THE MILLER HILL CORRIDOR TRAFFIC STUDY

October 1995

Prepared by the:
Metropolitan Interstate Committee

Duluth/Superior urban area communities
cooperating in planning and development through
a joint venture of the

Arrowhead Regional Development Commission
and the
Northwest Regional Planning Commission

Miller Trunk Corridor Traffic Study Advisory Committee

Minnesota Department of Transportation
Russ Kauzlaric, Assistant District Engineer
Dave Pickett, District Traffic Engineer
Bruce Axelson, District Pre-Design Engineer
Paul Huston, Pre-Design Engineer
Dave Bonnin, Geometric Supervisor
Denny Johnson, District Planning Director

City of Duluth
Mike Talarico, MIC/City Council Member
Scott Keenan, MIC/City Council Member
Ken Larson, City Engineer
Dean Beeman, City Traffic Engineer
Jim Mohn, City Planner

City of Hermantown
Dan Urshan, Mayor
John Klaers, City Planner

Neighborhood Representatives
Ron DeGrio, Duluth Heights
Harry Munger, Piedmont Heights

ARDC Staff
*Gary Tonkin, Division Director
***Len Simich, Program Manager
**Ron Chicka, Senior Planner
**Curt Pianalto, Associate Planner
*Graham Deters, Research Assistant
*Jon Fiskness, Research Assistant
*Andy Gunderson, Research Assistant
*Diane Dzuck, Secretary
Scott Peters, Associate Planner
Ray Keller, Planner
Michelle Hummel, Senior Planner

*** Project Lead
** Principal Staff
* Contributed to Plan

St. Louis County
Mic Dahlberg, Assistant County Engineer
Jim Foldesi, Engineer

Duluth Transit Authority
Phil Torgerson, Director of Operations
Jim Heilig, Director of Administration

Bicycle and Pedestrian Representative
Bryn Jacobson, MIC/TAC Member

Trucking Representative
James Manion, MIC/TAC Member

Airport Representative
Lt. Col. Carl Dahlin
Capt. Charlie Nelson

Minnesota State Patrol
Lt. Clarence Nylund

SRF Staff
Dennis Eyler, Principal
Jim Kranig, Associate

Environmental Representative
Debbie Ortman

Business Representative
Bill Wilson, Batteries Plus

Duluth-Superior Metropolitan Interstate Committee

Metropolitan Interstate Committee:

Scott Keenan, Duluth City Council
Keith Yetter, City of Duluth
Michael Talarico, Duluth City Council
Barbara Soder, City of Duluth
Dave Reim, St. Louis County Suburban Townships
Earl Elde, St. Louis County Suburban Townships
Will Mattson, St. Louis County
Linda Bruce, Superior City Council
Peter Moran, Superior City Council
Michael Fischer, Superior City Council
Bruce Abrahammson, City of Superior
James Rowheder, City of Proctor
Richard A. Kieren*
David Salo, City of Hermantown
Dan Urshan, City of Hermantown*
David Conley, Douglas County Board
Michael Glenn, Douglas County Board
Bruce Ciskie, Douglas County Board
Carl Zukowski, Douglas County Board

Metropolitan Interstate Committee Transportation Advisory Committee:

Ken Larson, City of Duluth
Richard Larson, City of Duluth
Bill Majewski, City of Duluth
Dean Beeman, City of Duluth
Paul King, City of Superior
Marshall Weems, City of Superior
John Foschi, City of Proctor
David Salo, City of Hermantown
Mic Dahlberg, St. Louis County
Roger Koski, St. Louis County*
George Palo, Douglas County
Dennis Jensen, Duluth Transit Authority
Jim Heilig, Duluth Transit Authority*
Sheldon Johnson, Northwest Regional Planning Commission
William Croke, Minnesota Department of Transportation
Dennis Johnson, Minnesota Department of Transportation
Wayne Golly, Minnesota Pollution Control Agency
John Allen, Wisconsin Department of Transportation
Martin Forbes, Wisconsin Department of Transportation*
Col. Ray Klosowski, Airport Representative
John Grinden, Airport Representative*
Bryn Jacobson, Bike/Pedestrian Representative
Ray Skelton, Ports Representative
Richard Fredricks, Rail Representative
James Manion, Trucking Representative

* Alternates

MILLER HILL AREA TRAFFIC IMPACT STUDY
TABLE OF CONTENTS

INTRODUCTION

INTRODUCTION

The Miller Hill commercial area, including the Miller Trunk Highway Corridor through Duluth and Hermantown, has experienced significant growth in recent years as a number of new commercial developments have established themselves near the regional shopping center at the Miller Hill Mall. The new developments have ranged from the expansion of existing shopping areas, to new department stores such as Kohl's and Wal-Mart, to entire new shopping centers such as the Stone Ridge Shopping Center and Burning Tree Plaza. The addition of this commercial activity has resulted in approximately 50 percent more traffic since the opening of the Miller Hill Mall in 1973.

In January of 1995, the Metropolitan Interstate Committee (MIC), the designated Metropolitan Planning Organization (MPO) for the Duluth-Superior urbanized area, was notified that the Simon Development Company Inc. was interested in expanding the current Miller Hill Mall site by approximately 387,152 Sq. Ft. This addition would equate to an increase of approximately 49% from the existing structure (currently 794,805 Sq. Ft.). Around this same time period, the MIC was also notified that the OPUS Corporation proposed to construct a 287,000 Sq. Ft. shopping center (including outlots), on a 35 acre undeveloped parcel located south of the Stone Ridge Mall on Highway 194/Central Entrance, and east of the Miller Hill Mall on Highway 53/Trinity Road.

The cumulative effect of these two major developments would have an impact of regional significance. Because of this, the MIC proposed to conduct a transportation study that would update and expand upon a previous study that was conducted in 1992. The new study would not only expand on the recent commercial developments (since 1992), but would encompass more of the entire transportation network such as pedestrian movement, bicycling, transit, and commodity flows.

The Arrowhead Regional Development Commission (ARDC) provided funds to cover the staff resources for facilitating and preparing the study through the MIC. Due to the technical nature of the study, the MIC required assistance in traffic engineering from the consulting firm of Strgar-Roscoe-Faush, Inc. (SRF). The cost associated with the consultants portion of the study was shared between the City of Duluth, the Minnesota Department of Transportation (Mn/DOT), and the two major developers (the Simon Development Company Inc. and the OPUS Corporation).

The analysis conducted within this document does indicate that there will be transportation impacts related to further development in the corridor. However, with the improvements outlined, the transportation network will be able to function as good if not more efficiently than in its current state.

Purpose

The purpose of the study was to:

1. ***Provide decision makers with the transportation impacts of the proposed new developments so they are able to make informed decisions.*** The transportation impacts are a vital component of the decision making process which includes such other issues as environmental impacts, social acceptability, conformance with comprehensive and land use plans, as well as other important factors. It's important to note that the transportation impacts should not be the sole determining factor in future decisions, but be part of an overall assessment prior to decisions being made.

2. ***Provide a plan to address current problems/deficiencies in the corridor.*** As mentioned previously, the Miller Hill area has seen an approximate 50 percent increase in the amount of traffic since the opening of the Miller Hill Mall in 1973. This traffic growth has already created transportation problems throughout the study area. Part of this plan will be to identify current transportation deficiencies and recommend strategies.

3. ***Provide a pro-active transportation plan to avoid or minimize transportation problems in the future before they become unmanageable.*** No one can exactly predict what the future will be. However, by reviewing historical trends, examining land use plans and policies, and modeling traffic based upon technically accepted procedures, we have an indication as to what the corridor could look like in the future. However, this information should only be used as a planning tool since it's virtually impossible to be exact on the type of development that will be constructed, the square footage of any future development and if a saturation point of commercial development will be reached prior to the construction of all developable land. The entire purpose of this task will be to examine future possibilities and to provide a pro-active not reactive transportation plan for the corridor.

This study was not intended to debate the merits of additional commercial activity in the Miller Hill corridor, nor was it to analyze the potential social or environmental impacts of future development. Those issues are for the political leaders to debate, and for the local jurisdictions and/or agencies with expertise in those areas to decide respectively.

Study Goal

The goal for the study was to improve or at least maintain the transportation network in the Miller Hill area. This goal would be accomplished by:

1. Implementing the proper improvements that will improve or at least maintain the current levels of service (LOS) as traffic increases in the future; and,

2. Improving circulation between sites to eliminate unnecessary trips onto the highway or through neighborhoods.

Study Objectives

The objectives for the study were as follows:

1. Determine the transportation impacts of the two proposed commercial developments, and identify any mitigating activities needed to maintain or improve the current condition of the transportation network.

2. Examine any existing transportation problems/deficiencies within the study area, and outline corrective measures to improve the situation to an acceptable level of service.

3. Examine impacts based on potential future development, and recommend pro-active solutions to avoid or minimize problems. Because future development is unknown, recommendations will be for long range improvements and will identify roadway and/or development patterns based upon forecasted build-out scenarios.

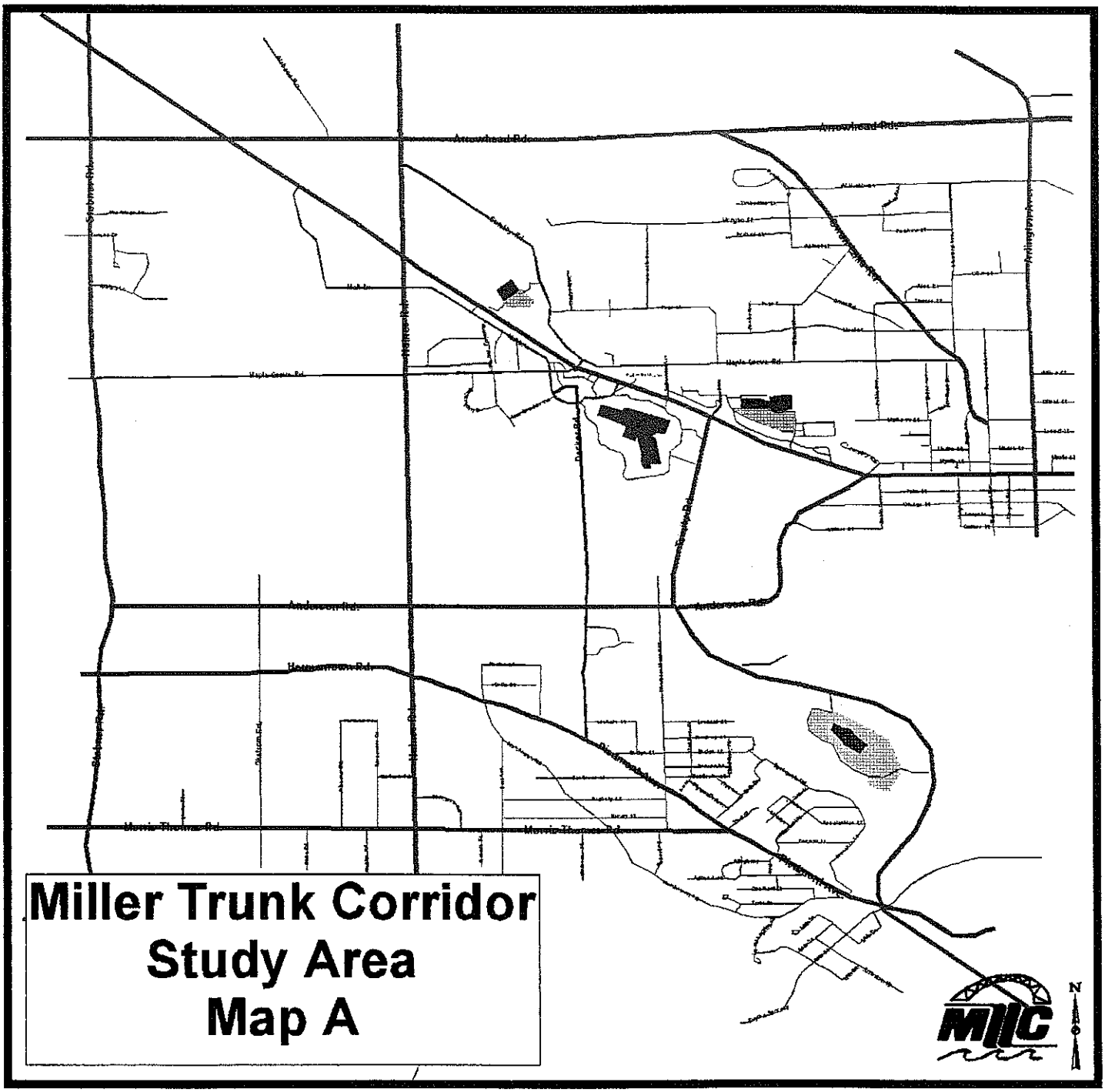
Study Advisory Committee

This study was guided by an advisory committee consisting of planning, engineering, safety, policy, neighborhood, trucking, airport, biking and transit representatives from the City of Duluth, City of Hermantown, St. Louis County, Mn/DOT, the Duluth Transit Authority (DTA), Piedmont Heights and Duluth Heights neighborhoods. A listing of the Study Advisory Committee appears at the begining of this document.

The Committee established the goals and objectives for the study, established the study area boundaries, reviewed technical data, reviewed improvement strategies, and made recommendations and implementation strategies.

Study Area

For the purposes of this analysis, the study area is generally defined as the area between Arrowhead Road to the north, Piedmont/Skyline intersection (6-corners) to the south, Arlington Avenue to the east, and Haines Road to the west. Map A shows the study area boundaries.


Miller Trunk Corridor
Study Area
Map A
MIC
N

Data Collection

To get a complete handle on all the issues within the study area, the following technical information was collected and analyzed.

- **Identification of Primary and Secondary Intersections**

All intersections in the study area were analyzed for traffic impacts. The intersections analyzed were those that were perceived to have direct traffic impacts from either of the proposed developments. These intersections are listed below.

1.) Miller Trunk Highway (Hwys. 53&194) / Arrowhead Road
2.) Miller Trunk Highway (Hwys. 53&194) / Mall Drive
3.) Miller Trunk Highway (Hwys. 53&194) / Maple Grove Road
4.) Miller Trunk Highway (Hwys. 53&194) / Western Mall Exit
5.) Miller Trunk Highway (Hwys. 53&194) / Cottonwood Avenue
6.) Miller Trunk Highway / Trinity Road / Joshua Avenue
7.) Miller Trunk Highway (Hwy. 194) / Anderson Road
8.) Miller Trunk Highway (Hwy. 194) / Arlington Avenue
9.) Trinity Road (Hwy. 53) / Anderson Road
10.) Trinity Road (Hwy. 53) / Arlington Avenue
11.) Trinity Road (Hwy. 53) / SE Miller Hill Mall Entrance
12.) Maple Grove Road / Burning Tree Road
13.) Maple Grove Road / Mall Drive
14.) Haines Road / Mall Drive
15.) Decker Road / Mall Drive
16.) Burning Tree Road / Mall Drive

- **Traffic Turning Movements**

Turning movement counts for all intersections were analyzed based on data collected and turning movement counts documented in the ***Miller Trunk Highway Corridor Traffic Analysis Study (MTHCTAS)***, December 1992. These turning movement counts took place between May 25th and June 8th, 1995, between the hours of 3:00 P.M. and 6:00 P.M. A listing of the intersections and the data sheets can be seen in the appendix along with all other technical documentation.

- **Current Land Use, Zoning, and Aerial Maps**

These items were gathered to assist in the planning study process. Maps of the current land uses are included within this report.

- **Historic ADT's**

Historic Average Daily Traffic (ADT) counts were examined for all roads in the corridor. In most cases, counts do not exist every year for each roadway in the study area. A table of the available ADT's since 1973 is included in this report.

SITUATION ANALYSIS

SITUATION ANALYSIS
"EXISTING CONDITIONS"

This section outlines existing conditions within the study area. This information was analyzed to help determine needed improvements to correct existing problems/deficiencies.

Demographic/Market Research

Demographic data collected by the Simon Property Group indicates that over half of all shopping trips to the Miller Hill Mall, originate from the Twin Ports area. An additional 26% come from other communities in northeast Minnesota. (Refer to the appendices for further documentation of shopper origin locations.) This information is useful in determining the routes that would see the largest increase in traffic if there is any major retail expansion within the study area.

Miller Hill Mall data also shows that the average shopping time at the mall is 81 minutes. Shoppers make an average of 8.8 trips to Miller Hill Mall every three months, and the average size of the shopping party is two people. Shopper surveys indicate that a large percentage of trips to the Miller Hill area consist of stops at more than one location in the study area.

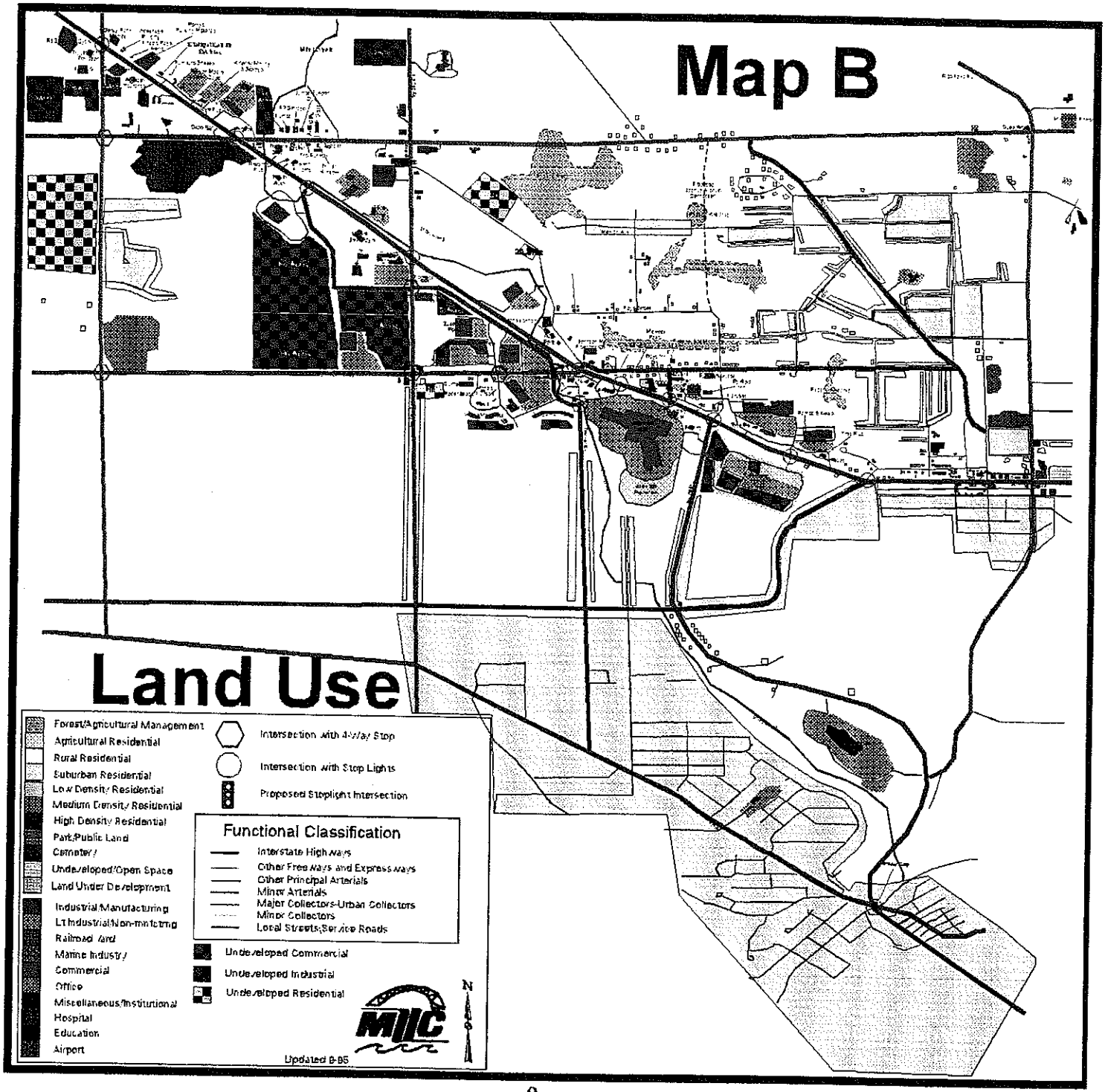
Retail sales for the study area analyzing sales tax revenue was gathered from data supplied by the City of Duluth. The chart titled, "Retail Sales - Miller Hill Corridor" found in the appendices, shows that sales in the Miller Hill corridor reflect national trends. The recession years of 1991 and 1992 show slightly lower numbers than 1990 totals. When adjusted for inflation, sales in the first three quarters of 1993 were lower than that of the previous three years. However, coinciding with the opening of the Stone Ridge Mall, sales in the corridor picked up and continued strong through 1994.

Since the 3rd quarter of 1993, retail sales in the study area have increased faster than other areas in the City of Duluth. This may indicate that shoppers are spending more money and/or making more trips to the Miller Hill area.

Land Use

Transportation and land use are closely related. Existing land use and land use planning provides key information as to the level of traffic that may be generated from a site. In a well integrated system of land use decisions and transportation investments, trips generated by development should either be efficiently handled on the transportation network, or be able to be handled on the network through system improvements. Where land use and transportation decisions are not considered together, a variety of problems may occur such as the travel demand exceeding the transportation system's capacity.

The land use within the existing study area is shown on Map B.


Map B
Land Use
Forest/Agricultural Management
Agricultural Residential
Rural Residential
Suburban Residential
Low Density Residential
Medium Density Residential
High Density Residential
Park/Public Land
Cemetery
Undeveloped/Open Space
Land Under Development
Industrial/Manufacturing
LT Industrial/Non-manufctrng
Railroad Yard
Marine Industry
Commercial
Office
Miscellaneous/Institutional
Hospital
Education
Airport
Intersection with 4-Way Stop
Intersection with Stop Lights
Proposed Stoplight Intersection
Functional Classification
Interstate Highways
Other Freeways and Expressways
Other Principal Arterials
Minor Arterials
Major Collectors-Urban Collectors
Minor Collectors
Local Streets/Service Roads
Undeveloped Commercial
Undeveloped Industrial
Undeveloped Residential
MLC
N
Updated 8-95

The land use information was obtained from: the Cities of Duluth and Hermantown; from land use surveys conducted by ARDC staff; and from aerial photos of the study area taken in May of this year (1995).

Within the study corridor in Duluth, there is approximately 270 acres of land area dedicated to existing and proposed commercial and office development. Given the existing zoning, less than 10 percent of this total is currently available for new commercial development. (These figures do not include the large OPUS site which is presently zoned residential.) Land use in Hermantown is also indicated on Map B.

The vacant parcels zoned for commercial development in Duluth are located between Miller Hill Mall and Haines Road. They range in size from 0.2 acres to a 6.0 acre parcel located along Mall Drive between Super One grocery store and Krenzen Auto. In addition, four multifamily residential sites have been identified along the corridor. Different from single-family homes in trip generation rates, these potential sites have a more localized impact on the street network. The largest site, along Sundby Road north of the new Kohl's store, is projected to entail a 60 unit development.

The vacant parcels in Hermantown are divided into commercial, industrial and residential sites. The larger commercial sites, and therefore the greater traffic generators, are situated along Maple Grove Road and Haines Road immediately south of Trunk Highway 53. Two 40-acre industrial sites have been identified: one with access off of Highway 53 west of Haines Road and the other site located near the Duluth Airport off of Haines Road. Lastly, one large multifamily residential site has been identified along Stebner Road south of Arrowhead Road.

Commercial Square Footage - Duluth

The square footage of commercial zoned properties in the Miller Hill area was obtained from the City of Duluth Assessor's office and from the City of Hermantown. Parcels are classified as "Retail," "Commercial Non-Retail," or "Industrial." See the Appendices for a complete listing of these parcels in both Duluth and Hermantown.

Existing Roadway Network/Functional Classification

The existing study area roadway network and functional classification is shown on Map C. A description of the design elements related to each functional classification appears on Figure 1.

Existing Traffic Volumes and Level of Service

The existing traffic volumes on the major roadways within the study area are shown on Map D. These volumes were obtained from traffic counts made by the Minnesota Department of Transportation, St. Louis County, and the City of Duluth.

