street

This intersection is unsignalized and all movements currently operate at LOS 'C' or better during the weekday morning and weekday evening peak hours, with the exception of the eastbound approach which operates at LOS 'E' during the weekday evening peak hour. These movements will continue to operate at LOS 'C' or better, with the weekday evening eastbound approach operating at LOS 'F' (though it is only slightly into the F-range) for background and future 2014, and future 2034 conditions. For the future 2034 condition, the eastbound approach will drop to LOS 'E' during the weekday morning period.

Lake Avenue & Holy Sepulchre Cemetery

This intersection is signalized and currently operates at an overall LOS 'A' during the weekday morning and weekday evening peak hours studied.



Exhibit 5 - Lake Avenue at Holy Sepulchre Cemetery, Existing Conditions

This intersection is anticipated to continue to operate at a LOS 'A' during the weekday morning and weekday evening peak hours for background conditions. Similarly, this intersection is anticipated to operate at an overall LOS 'A' for the future 2014 and future 2034 scenarios during the weekday evening peak hour. Due to effect of the reduced number of lanes in the link leading to the southbound approach and the projected levels of future commuter traffic, the intersection is anticipated to operate at an overall LOS 'C' for the future 2014 scenario and at an overall LOS 'D' for the future 2034 scenario during weekday morning peak hour. All approaches currently operate at an acceptable LOS 'C' or better for the peak hours and are anticipated to be operating at LOS 'E' or better for background and full-build conditions.

Unsignalized Option

The intersections within the corridor were also analyzed with the traffic signals at the intersection of Lake Avenue/Merrill Street and Lake Avenue/Holy Sepulchre Cemetery removed. **Table 3** presents a summary of the weekday morning and weekday evening peak hour intersection capacity analysis results for the Existing 2011 (two lane), Future Background 2014 (two lane), and the one lane

unsignalized conditions for the Future Build 201 and 2034 traffic conditions. The HCM and Queue printouts from Synchro are provided in **Appendix 'D'**.

Table 3: Level of Service Summary (Unsignalized Option)

Intersection Approach	<u>Existing 2011 Two Lanes (Signalized)</u>		<u>Background 2014 Two Lanes (Signalized)</u>		<u>Future 2014 One Lane (Unsignalized)</u>		<u>Future 2034 One Lane (Unsignalized)</u>	
	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>	<u>AM</u>	<u>PM</u>
Lake Avenue & Merrill Street					UNSIGNALIZED		UNSIGNALIZED	
EB L	D (54)	D (51)	D (54)	D (55)	F (343)	F (217)	F (744)	F (428)
EB TR	D (54)	D (50)	D (53)	D (53)	D (29)	B (14)	E (41)	C (16)
WB LTR	D (54)	D (50)	D (54)	D (53)	F (135)	F (382)	F (265)	F (803)
NB L	A (4)	A (2)	A (5)	A (3)	C (19)	A (10)	C (23)	A (10)
NB T TR	A (3)	A (3)	A (3)	A (5)	-	-	-	-
SB L	A (4)	A (8)	A (4)	B (10)	A (8)	B (13)	A (8)	B (14)
SB T TR	A (7)	A (9)	A (7)	B (12)	-	-	-	-
OVERALL	A (9)	A (8)	A (9)	B (11)	N/A		N/A	
Lake Avenue & Winchester Street								
EB LR	C (19)	E (45)	C (21)	F (50)	D (28)	F (67)	E (36)	F (92)
NB L	B (14)	A (9)	C (15)	A (9)	C (15)	A (9)	C (17)	A (10)
OVERALL	N/A		N/A		N/A		N/A	
Lake Avenue & Holy Sepulchre Cemetery					UNSIGNALIZED		UNSIGNALIZED	
EB LTR	C (27)	C (31)	C (27)	C (31)	F (78)	D (33)	F (117)	E (39)
WB LTR	C (27)	C (31)	C (27)	C (31)	F (128)	F (63)	F (224)	F (85)
NB LT TR	A (2)	A (3)	A (2)	A (3)	-	-	-	-
NB L	-	-	-	-	C (15)	A (9)	C (17)	A (9)
NB TR	-	-	-	-	-	-	-	-
SB LT TR	A (4)	A (1)	A (5)	A (1)	-	-	-	-
SB L	-	-	-	-	A (9)	B (13)	A (9)	B (14)
SB TR	-	-	-	-	-	-	-	-
OVERALL	A (4)	A (2)	A (5)	A (2)	N/A	N/A	N/A	N/A