Functional Classification Map C

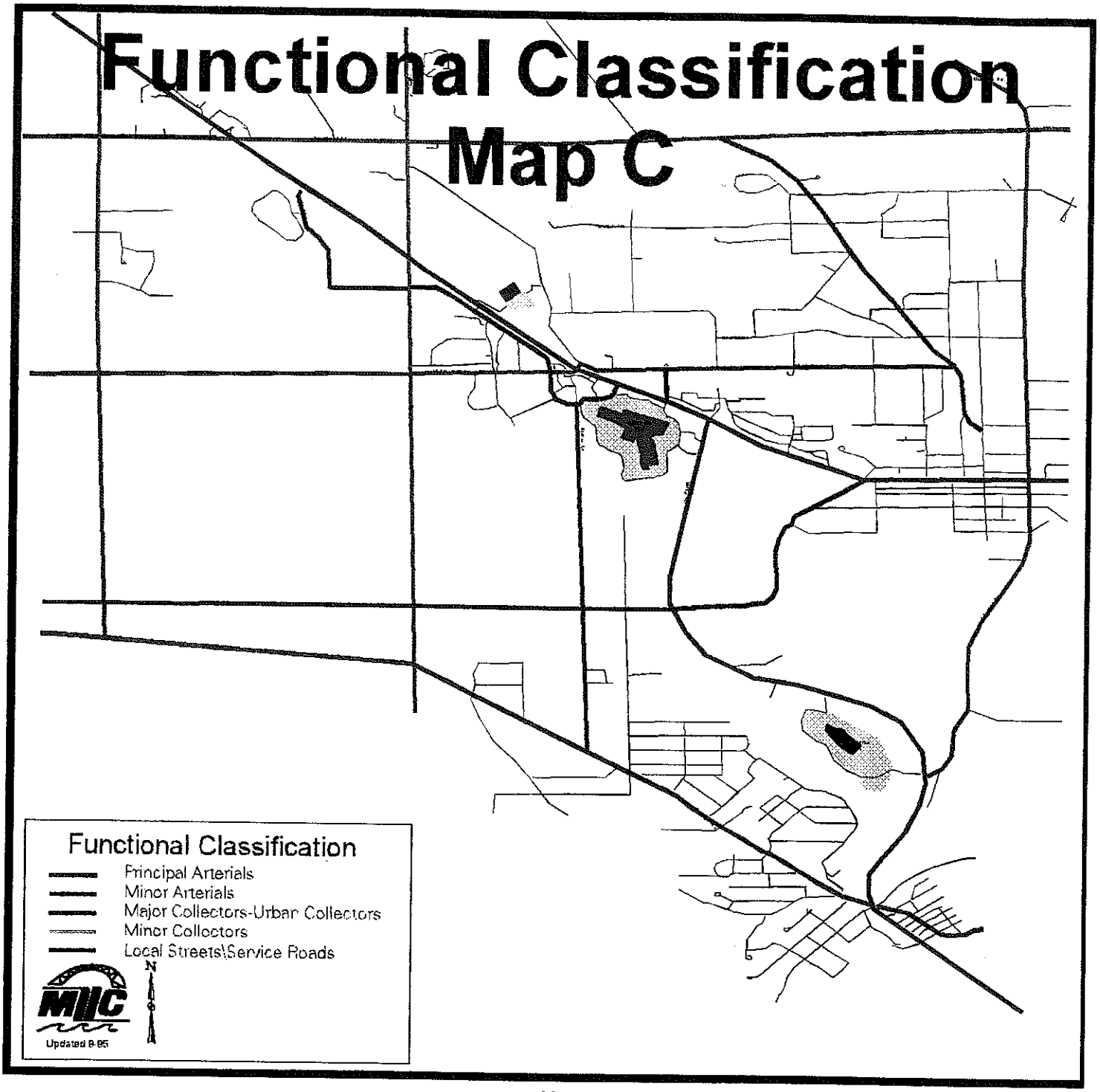
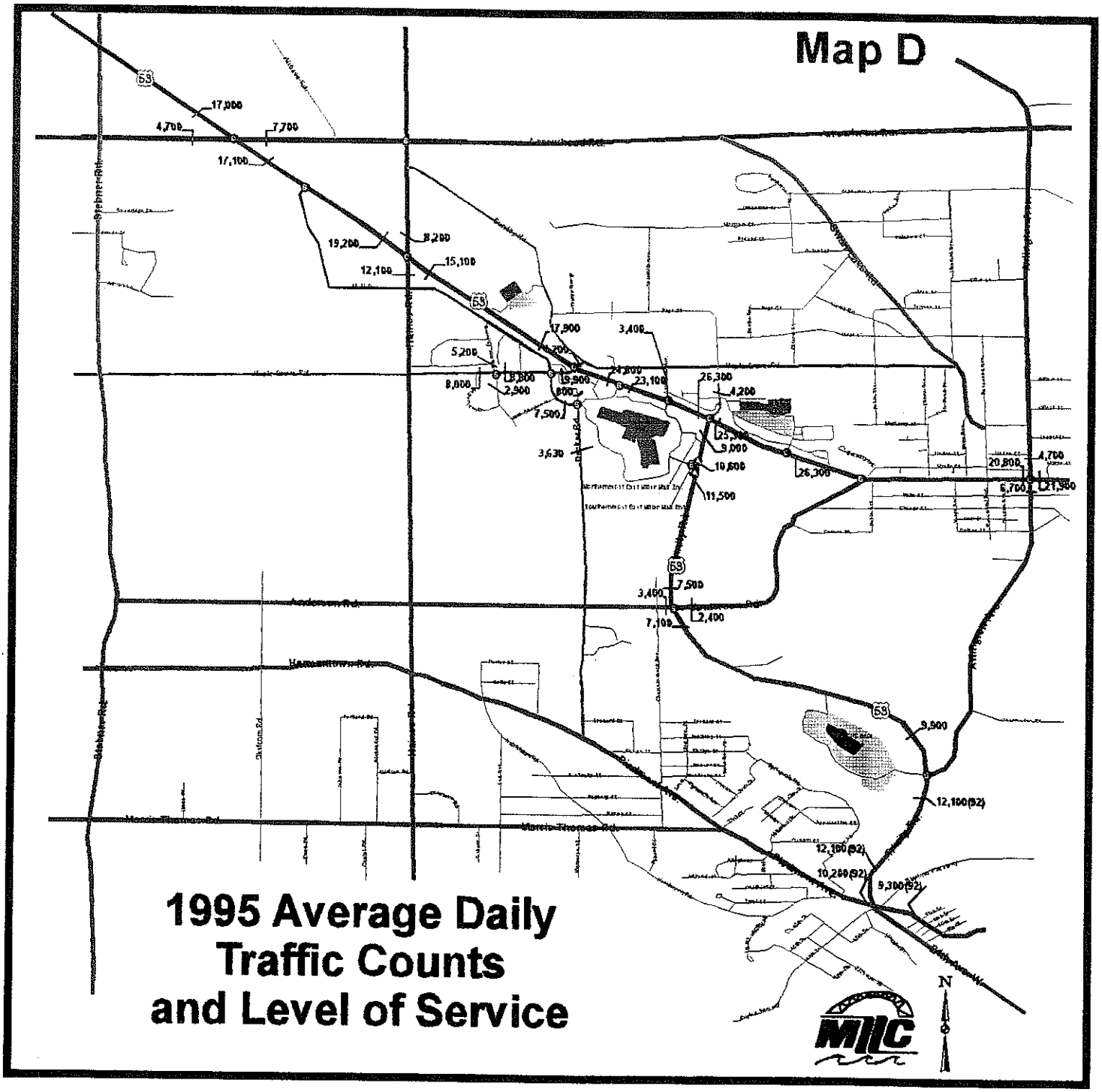


Figure 1

Functional Classification System					
Design Elements					
	Freeway	**Principal Arterials**	**Minor Arterials**	**Major Collectors**	**Minor Collectors**
Typical Signal Spacing	None	1/2 - 1 Mile	1/3 - 1/2 Mile	Where warrant is met	None
Typical Speed Limit	55-65	40-55	30-45	20-40	15-35
Approximate Spacing (Miles)	Where warrant is met	2-5	1/2- 2	1/2 - or less	As needed
Link to Regional Roadway	Regional roadway	Usually serves as a regional roadway	Yes	Rarely	Never
Parking	Prohibited	Probihited	Generally prohibited	Limited	Permitted
Continuity	Continuous	Continuous	Semi-Continuous	Usually not continuous	Discontinuous
Trip Making Service Performed		Provides high level of mobility within the metropolitan area	Provides mobility within and between sub-areas	Provides mobility between neighborhoods and land uses	Provides mobility within neighborhoods and land uses
Location	Where warrant is met	Within natural community separations	On edges or within neighborhoods	On edges or within neighborhoods	Within neighborhoods
Mobility	High mobility	High mobility	Medium to high mobility	Limited mobility	Most Limited mobility
Access	No direct land access	No direct land access	Limited	High land access	Highest land access
Approximate Vehicles/Day	20,000 +	15,000 - 40,000	5,000 - 20,000	1,000 - 8,000	Up to 1,000


Map D
1995 Average Daily
Traffic Counts
and Level of Service
N
MIC

Parking Requirements

The City of Duluth's code requires commercial developments, such as the proposed Simon and Opus projects, to maintain a 5 stalls per 1,000 Sq. Ft. of gross floor space. In a recent survey of cities in Minnesota that house regional shopping centers (Roseville, Brooklyn Park, Eden Prairie, Maplewood and Bloomington), all with the exception of Bloomington (Mall of America) had ***similar standards.*** The reason for lower standards for the Mall of America can somewhat be attributed to the fact that they have a large investment into a transit hub which provides over five thousand trips per day into and out of the mall, and because over 30% of their shoppers are tourists (non regular shoppers) that arrive via air (shuttled from Mpls/St. Paul Int. Airport) and/or charter bus (Source: Mall of America Impact Analysis, December 1992).

Accident Data

Accident rates were calculated for all major intersections in the study area where data was available. Analysis provides standards that show whether intersections have a high percentage of accidents. The first step to calculate the accident rate is to determine the number of vehicles that pass through the intersection on a given day. That number is multiplied by 365 to estimate the traffic for a year. The next step is to determine the number of accidents that have happened at the intersection. For this analysis, MN/DOT provided five-year accident information (1990 - 1994) for all major intersections in the corridor. Any accident that was reported to the police was included. The final step is to calculate the accident rate. This is done with the following ratio:

$$\frac{\text{Number of Accidents}}{(\text{ADT}) \times 365} = \frac{\text{Intersection Accident Rate}}{1{,}000{,}000}$$

In essence, this ratio gives us the number of accidents for every million vehicles that pass through the intersection. General standards suggest that if the accident rate is above 2.0, it can be considered unsafe (i.e. if there are more than two accidents for every one million vehicles that pass through the intersection).

The table below lists the intersections, the number of vehicles that entered each of those intersections, the five-year average of annual accidents, and final accident rate for the intersection. No intersections had a rate that was above 2.0. The closest was the Trinity Road / Arlington Avenue intersection with a rate of 1.72.

	Intersection	Average Daily Vehicles Entering Intersection	Average Number of Annual Accidents	Accident Rate
1.	Miller Trunk Highway / Arrowhead Road	22,800	6.2	**0.75**
2.	Miller Trunk Highway/ Mall Drive	19,000	2.2	**0.32**
3.	Miller Trunk Highway / Maple Grove Road	29,800	6.2	**0.57**
4.	Miller Trunk Highway / Western Mall Exit	23,000	1.2	**0.14**
5.	Miller Trunk Highway / Cottonwood Avenue	25,000	4.2	**0.46**
6.	Miller Trunk Highway / Trinity Road / Joshua Avenue	25,600	6.6	**0.71**
7.	Miller Trunk Highway / Stone Ridge Entrance	19,800	1.6	**0.22**
8.	Miller Trunk Highway / Anderson Road	24,200	6.8	**0.77**
9.	Miller Trunk Highway / Arlington Avenue	28,700	8.4	**0.80**
10.	Trinity Road / Anderson Road	11,200	6.2	**1.52**
11.	Trinity Road / Arlington Avenue	11,800	7.4	**1.72**
12.	Trinity Road / SE Miller Hill Mall Entrance	11,500	1.2	**0.29**

Traffic Changes Since 1973

Traffic in the Miller Hill corridor has substantially increased in the past twenty years. The table below displays the traffic increases at several locations within the corridor. These locations signify areas where 1973 traffic counts were available. These traffic counts suggest that traffic has increased on roads in the corridor by nearly 50% since the mid 1970's. The roads with the highest growth include Trinity Road, Haines Road, Swan Lake Road, and the Miller Trunk Corridor. Traffic on Trinity Road has grown by more than 80% since 1970. Swan Lake Road's traffic has increased from approximately 500 to 1,500 vehicles a day in 1990. The entire Miller Trunk Corridor has seen increases ranging from 30% to 65%.

	Count Location	1973 A.D.T.	1990 A.D.T.	Percent Change	2015 Projected A.D.T.*	Percent Change
1	Arrowhead Road @Haines	6,100	6,900	13.1%	7,200	4.3%
2	Swan Lake Rd@Arrowhead	500	1,500	200.0%	2,400	60.0%
3	Arrowhead Rd @Arlington	10,413	14,275	37.1%	16,000	12.1%
4	Miller Trunk@Haines	11,700	16,000	36.8%	20,300	26.9%
5	Maple Grove Rd @MillerTrunk	7,300	9,600	31.5%	11,100	15.6%
6	Miller Trunk @Arlington Ave	12,300	20,400	65.9%	27,100	32.8%
7	Miller Trunk @Anderson Rd	11,700	14,800	26.5%	20,100	35.8%
8	Haines@Maple Grove Rd	3,800	6,900	81.6%	8,100	17.4%
9	Trinity@Arlington Ave	4,500	8,500	88.9%	12,100	42.4%
10	Trinity@Anderson Rd	4,000	7,130	78.3%	12,600	76.7%
	TOTAL	**72,313**	**106,005**	**46.6%**	**136,700**	**29.0%**

TRAVEL

Included in this table are projections for the year 2015 taken from the TRANPLAN model. TRANPLAN is a computer-based traffic modeling program. TRANPLAN can predict and estimate current and future traffic behaviors and volumes. The TRANPLAN model was developed as part of the *2015 Duluth-Superior Long Range Transportation Plan*. The TRANPLAN modeling process is based on a three-step process:

1.) **Trip Generation**
2.) **Trip Distribution**
3.) **Trip Assignment** MODE CHOICE

In essence, the model examines socioeconomic changes such as housing and employment for 355 zones in the Duluth-Superior area. It then relates those socioeconomic changes to changes in traffic or Trip Generation. The model then distributes these generated trips between the 355 zones. Those zones with the highest traffic generators (major employment, retail, and housing centers) receive the bulk of the traffic. The model then loads these generated and distributed trips onto the roadway network (Trip Assignment). The final step is what gives us the 2015 traffic projections.

Neighborhood Traffic

One consequence of the increased traffic generated from the corridor's retail expansion is the amount of neighborhood cut-through traffic. This cut-through traffic refers to traffic that is traveling through neighborhood streets to get to a destination other than that neighborhood. Ideally this type of traffic should be using principal/minor arterials or major collectors. Neighborhood streets (Local Collectors) should be used as collectors of traffic for those neighborhoods to load onto arterials. To estimate the amount of neighborhood cut-through traffic, staff used 1990 traffic counts and TRANPLAN traffic generation rates. The TRANPLAN model can tell us how much traffic is generated by the neighborhood homes in a specific area. To estimate the cut-through traffic, the TRANPLAN residential traffic generation is subtracted from the 1990 ADT. The model identified three major cut-through routes in the study area:

1.) Swan Lake Road/Eklund Avenue/Maple Grove Road
2.) Arlington Avenue
3.) Decker Road/Anderson Road

	Roadway	Roadway Classification	Location	1990 ADT	TRANPLAN Traffic Generation	Estimated Cut-Through Traffic	Estimated % Cut-Through Traffic
1.	Eklund Avenue	Local Collector	Near Maple Grove Rd	2,300	1,500	800	34.8%
	Swan Lake Road	Major Collector	Near Arrowhead Rd	2,000	1,200	800	40.0%
	Maple Grove Road	Major Collector	East of Eklund	3,700	2,300	1,400	37.8%
2.	Arlington Avenue	Minor Arterial	Near Arrowhead Rd	7,600	1,800	5,800	76.3%
3.	Decker Road	Major Collector	Near Anderson Rd	5,580	500	5,080	91.0%
	TOTAL			**21,180**	**7,300**	**13,880**	**65.5%**

1.) **Swan Lake Road/Eklund Avenue/Maple Grove Road** - Automobiles traveling westbound on Arrowhead Road will take a left turn on Swan Lake Road, take a right turn on Eklund Avenue and take a right turn on Maple Grove Road. At this point, traffic will either travel on Maple Grove Road to Cottonwood Avenue or continue to Highway 53. Automobiles will use the exact opposite route when coming from the Miller Hill area traveling toward Arrowhead Road.

1990 A.D.T. for Eklund Avenue and Swan Lake Road was 2,300 and 2,000 respectively. TRANPLAN suggests that the homes in this area will generate 1,500 trips on Eklund and 1,200 on Swan Lake Road. On Maple Grove Road, TRANPLAN suggests that 2,300 trips are generated by homes in this area. We also have to take into account traffic generated by the homes in the Eklund Avenue neighborhood that also use Maple Grove Road. With these factors taken into account, the estimated cut-through traffic for Maple Grove Road is 1,400 trips. These figures suggest that 35% - 40% of the traffic on this route is generated by cut-through traffic.

2.) **Arlington Avenue**- The second route analyzed was Arlington Avenue. Automobiles traveling westbound on Arrowhead Road will use Arlington Avenue to get to Central Entrance and vice versa. Arlington Avenue is classified as a *Minor Arterial.* As such, it is expected to receive higher amounts of cut-through traffic. We have estimated that nearly 77% of the traffic on Arlington Avenue is generated by cut-through traffic. This is within reasonable standards of a Minor Arterial classified road.

3.) **Decker Road/Anderson Road**- Automobiles use Decker Road and Anderson Road as a link between the Miller Hill Mall area and Trinity Road. Decker and Anderson are both *Major Collectors.* There are approximately 50 housing units that are served directly by Decker Road. This translates into approximately 500 generated trips. The 1990 A.D.T. on Decker is nearly 5,600. This means that 90% of the trips on this Major Collector are generated by cut-through traffic. This is higher than typical standards for a Major Collector.

NOTE: *Many of the neighborhood streets have not had traffic counts taken since 1990. Therefore, for consistency purposes, 1990 ADT information was used. Because of road construction in the area (1990), and with the addition of the Stone Ridge shopping center (1993), the total ADT that appears on the neighborhood streets may be higher or lower today than what appeared in 1990.*

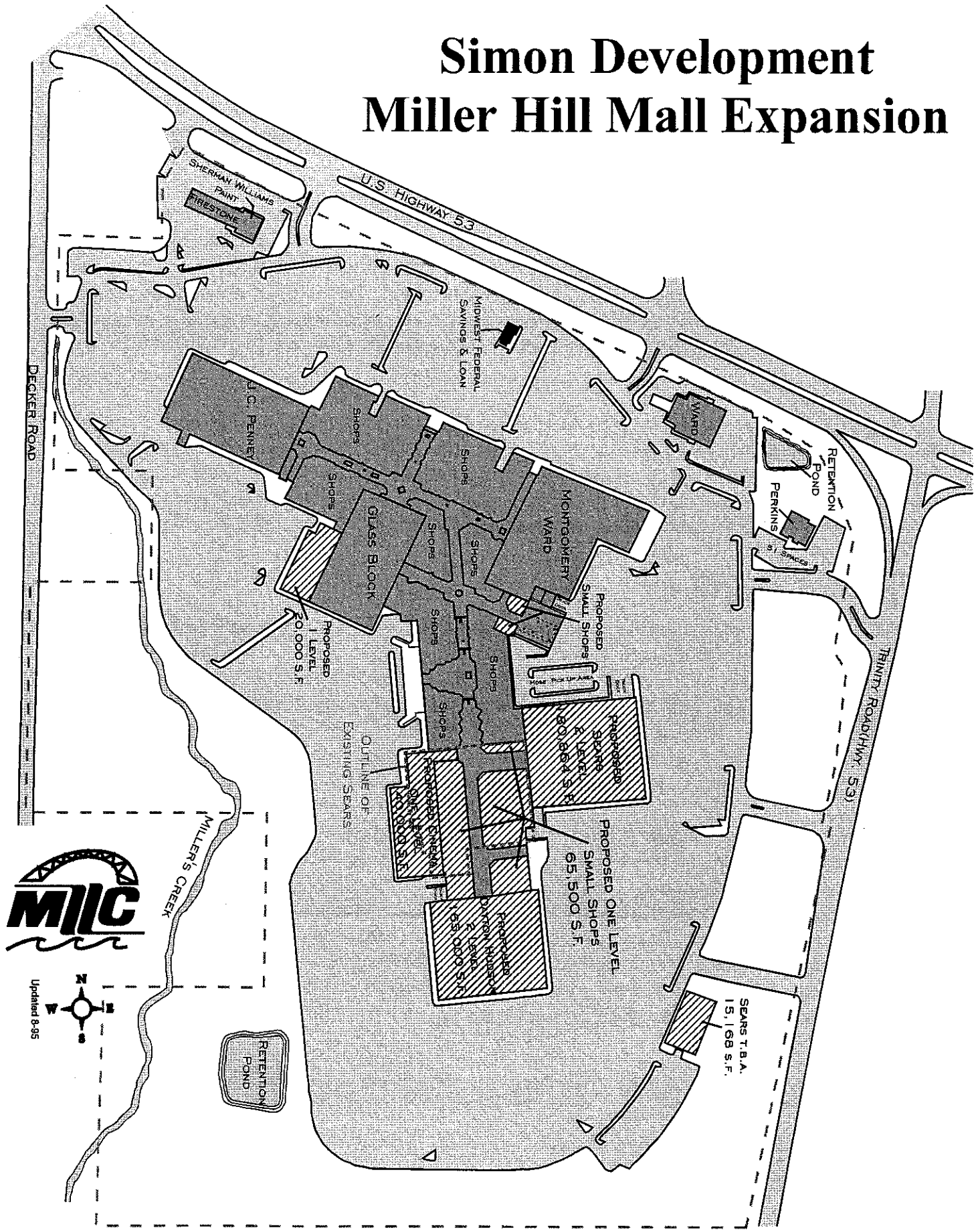
Proposed Development

The Simon Development Company, Inc. has proposed an expansion to the current Miller Hill Mall. The net square footage of the expansion would be approximately 387,152 Sq. Ft. This addition equates to an increase of approximately 49 percent from the existing structure (currently 794,805 Sq. Ft., proposed 1,181,957 Sq. Ft.). Most of the expansion area would occupy current parking spaces located on the south side of the mall. The proposed Miller Hill Mall expansion is expected to house a major department store, provide space for a new Sears store, house a new cinema complex as well as numerous small shops. The proposed expansion can be seen in Map E.

The Opus Corporation has proposed to construct a shopping center with 261,000 Sq. Ft. (287,000 including the outlots) of gross leasable floor space on a 35 acre parcel in the Miller Trunk Highway/Trinity Road corridor. The site is currently a wooded undeveloped tract of land that is steeply sloped in areas with numerous rock outcrops. The site would lie south of the Stone Ridge Mall, and east of the Miller Hill Mall (intersection of Trinity Road and the Miller Trunk Highway). The project is expected to be somewhat similar to the Stone Ridge Mall with a large department store, a strip of smaller retail stores, and development on five outlots that may include three restaurants, a general retail site and a bank. Map F shows the proposed Opus Corporation shopping center.

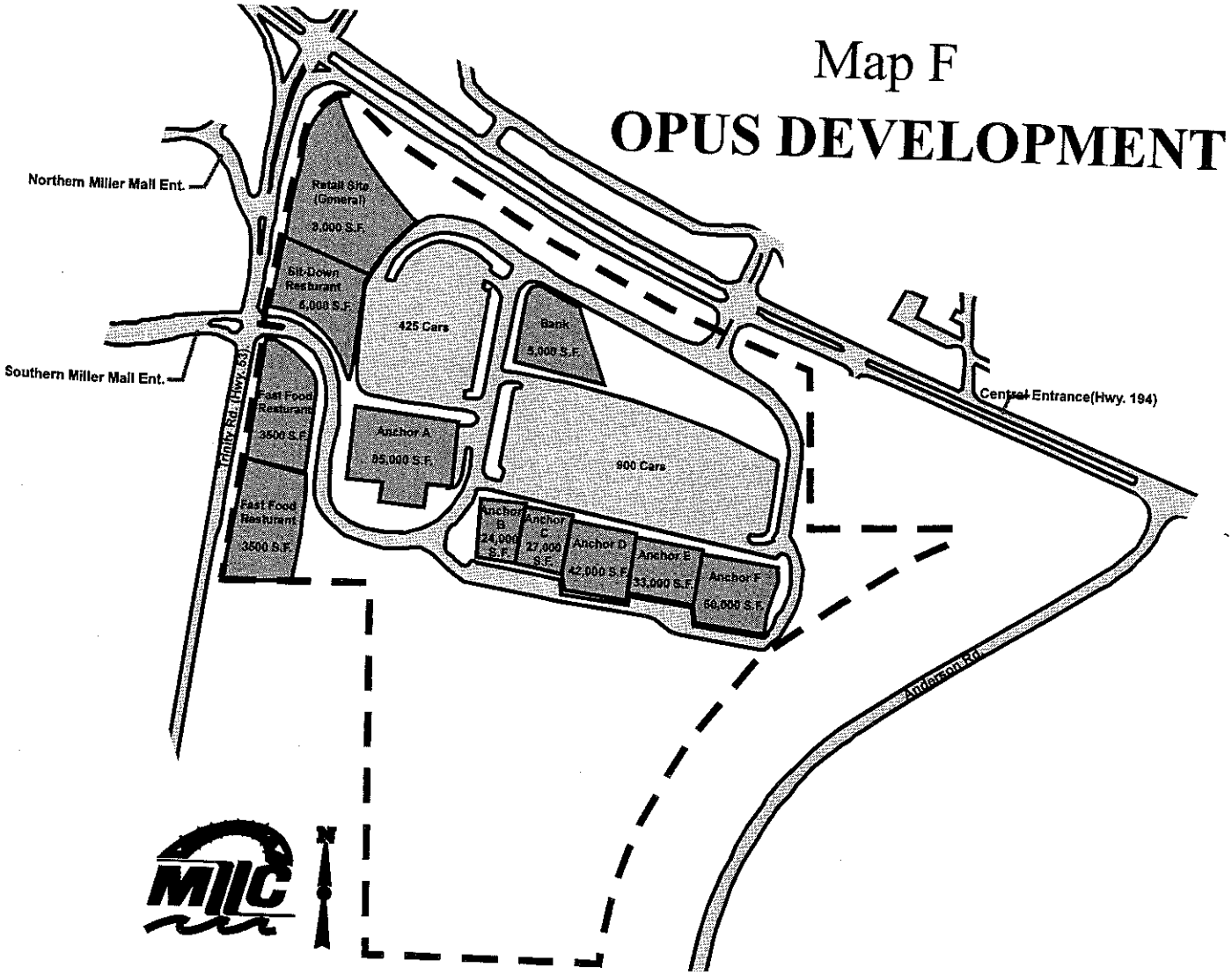
Map E

Simon Development
Miller Hill Mall Expansion



Map F

OPUS DEVELOPMENT



Existing Transit Network

Regular Route Service:

The Duluth Transit Authority currently operates five regular routes that service the Miller Hill Corridor. These routes and their respective headways are listed below. The headway refers to time at a bus stop before that same stop is serviced by another bus on the same route.

Lakeside/Mall Route . .	80 Min. Headway
Downtown Express . .	60 Min. Headway
Heights/Mall Route . .	60 Min. Headway
West 4th/Eklund Route . .	25-120 Min. Headway
Anderson/Heights Route . .	30-60 Min. Headway

These routes provide service to the Miller Hill Mall. In addition, the Lakeside/Mall and the Heights/Mall routes provide service to K-Mart, Target, and Wal-Mart in Hermantown.

The MAC Shuttle Service:

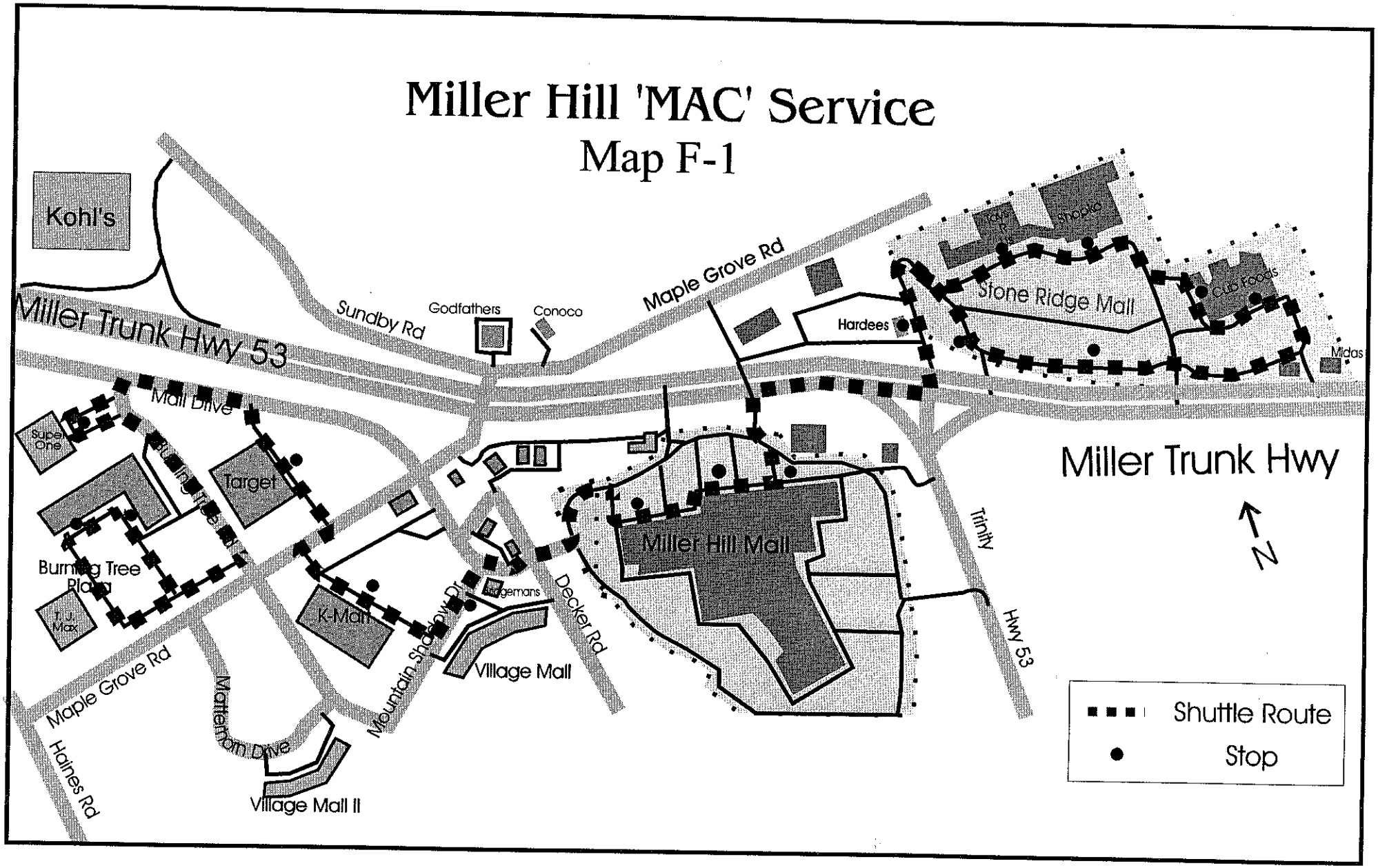
Besides the five regular routes, the DTA also operates a shuttle service between commercial areas in the Miller Hill Corridor. The service, the Mall Area Connector (MAC), is operated with a smaller low-floor bus that seats approximately 25 people. The DTA currently owns one low-floor bus and is expected to receive another by November 1995. The charge to ride the MAC is 25¢. (Please see the attached map for the MAC's routing.) The MAC service operates on two loops that originate at the Miller Hill Mall's main entrance. The east loop travels from the Miller Hill Mall to the Stone Ridge Mall via Joshua Avenue. The MAC services the lower strip development on the site, Cub Foods, Barnes & Noble, Shopko, the Pet Food Warehouse and Toys R Us. From the Stone Ridge Mall, the MAC travels back to the Miller Hill Mall. The MAC then proceeds to the western loop where it services the Village I Mall, K-Mart, Target, Super One and the Burning Tree Plaza.

East Loop Services from the Miller Hill Mall to Stone Ridge:
30 Min. Headway before 10:00 a.m. and after 3:00 p.m.
40 Min. Headway between 10:00 a.m. and 3:00 p.m.

West Loop Services from the Miller Hill Mall to K-Mart, Burning Tree Plaza and Target:
30 Min. Headway before 10:00 a.m. and after 3:00 p.m.
40 Min. Headway between 10:00 a.m. and 3:00 p.m.

Other Transit Services:

The DTA also operates the STRIDE program. The STRIDE program provides transport for disabled individuals who are unable to ride the regular route service. The STRIDE is a demand-based operation and will service the Miller Hill area upon demand. During summer months, the DTA installs bike racks on their buses allowing people to ride the bus with their bikes. Arrowhead Transit, operated by the Arrowhead Economic Opportunity Agency, provides service to the Miller Hill area, from various cities in Northern Minnesota two times per week. People using Arrowhead Transit are able to shop at all locations in the area by linking with the MAC service.


Miller Hill 'MAC' Service
Map F-1
Kohl's
Miller Trunk Hwy 53
Sundby Rd
Godfathers
Conoco
Maple Grove Rd
Hardees
Stone Ridge Mall
Shopko
Cub Foods
Midas
Mall Drive
Super One
Target
Burning Tree Plaza
T.J. Maxx
K-Mart
Bridgemans
Mountain Shadow Dr
Village Mall
Decker Rd
Miller Hill Mall
Trinity
Hwy 53
Miller Trunk Hwy
N
Maple Grove Rd
Matterhorn Drive
Haines Rd
Village Mall II
Shuttle Route
Stop

SIDEWALK AND BICYCLE PATH OVERVIEW

Pedestrian and bicycle facilities should be an integral component of a local transportation network. A system that is properly planned and developed can greatly enhance site access for non-motorized travel. Benefits for provision of such a system are numerous including reduced air and noise pollution, health related reasons, fuel resource conservation and an overall increase in the livability of an area. Transportation benefits are also numerous. The most important aspect is providing an amenity that will ease traffic congestion in an area that can get heavily congested. Sidewalks or bike paths can link to other modes of transportation into the corridor, such as a bus, that will also aid the congestion problem. A well planned network can play a major role for trips of short distance from neighborhoods adjoining the commercial district. Short trips of two to three miles can be made more efficiently via bicycle than the private auto and reduce the amount of air pollution that occurs with short distance car trips.

Bicyclists encounter many of the same traffic problems and needs that motorists experience. They want to reach many of the same destinations as motor vehicles do and also by the shortest or most timely route possible. Safety presents a problem as roadways may be narrow with little if any shoulder space available for bicycle travel. Intersections can be hazardous with vehicle movements especially if no crosswalk signal exists to aid the pedestrian or bicyclist. Since there is a lack of bicycle facilities in the corridor, bicyclists are forced to use many of the same streets used by motor vehicles to reach destinations within the corridor. An additional problem is encountered by bicyclists at many of the commercial sites since there is usually no storage/parking facilities for the bicycle. Provision of such an amenity needs to be discussed with developers at the early stages of project development or pointed out to the owners of a building.

The Miller Hill Corridor, while served fairly well for motorized vehicles, is deficient in adequate walkway or bikeway access to and between major commercial sites. With the proper facility a person could use their bicycle or walk to the commercial corridor for employment and shopping trips. This is especially true for the casual bicyclist and children who are less confident of their ability to operate under mixed traffic situations. This group prefers special provisions for bicycles that are physically separated from motor vehicle traffic. In general, the current situation for bicycle and pedestrian movements is very limited and unsafe in most instances.

Pedestrian and Bicycle Facility Existing Conditions

Miller Hill Mall Area

- No sidewalks exist adjoining the mall site on either Trinity Road or Miller Trunk Highway. There are no dedicated walkways through the mall parking lot leading to the store fronts.
- A sidewalk does exist along the east side of Decker Road south of the intersection with Mall Drive.
- A signalized crosswalk including pavement markings exists at the Cottonwood Avenue intersection.
- There is no signalized crosswalk at the intersection of Highway 53/Central Entrance/Joshua Avenue/Trinity Road.

Central Entrance Area

- Sidewalk exists on the south side of Central Entrance from Arlington Avenue to near Anderson Road. Sidewalk on the north side of Central Entrance runs from Arlington Avenue to Anderson Road.
- There is no connection to Trinity Road/Joshua Avenue on either side of Central Entrance west of Anderson Road making the trip to Stone Ridge Shopping Center difficult and unsafe for pedestrians and bicyclists. No walkways exist leading from the roadway to Stone Ridge Plaza.
- Some sidewalk extensions into adjoining neighborhoods exist along Arlington Avenue and Basswood Avenue.
- The Central Entrance Bike Path just outside of the study area of this project provides the only dedicated route that is separated from vehicular traffic. This path terminates at Arlington Avenue south of the Central Entrance intersection.
- Signalized crosswalks exist at the intersections of Anderson Road, Basswood Avenue and Arlington Avenue.

Maple Grove Road / Mall Drive Area

- A sidewalk of substandard width exists along the south side of Maple Grove Road between Haines Road and Mall Drive. This link is also in poor condition.

- Sidewalk exists along the east and north sides of Matterhorn Drive between Maple Grove Road and Burning Tree Road.

- No signalized intersection crosswalks exist along either Maple Grove Road, Sundby Road, Mall Drive or Haines Road.

- No sidewalks exist adjoining the Burning Tree Plaza, Target, Super One or Kohl's Department Store. There are no dedicated walkways to these sites through their respective parking lots from a sidewalk facility.

Truck Movement Analysis

Through truck traffic, as with all types of traffic, adds to level of service problems in the Miller Hill corridor. It is estimated that a truck is equivalent to up to three automobiles in the space that it takes up on a roadway. To determine the impact of routing trucks away from the Miller Hill corridor, MIC staff conducted a Truck Movement Analysis.

Methodology:

The survey was conducted on Monday, August 28. Trucks were observed from three locations within the corridor area simultaneously.

- Miller Trunk Highway, east of Haines Road.
- Central Entrance, west of Anderson Road.
- Trinity Road, south of Miller Trunk Highway.

Surveys were taken during three different two-hour periods. These times are considered to be peak traffic times in the corridor area.

- 7:00 A.M. to 9:00 A.M.
- 11:00A.M. to 1:00 P.M.
- 4:00 P.M. to 6:00 P.M.

Survey takers recorded data on tape as trucks passed their observation point. Individual trucks were identified using these criteria:

- Time
- Direction (In or Out of Corridor)
- Type of Vehicle (Light, Heavy, "HV")
- Tractor/Cab Description (Color, Name, Conventional or Cabover)
- Trailer/Cargo Description (Flatbed, Box, Tanker, Etc. Name or other markings)
- Other features

The Type of Vehicle description followed guidelines established in the MN/DOT Road Design Manual. Trucks classified as "HV" are a Type 4 vehicle in the MN/DOT manual. These trucks are a single unit, two axle, 6-tire vehicle. "Light" trucks are a Type 5 vehicle. They are a single unit, three or four axle truck. "Heavy" trucks are vehicle Types 6 through 10. These classes are all tractor trailer combinations or trucks with trailers. Buses were not recorded. (See the techincal document for a more detailed description of vehicle types.) The transcripts of each of the three observation points were then compared and each truck was given an identification number that reflected how each individual truck traveled when entering the corridor.

Results:

A detailed table of the results is found in the appendix. An average of all three time intervals is used in discussing the results. Truck numbers reflect MN/DOT total truck ADT counts within the corridor. Truck ADT numbers are two-way counts.

The findings of the survey indicate that 67% of all inbound truck traffic is traveling through the study area and not stopping. An even greater proportion (75%) of heavy trucks are just passing through the corridor. With such a large portion of the trucks traveling into the study area merely passing through to other destinations, level of service in the corridor could be improved by routing through-truck traffic onto roadways that bypass the corridor area.

By law, cities and counties may not ban trucks from state-aid routes for any reason other than weight. However, trucks can be encouraged to use designated truck routes that would bypass the Miller Hill corridor. Based on the findings of this survey, several alternative truck bypasses were identified and can be seen in the recommendation section of this report.

TRIP GENERATION & DISTRIBUTION

TRIP GENERATION AND DISTRIBUTION

Trip generation is defined as the number of vehicles generated by a unit of land use. Different types of land use will generate differing amounts of traffic based on its size and number of employees. For instance, a shopping center of 300,000 square feet will attract much more automobile trips than a manufacturing warehouse of the same size.

To get the trip generation figures presented in this report, ARDC staff and the consultants from SRF used the *Institute of Transportation Engineers (ITE) Manual of Trip Generation*. This manual is the leading resource for transportation planners and engineers who are trying to predict traffic generation at proposed developments. The *ITE Manual* gives trip generation rates for more than 90 different land uses ranging from shopping centers to apartment complexes. In addition, for each land use type, rates are further broken down by the gross leasable area or for the number of employees at the site. The numbers generated in the *ITE Manual* are based on a large number of empirical studies conducted during the past several decades.[1]

For this study, trip generation is being analyzed for two primary reasons:

1. To project the number of vehicles that could be generated by either one or both of the two proposed developments in the City of Duluth (The OPUS Development and the Simon expansion). These two sites will have direct traffic impacts on the Miller Trunk Highway corridor.

2. To project the number of vehicles that could be generated by potential development on vacant parcels that are currently undeveloped and zoned for development. A map of the undeveloped parcels can be seen on pages 36 and 37 respectively.

The specific methodologies for the two cases are described below.

1. Proposed Simon Expansion And OPUS Development Trip Generation

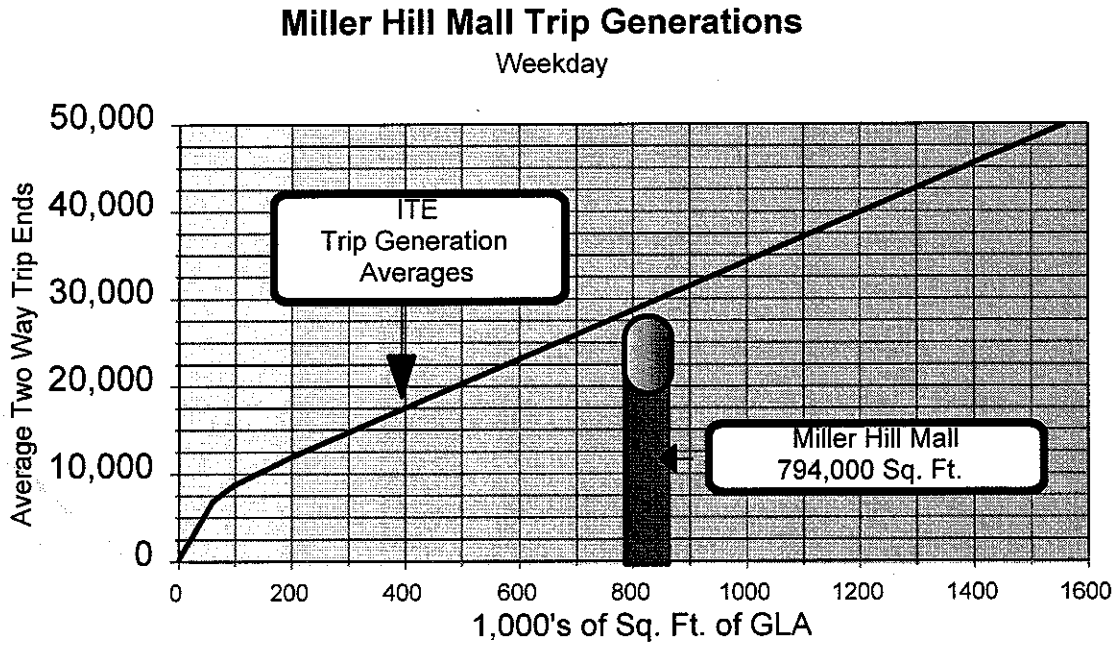
For the proposed Miller Hill Mall expansion (Simon Development Company Inc.) and OPUS development, trip generation was projected using the *ITE Manual.* One consideration that had to be accounted for was that the trip generation rates for the Miller Hill Mall area were lower than the national averages presented in the *ITE Manual*. To account for this, staff calibrated the generation rates from the manual with current traffic counts taken at the Miller Hill Mall entrance and exit points.

---

[1]Source: *Institute of Transportation Engineers Transportation Planning Handbook,* published by Prentice Hall, 1992.

The ITE Manual indicates that a shopping center the size of the Miller Hill Mall should generate approximately 30,000 two-way trips on a given weekday (15,000 entering & exiting). The entrance/exit counts at the Mall averaged 23,000 with a corresponding range of 18,000 to 28,000 two-way trips (refer to chart below). Therefore, the actual counts are 23% lower than indicated values out of the ITE Manual.

If the Miller Hill Mall expands as proposed, the ITE Manual indicates that it should generate 40,000 vehicles per day. By applying the 23 percent reduction factor, the calibrated traffic generation equals 31,000 vehicles per day. Therefore, since the Miller Hill Mall currently generates an average of 23,000 vehicles per day, the additional trips that can be attributed to the expansion would be approximately 8,000.



Traffic generation for the OPUS site was done in a similar fashion as it was for the Miller Hill Mall expansion. The OPUS development includes 261,000 sq/ft GLA of shopping center and 26,000 square feet of outlots. It should be noted that because the ITE trip rates represent trip generation from isolated land uses, the trip generation from the outlot development was reduced by 30 percent to account for multi-purpose trips within the development. (30% is well within the acceptable reduction rates for multi-purpose trips within a development identified by the ITE Manual.) The detailed trip generation calculations using the land uses and ITE trip generation rates are as follows:

Land Use	Size (sq/ft)	Daily Trip Rate	Daily Volumes
Shopping Center	261,000	49.32	12,872
Two Fast Food Restaurants	7,000	632.12	3,098 (1)
Sit-Down Restaurant	6,000	205.36	862 (1)
Retail Site (General)	8,000	40.67	228 (1)
Bank	5,000	411.17	1,439 (1)
Total	287,000		18,499

(1) *Reflects a 30 percent reduction for multi-purpose linked trips within the development.*

As with the Miller Hill Mall, adjustments to the ITE trip calculations had to be made to account for trip generation rates for the Miller Hill Mall area that are lower than the national averages presented in the *ITE Manual*. Below is the anticipated OPUS driveway count with the ITE trip calculation adjustments:

ITE Trips for Development	18,500
Miller Mall Rate of Actual Count/ITE	86.8%
Anticipated OPUS Driveway Count	**16,050**

2. Vacant Parcels - Trip Generation and Methodology

Another objective of this study is to provide traffic generation data on potential future development in the corridor. An analysis of the larger vacant parcels that are currently zoned as buildable for either commercial, industrial, or residential activity was undertaken to give an indication of the extent of overall growth that might occur in the corridor. This is important since land use and development decisions that occur today will have a traffic impact on the entire roadway network for many years to follow. The adjacent roadway network and access points can be planned taking into account levels of traffic and proper circulation leading to and within a particular site.

As mentioned in the introduction, no one can exactly predict what type of development will be constructed, when it will be constructed, what size the development will be, and when if ever the saturation point for commercial development will be reached. The analysis of vacant parcels should therefore only be used as a planning tool and not considered to be absolute.

The following analysis examined the vacant parcels in Duluth and Hermantown that would have an impact on traffic circulation if developed. The first step in this analysis involved location and measurement of the vacant parcels. City Planning in both communities were consulted in locating the parcels to be examined. Size of the parcels was approximated via large scale air photos. The second step was a calculation of approximate buildable acreage for each site that considered local zoning regulations or site specific conditions. The third step was attributing a set percentage of a site for the structure. This percentage was determined by examining existing development in the corridor and arriving at an average lot coverage figure. The fourth and final step was forecasting a daily traffic count generated by each site utilizing the ITE Traffic Generation Manual. Because ITE trip generation tables view development as if it were a "stand alone" facility or developed in isolation from other

development, the traffic volumes do not take into account multi-purpose trips made at or between sites without the use of an automobile. Because of this, the ITE rates are inflated. To account for this, the ITE trip rates were factored down up to 20 percent to account for the multi-purpose trips between commercial developments. This is consistent with the methodology applied to both the Simon and OPUS developments.

The discussion of future traffic generation does not take into account land usage rate. Some or all of the parcels identified in the study could potentially be used for development given the current zoning. Likewise some parcels identified as vacant may remain as open space or developed differently than indicated in this study. Such an action would therefore affect traffic generation. These sites could be developed in ten years, twenty years, or even more depending on the economy at any given time. The key point of this analysis is that the reader is given some indication as to the possible level of building activity in the future, and thereby serves as an input to future transportation plans for the corridor.

Duluth Buildable Commercial Space - Traffic Generation (Refer to Map G)

A comprehensive inventory of existing retail and commercial non-retail development was generated for the study corridor area. This information was obtained from the City Assessor's office. The purpose of this action was to track density of development and arrive at an average density figure for the Duluth area of the corridor. Results of this analysis indicated an average density of slightly over 21 percent. To give a conservative estimate, staff assumed 25 percent in the calculations below. Traffic generation figures for each site reflect this assumption. The complete list of possible commercial developments in Duluth by code is lengthy. A listing can be referenced in the Duluth Zoning Regulations.

All sites identified below are currently zoned for commercial development.

Site A: Located along Mall Drive between Haines Road and Burning Tree Road.

Development Acreage:	Only two acres out of approximately six could be used for development due to the large expanse of wetlands on site.
Square Foot Calculation:	22,000
Daily Traffic Generation:	2,400
Comments:	Zoned for commercial development. Access would be onto Mall Drive.

Site B: Additional Development to Burning Tree Plaza.