Key: Letters represent Levels of Service (LOS); Numbers represent seconds of delay

Lake Avenue & Merrill Street

Based on the HCM analysis for the unsignalized option, the eastbound left-turn movement and the westbound approach for this intersection are anticipated to "fail" for the future 2014 and 2034 conditions during the weekday morning and weekday evening peak hours. Without signalization, the northbound left-turn

movement is anticipated to degrade during the AM peak hour from a LOS 'A' to a LOS 'C' due to the limited number of gaps presumed in southbound AM traffic flow.

Lake Avenue & Winchester Street

Although this intersection is currently unsignalized, the eastbound approach is anticipated to degrade further during the PM peak hour for the future condition scenarios with the traffic signal removed from the intersection of Lake Avenue and Merrill Street. Additionally, without the gaps created by the adjacent signal to the south, excessive queues are projected to occur on Winchester Street. The queue reports are included in **Appendix 'D'**.

Lake Avenue & Holy Sepulchre Cemetery

This intersection is currently signalized. However, the eastbound and westbound approaches for this intersection are anticipated to "fail" for the future 2014 and 2034 conditions during the weekday morning and weekday evening peak hours for the unsignalized option. Although the peak hour traffic volumes are low on the minor approaches, cemetery employees and grounds keepers cross Lake Avenue frequently throughout the day; crossing safety is a serious concern.

B. Arterial Analysis

Lake Avenue is a primary arterial that provides a direct connection to downtown from the neighborhoods in this section of Rochester. As described in the HCM, the arterial LOS is a function of the arterial class and the travel speed along the corridor within the study area. **Table 4** provides a summary of the arterial analysis performed for this section of Lake Avenue within the study area. Full definitions of LOS for arterials are included in **Appendix 'C'** and the arterial analysis printout sheets are provided in **Appendix 'D'**.

Table 4 – Arterial Level of Service Summary

	Existing 2011 TWO LANES				Background 2014 TWO LANES				Future 2014 ONE LANE				Future 2034 ONE LANE			
	AM		PM		AM		PM		AM		PM		AM		PM	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Merrill to Cemetery	A	B	A	B	A	B	A	B	A	A	B	B	A	A	B	B
Cemetery to Wyndham Road	A	A	A	A	A	A	A	A	A	B	B	A	A	C	B	A
Class	I	II	I	II	I	II	I	II	III	III	II	III	III	III	II	III
OVERALL	A	A	B	A	A	A	B	A	A	B	B	A	A	C	B	B

Note: Synchro - Arterial Clases change as the flow speed changes

Two-Lane Analysis

The existing two-lane Lake Avenue corridor was analyzed with the existing and background 2014 traffic volumes. To replicate the existing speeds on Lake Avenue, the 85th percentile speed of 47 MPH was used in the analysis. In the northbound direction, the corridor currently operates at a LOS 'A' for the AM Peak hour and at a LOS 'B' for the PM peak hour. The southbound direction currently operates at a LOS 'A' for both peak hours studied. The corridor is anticipated to continue to operate at current levels of service for the background 2014 scenario.