Development Acreage:	Buildable area to complete the open area of the plaza totals approximately 1.5 acres.
Square Foot Calculation:	60,000
Daily Traffic Generation:	4,300
Comments:	Parking exists for expansion. Access provided onto Burning Tree Road and Haines Road.

Site C: Northeast Corner of Haines Road and Maple Grove Road.

Development Acreage:	Small site of approximately one-quarter acre.
Square Foot Calculation:	2,000
Daily Traffic Generation:	500
Comments:	Access onto Maple Grove Road.

Site D: West Side of Burning Tree Road Between Maple Grove Road and Matterhorn Drive.

Development Acreage:	Three separate parcels totaling approximately 2 acres.
Square Foot Calculation:	21,000
Daily Traffic Generation:	2,300
Comments:	Access onto Burning Tree Road and/or Matterhorn Drive.

Site E: South of (Behind) Village Mall West.

Development Acreage:	Three separate parcels totaling approximately 4 acres.
Square Foot Calculation:	45,000
Daily Traffic Generation:	3,800
Comments:	Access from an extension of Burning Tree Road to the east.

Site F: South of (Behind) Village Mall East.

Development Acreage:	Approximately 3.5 acres.
Square Foot Calculation:	37,000
Daily Traffic Generation:	3,230
Comments:	Access from an extension of Burning Tree Road to the west and/or Decker Road to the east. Possible motel/hotel has been discussed for the site.

Site G: Near the Southwest Corner of Sundby Road and Page Street.

Development Acreage:	Approximately 1 acre.
Square Foot Calculation:	11,000
Daily Traffic Generation:	1,500
Comments:	Access onto Sundby Road. Office structure has been discussed.

Duluth Buildable Residential Space - Traffic Generation (Refer to Map G)

Four vacant residential sites were identified within the study corridor. These sites are zoned for multifamily development and are therefore included in the analysis due to the relatively higher volumes of traffic generated at these locations. Possible number of units was arrived at through discussions with the City Planning Department. An average figure of traffic generation taken from ITE Trip Generation was used.

Site A: Southeast Corner of Maple Grove Road and Haines Road.

Development Acreage:	Approximately 2.5 acres.
Number of Units:	28
Daily Traffic Generation:	170
Comments:	Access onto Haines Road.

Site B: Sundby Road Between Haines Road and Page Street.

Development Acreage:	Approximately 3.5 acres.
Number of Units:	60
Daily Traffic Generation:	370
Comments:	Access onto Sundby Road.

Site C: Sundby Road just north of Page Street Intersection.

Development Acreage:	Approximately 1 acre.
Number of Units:	20
Daily Traffic Generation:	120
Comments:	Access onto Sundby Road.

Site D: West of Cottonwood Avenue and South of Maple Grove Road

Development Acreage:	Approximately 1 acre.
Number of Units:	20
Daily Traffic Generation:	120
Comments:	Access onto Maple Grove Road to the north and/or Cottonwood Avenue to the east.

Total Trip Generation - All Land Uses for Duluth = 18,810

Hermantown Buildable Commercial Space - Traffic Generation (Refer to Map H)

Data on commercial development in Hermantown was collected through the County Assessor's and Auditor's office. Information gathered included parcel size, current use, property address, building square footage and vacant lot data. As mentioned earlier, the intent of this exercise was to generate average density of commercial development in the corridor for Hermantown. This percentage was then used in forecasts for further growth at the Hermantown vacant sites. Results indicated average density at approximately 14%. This is significantly lower than commercial density in Duluth. Staff assumed 15% density in the traffic forecast generation for the vacant parcels identified below.

Site A: **Located along the west side of Stebner Road between Highway 53 and Arrowhead Road.**

Development Acreage:	Approximately 10 acres.
Square Foot Calculation:	65,000
Daily Traffic Generation:	4,100
Comments:	Access from Stebner Road.

Site B: **Located along the east side of Stebner Road between Highway 53 and Arrowhead Road.**

Development Acreage:	Approximately 4 acres.
Square Foot Calculation:	26,000
Daily Traffic Generation:	2,800
Comments:	Access from Stebner Road.

Site C: **Located on Arrowhead Road east of Highway 53 intersection.**

Development Acreage:	Approximately 7.5 acres.
Square Foot Calculation:	49,000
Daily Traffic Generation:	3,900
Comments:	Access onto Arrowhead Road adjacent to Menards.

Site D: **Located south of the existing Wal-Mart store.**

Development Acreage:	Approximately 40 acres.
Square Foot Calculation:	261,000
Daily Traffic Generation:	11,300
Comments:	Large commercial site bounded by Mall Drive to the northeast, a proposed road to the east, proposed Lindgren Road to the south and proposed Westberg Road to the west. Site would not have direct access onto Highway 53.

Site E: **Located along Maple Grove Road west of Haines Road.**

Development Acreage:	Approximately 20 acres.
Square Foot Calculation:	131,000
Daily Traffic Generation:	7,200
Comments:	Access onto Maple Grove Road and possibly onto proposed roads to the east and west.

Site F: **Located along Haines Road between Mall Drive and Maple Grove Road.**

Development Acreage:	Approximately 15 acres.
Square Foot Calculation:	98,000
Daily Traffic Generation:	5,900
Comments:	Access onto Haines Road to the east, Mall Drive to the north and possibly proposed access roads to the west and south.

Site G: **Located along Haines Road between Arrowhead Road and Highway 53.**

Development Acreage:	Approximately 4 acres.
Square Foot Calculation:	26,000
Daily Traffic Generation:	2,800
Comments:	Access onto Haines Road.

Hermantown Buildable Industrial Space - Traffic Generation (Refer to Map H)

Data on industrial development in Hermantown was collected through the County Assessor's and Auditor's office. The same methodology applied to the commercial vacant sites identified above was used in the analysis for the two large industrial zoned tracts of land described below. Results indicated an average density of less than 10% which is the percentage that has been applied in traffic generation calculations. Industrial sites are less intensive than commercial locations and therefore have relatively lower traffic generation counts.

Site A: **Located south of Highway 53 between Lavaque Road and Stebner Road.**

Development Acreage:	Approximately 10 acres.
Square Foot Calculation:	44,000
Daily Traffic Generation:	520
Comments:	Access could come from Highway 53 to the north or off of Stebner Road to the east.

Site B: **Located at the southwest corner of Haines Road and Airport Road.**

Development Acreage:	Approximately 10 acres.
Square Foot Calculation:	44,000
Daily Traffic Generation:	520
Comments:	Access onto Haines Road to the east and Airport Road to the north.

Hermantown Buildable Residential Space - Traffic Generation (Refer to Map H)

Only one large vacant residential site was identified within the study corridor. This site is zoned for multifamily development and was included in the analysis due its potential to generate higher volumes of traffic. Possible number of units was arrived at through discussions with the City Planning Department. An average figure of traffic generation taken from ITE Trip Generation was used.

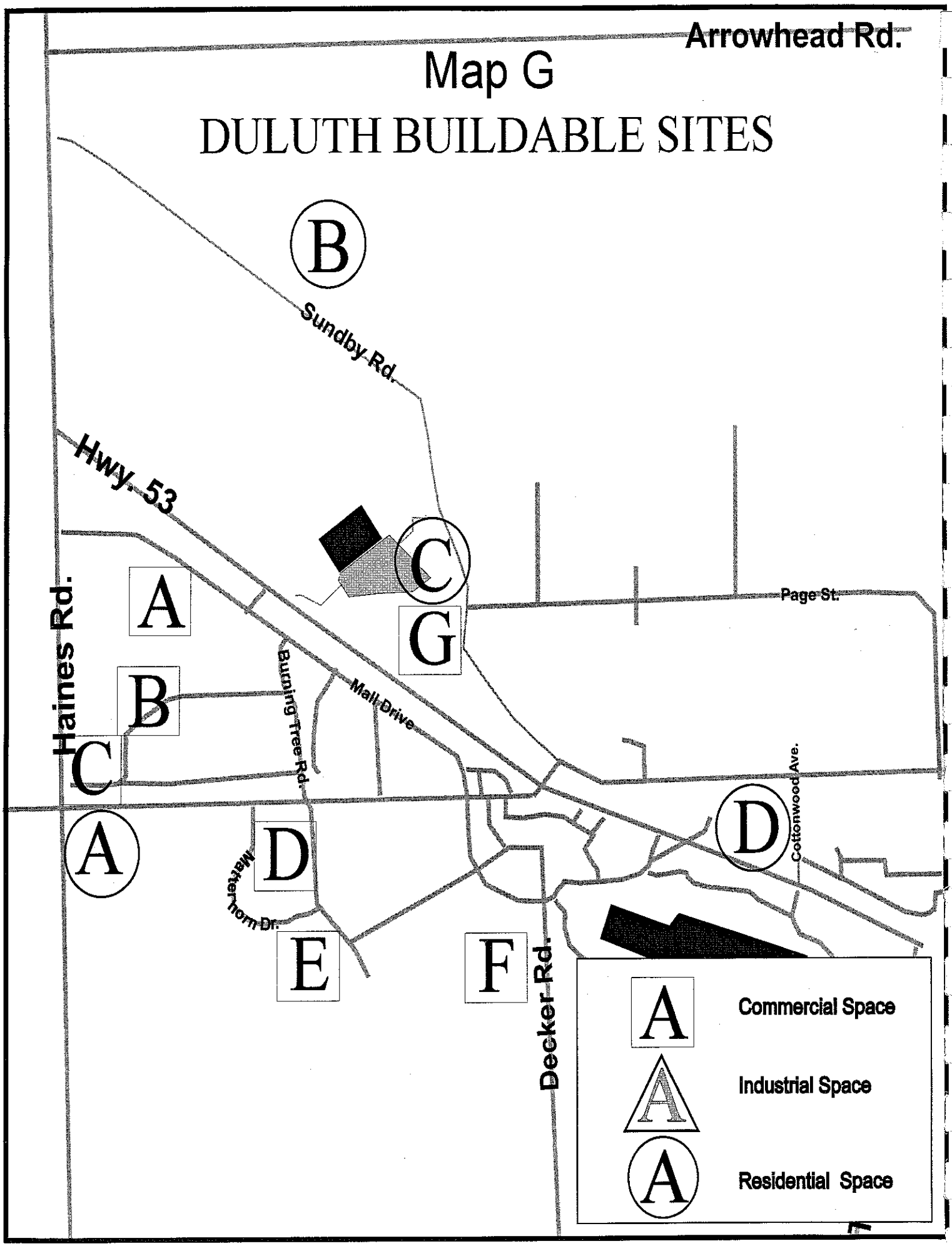
Site A: **Located along the west side of Stebner Road between Arrowhead Road and Maple Grove Road.**

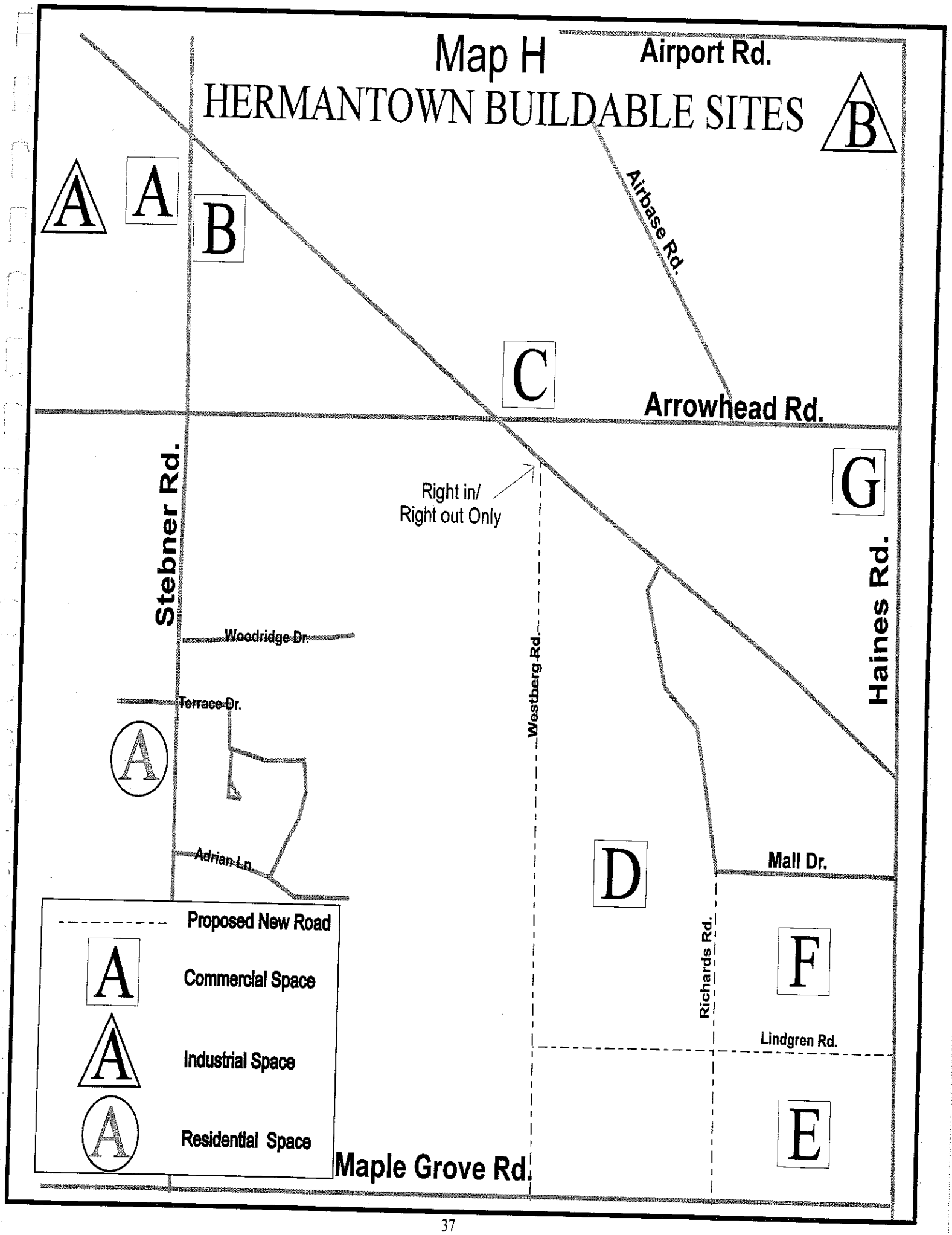
Development Acreage:	Approximately 100 acres.
Number of Units:	600 units (6 units maximum per acre by code)
Daily Traffic Generation:	3,680
Comments:	Access onto Stebner Road. Possible development would resemble "The Meadows" complex at the corner of Maple Grove Road and Stebner Road.

Total Trip Generation - All Land Uses for Hermantown = 42,720

Total Trip Generation - Duluth + Hermantown = 61,530

During the Long Range Transportation Planning process, levels of employment and housing growth/decline were projected. These projected changes in housing and employment were then entered into the TRANPLAN Traffic Modeling Program. The changes in housing and employment correspond to changes in traffic. To verify the traffic generation figures that were estimated for vacant parcels, the trip increases were compared with the generation figures from the 2015 TRANPLAN model. The TRANPLAN model underestimated only one area in the Miller Hill Corridor, which were the Hermantown commercial sites D, E, and F. These sites were shown only to have an increase of 150 employees by 2015. Given the large size of these lots, and if they were to be fully built out, it was estimated that 600 employees could be employed at these sites. Again, this is assuming a full build out scenario. The major effects from these sites would be to Maple Grove Road, Haines Road, Lindgren Road, and Richards Road (See Map H).


Arrowhead Rd.
Map G
DULUTH BUILDABLE SITES
B
Sundby Rd.
Hwy. 53
C
A
G
Page St.
Haines Rd.
B
Burning Tree Rd.
Mall Drive
C
D
Cottonwood Ave.
A
D
Matterhorn Dr.
E
F
Decker Rd.
A
Commercial Space
A
Industrial Space
A
Residential Space


Map H
HERMANTOWN BUILDABLE SITES
Airport Rd.
Airbase Rd.
Arrowhead Rd.
Stebner Rd.
Haines Rd.
Westberg Rd.
Richards Rd.
Lindgren Rd.
Mall Dr.
Maple Grove Rd.
Woodridge Dr.
Terrace Dr.
Adrian Ln.
Right in/
Right out Only
A
A
B
C
D
E
F
G
B
A
A
A
Proposed New Road
Commercial Space
Industrial Space
Residential Space

OVERVIEW OF ISSUES

OVERVIEW OF ISSUES

The Study Advisory Committee identified the following as an accumulation of transportation problems currently occurring, or that are expected to increase with the addition of more commercial activity throughout the study area unless mitigating activities are implemented. Below are the problems/issues noted by the Study Advisory Committee:

- Much of the commercial activity is located on or adjacent to Trunk Highways (TH) 194 and 53. This causes many short trips (between sites) to occur on the Highway.

- Very few frontage roads exist along the TH 53/194 corridor. As in the case above, trips between sites are forced to use the highway adding to the growing congestion.

- A high number of access points onto TH 53 and 194. Many sites have individual access points onto the Highway, versus a number of sites connected together via a service road with only one access onto the Highway. Because of the situation that currently exists, additional trips are added to the Highway. This situation also leads to unsafe operating conditions with so many areas for vehicles to pull out onto a roadway with higher operating speeds.

- A high number of signalized intersections along the 53/194 corridor (un-synchronized). This causes time delays and adds to the congestion problem.

- Recent increases in the amount of commercial development (Kohls, Burning Tree Plaza, Wal-Mart, Stone Ridge Mall, etc...). Each new development has added traffic within the corridor. In some cases the individual site has caused a transportation deficiency to occur. The accumulated effect of all the recent development has attributed to the transportation problems currently being experienced within the study area.

- Increased neighborhood traffic (cut through traffic). Just as total traffic has increased in the Miller Hill commercial area, so has the traffic volumes in the neighborhoods close to the shopping areas. Much of the increase in neighborhood traffic can be attributed to the activities of the commercial area. Other factors such as current deficiencies (congestion, safety, connectivity) on the major and minor arterials, probably play an even bigger role.

- No direct access to the heart of the commercial district from the northeast. If traveling to the Miller Hill commercial area from the northeast, the current roadway options are to use Arlington Avenue (to Central Entrance), Haines Road (to TH 53), or to cut through on local streets. Both Arlington Avenue and Haines Road are classified as minor arterials which means they provide a high to medium level of mobility between sub-areas. The distance between minor arterials should be no more than 1/3-1/2 mile apart, otherwise neighborhood/local streets are utilized more for travel between sub-areas (used as a minor arterial) instead of for mobility within the neighborhoods as they were designed. The current spacing between Arlington Avenue and Haines Road is approximately 2.5 miles. This tends to indicate that a spacing and connectivity deficiency does exist.

- Lack of a sidewalk and crosswalk network for pedestrians to utilize when traveling between the various commercial sites. This is important considering the number of short trips between sites that currently are made via the automobile traveling on and off the principal and minor arterials. A good pedestrian network would not eliminate all the short trips currently being made on the principal and minor arterials, but would help provide options to those individuals that do not or choose not to drive, and would make transit and bicycling a more attractive alternative.

- Lack of bicycle routes for cyclists to use when traveling to the Miller Hill area or between the various commercial sites. This is very similar to the issue discussed above. However, an additional need, would be having a good network of bicycle routes accessing the Miller Hill commercial area from all points within the region.

- Lack of a good transit hub or even transit access to all the commercial sites in the area.

- There is the potential for a high number of trips to be generated from the remaining commercially zoned sites located in the study area.

- A high number of trucks (67%) are not destined for a site within the study area and are just passing through.

- There may be a need to provide a connecting road on the south side of Miller Hill Mall between Trinity Road and Decker Road. If constructed, this road should also be connected to the existing Burning Tree Road, east of Mountain Shadow Drive. This road would provide better access between and to sites, while minimizing trips taken on the highway.

- There are current capacity or other deficiencies noted at:
  - -Hwy 53/Maple Grove Road intersection
  - -Joshua Avenue/Trinity Road/Central Entrance intersection
  - -Six Corners intersection
  - -Hwy 53/Cottonwood Avenue intersection
  - -Burning Tree Road/Maple Grove Road intersection
  - -Target/K-Mart accesses onto Maple Grove Road

- If the Miller Hill Mall expands, OPUS development occurs, or both happen, it is projected that:
  - -Miller Hill Mall would generate an additional 8,000 trips.
  - -The OPUS development would generate approximately 16,000 trips.
  - -Traffic at the Hwy 53/Maple Grove Road intersection would worsen.
  - -Traffic at the Joshua Avenue/Trinity Road/Central Entrance intersection would worsen.
  - -Trinity Road between Anderson Road and Central Entrance would need improvement.
  - -The Mall Drive/Decker Road intersection would have a failing Level of Service (LOS).
  - -The Stone Ridge Mall/OPUS/Central Entrance intersection would have a failing LOS.

RECOMMENDATIONS

RECOMMENDATIONS

The recommendations are broken into three categories:

A) ***Conditions of Development***

Necessary improvements to the roadway network if the Miller Hill Mall sites expands, if the proposed OPUS site is developed or if both should occur. Implementation of these recommendations will be necessary to maintain existing levels of service within the corridor.

B) ***Solutions to Existing Problems***

Solutions to existing problems in the corridor with an implementation period up to five years. These recommendations are necessary at the present time to alleviate current geometric, intersection and traffic flow problems. The recommendations in this section are not tied specifically to commercial development proposals.

C) ***Long Term Improvements***

Possible solutions to long term traffic flow dilemmas facing the Miller Hill corridor. Transportation recommendations are provided to accommodate projected levels of growth, land use, and population within the metropolitan area. A number of these are conceptual in nature, and involve building new roadways at strategic points in order to maintain efficient traffic flow in the corridor. Many of the conceptual recommendations will require further analysis and more public involvement.

Costs identified for each recommendation do not reflect potential environmental impacts and mitigation efforts.

Recommendations are based on an analysis of existing and forecasted Level of Service (LOS) in the corridor. LOS refers to the delay time for a driver at a particular intersection. It is a complex measurement that is dependent on such variables as capacity of roadway network, traffic light progression along a corridor, and traffic light cycle length. In certain instances, LOS is noted as "Undetermined", meaning that a failing intersection is under description with delay times greater than 60 seconds. (A discussion of the various levels of service is provided on the following page.)

Level of service was also analyzed for each of the intersections in each recommendation category. The TRANPLAN modeling program was used to predict traffic patterns. The LOS for each intersection was then projected for the year 2015, based on the projected TRANPLAN A.D.T.'s. These figures give us an idea of the traffic situation with a full-buildout scenario in the Miller Hill Corridor.

There are recommendations for certain intersections that belong to more than one of the three sections described above. This is explained thoroughly within each recommendation. The **"Solutions to Existing Problems"** section should take into account traffic needs of the future in both design and construction. Such action will provide lower expenses in the future when greater capital investments are required.

An intersection or roadway schematic follows each recommendation. The graphic includes a current look and proposed setup for the intersection and/or road. In some cases, a conceptual map has been developed that indicates a possible addition to the roadway network. It needs to be stressed that these conceptual alignments have not been analyzed for any environmental impacts. There are simply put forward as a means to aid the traffic problems that exist or are projected to exist in the future.

Levels of Service

Level of Service A: Free flow with individual users virtually unaffected by the presence of others in the traffic stream.

Delay: 0 - 5.0 Seconds

Level of Service B: Stable flow with a high degree of freedom to select speed and operating conditions, but with some influence from other users.

Delay: 5.1 - 15.0 Seconds

Level of Service C: Restricted flow which remains stable, but with significant interactions with others in the traffic stream. The general level of comfort and convenience declines noticeably at this level.

Delay: 15.1 - 25.0 Seconds

Level of Service D: High density flow in which speed and freedom to maneuver are severely restricted and comfort and convenience have declined even though flow has remained stable.

Delay: 25.1 -- 40.0 Seconds

Level of Service E: Unstable flow at or near capacity levels with poor levels of comfort and convenience.

Delay: 40.1 - 60.0 Seconds

Level of Service F: Forced flow in which the amount of traffic approaching a point exceeds the amount that can be served, and queues form, characterized by stop-and-go waves, poor travel times, low comfort and convenience, and increased accident exposure.

Delay: 60.1+ Seconds

*Definitions for levels of service are drawn from: Institute of Transportation Engineers, *Transportation Planning Handbook*, (Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1992.)

****NOTE: Many of the mid and long term recommendations are conceptual in nature. Implementation of these recommendations would require more detailed engineering and public involvement.** **(See next page.)**

SUMMARY OF RECOMMENDATIONS TO MILLER HILL CORRIDOR

	Recommendation	Page #	Cost	Conditional Improvement w/ Simon Expansion	Conditional Improvement w/ OPUS Development	Conditional Improvement w/ Both Developments	Short Term Improvement to Existing Problem	Long Term Improvement to Existing Problem
	Trinity Rd Improvements							
	Phase A	45	$400,000	X	X	X		
	Phase B	45	$100,000	X	X	X		
	Phase C	45	$20,000	X	X	X		
	Improve Trinity Rd/ Joshua Ave/ Central Entrance	49	$500,000	X	X	X	X	
	Improve Decker Rd/ Mall Drive Intersection	53	$200,000	X		X		
	Improve Stoneridge/ OPUS Site Intersection on Central Entrance	55	$50,000		X	X		
	Improve Miller Trunk / Maple Grove Intersection (Immediate)	59	$250,000	X	X	X	X	
	TOTAL COST			**$1,470,000**	**$1,320,000**	**$1,520,000**		
	6-Corners Interim Intersection Improvements	69	$200,000				X	
**	Improve Cottonwood Ave/ Miller Trunk Highway Intersection	71	$25,000				X	
**	Improve Maple Grove Rd/ Miller Trunk Highway/ Sundby Rd Intersection (Mid-Range)	77	$1,000,000				X	
	Improve Burning Tree Rd/ Maple Grove Rd Intersection	81	$250,000				X	
	Align K-Mart/Target Access Drives	83	$10,000				X	
	Limit Burning Tree Haines Rd Access	85	$0				X	
	Piedmont Ave Re-Paving Project	86	$2,000,000				X	
	TOTAL COST						**$3,485,000**	
	Improve Arlington Ave/ Central Entrance Intersection	91	$100,000					X
	Improve Arlington Ave/ Trinity Road Intersection	95	$75,000					X
	Improve Trinity Road/ Anderson Road Intersection	97	$300,000					X
**	Add Southbound Lane on Trinity Road	99	$5,000,000					X
	Implement Piedmont Ave/ Trinity Road/ T.H. 53 Permanent Improvements	100	$12,000,000					X
**	Construct North/South Connector Route from Arrowhead Rd to Miller Trunk Highway	101-111	$1,000,000 - $3,000,000					X
**	Decker Rd to Trinity Rd Connector	113	$1,250,000					X
**	Decker to Burning Tree Connector	113	$500,000					X
	TOTAL COST							**$20,725,000**

SUMMARY OF RECOMMENDATIONS TO MILLER HILL CORRIDOR

Recommendation	Page #	Cost	Conditional Improvement w/ Simon Expansion	Conditional Improvement w/ OPUS Development	Conditional Improvement w/ Both Developments	Short Term Improvement to Existing Problem	Long Term Improvement to Existing Problem
TRANSIT RECOMMENDATIONS							
Expand MAC Route to OPUS	123			X			
Add MAC Service to other commercial sites	123					X	X
Add direct regular route service from other parts of city	123					X	X
Implement transit hub in corridor	123					X	X
Implement Park & Ride Lots	124					X	X
Implement TDM Strategies	124					X	X
Implement transit site design issues	124		X	X	X	X	X
BICYCLE/PEDESTRIAN RECOMMENDATIONS							
Mall Drive/Maple Grove area							
Improve/Construct sidewalk between Haines and Hwy 53 along Maple Grove Rd	128	$43,500				X	X
Construct sidewalk on N. side of Maple Grove between Haines and Mall	128	$36,000				X	X
Construct sidewalk on south and west side of Mall from Haines to Decler	128	$66,000				X	X
Construct sidewalk on E side of Haines between Mall Dr and Maple Grove Rd	128	$28,500				X	X
Construct sidewalk on W side of Burning Tree between Mall and Mountain Shadow	128	$34,000				X	X
Construct sidewalk on S side of Mountain Shadow between Burning Tree and Mall	128	$25,500				X	X
Create sidewalk on W side of Sundby from Hwy 53 to Haines Road	128	$84,000				X	X
Create sidewalk on Maple Grove from Hwy 53 to Swan Lake	128	$99,000				X	X
Create sidewalk on Swan Lake from Arrowhead to Basswood	128	$115,500				X	X
Add crosswalks at Maple Grove/Haines, Maple Grove/Burning Tree, Maple Grove/ Mall, and Maple Grove/Hwy 53	129					X	X
Miller Hill Area							
Create sidewalk/bikeway on S side of Hwy 53 between Maple Grove and Trinity	129	$77,000				X	X
Create sidewalk on Cottonwood between Hwy 53 and Maple Grove	129	$19,500				X	X
Create sidewalk on N side of 53 between Cottonwood and Joshua	129	$13,500				X	X
Create sidewalk on W side of Joshua between Hwy 53 and proposed bike path	129	$6,000				X	X
Add crosswalks at Hwy 53/Trinity, Decker/Mall, Trinity/Miller Hill/ OPUS Entrance (Sidewalk to OPUS)	129	Sidewalk Only= $10,500	X	X	X	X	X
Central Entrance Area							
Create bike/sidewalk path through Stoneridge Plaza from Joshua to Sundby	130	$85,000				X	X
Create bike/pedestrian path from Hwy 53/ Central Entrance through or around OPUS site	130	$80,000		X		X	X
Create sidewalk on S side of Central Entrance from Anderson to Teak	130	$7,500				X	X
Add crosswalks at OPUS/Stoneridge main intersection on Central Entrance (S/W to OP	130	S/W = $6,000		X		X	X
Hermantown							
Create sidewalk from Haines to Wal-Mart	130					X	X
Extend sidewalk on Maple Grove from Haine to future sites	130					X	X
TRUCK ROUTING RECOMMENDATIONS							
** Maple Grove Road and Midway Road proposed truck bypass	133					X	X

SECTION A:

CONDITIONS OF DEVELOPMENT

Solutions to handle additional traffic generated by Miller Hill Mall Expansion, OPUS Development, or Both

RECOMMENDATION: ***Improving Trinity Road (Hwy 53) between the current most southernly Miller Mall entrance and the intersection of Trinity Road/Central Entrance (Hwy 194)/Joshua Avenue.***

DESCRIPTION:

A) Improve capacity problems along Trinity Road by expanding to four lanes between the existing Miller Hill Mall south entrance (proposed signalized intersection, see next paragraph) to the intersection of Trinity Road/Central Entrance/Joshua Avenue. This recommendation applies if either development is approved.

B) Add traffic signal with both a northbound and southbound left turn lane at the current most southernly entrance into the Miller Hill Mall off Trinity Road. This intersection would be shared between the Miller Hill Mall and the OPUS development (the only recommended entrance point off of Trinity Road into the OPUS development). This recommendation applies if either development is approved. However, the southbound left turn lane is only needed if the OPUS development occurs. Even if the OPUS development does not occur, it may be in the best interest to still construct a southbound left turn lane at the intersection to account for any future development of the site (similar to proposed OPUS/Stone Ridge Mall intersection off Central Entrance).

C) Maintain smooth traffic flow along Trinity Road by allowing for only two southbound (Miller Hill Mall) and one northbound (OPUS) access/entrance points along Trinity Road. This recommendation applies to each development scenario.

REASON NECESSARY: Necessary to accommodate additional traffic if either development (Miller Hill Mall expansion and/or OPUS development) occurs. See above for specifics.

CURRENT STATUS:

A) *Trinity Road between the Central Entrance intersection and the current south Miller Hill Mall entrance*: This stretch along Trinity Road currently has only two lanes from the current most southern Miller Hill Mall entrance (off Trinity Road) to the intersection.

B) *Current most southern Miller Hill Mall entrance off Trinity* Road: Trinity Road/Miller Hill Mall entrance currently operating at a LOS-A on Trinity Road, and a LOS-E at the Miller Hill Mall entrance leg. Average delay 2.7 seconds.

C) *Trinity Road access/entrance points*: Currently there are only two access/entrance points southbound onto Trinity Road into the Miller Hill Mall.

NEED:

A) *Expanding to four lanes between intersection at Central Entrance to current south Miller Hill Mall entrance on Trinity Road*: With the additional traffic generated from either the OPUS development or the Miller Hill Mall expansion, additional capacity would be needed to accommodate traffic levels, provide for smooth traffic flow, and maintain safe traffic operating conditions.

B) *Adding Traffic Signal at current south Miller Hill Mall entrance on Trinity Road*: Traffic signal warrants are met with the additional traffic generated from either the OPUS development or the Miller Hill Mall expansion.

C) *Allow two southbound and one northbound access/entrance points along Trinity Road*: To avoid operational problems and maintain proper spacing standards, no more than two southbound access points (with one being a right in and right out only), and one northbound access point should be allowed onto Trinity Road.

Two southbound access points should be able to accommodate all the proposed traffic utilizing the entrances to the Miller Hill Mall. The preferred access points would be the two most southernly entrances proposed by the Simion Development Company. This would require closing the current entrance nearest to the Perkins Restaurant.

Since most of the traffic accessing the proposed OPUS site is projected to utilize TH 194/Central Entrance, and because the development will have an interconnecting roadway system (between outlots and main development), one northbound access off of Trinity Road is sufficient.

PROJECTED STATUS:

With Miller Hill Mall Expansion - LOS - A/B on Trinity Road and F at Miller Mall Entrance. ***Average Intersection LOS - C.*** Delay - >60.0 seconds on E/W leg, <5.0 seconds on N/S leg.

With OPUS Development - LOS - A/B on Trinity Road and F at OPUS entrance. ***Average Intersection LOS - C.*** Delay - >60.0 seconds on E/W leg, <5.0 seconds on N/S leg.

With Miller Hill Mall & OPUS Developments - LOS - A/B on Trinity Road and F at Miller Hill Mall and OPUS entrances. ***Average Intersection LOS - C.*** Delay - >60.0 seconds on E/W leg, <5.0 seconds on N/S leg.

2015 Model (average growth accounted for) - LOS - B on Trinity Road and F at Miller Hill Mall and OPUS entrances. ***Average Intersection LOS - D.*** Delay - >60.0 seconds on E/W leg, >5.0 and <15.0 seconds on N/S leg.

ESTIMATED COST:

A) Expanding to four lanes between intersection at Central Entrance to current south Miller Hill Mall entrance on Trinity Road: $400,000

B) Adding Traffic Signal at current south Miller Hill Mall entrance on Trinity Road: $100,000

C) Allow two southbound and one northbound access/entrance points along Trinity Road: $20,000 (channelization work)

AIR QUALITY/ ENVIRONMENTAL: Hot Spot Analysis needed. Wet Land Mitigation unknown.

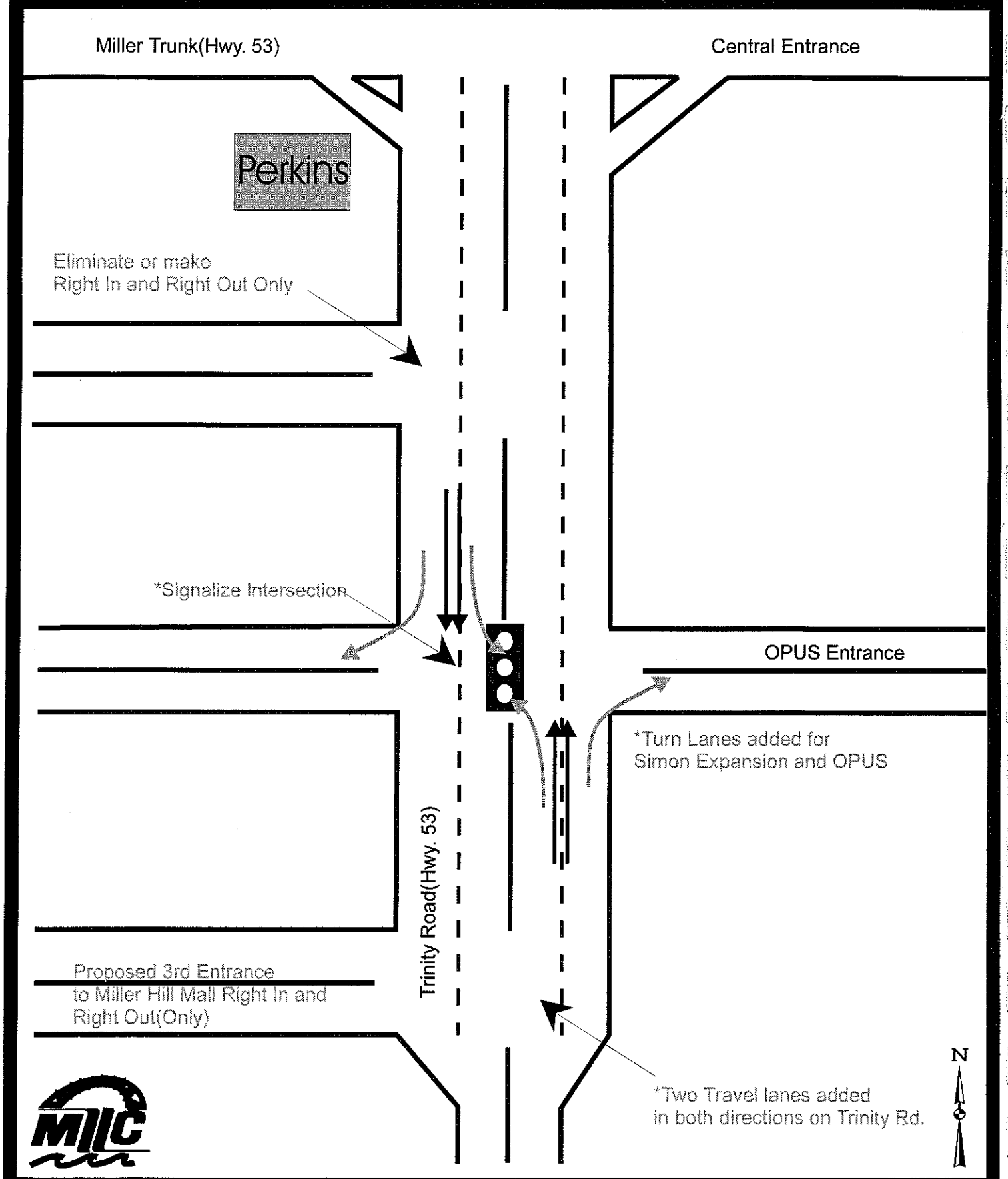
TRAFFIC IMPACTS OF RECOMMENDATION: With Miller Hill Mall Expansion - Average Intersection LOS improved to - B. Average Delay - 9.1 seconds.

With OPUS Development - Average Intersection LOS is maintained at - C. Average Delay - 20.3 seconds.

With Miller Hill Mall & OPUS Developments - Average Intersection LOS is maintained at - C. Average Delay - 21.2 seconds.

2015 Model (average growth accounted for) - Average Intersection LOS is improved to - C. Average Delay - 20.5 seconds.

Trinity Road-Central Ent. to South Miller Mall Exit/Ent.



RECOMMENDATION: ***Improve the Trinity Road/Central Entrance/Joshua Avenue intersection.***

DESCRIPTION: Upgrade and improve signals (interconnect and coordination), rebuild approach, align lanes of Trinity Road and Joshua Avenue, provide for channelization at the intersection, add westbound double left off of Trinity Road onto the Miller Trunk Highway, add southbound double left off of Central Entrance onto Trinity. Also, to improve a safety concern, tighten radius for Trunk Highway 53 southbound right turn lane onto Trinity Road.

REASON NECESSARY: Overall intersection improvement necessary regardless of new development. Double southbound left off of Central Entrance onto Trinity especially needed if Miller Mall expands as proposed. A westbound double left off Trinity Road onto Highway 53 will be needed to accommodate traffic exiting the proposed OPUS site if developed.

CURRENT STATUS: Intersection LOS - C, Delay =18.4 seconds

This is a major intersection of two trunk highways: T.H. 53 (Trinity Road) and T.H. 194 (Central Entrance). Joshua Avenue on the north leg of the intersection is a dead-end roadway providing access to commercial properties (Stone Ridge Mall, Gander Mountain, Hardee's, others...) on the north side of the highway. The intersection is currently signalized with dedicated single left-turn lanes on the east, west, and south legs of the intersection. There are also channelized right turn lanes off of the south and west legs of the intersection.

NEED: The intersection is impacted by both of the proposed developments. The north and south legs of the intersection do not currently align. The intersection of the north frontage road and Joshua Avenue is located too close to the main intersection with the highway, causing a lack of space for vehicle storage. Vehicles traveling from eastbound T.H. 53/194 to southbound Trinity Road experience merging problems due to unsafe speeds. A southbound double left off Central Entrance/194 onto Trinity Road is needed to accommodate the traffic heading toward the south and west ends of the Miller Hill Mall. This will be especially true if another major anchor such as Daytons were to locate in that area. Likewise, additional traffic exiting the proposed OPUS site causes the northbound intersection approach to fall to LOS F. A double left off Trinity Road onto Highway 53 is recommended.

PROJECTED STATUS WITHOUT IMPROVEMENTS:

With Miller Hill Mall Expansion - LOS- F, Delay > 60.0 seconds

With OPUS Development - LOS- F, Delay > 60.0 seconds

With Miller Hill Mall & OPUS Developments - LOS - F, Delay > 60.0 seconds

2015 Model (average growth accounted for) -LOS - F, Delay > 60.0 seconds

ESTIMATED COST: $500,000

AIR QUALITY/ ENVIRONMENTAL: Hot Spot Analysis needed. Wet Land mitigation unknown.

TRAFFIC IMPACTS OF RECOMMENDATION:

With Miller Hill Mall Expansion - LOS is improved to - C, Delay = 19.0 seconds

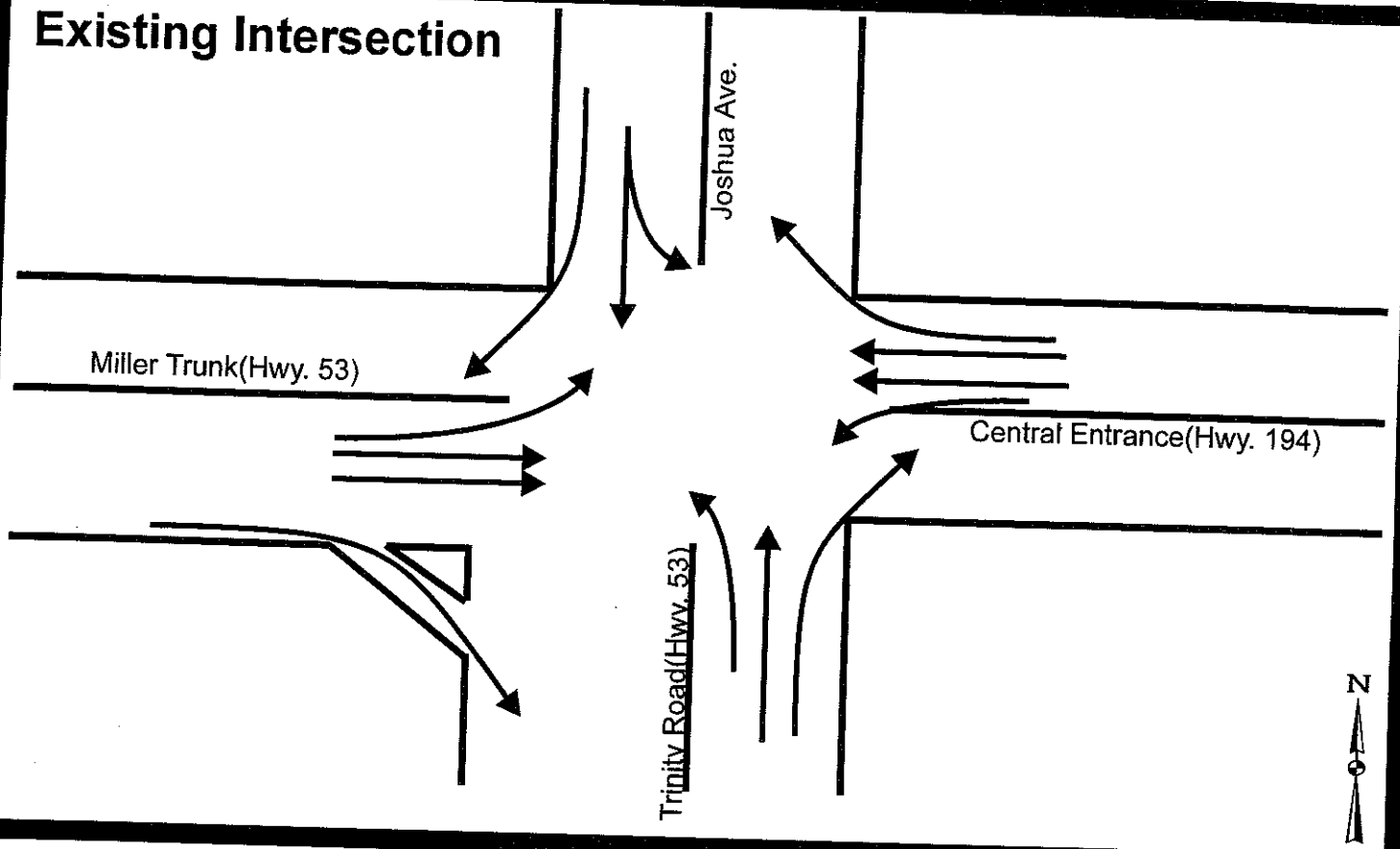
With OPUS Development - LOS is improved to - C, Delay = 19.0 seconds

With Miller Hill Mall & OPUS Developments - LOS is improved to - C, Delay = 19.4 seconds

2015 Model (average growth accounted for) -LOS is improved to -C, Delay = 20.5 seconds

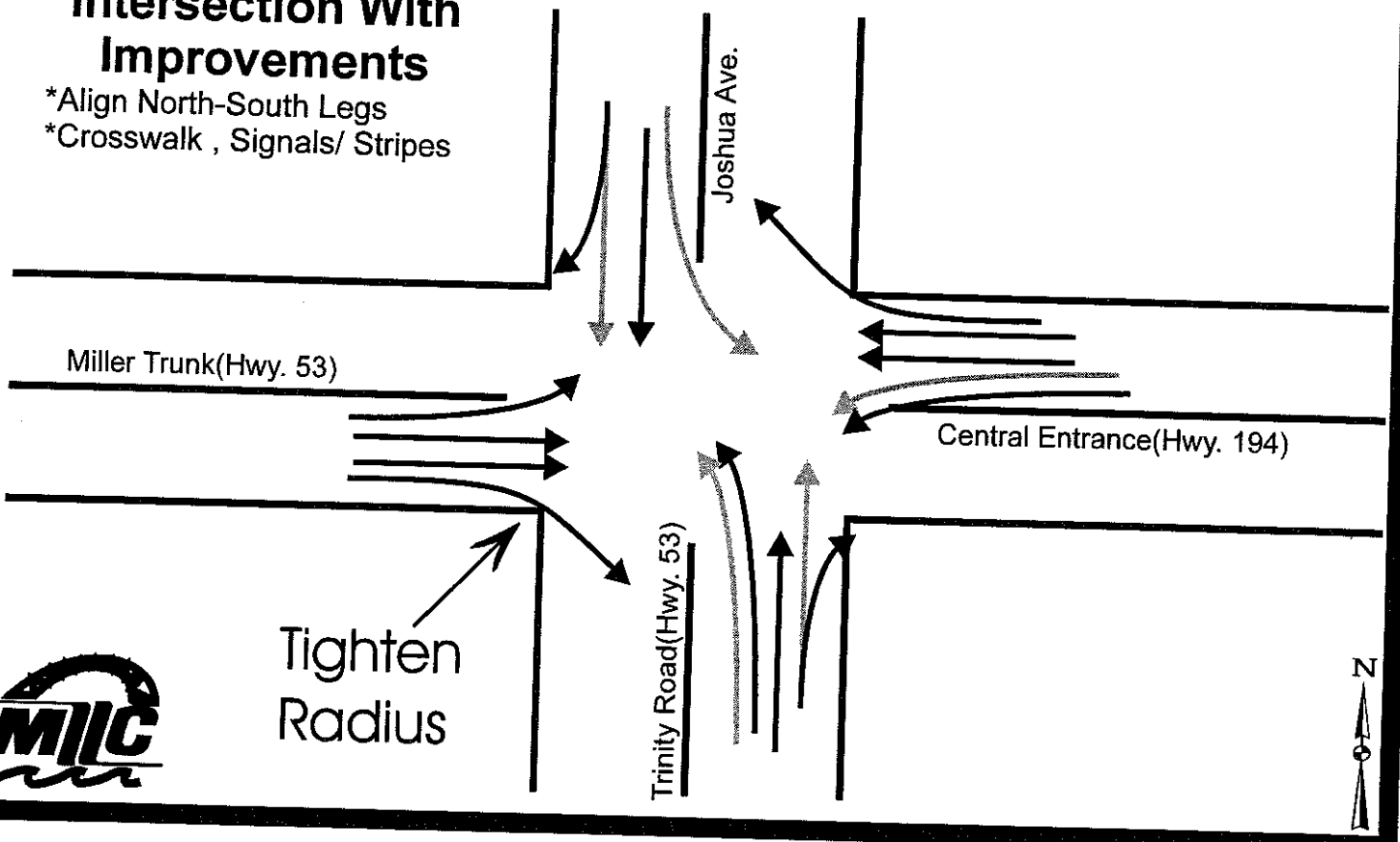
Miller Trunk Highway/ Trinity (TH 53)/ Joshua Ave.