One-Lane Analysis

Within the project area, the Lake Avenue corridor was analyzed with one lane in each direction as proposed for the future 2014 and 2034 scenarios. Link speeds of 35 MPH were used in the future analysis as the "Road Diet" is presumed to reduce the overall travel speed along the corridor. For the future scenarios, all links are anticipated to operate at similar levels of service. However, the southbound link between the northern project limits and the Cemetery is anticipated to degrade slightly from a LOS 'A' to a LOS 'B' and a LOS 'C' during the Future 2014 and Future 2034 AM peak hours, respectively. Similarly, the northbound link between the Cemetery and the northern project limit is anticipated

to degrade slightly from a LOS 'A' to a LOS 'B' during the Future 2014 and Future 2034 PM peak hour scenarios. Overall, with one lane in each direction and left turn lanes at intersecting streets, the Lake Avenue corridor is anticipated to operate at level 'C' or better for the future conditions analyzed.

The reported arterial classification is included in the arterial printouts as the LOS and delay thresholds for each classification are defined by different ranges of free-flow speeds.

IV. SIGNAL WARRANT ANALYSES

A signal warrant analysis as described in the NYS Manual of Uniform Traffic Control Devices, 2009 was performed to determine if the existing signal is justified at the intersection of Lake Avenue and the Holy Sepulchre Cemetery and at the intersection of Lake Avenue and Merrill Street. Of the nine (9) traffic signal warrants listed in MUTCD, three (3) were found to be applicable for these locations. The following MUTCD Signal Warrants were analyzed with existing and future traffic volumes:

- Warrant 1 – Eight Hour Vehicular Volume Warrant
 - Condition A – Minimum Vehicular Volume
 - Condition B – Interruption of Continuous Traffic
- Warrant 2 – Four-Hour Volume Warrant
- Warrant 3 – Peak Hour Volume Warrant

Based upon existing and future traffic volumes, the intersection of Lake Avenue and the Holy Sepulchre Cemetery does not meet the minimum warrant criteria typically used to analyze whether a traffic signal is suitable control device for an intersection.

The intersection of Lake Avenue and Merrill Street meets the minimum warrant criteria for the existing and future conditions. In accordance with MUTCD, a portion of the right-turn lane volume was subtracted from the Merrill Street volume prior to evaluating the traffic signal warrants. For this location, it was presumed that

approximately 25% of the right-turn volume would be able to access Lake Avenue with less than 7 seconds of delay.

The calculations for the signal warrant analyses for both intersections are provided in **Appendix 'E'** and are summarized as follows for the Existing and Future conditions:

Existing Conditions

Based on speed and class reports from June 15th, 2009 to June 18th, 2009 provided by MCDOT, The 85th percentile speed along Lake Avenue was approximately 48 MPH. According to MUTCD, in the case where the major road's 85th percentile speed is in excess of 40 MPH an option to the Signal Warrant Standards allow for the use of the 70% column in place of the 100% column. The following warrants were considered at 70% for the existing traffic volume conditions. The speed and class report summary printouts are included in **Appendix 'E'**

Warrant 1 – Eight Hour Vehicular Volume Warrant (70% Option)

The eight hour vehicular volume warrant is satisfied if 70% of 'Condition A' or 'Condition B' is met.

- Condition A–Minimum Vehicular Volume:

The 'Minimum Vehicular Volume, Condition A' warrant is satisfied where the volume of intersecting traffic is the principal reason for consideration of signal installation. The warrant is satisfied when the minimum volumes specified in the MUTCD are met or exceeded for each of any eight hours of an average day.

- This condition was not met for 8 hours of an average day at the intersection of Lake Avenue and the Holy Sepulchre Cemetery for the existing conditions.
- This condition was not met for 8 hours of an average day at the intersection of Lake Avenue and Merrill Street for the existing conditions.

- Condition B – Interruption of Continuous Traffic:

The 'Interruption of Continuous Traffic, Condition B' warrant is satisfied where the volume of the major street traffic is so heavy that the traffic on the intersecting minor street suffers excessive delay or conflict in entering or crossing the major roadway. The warrant is satisfied when 70% of the minimum volumes specified in the MUTCD are met or exceeded for each of any eight hours of an average day.

- This condition was not met for 8 hours of an average day at the intersection of Lake Avenue and the Holy Sepulchre Cemetery for the existing conditions.
- Condition B of Warrant #1 was met for 8 hours of an average day at the intersection of Lake Avenue and Merrill Street for the existing conditions.