Existing Intersection



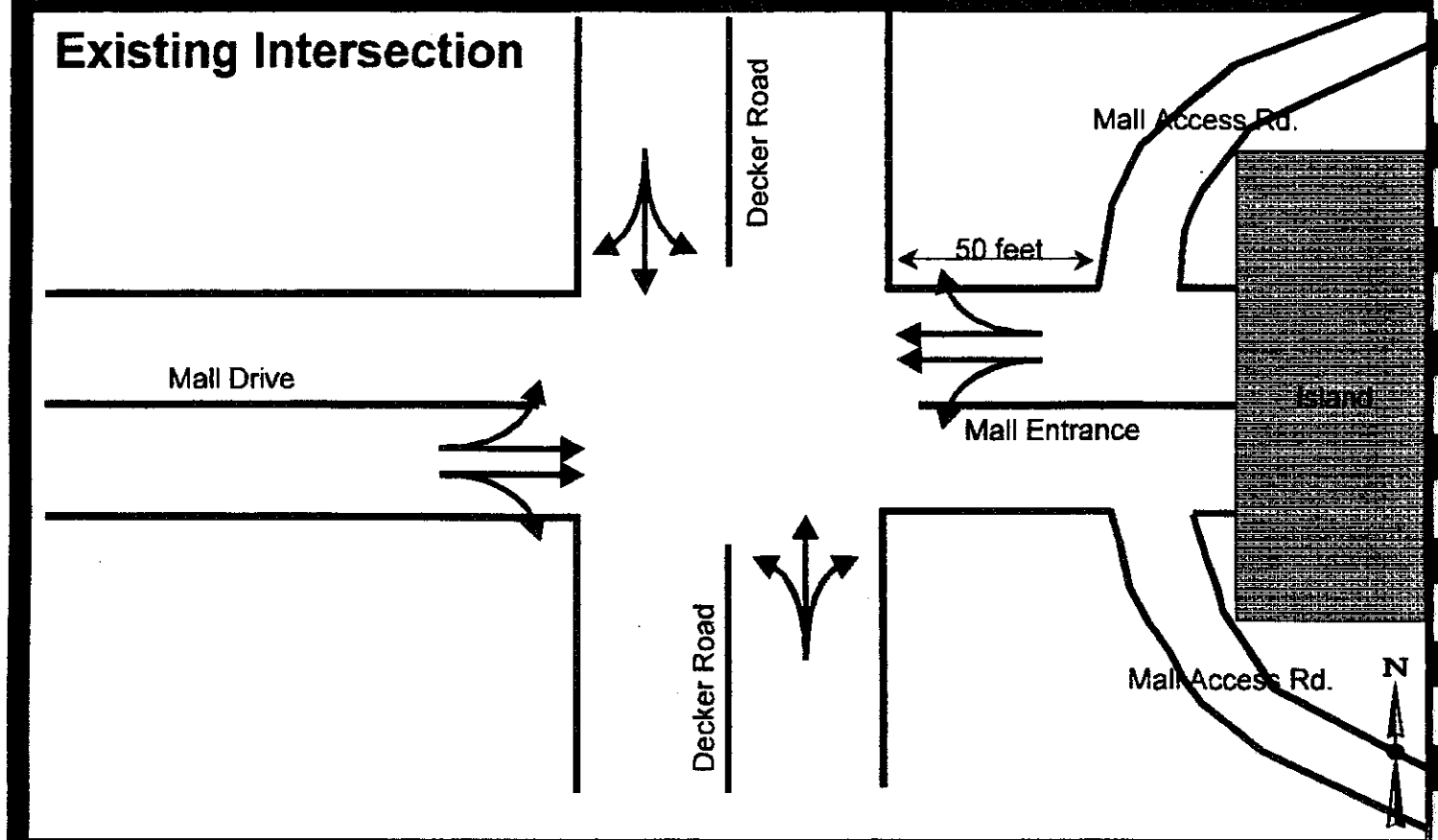
Intersection With Improvements

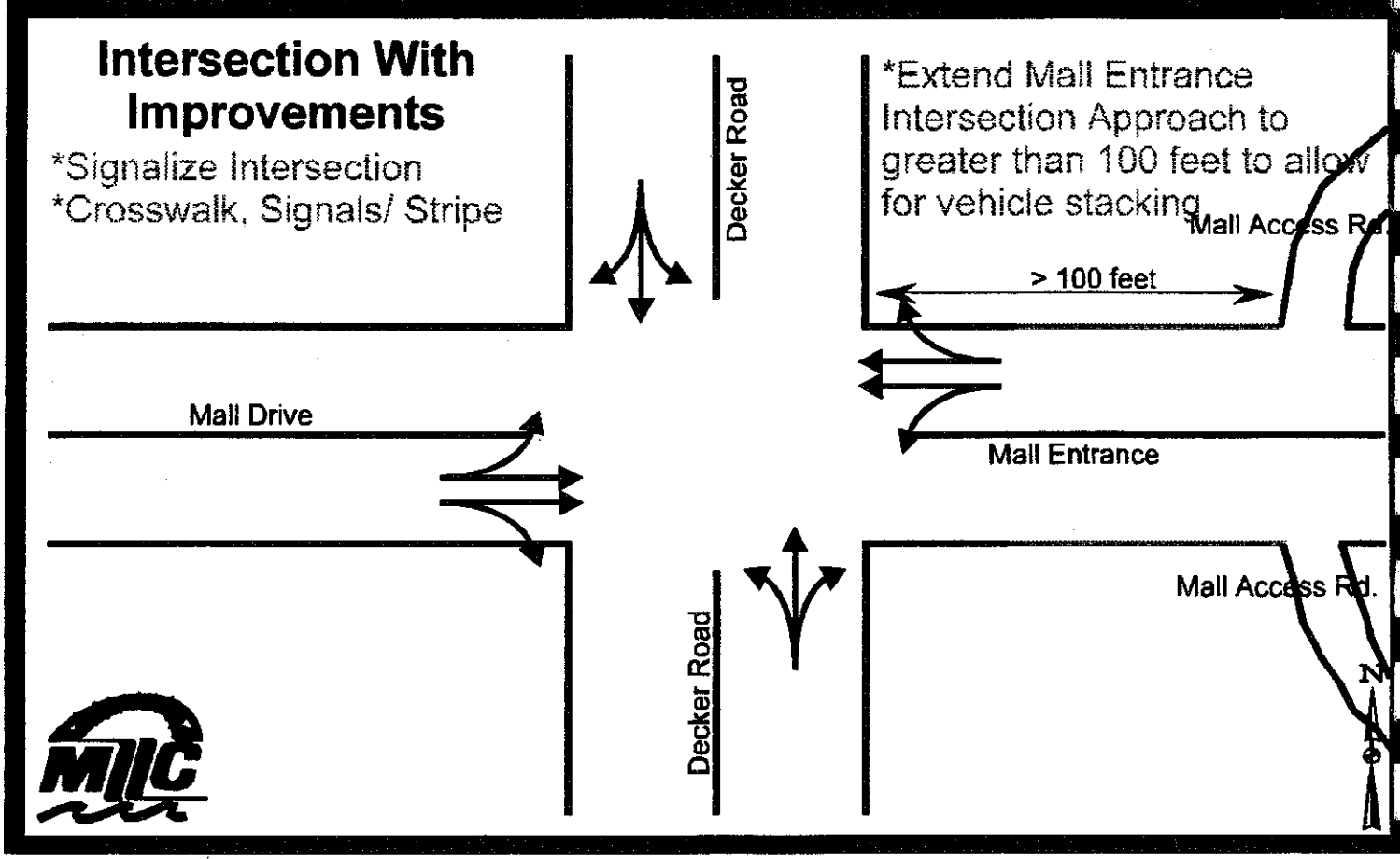
*Align North-South Legs
*Crosswalk , Signals/ Stripes



RECOMMENDATION:	***Improve the Decker Road/Mall Drive intersection.***
DESCRIPTION:	Improve the Decker Road/Mall Drive intersection by adding signals, improving the intersection geometrics, and extending the throat length of the approach leaving the Miller Hill Mall.
REASON NECESSARY:	Need currently exists. However, especially needed if Miller Hill Mall expands.
CURRENT STATUS:	Current intersection LOS - A/B, Delay = 8.2 seconds
NEED:	Currently the most heavily used Miller Hill Mall entrance. The proposed Miller Hill Mall expansion would increase the traffic at the intersection over what it can effectively and safely accommodate.
PROJECTED STATUS WITHOUT IMPROVEMENTS:	With Miller Hill Mall Expansion - LOS- F, Delay > 60.0 seconds With OPUS Development - LOS- A/B, Delay 6.3 seconds With Miller Hill Mall & OPUS Developments - LOS - F, Delay > 60.0 seconds 2015 Model (average growth accounted for) - LOS - F, Delay > 60.0 seconds
ESTIMATED COST:	$200,000
AIR QUALITY/ ENVIRONMENTAL:	Hot Spot Analysis needed. Potential Wet Land Mitigation needed.
TRAFFIC IMPACTS OF RECOMMENDATION:	1996 With Miller Hill Mall Expansion - LOS is improved to B, Delay = 10.2 seconds 1996 With OPUS Development - LOS is maintained at B, Delay = 9.6 seconds 1996 With Miller Hill Mall & OPUS Developments -LOS is improved to B, Delay = 10.2 seconds 2015 Model (average growth accounted for) - LOS is improved to C, Delay = 16.3 seconds

Decker Road/ Mall Drive





RECOMMENDATION: ***Improve Stone Ridge Mall/OPUS Site/Hwy 194 intersection.***

DESCRIPTION: Improve the intersection geometrics located on the Stone Ridge Mall site to provide for left, right, and through movements exiting the site. Also extend the throat length of the approach onto Central Entrance.

REASON NECESSARY: Proposed OPUS development.

CURRENT STATUS: Current intersection LOS - C, Delay = 17.6 seconds

Signalized intersection with dedicated left into Stone Ridge from eastbound Central Entrance. Stone Ridge Mall has only one lane for exiting vehicles. Close to the intersection there is some space provided for separate left and right turn movements, but stacking problems still commonly occur.

NEED: The OPUS project will have an impact on traffic operations at the current Stone Ridge Mall intersection. Existing geometrics on the Stone Ridge Mall site will not allow for dedicated left, right and through movements to exit causing excessive delays at this intersection.

PROJECTED STATUS WITHOUT IMPROVEMENTS: With Miller Hill Mall Expansion - LOS- C, Delay = 18.2 seconds

With OPUS Development - LOS- F, Delay > 60.0 seconds

With Miller Hill Mall & OPUS Developments - LOS - F, Delay > 60.0 seconds

2015 Model (average growth accounted for) - LOS - F, Delay > 60.0 seconds

ESTIMATED COST: $50,000

AIR QUALITY/ ENVIRONMENTAL: Hot Spot Analysis needed. Wet Land Mitigation unknown.

TRAFFIC IMPACTS OF RECOMMENDATION:

1996 With Miller Hill Mall Expansion - LOS is maintained at C, Delay = 18.2 seconds

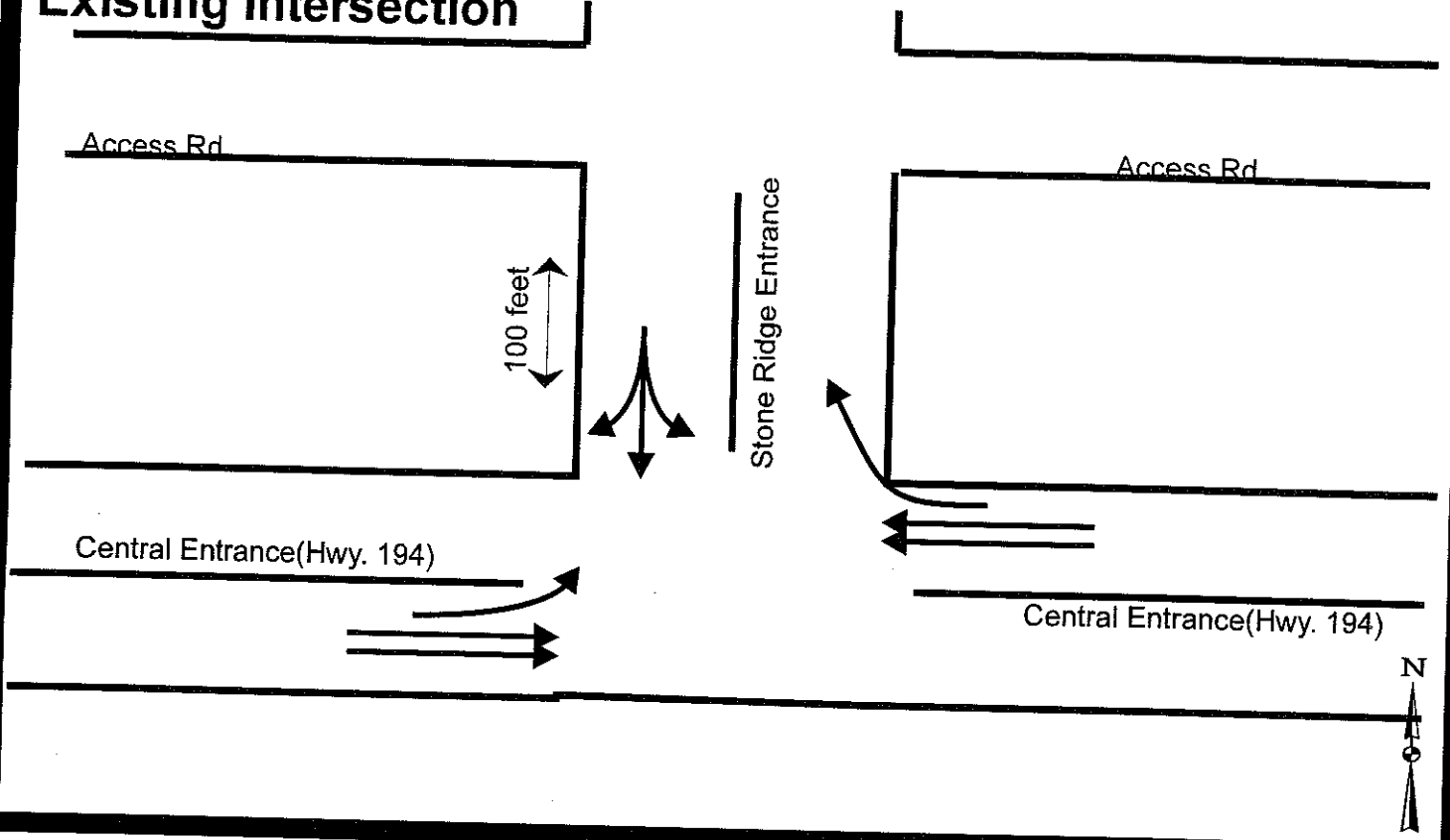
1996 With OPUS Development - LOS is improved to E, Delay = 41.7 seconds

1996 With Miller Hill Mall & OPUS Developments - LOS is improved to E, Delay = 44.2 seconds

2015 Model (average growth accounted for) - LOS is improved to E, Delay = 42.7 seconds

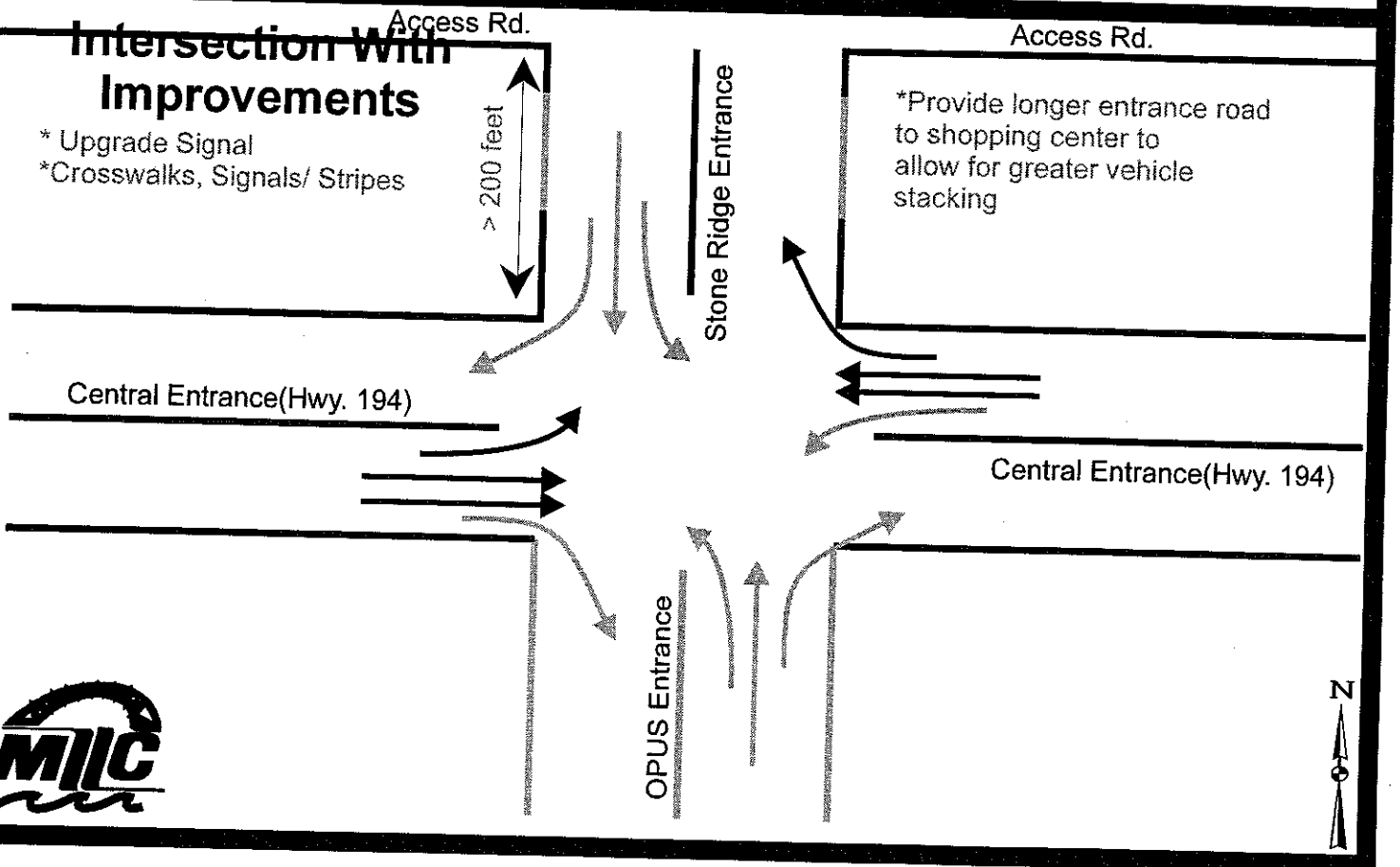
Central Entrance(Hwy 194)/ Stone Ridge Entrance

Existing Intersection



Intersection With Improvements

* Upgrade Signal
*Crosswalks, Signals/ Stripes



RECOMMENDATION: ***Improve the Hwy 53/Maple Grove Intersection-Phase I***

DESCRIPTION: Add signal detectors on Maple Grove Road; change phasing of current signals; add westbound double left off Highway 53, and widen intersection approaches for through traffic.

REASON NECESSARY: Needed regardless if developments occur. LOS changed from C to C/D with addition of Kohl's. Need for this improvement is magnified if either development occurs.

CURRENT STATUS: Intersection LOS - C/D, Delay = 22.5 seconds.

NEED: As stated above, improvements are needed regardless if either or both developments occur. However, this intersection will be impacted by the two proposed developments. There is currently a lack of adequate storage on the north leg of the intersection for southbound traffic from both Maple Grove Road and Sundby Road. Vehicles queuing up at the north leg of the intersection often block through traffic along Maple Grove Road and Sundby Road.

PROJECTED STATUS WITHOUT IMPROVEMENTS:

With Miller Hill Mall Expansion - LOS-D, Delay = 25.1 seconds

With OPUS Development - LOS-D, Delay = 25.2 seconds

With Miller Hill Mall & OPUS Developments - LOS-D, Delay = 26.5 seconds

2015 Model (average growth accounted for) - LOS-D, Delay =30.7 seconds

ESTIMATED COST: $250,000

AIR QUALITY/ ENVIRONMENTAL: Hot Spot Analysis needed. Wet Land Mitigation probable.

TRAFFIC IMPACTS OF RECOMMENDATION:

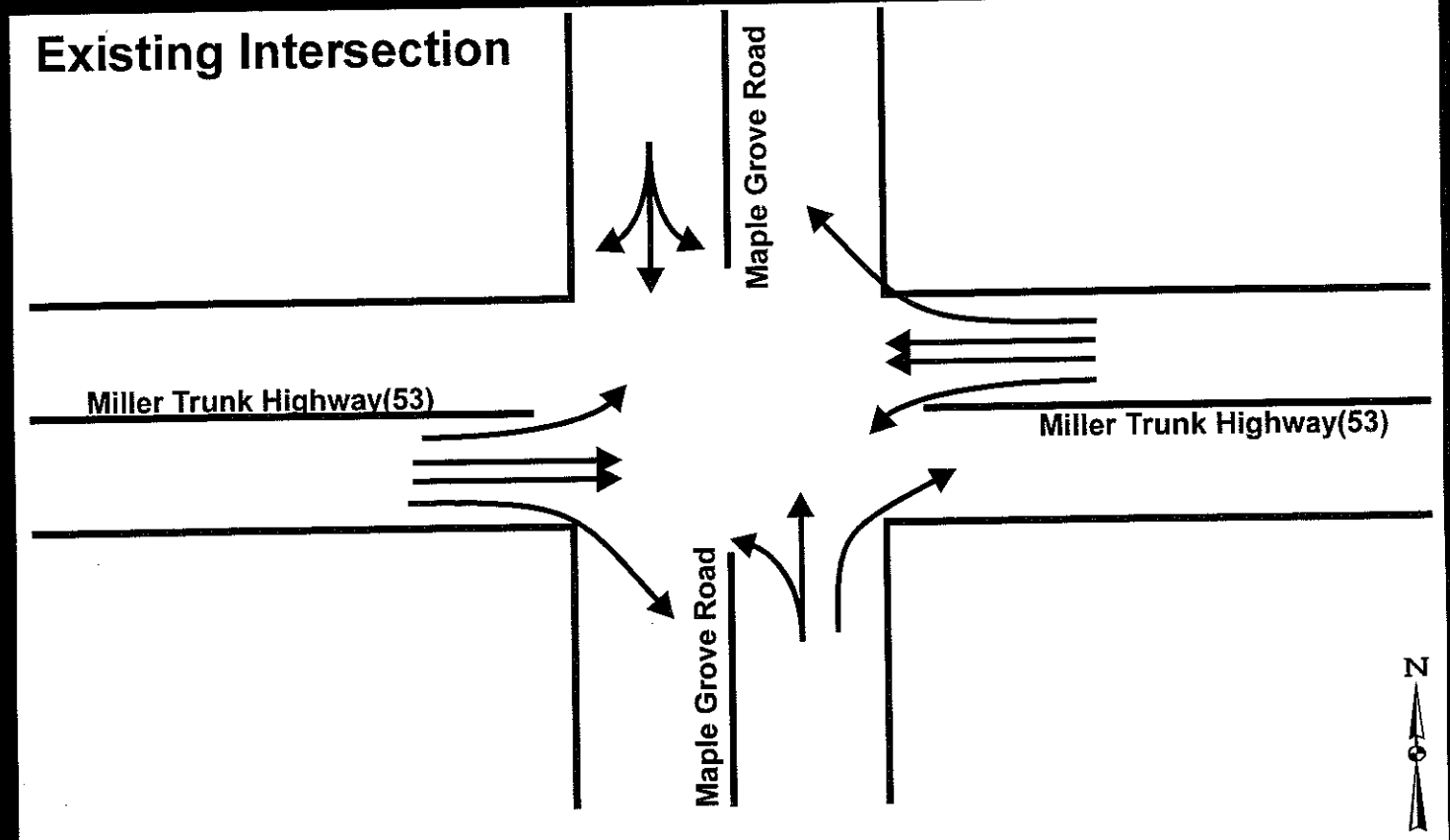
1996 With Miller Hill Mall Expansion - LOS is improved to C, Delay = 23.5 seconds