Based on the existing conditions, the 'Eight Hour Vehicular Volume Warrant' was not met as neither Condition A, Condition B nor a combination of both conditions were satisfied for the intersection of Lake Avenue at the Holy Sepulchre Cemetery. The intersection of Lake Avenue and Merrill Street met Condition B; therefore the intersection meets the 'Eight Hour Vehicular Volume Warrant' for the existing condition.

Warrant #2 – Four-Hour Volume Warrant (70% Option):

The 'Four Hour Volume' warrant is satisfied when the plotted points representing the vehicles per hour on the major street and the corresponding vehicles per hour on the higher volume minor street lie above the 70% curve lines shown in the MUTCD for any four hours of an average day.

- This warrant was not met for four hours of an average day at the intersection of Lake Avenue and the Holy Sepulchre Cemetery for the existing conditions.

- This warrant was met for four hours of an average day at the intersection of Lake Avenue and Merrill Street for the existing conditions.

Warrant #3 - Peak Hour Volume Warrant (70% Option):

The 'Peak Hour Volume' warrant is satisfied when the plotted points representing the vehicles per hour on the major street and the corresponding vehicles per hour on the higher volume minor street lie above the 70% curve lines shown in the MUTCD for any single hour of an average day.

- The intersection of Lake Avenue and the Holy Sepulchre Cemetery did not meet the warrant for the existing conditions.
- This warrant was met for four hours of an average day at the intersection of Lake Avenue and Merrill Street for the existing conditions.

Future Conditions

Warrant 1 – Eight Hour Vehicular Volume Warrant

The eight hour vehicular volume warrant is satisfied if either 'Condition A', 'Condition B', or 80% of both conditions are met.

- Condition A–Minimum Vehicular Volume:

The 'Minimum Vehicular Volume, Condition A' warrant is satisfied where the volume of intersecting traffic is the principal reason for consideration of signal installation. The warrant is satisfied when the minimum volumes specified in the MUTCD are met or exceeded for each of any eight hours of an average day.

- This condition was not met for 8 hours of an average day at the intersection of Lake Avenue and the Holy Sepulchre Cemetery for the future (improved) conditions.

- This condition was not met for 8 hours of an average day at the intersection of Lake Avenue and Merrill Street for the future (improved) conditions.

- Condition B – Interruption of Continuous Traffic:

The 'Interruption of Continuous Traffic, Condition B' warrant is satisfied where the volume of the major street traffic is so heavy that the traffic on the intersecting minor street suffers excessive delay or conflict in entering or crossing the major roadway. The warrant is satisfied when the minimum volumes specified in the MUTCD are met or exceeded for each of any eight hours of an average day.

- This condition was not met for 8 hours of an average day at the intersection of Lake Avenue and the Holy Sepulchre Cemetery for the future (improved) conditions.
- Condition B of Warrant #1 was not met for 8 hours of an average day at the intersection of Lake Avenue and Merrill Street for the future (improved) conditions.

Based on existing and future traffic volumes, the 'Eight Hour Vehicular Volume Warrant' was not met as neither Condition A, Condition B nor a combination of both conditions were satisfied for the intersection of Lake Avenue at the Holy Sepulchre Cemetery and the intersection of Lake Avenue at Merrill Street.

Warrant #2 – Four-Hour Volume Warrant:

The 'Four Hour Volume' warrant is satisfied when the plotted points representing the vehicles per hour on the major street and the corresponding vehicles per hour on the higher volume minor street lie above the curves shown in the MUTCD for any four hours of an average day.

- This warrant was not met for four hours of an average day at the intersection of Lake Avenue and the Holy Sepulchre Cemetery for the future (improved) conditions.

- This warrant was met for four hours of an average day at the intersection of Lake Avenue and Merrill Street for the future (improved) conditions.

Warrant #3 - Peak Hour Volume Warrant:

The 'Peak Hour Volume' warrant is satisfied when the plotted points representing the vehicles per hour on the major street and the corresponding vehicles per hour on the higher volume minor street lie above the curves shown in the MUTCD for any single hour of an average day.

- The intersection of Lake Avenue and the Holy Sepulchre Cemetery did not meet the warrant for the future (improved) conditions.
- This warrant was not met for four hours of an average day at the intersection of Lake Avenue and Merrill Street for the existing or future 2014 conditions. However, with the 25% reduction in right-turns it is approaching the threshold for the future 2014 conditions. The warrant was met for the future 2034 conditions.

Lake Avenue @ Holy Sepulchre Cemetery

Although the intersection does not meet any of the traffic signal warrants typically analyzed when a new signal is considered for installation, the loss of the traffic signal will increase delay and safety concerns at the Holy Sepulchre driveways. Maintenance vehicles routinely cross Lake Avenue on a daily basis; therefore, employee safety is a serious concern. For that reason, retaining the signal with actuation on the eastbound and westbound approaches is recommended. Cemetery volumes are very low. The actuation would enable free flow on Lake Avenue until the side street green time is triggered by a vehicle waiting to access Lake Avenue.

Lake Avenue @ Merrill Street

Based on current traffic volumes, each of the three (3) MUTCD Traffic Signal Warrants that were analyzed for the study were met at the intersection of Lake

Avenue and Merrill Street; 'Eight Hour Vehicular Volume Warrant', 'Four Hour Volume Warrant' and the 'Peak Hour Volume' traffic signal warrants. Based on future traffic conditions with improvements and slower speeds on the arterial, two (2) of the three (3) MUTCD Traffic Signal Warrants that were analyzed for the intersection of Lake Avenue and Merrill Street were met; 'Four Hour Volume Warrant' and the 'Peak Hour Volume' traffic signal warrants. Removal of this traffic signal is not recommended.

V. ACCIDENT ANALYSIS

T.Y. Lin International (TYLI) obtained and reviewed accident reports from the City of Rochester within the Lake Avenue Improvements Project study area. The accident reports were reviewed for a three-year period between November 1, 2008 and October 31, 2011. The purpose of the accident analysis was to determine if there are patterns of accidents and high accident locations that may be mitigated by the proposed improvements within the study area.

Within the time period studied, accidents occurred at the following intersections:

- Lake Avenue @ Merrill Street
- Lake Avenue @ Winchester Street
- Lake Avenue @ Holy Sepulchre Cemetery
- Lake Avenue @ Riverside Cemetery

Accidents occurred on Lake Avenue within the following midblock locations:

- Winchester Street to Holy Sepulchre Cemetery
- Holy Sepulchre Cemetery to Riverside Cemetery
- Riverside Cemetery to the City Line

Refer to **Appendix 'G'** for the collision summary and diagram.

Accident rates at the intersections and along the mid-blocks were calculated and compared to the Monroe County Average Accident Rates based on the existing traffic volume and the number of reportable accidents. Accidents are considered non-reportable if there are no injuries and there was less than \$1,000 in damages. Non-reportable accidents were removed from the accident rate calculations as Monroe County Average Accident Rates do not include non-reportable accidents. See **Appendix 'G'** for accident rate calculations.

Intersections

Lake Avenue and Merrill Street

At the signalized intersection of Lake Avenue and Merrill Street, four (4) reportable accidents occurred within the three-year study period. Of the 4 accidents, one (1) was a rear-end accident, two (2) were overtaking accidents and the fourth was described as a left-turn accident. The accident rate for this intersection is 0.17 accidents per million entering vehicles (Acc/Mev) which is slightly higher than the Monroe County overall mean rate of 0.11 Acc/Mev. No significant patterns of accidents are evident at this intersection.

Lake Avenue and Winchester Street

At the unsignalized intersection of Lake Avenue and Winchester Street, four (4) reportable accidents occurred within the three-year study period. Of the 4 accidents, two (2) were a rear-end accidents – one of which resulted in personal injury, one (1) was a left-turn accident, and the fourth was described as a backing accident. The accident rate for this intersection is 0.18 accidents per million entering vehicles (Acc/Mev) which is slightly higher than the Monroe County overall mean rate of 0.09 Acc/Mev. No significant patterns of accidents are evident at this intersection.