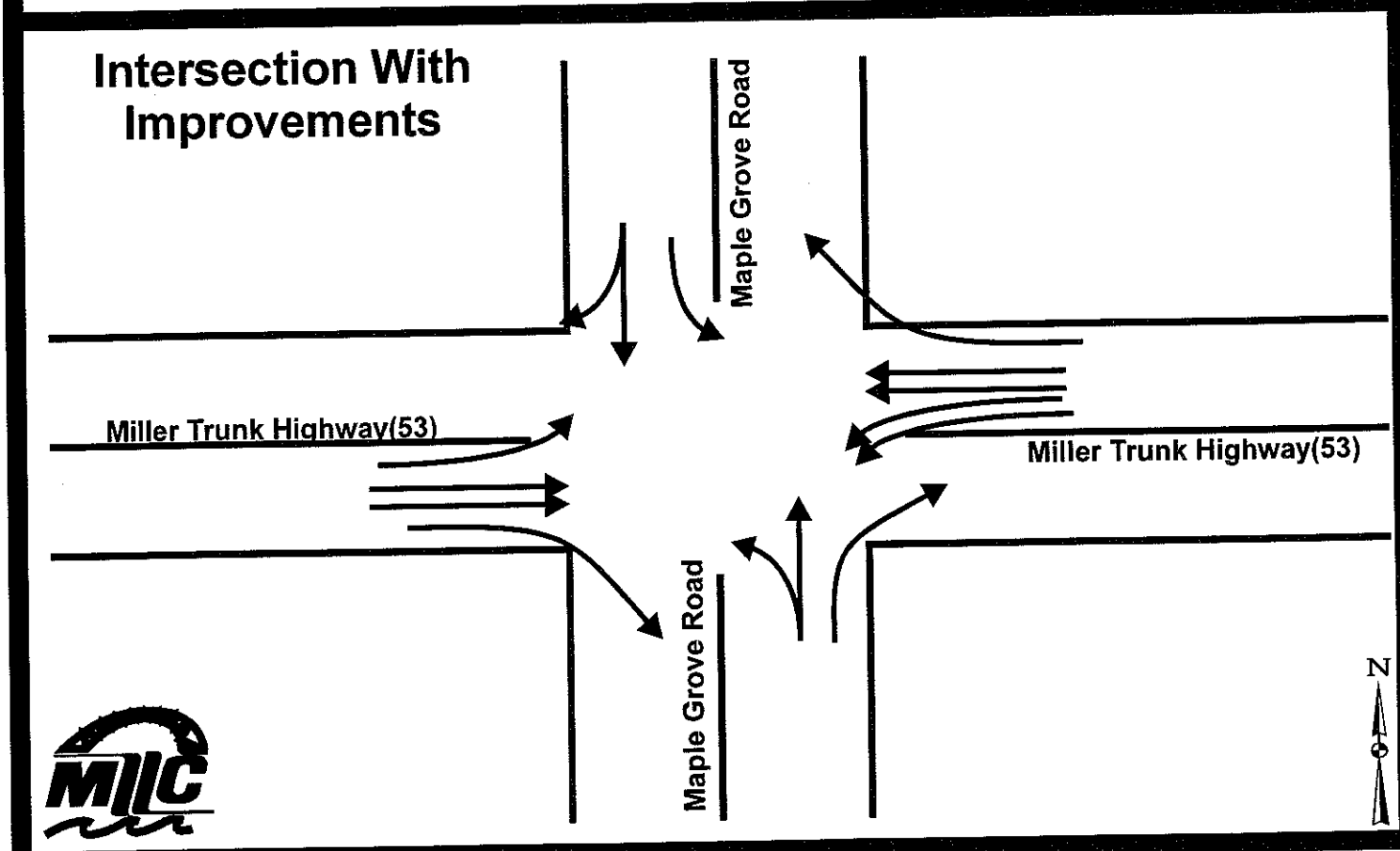
1996 With OPUS Development - LOS is improved to C, Delay = 23.9 seconds

1996 With Miller Hill Mall & OPUS Developments - LOS is improved to C, Delay = 23.6 seconds

2015 Model (average growth accounted for) - LOS is improved to C, Delay = 24.6 seconds

Highway 53/ Maple Grove Road





P.M. Peak Hour Projected Traffic Counts

Current Conditions

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	2530	9.5	C	2630	16.6	D	420	32	E	900	51.6	C	6480	18.4
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	N/A	0	N/A	E	330	18.4	A	1060	0.9	A	1150	0.9	A	2540	2.7
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	B	840	4.7	B	750	7.2	A	80	1.5	C	360	19.5	B	2030	8.2
Improve Stone Ridge Mall/OPUS Site Intersection	C	2630	17.8	B	2550	13	D	420	34.9	N/A	0	N/A	C	5600	17.6
Improve Miller Trunk/Maple Grove Road Intersection	B	420	14.9	D	990	32.2	C	1790	21.3	D	2480	26.2	C	5680	22.5

P.M. Peak Hour Projected Traffic Counts
Current Situation w/Miller Expansion

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	2740	11.7	C	2870	18.5	D	440	28.8	F	970	>60	**F**	**7020**	**>60**
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	N/A	0	N/A	D	460	28.2	A	1120	1.1	A	1240	1.1	**B**	**2820**	**5.0**
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	F	1170	>60	F	980	>60	F	100	>60	F	440	>60	**F**	**2690**	**>60**
Improve Stone Ridge Mall/OPUS Site Intersection	C	2790	18.6	B	2700	13.3	D	740	35.7	N/A	0	N/A	**C**	**6230**	**18.2**
Improve Miller Trunk/Maple Grove Road Intersection	C	490	16.9	D	990	32.8	D	1840	38.2	D	2540	27.6	**D**	**5860**	**25.1**

P.M. Peak Hour Projected Traffic Counts
Miller Expansion w/ Recommendations

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	2740	13.9	B	2739	2870	D	440	27.7	E	970	34.4	**C**	**6889**	**19.0**
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	N/A	0	N/A	D	30.9	A	A	1120	4	A	1240	4.6	**B**	**2390.9**	**9.1**
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	B	1170	7.5	B	980	6.1	C	100	23.7	D	440	27.8	**B**	**2690**	**10.2**
Improve Stone Ridge Mall/OPUS Site Intersection	C	2790	18.6	B	2700	13.3	D	740	35.7	N/A	0	N/A	**C**	**6230**	**18.2**
Improve Miller Trunk/Maple Grove Road Intersection	C	490	22.3	D	990	25.8	D	1840	25.8	C	2540	21.9	**C**	**5860**	**23.5**

P.M. Peak Hour Projected Traffic Counts
Current Situation w/OPUS Development

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	2940	11.8	C	2970	22.9	D	480	29.5	F	1200	>60	F	7590	>60
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	F	740	>60	F	440	>60	A	1340	0.6	A	1560	1.1	F	4080	>60
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	A	850	1.5	C	760	13.5	B	80	6	A	370	4	B	2060	6.3
Improve Stone Ridge Mall/OPUS Site Intersection	C	3280	21.8	C	2990	21.3	F	800	>60	F	870	>60	F	7940	>60
Improve Miller Trunk/Maple Grove Road Intersection	C	480	17.8	D	1040	34.4	D	1850	32.7	D	2580	27	D	5950	25.2

P.M. Peak Hour Projected Traffic Counts
OPUS Development w/ Recommendations

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	2940	13.8	B	2970	14.6	E	480	46.4	D	1200	36.4	C	7590	19.0
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	D	740	29.2	D	440	34.9	C	1340	16.2	C	1560	15.6	C	4080	20.3
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	B	850	6.4	B	760	7	C	80	22.4	C	370	24.5	B	2060	9.6
Improve Stone Ridge Mall/OPUS Site Intersection	C	3280	21.4	C	2990	21.1	E	800	41.2	E	870	52.5	E	7940	41.7
Improve Miller Trunk/Maple Grove Road Intersection	C	480	23.2	D	1040	26.7	C	1850	23.5	C	2580	21.6	C	5950	23.9

P.M. Peak Hour Projected Traffic Counts

Current Conditions w/ Both Developments

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	3000	11.3	C	2960	22.5	D	510	31	F	1170	>60	**F**	**7640**	**>60**
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	F	800	**>60**	F	540	**>60**	A	1430	1.2	A	1660	0.9	**F**	**4430**	**>60**
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	F	1170	>60	F	980	>60	F	100	>60	F	440	>60	**F**	**2690**	**>60**
Improve Stone Ridge Mall/OPUS Site Intersection	C	3370	17.8	B	3090	12.7	F	830	>60	F	880	>60	**F**	**8170**	**>60**
Improve Miller Trunk/Maple Grove Road Intersection	C	480	19.5	D	1020	34.2	D	1890	37.6	D	2610	28.1	**D**	**6000**	**26.5**

P.M. Peak Hour Projected Traffic Counts

Both Developments w/ Recommendations

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	3000	14.4	C	2960	15.2	E	510	43.5	D	1170	36.9	**C**	**7640**	**19.4**
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	D	800	31.6	D	540	34.4	C	1430	16.5	C	1660	16.8	**C**	**4430**	**21.2**
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	B	1170	7.5	B	980	6.1	C	100	23.7	D	440	27.8	**B**	**2690**	**10.2**
Improve Stone Ridge Mall/OPUS Site Intersection	E	3370	45.2	D	3090	31.3	E	830	53.5	F	880	71.3	**E**	**8170**	**44.2**
Improve Miller Trunk/Maple Grove Road Intersection	C	480	22.2	D	1020	26.3	D	1890	25.5	C	2610	22.3	**C**	**6000**	**23.6**

P.M. Peak Hour Projected Traffic Counts
2015 Growth Scenario w/ No Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	B	3340	12.6	D	3300	25.3	D	560	31.4	F	1300	>60	F	8500	>60
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	F	770	>60	F	540	>60	B	1890	6.2	B	1630	6.2	F	4830	>60
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	F	1170	>60	F	1010	>60	F	110	>60	F	470	>60	F	2760	>60
Improve Stone Ridge Mall/OPUS Site Intersection	F	3950	>60	F	3670	>60	F	100	>60	F	970	>60	F	8690	>60
Improve Miller Trunk/Maple Grove Road Intersection	C	450	19.3	E	1320	44.6	C	2160	24.5	D	3010	37.7	D	6940	30.7

P.M. Peak Hour Projected Traffic Counts
2015 Growth Scenario w/ Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Trinity Road / Joshua Avenue / Central Entrance	C	3340	15.3	C	3300	16.3	E	560	45.4	D	1300	38.5	C	8500	20.5
Expand Trinity Road to 4-lanes															
Add Traffic Signal/Left Turn Lane at South Miller Entrance	D	770	35	D	540	37.2	C	1890	17.3	C	1630	17.1	C	4830	22.1
Maintain 2 Southbound Entrances into Miller Mall and one Northbound Entrance into OPUS Site															
Improve Decker Road Mall Drive Intersection	D	1170	39	F	1010	70.1	B	110	7.7	A	470	1.2	C	2760	16.3
Improve Stone Ridge Mall/OPUS Site Intersection	E	3950	45.1	D	3670	25.8	F	100	64.8	F	970	93	E	8690	42.7
Improve Miller Trunk/Maple Grove Road Intersection	C	450	21.5	D	1320	30	C	2160	19.6	D	3010	25.1	C	6940	24.6

SECTION B:

SOLUTIONS TO EXISTING PROBLEMS

Recommendations to existing problems in the corridor with an implementation period up to five years. These recommendations are neccessary at the present time to alleviate current deficiencies.

RECOMMENDATION: ***Improve the Six-Corners intersection of Trinity Road/Piedmont Avenue/Skyline Parkway/24th Avenue West.***

DESCRIPTION: Implement four-phased traffic signal at all legs of the intersection. Provide right-turn channelization off of 24th Avenue West northbound onto Piedmont Avenue southbound. Provide channelization off of Trinity Road southbound onto Piedmont Avenue northbound.

REASON NECESSARY: Current congestion and safety problems

CURRENT STATUS: Intersection LOS- F, Delay > 60 seconds

This is a congested intersection with six legs meeting at one spot. The intersection is controlled by stop signs at all legs. (Please see schematic.) T.H. 53 winds up Piedmont Avenue from I-35 in the West End. Upon reaching this intersection T.H. 53 continues north on Trinity Road toward the Miller Hill area. Piedmont Avenue continues to the northwest until it reaches Haines Road. Skyline Parkway intersects from the southwest and continues to the northeast. Finally, 24th Avenue West intersects from the southeast. This project is planned for implementation in 1996.

NEED: This intersection can become very congested and can lead to unsafe conditions. Vehicles on each of the six legs proceed through the intersection slowly and very cautiously. A more safe and efficient traffic control device is needed. In addition, the intersection becomes highly congested in peak travel times. This is especially true for southbound vehicles traveling on T.H. 53/Trinity Road where there is only one southbound lane.

PROJECTED STATUS WITHOUT IMPROVEMENTS:

With Miller Hill Mall Expansion- LOS- F, Delay > 60 seconds

With Opus Development- LOS- F, Delay > 60 seconds

With Miller Hill and Opus Developments- LOS- F, Delay > 60 seconds

2015 Model (average growth accounted for)- LOS- F, Delay > 60 seconds

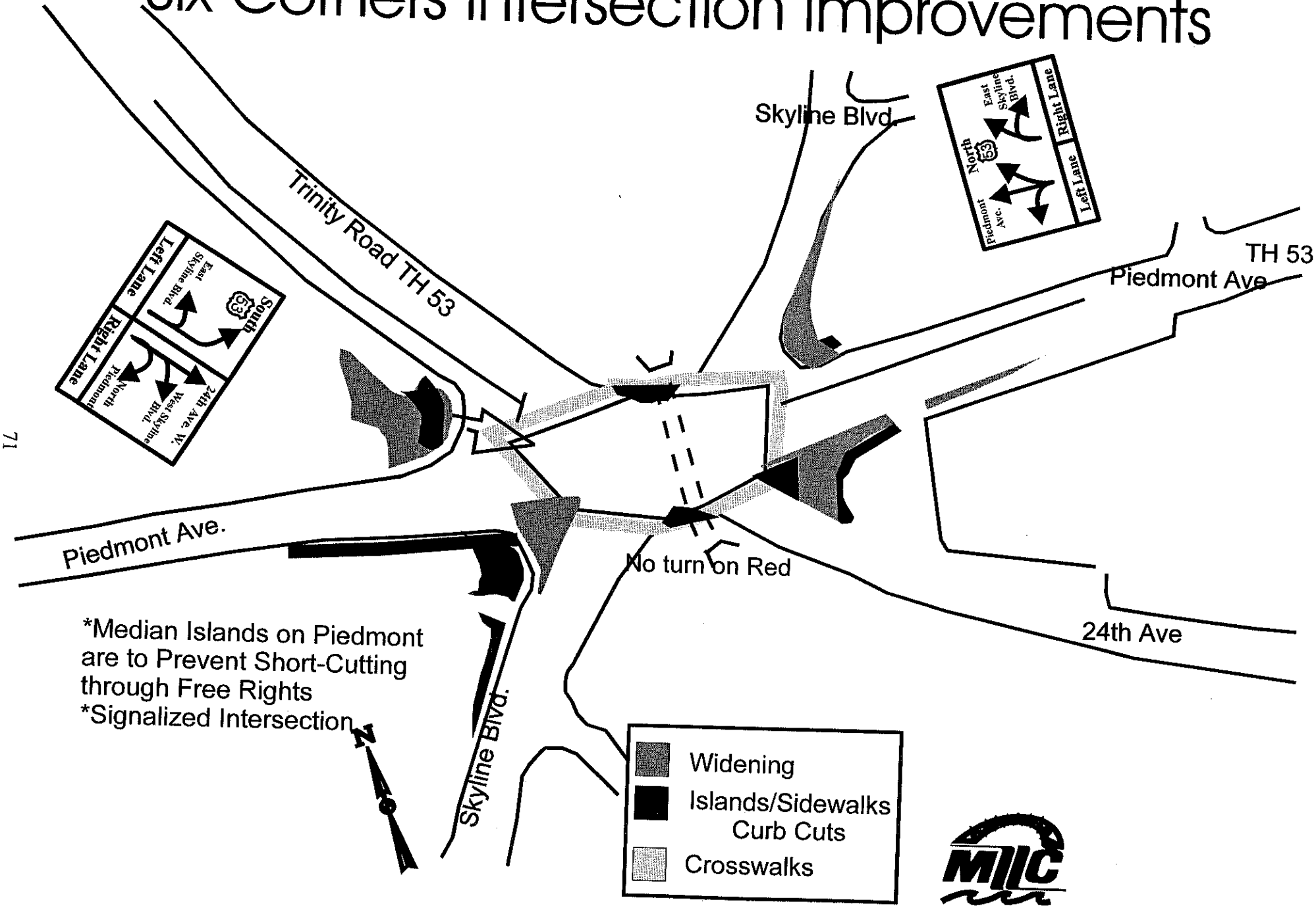
ESTIMATED COST: $200,000

AIR QUALITY\ ENVIRONMENTAL: May require hot-spot analysis

TRAFFIC IMPACTS OF RECOMMENDATION: 1996 Level of Service is upgraded to LOS-C

2015 Level of Service is maintained at LOS-C

Six Corners Intersection Improvements



RECOMMENDATION: ***Improve Hwy 53/Cottonwood Avenue/North Frontage Road intersection.***

DESCRIPTION: Add dedicated approach lanes on Cottonwood Avenue at intersection with Highway 53 and examine potential frontage road geometric improvements for the long term.

REASON NECESSARY: Current intersection has inadequate storage on Cottonwood Avenue and the intersection is projected to become more congested by 2015.

CURRENT STATUS: Intersection LOS- C, Delay = 17.2 seconds

The North Frontage Road provides access between Joshua Avenue and Cottonwood Avenue. This road provides service to Hardee's, the St. Louis County branch offices, Marty Irving, and the Duluth Camera Exchange. Cottonwood Avenue and Joshua Avenue are both signalized intersections with Highway 53.

Cottonwood Avenue provides access to the Miller Hill Corridor from Maple Grove Road. Cottonwood Avenue also provides access to Highway 53 for Duluth Fire Hall #7.

NEED: The North Frontage Road is located too close to the Highway 53 /Cottonwood Avenue intersection. There is not enough storage space for vehicles turning off the frontage road onto southbound Cottonwood Avenue. Vehicles making this movement facing a red signal phase at the Highway 53 intersection can block the Cottonwood Avenue northbound lane. It is necessary to keep the frontage road open to allow access to Duluth Camera Exchange and Marty Irving. It may be necessary, however, to design the current intersection to allow for more traffic storage room while still allowing access to the frontage road.

There are no clear lane markings on Cottonwood Avenue where it intersects with Highway 53 (north leg). Circulation could be improved with dedicated through and left turn lanes.

RECOMMENDATION: ***Improve intersection of Highway 53 / Maple Grove Road/ Sundby Road***

DESCRIPTION: Consider detachment of Maple Grove Road / Sundby Road leg from Highway 53. The detached road would function as a service/frontage road for businesses along Sundby Road as well as provide access to businesses fronting Highway 53 and Maple Grove Road. The schematics on the following pages offer two alternatives. It should be noted that these are conceptual in nature and do not imply actual alignments. It should be noted that the schematics pictured are just two of many possible alternatives.

REASON NECESSARY: Current deficiency at this intersection. Options have been discussed for a new signalized intersection of Sundby Road onto Highway 53.

CURRENT STATUS: Signalized intersection. Improper alignment/lane channelization of north and south legs of intersection. Lack of stacking on north leg. LOS - C-/D+, Delay = 22.5 seconds

NEED: Continued development north of Highway 53 along Sundby Road and Maple Grove Road cause improper stacking conditions on the north leg of this intersection. This results in traffic congestion, increased travel time and unsafe conditions.

Tied with this recommendation are improvements to Sundby Road and Maple Grove Road. This would involve reconstruction/upgrade of these roadways from Maple Grove Road/Sundby Road/Hwy 53 intersection to Haines Road and Swan Lake Road. Improvements should include street widening and paved shoulders to improve traffic flow and safety. Sidewalks should be constructed along both street segments to aid pedestrian movement.

PROJECTED STATUS WITHOUT IMPROVEMENTS: With Miller Hill Mall Expansion - LOS - C-/D+, Delay = 25.0 seconds

With OPUS Development - LOS - D, Delay = 25.2 seconds

With Miller Hill Mall and OPUS Developments - LOS - D, Delay = 26.5 seconds

2015 Model (average growth) - LOS - D, Delay = 30.7 seconds

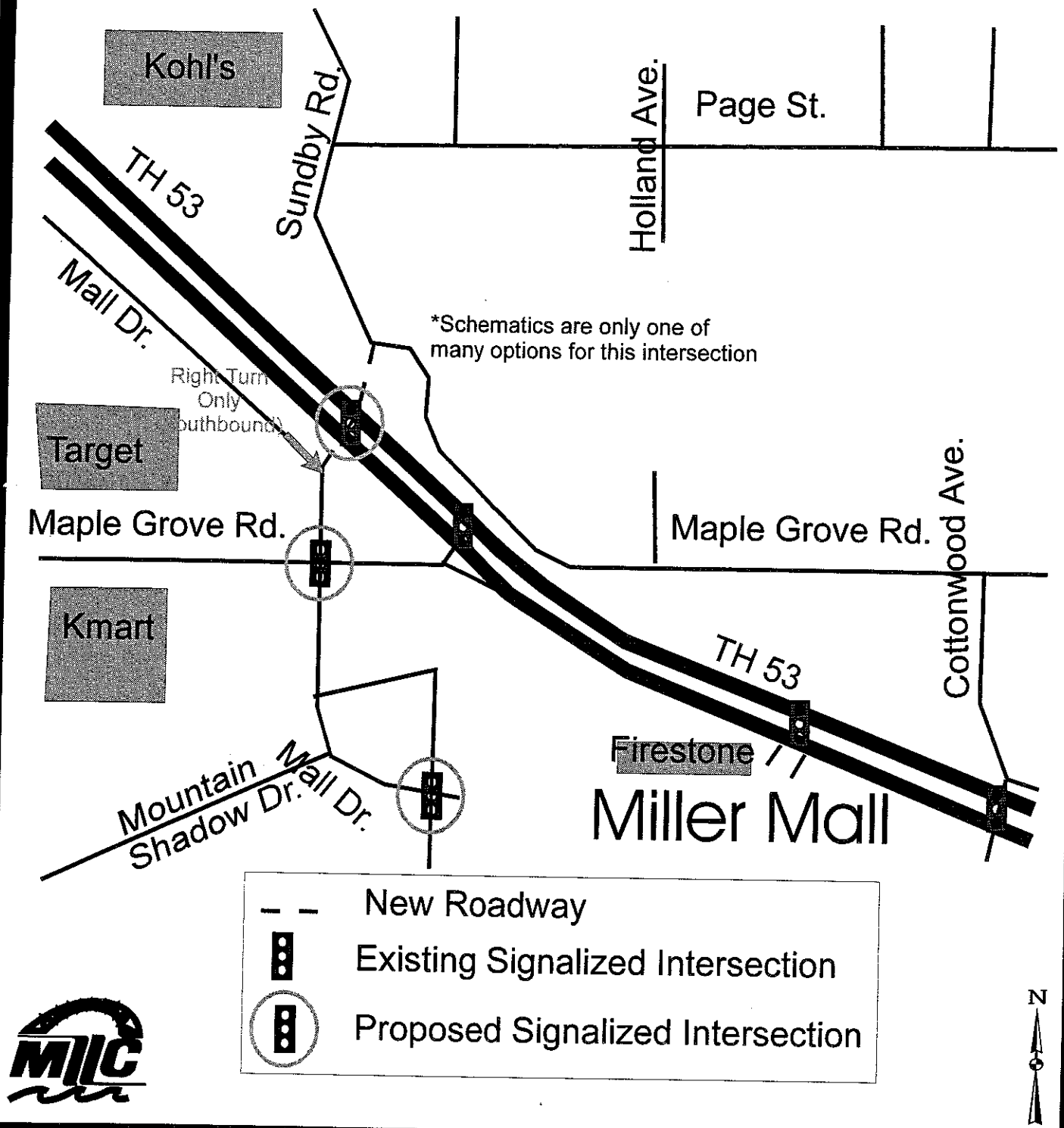
ESTIMATED COST: $ 1 million

AIR QUALITY/ ENVIRONMENTAL: Hot Spot Analysis needed. Right-of-way to acquire if new intersection is constructed. Construction impacts and wetland mitigation unknown.