Lake Avenue and Holy Sepulchre Cemetery

At the signalized intersection of Lake Avenue and the Holy Sepulchre Cemetery, twelve (12) reportable accidents occurred within the three-year study period. Of the 12 accidents, six (6) were rear-end accidents – one of which resulted in personal injury, three (3) left-turn accidents – two of which resulted in personal injury, two (2) overtaking accidents, and one (1) pedestrian accident. Four (4) of the 12 accidents resulted in



Exhibit 6 – Intersection of Lake Avenue and Holy Sepulchre Cemetery

personal injury. Three of the rear-end accidents occurred in the northbound direction and three occurred in the southbound direction. The accident rate for this intersection is 0.63 accidents per million entering vehicles (Acc/Mev) which is higher than the Monroe County overall mean rate of 0.11 Acc/Mev. The pattern of rear-end accidents at the intersection could indicate there is a need to remove left-turning vehicles from the through lane of traffic, and adjust the traffic signal to allow for better free-flow of northbound and southbound traffic.

Lake Avenue and Riverside Cemetery

At the unsignalized intersection of Lake Avenue and the Riverside Cemetery, two (2) reportable accidents occurred within the three-year study period. Of the 2 accidents, one (1) was a right-angle accident, and one (1) was an overtaking accident. Neither of these accidents resulted in personal injury. The accident rate for this intersection is 0.10 accidents per million entering vehicles (Acc/Mev) which is slightly higher than the Monroe County overall mean rate of 0.09 Acc/Mev. No significant patterns of accidents are evident at this intersection.

Midblock

Lake Avenue from Winchester Street to Holy Sepulchre Cemetery

In the 0.54 mile midblock of Lake Avenue between Winchester Street and Holy Sepulchre Cemetery, thirty (30) reportable accidents occurred within the three-year study period. The following is a breakdown of the types of accidents that occurred within the midblock section:

- 8 overtaking
- 6 rear-end
- 6 run-off-the-road
- 3 head-on
- 2 right-angle
- 2 side-swipe
- 2 animal related
- 1 parked vehicle accident

Six (6) of the 30 accidents resulted in personal injury; three of those were head-on or sideswipe accidents. Based on the total reportable accidents within the midblock section, the calculated accident rate is 2.71 accidents per million vehicle miles (Acc/Mvm). In comparison with the Monroe County overall mean rate of 0.30 Acc/ the actual rate is higher. The most common accidents (overtaking and rear-end) at this midblock may be mitigated with corridor improvements which reduce the number of lanes – and therefore speeds - in each direction to single lanes.

Lake Avenue from Holy Sepulchre Cemetery to Riverside Cemetery

In the 0.24 mile midblock of Lake Avenue between Holy Sepulchre Cemetery and Riverside Cemetery, seven (7) reportable accidents occurred within the three-year study period. Of the 7 accidents analyzed within the midblock section, five (5) were run-off-the-road accidents – one of which resulted in personal injury, one rear-end accident – which resulted in personal injury, and one side-swipe accident. Based on the total reportable accidents within the midblock section, the calculated accident rate is 1.42 accidents per million vehicle miles (Acc/Mvm). The actual rate is higher than the Monroe County overall mean rate of 0.30 Acc/Mev. Accidents involving vehicles running off the road occurred most frequently within this midblock section. This type of accident is mitigated with the installation of left-turn lanes at intersecting streets.

Lake Avenue from Riverside Cemetery to the City Line

In the 0.24 mile midblock of Lake Avenue between the Riverside Cemetery and the City Line, seven (7) reportable accidents occurred within the three-year study period. Of the 7 accidents analyzed within the midblock section, two (2) were overtaking accidents, and one (1) each of the following accident types: rear-end, right angle, pedestrian, run-off-the-road, and animal. Two (2) of the 7 accidents resulted in personal injury. Based on the total reportable accidents within the midblock section, the calculated accident rate is 2.13 accidents per million vehicle miles (Acc/Mvm). The actual rate is higher than the Monroe County overall mean rate of 0.30 Acc/Mev. No pattern of accidents occurred in this segment along Lake Avenue.

Overall Project

Within the mile long corridor of Lake Avenue between Merrill Street and the City Line, sixty-seven (67) reportable accidents occurred within the three-year study period. According to the Federal Highway Administration (FHWA), the installation of the left turn lane may reduce crashes by 19% for signalized intersections and 47% for unsignalized intersections. Approximately 49% of all of the accidents are types of accidents (rear-end and overtaking) that could be mitigated with the proposed improvements along the corridor. Based on the total reportable accidents within the corridor, the calculated accident rate is 3.26 accidents per million vehicle miles (Acc/Mvm). The actual rate is higher than the Monroe County overall mean rate of 0.30 Acc/Mev.

VI. EVALUATION OF IMPROVEMENTS “ROAD DIET”

The corridor of Lake Avenue between Merrill Street and Burley Road is under consideration for lane reduction modifications to balance all modes of mobility. The following factors are typically used to determine the feasibility of implementing a road diet:

- Provide balance between accessibility and mobility
- Traffic volume and overall levels of service
- Turning movement volumes
- Busses
- Speeding vehicles and queuing vehicles
- Crash types/patterns
- Pedestrian and bicycle accessibility/activity
- Right-of-way and costs
- Parallel routes that may divert traffic
- Other project specific considerations i.e. parking, driveway cuts, intersection distances.

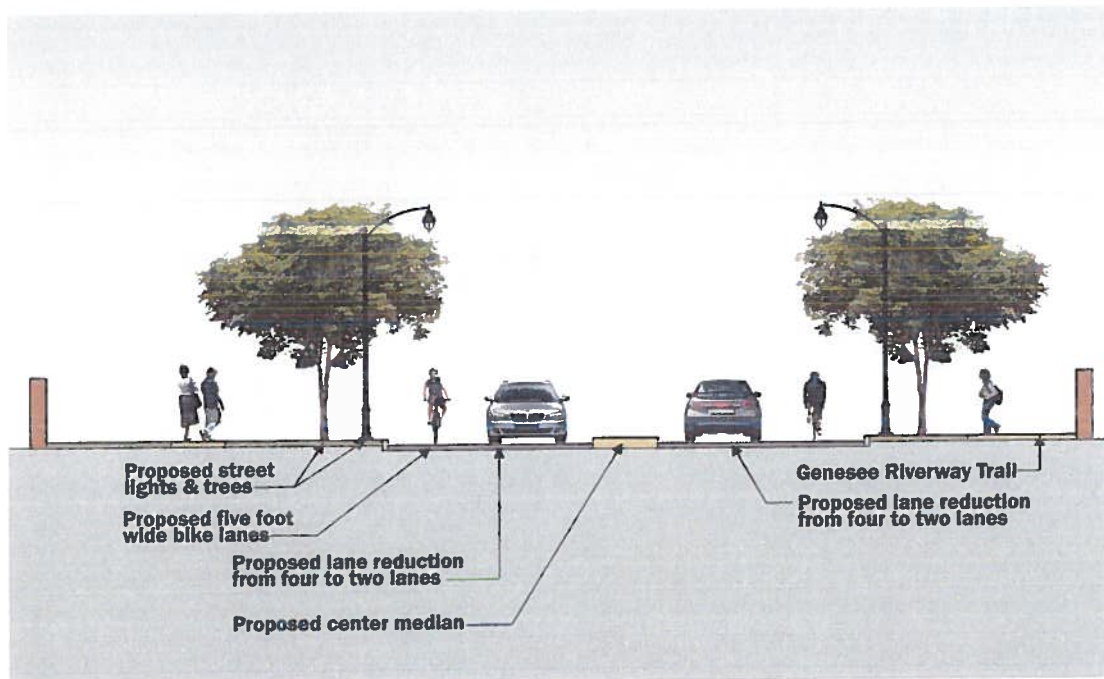


Exhibit 7 - Proposed One Lane Configuration with Raised Median on Lake Ave.

VII. CONCLUSIONS AND RECOMMENDATIONS

The City of Rochester is proposing to reconstruct approximately 1-mile of Lake Avenue from Merrill Street to 600 feet south of Burley Road in the City of Rochester. Future traffic was analyzed for two future scenarios: the existing lane configuration (two lanes in each direction); and the “Road Diet” configuration (one lane in each direction with left-turn lanes). The “Road Diet” configuration reassigns the lane configuration within the existing pavement width from two through lanes in each direction to one through lane with a 5-ft wide bicycle lane in each direction, and a 10-ft center median along the length of the corridor with left turn pockets at each intersection. It is anticipated that the one-lane geometry would reduce speeds along the corridor to better match the existing posted speed limit of 35 mph. Lake Avenue reconstruction project is anticipated to start and be completed in 2014.

In conclusion, reducing the northbound and southbound through lanes on Lake Avenue between Merrill Street and Burley Road may reduce existing speed along the corridor; provide better accessibility for pedestrians and bicyclists while maintaining acceptable levels of service along the corridor during AM and PM peak hours. Though the traffic signal at the cemetery does not meet the warrants, it is recommended that the signal remain. Providing actuation to the signal will provide better traffic control and traffic flow on Lake Avenue, and improved safety for through vehicles and cemetery maintenance personnel, who frequently cross Lake Avenue.

The following is a summary of findings and the recommended improvements to accommodate the proposed corridor project: Refer to **Appendix ‘H’** for the conceptual roadway plans.

Lake Avenue (Merrill Street to a point 600-ft south of Burley Road)

- Provide one through lane with left turn lanes at each intersection.
- Install 5-ft. wide bicycle lanes along both sides of the street.
- Install a 10-ft. wide raised median to separate the travel lanes and to provide a pedestrian refuge area.

- Install pull-off areas for buses at designated bus stops throughout the corridor.
- Install high visibility pedestrian crosswalks at the intersections of Lake Ave/Merrill Street and Lake Ave/ Entrance to Holy Sepulchre Cemetery and at the existing mid-block pedestrian crossing on Lake Avenue at St. Bernard's apartment complex.

Lake Avenue @ Merrill Street

- South of Merrill Street, reduce the southbound lane configuration from 3 lanes to 2 lanes.
- Add lane reduction warning signs to the northbound approach.
- Remove the existing parking along the west side of Lake Avenue between Winchester Street and Merrill Street.

Lake Avenue @ Winchester Street

- Maintain the existing northbound lane configuration.
- Remove the southbound right turn lane.
- Add lane reduction warning signs to the northbound approach.

Lake Avenue @ Cemetery Entrance

- Provide one through lane with an exclusive left-turn lane at the northbound and southbound approaches.
- Maintain the presence inductance loops on the cemetery driveways and hold the controller in the Lake Avenue phase until a side approach is triggered.
- Replace the existing span wire traffic signal with mast arms.
- Modify the overall cycle length from 60 seconds to 120 seconds during the AM peak hour and from 65 seconds to 120 seconds during the PM peak hour.

600' south of Lake Avenue @ Burley Road

- Maintain existing street lane geometry.
- Add lane reduction warning signs to the southbound approach.

Based on the findings of the analysis, implementing a "Road Diet" along this section of Lake Avenue is feasible to reduce traffic speeds within the corridor and to provide a "Gateway" between the Charlotte neighborhoods to the north and the Eastman Kodak neighborhoods to the south. The benefits of lane reduction include slower vehicular traffic within the corridor and improved safety with fewer points of conflict at the intersections. As a result of slower speeds and minimal points of conflict, a reduction in the overall number crashes such as rear-end and overtaking collisions is anticipated within the corridor.

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