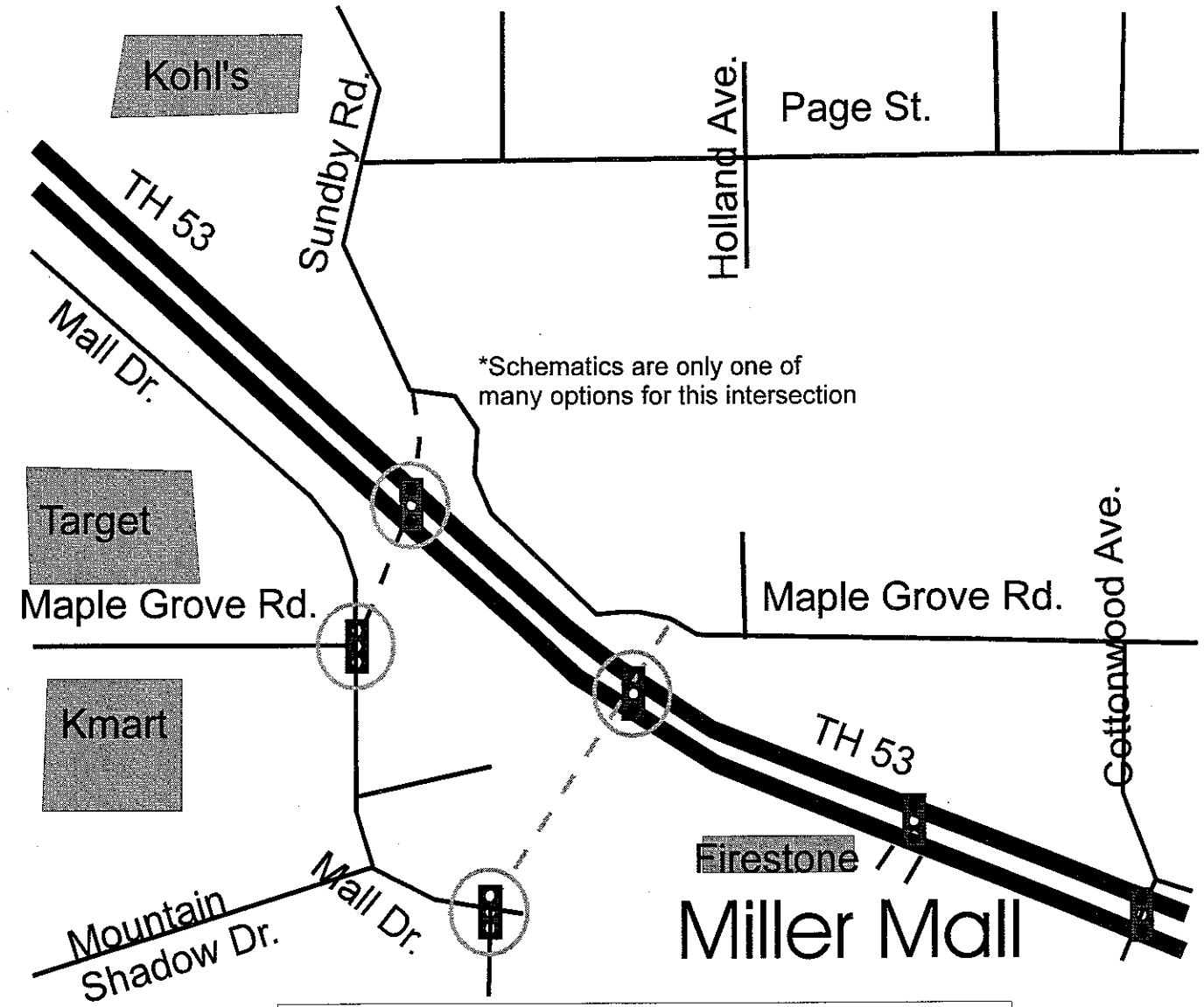
TRAFFIC IMPACTS OF RECOMMENDATION: Level of service at the current intersection with Highway 53 would improve. Safety is greatly improved. Access from adjacent businesses would be served by the newly created service road and access onto Highway 53 would be funneled to new signalization points where stacking problems would be mitigated. A new intersection for Sundby Road could be one component of a much larger project linking Highway 53 with Arrowhead Road thereby providing a needed north-south connector route in this area (refer to Long Term Recommendations).

NOTE: **The following schematics are two of a number of options. Any solution would require detailed engineering and public involvement.**

Miller Trunk Highway/ Maple Grove Road Phase 2
Option 1



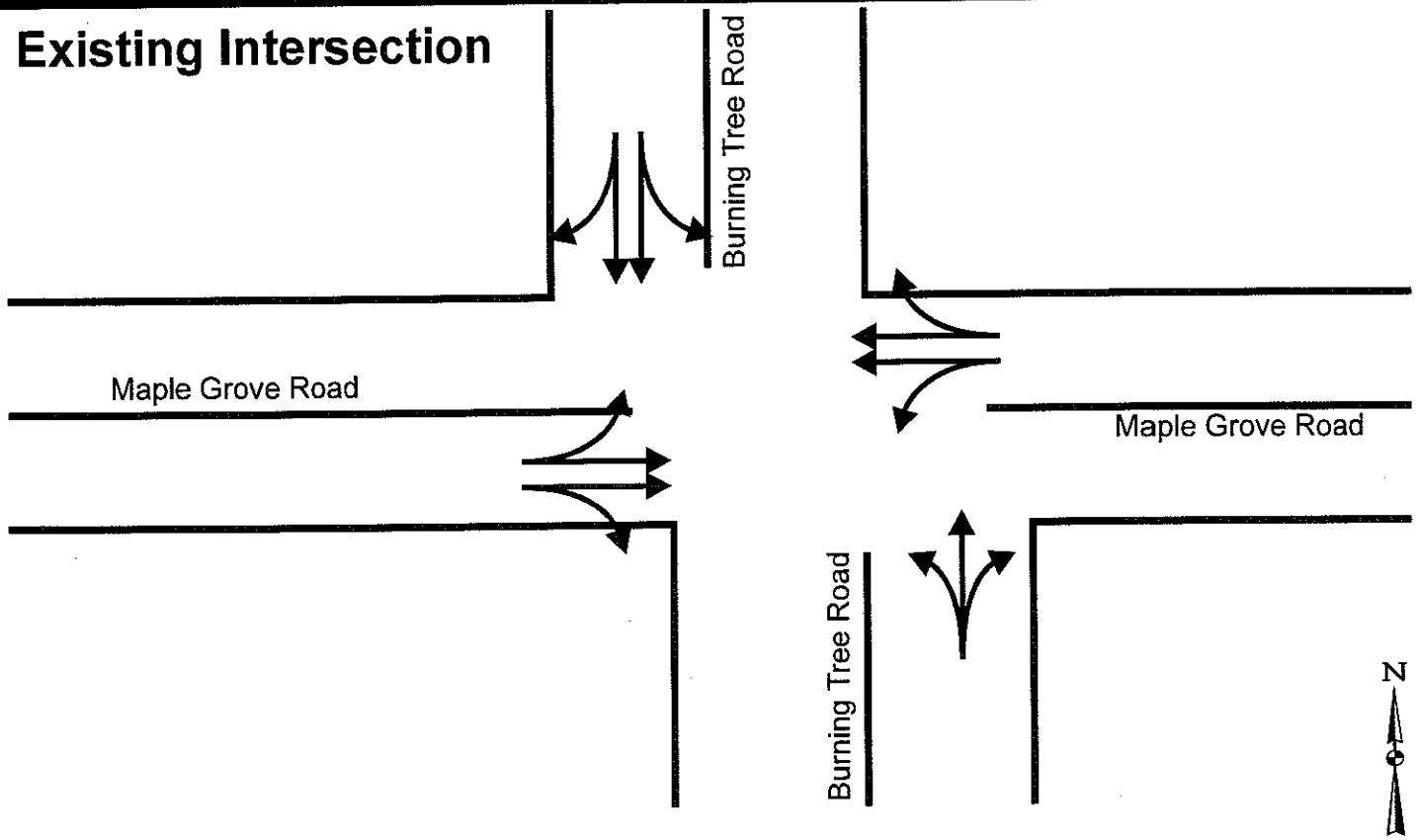
Miller Trunk Highway/ Maple Grove Road Phase 2
Option 2



RECOMMENDATION:	***Improve Burning Tree Road/Maple Grove Road intersection.***
DESCRIPTION:	Signalize and properly align all four legs of this intersection.
REASON NECESSARY:	Necessary to improve and enhance intersection congestion and safety.
CURRENT STATUS:	Intersection LOS- B , Delay = 9.6 seconds Maple Grove Road, County State Aid Highway (CSAH) 6, provides access from the Miller Trunk Highway to the Burning Tree Plaza, the Village Mall II and further west to Haines Road and Hermantown. Burning Tree Road serves as the primary access road for Burning Tree Plaza and the Village II Mall.
NEED:	This intersection is controlled by a four-way stop sign and is congested during peak traffic times. Additional proposed commercial residential development is proposed south of the Village II Mall meaning more traffic through the intersection. Also, the sections of Burning Tree Road on each side of Maple Grove Road do not align causing vehicles to make a swerving movement across the intersection. Alignment of this intersection will require right-of-way (ROW) acquisition.
PROJECTED STATUS WITHOUT IMPROVEMENTS:	With Miller Hill Mall Expansion- LOS- B, Delay = 9.6 seconds With Opus Development- LOS- B, Delay = 9.6 seconds With Miller Hill and Opus Developments- LOS-B, Delay = 9.6 seconds 2015 Model (average growth accounted for)- LOS- E, Delay - 34.1 - 59.9 seconds
ESTIMATED COST:	$250,000
AIR QUALITY\ ENVIRONMENTAL:	May need hot-spot analysis.
TRAFFIC IMPACTS OF RECOMMENDATION:	1996 LOS at intersection is maintained at C, Delay = 16.1 seconds 2015 LOS at intersection is upgraded to C, Delay = 19.2 seconds

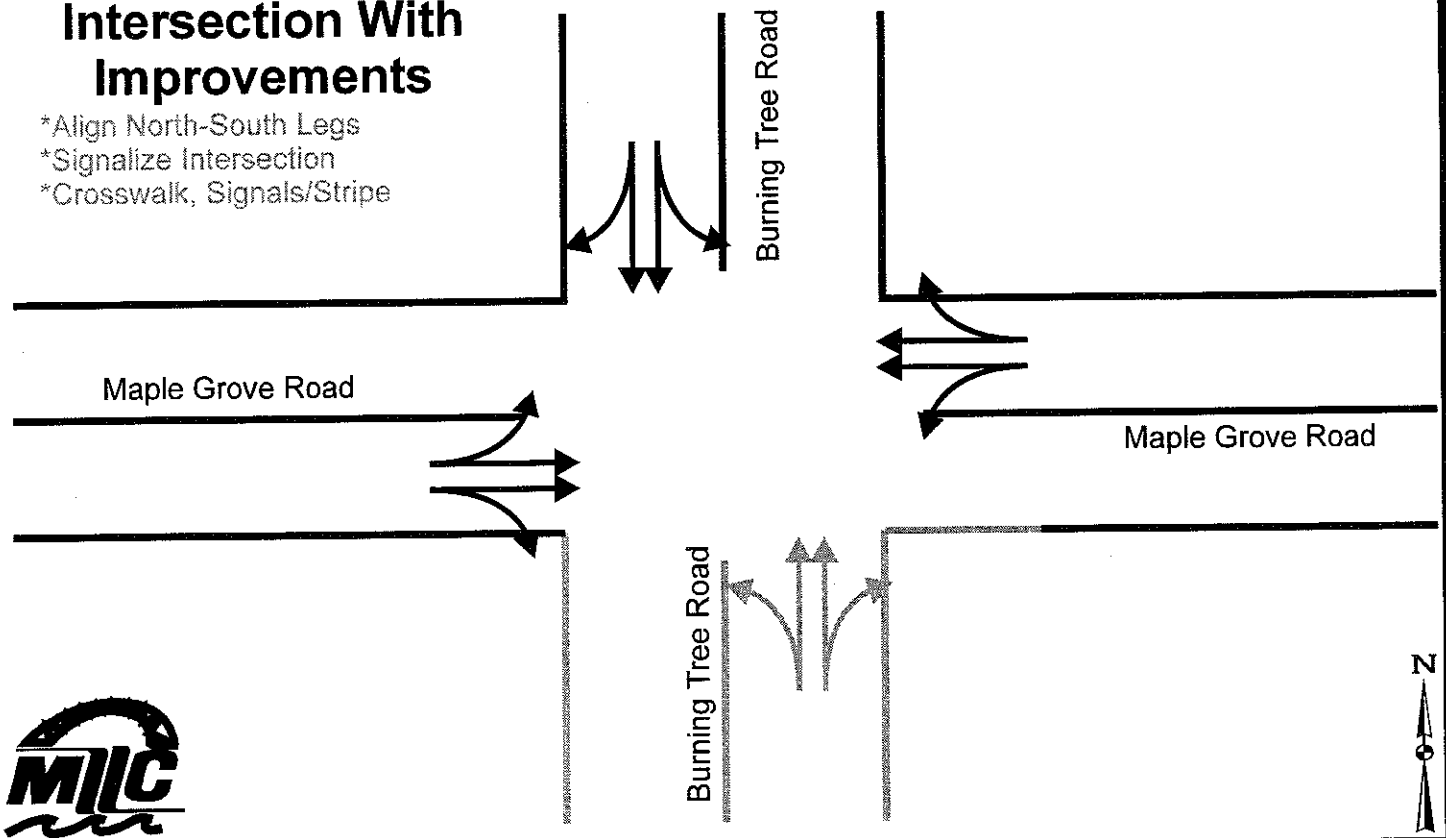
Maple Grove Road/ Burning Tree Road

Existing Intersection



Intersection With Improvements

*Align North-South Legs
*Signalize Intersection
*Crosswalk, Signals/Stripe

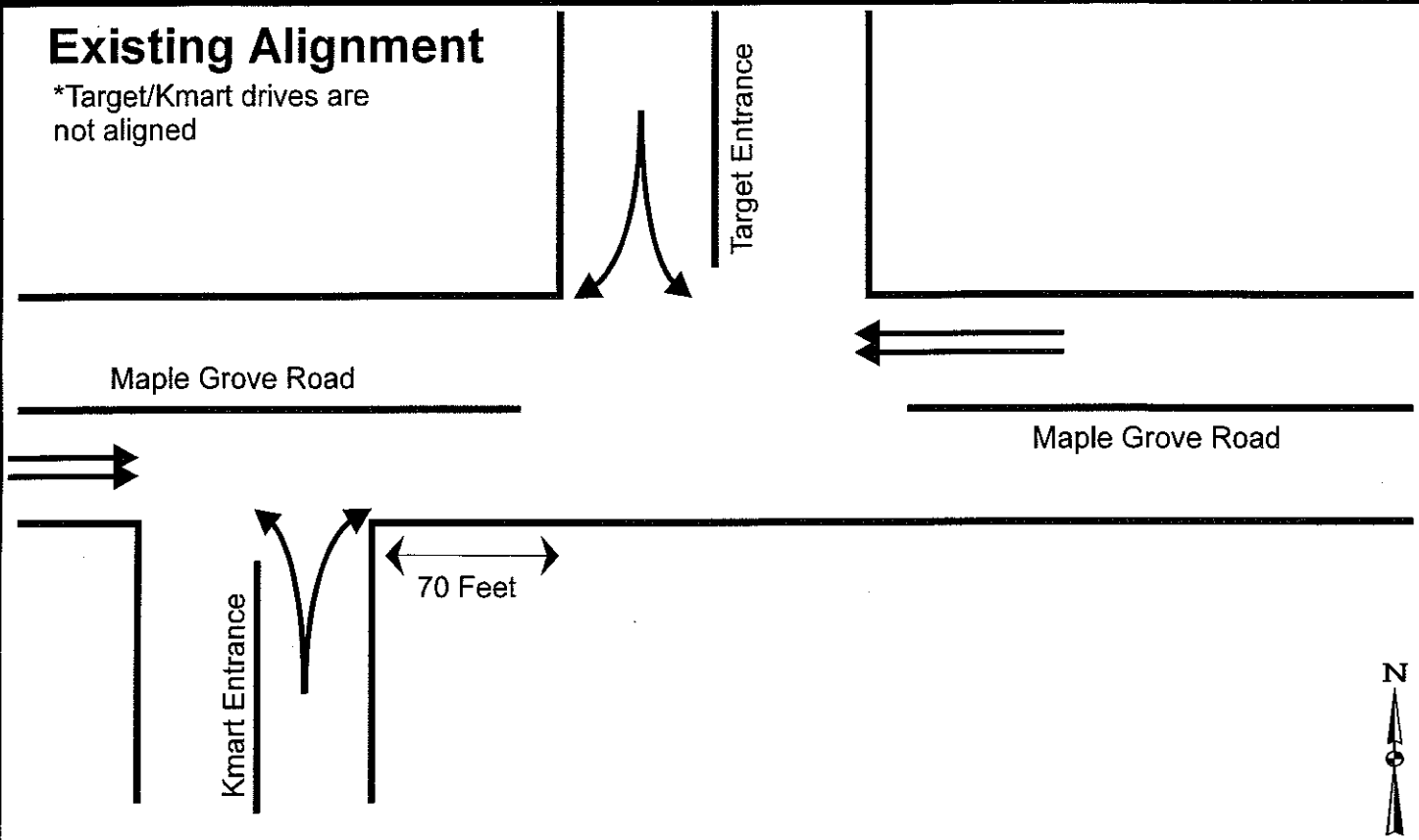


RECOMMENDATION:	***Align main access drives from Target and K-Mart on Maple Grove Road.***
DESCRIPTION:	These two access drives do not currently align.
REASON NECESSARY:	Current and future safety problem.
CURRENT STATUS:	Intersection LOS- N/A, Delay = N/A Both the Burning Tree Road/Maple Grove Road and Mall Drive/Maple Grove Road intersections to the west and east are currently controlled by four-way stop signs.
NEED:	Vehicles traveling out of the K-Mart parking lot wishing to enter the Target lot across Maple Grove Road, must first make a right turn onto Maple Grove Road, then immediately switch lanes to make a left turn into the Target parking lot. The reverse is true for vehicles traveling out of the Target lot to K-Mart. This whole movement has to be done within a distance of 15 yards on Maple Grove Road. Given the steady stream of traffic on Maple Grove Road, this movement increases the congestion problem and is a safety concern. When the intersections to the east and west are signalized there will be gaps in traffic flow allowing movement between sites. Therefore, aligned access drives are recommended as vehicles will have a better opportunity to make a safe cross street movement. *This recommendation is contingent on completion of traffic signals at the Burning Tree Road/Maple Grove Road and Mall Drive/Maple Grove Road intersections.*
PROJECTED STATUS WITHOUT IMPROVEMENTS:	With Miller Hill Mall Expansion- N/A With Opus Development- N/A With Miller Hill and Opus Developments- N/A 2015 Model (average growth accounted for)- N/A
ESTIMATED COST:	$10,000
AIR QUALITY\ ENVIRONMENTAL:	Does not need hot-spot analysis.
TRAFFIC IMPACTS OF RECOMMENDATION:	This recommendation will enhance safety without any negative effects to traffic on Maple Grove Road.

Maple Grove Road/ Target-Kmart Entrances

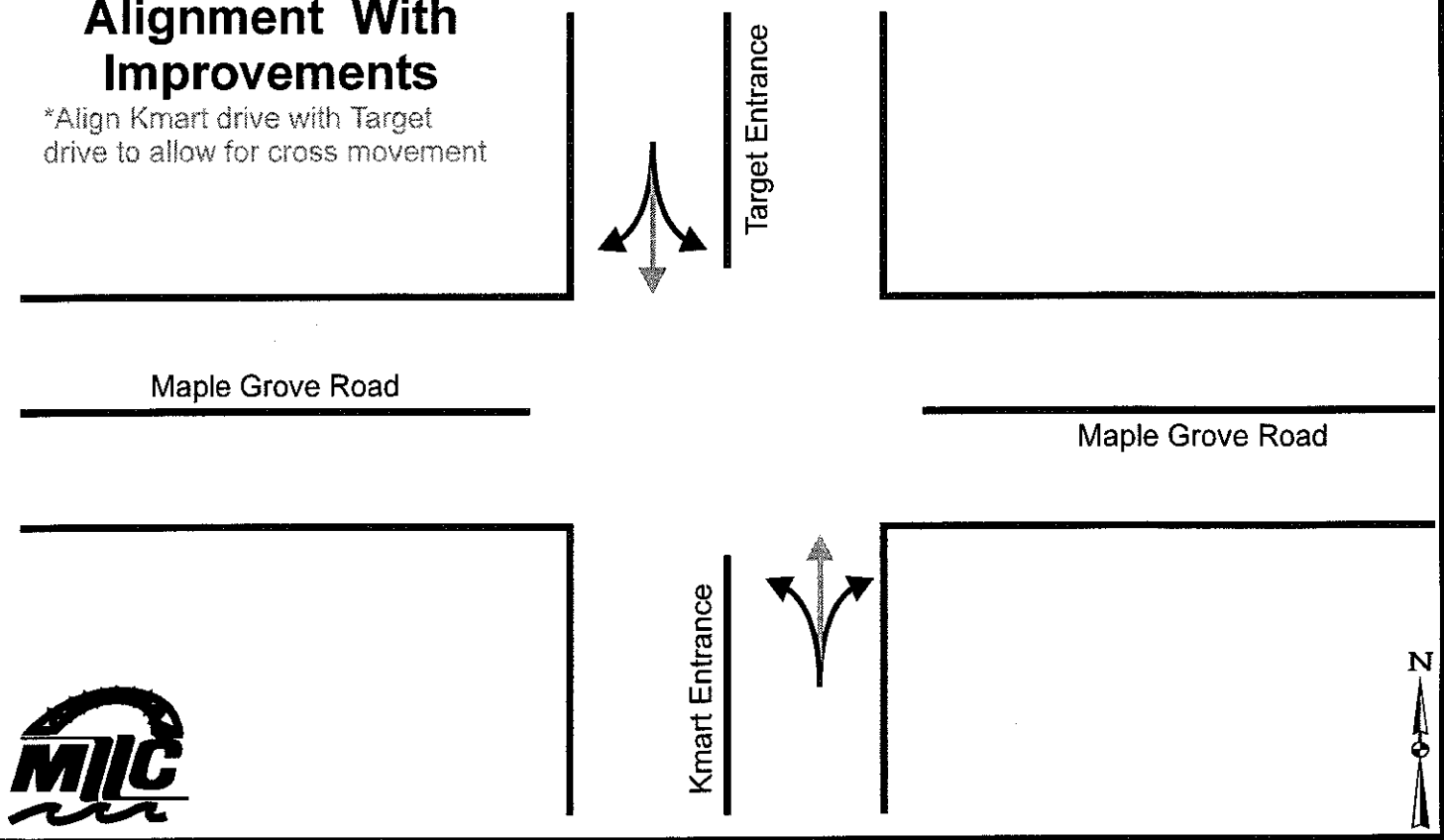
Existing Alignment

*Target/Kmart drives are not aligned



Alignment With Improvements

*Align Kmart drive with Target drive to allow for cross movement



RECOMMENDATION:	***Limit access road from Burning Tree Plaza onto Haines Road to exit only/right-turn out only***
DESCRIPTION:	See above.
REASON NECESSARY:	Current safety problem.
CURRENT STATUS:	LOS - N/A / Delay = N/A
NEED:	Burning Tree Plaza has a western exit onto Haines Road. This access road is located very close to the Haines Road/Maple Grove Road four-way stop sign intersection. Vehicles are using this access point as an entrance. Vehicles are also making left turns out of the Plaza onto Haines Road. Both of these issues are safety concerns given the close proximity to the Haines Road/Maple Grove Road intersection. This access road was intended to be used solely as an exit onto Haines Road.
PROJECTED STATUS WITHOUT IMPROVEMENTS :	With Miller Hill Mall Expansion- N/A With Opus Development- N/A With Miller Hill and Opus Developments- N/A 2015 Model (average growth accounted for)- N/A
ESTIMATED COST:	Cost of on-site improvement should be incurred partly or totally by the landowner or developer.
AIR QUALITY\ ENVIRONMENTAL:	Does not need hot-spot analysis
TRAFFIC IMPACTS OF RECOMMENDATION:	This recommendation will improve safety on Haines Road by limiting ingress/egress to right-turn out only.

RECOMMENDATION:	***Improve Piedmont Avenue west of the Six-Corners intersection.***
DESCRIPTION:	Implement Piedmont Avenue reconditioning project to preserve roadway.
REASON NECESSARY:	Current pavement deficiency.
CURRENT STATUS:	LOS- N/A.
NEED:	Piedmont Avenue is an important link to the Piedmont Heights neighborhood and Hermantown. It also provides a link from the Six-Corners intersection to Haines Road. The pavement is in need of reconditioning.
PROJECTED STATUS WITHOUT IMPROVEMENTS:	With Miller Hill Mall Expansion- N/A With Opus Development- N/A With Miller Hill and Opus Developments- N/A 2015 Model (average growth accounted for)- N/A
ESTIMATED COST:	$2,000,000
AIR QUALITY\ ENVIRONMENTAL:	Does not require hot-spot analysis.
TRAFFIC IMPACTS OF RECOMMENDATION:	No significant impacts on traffic.

P.M. Peak Hour Projected Traffic Counts

Current Conditions

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve the 6-Corners Intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	F	N/A	>60
Improve the Cottonwood Avenue/ North Frontage Road/ Miller Trunk Intersection	B	2470	14	C	2310	16.1	C	340	25	D	480	32.6	C	5600	17.2
Improve the Burning Tree/ Maple Grove Road Intersection	C	880	10.6	B	800	8.8	B	290	6.9	C	520	14.8	B	2490	9.6
Improve the Maple Grove Road/ T.H. 53 Sundby Road Intersection	B	420	14.9	D	990	32.2	C	1790	21.3	D	2480	26.2	C	5680	22.5
Align K-Mart/Target Access Drives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limit Burning Tree Plaza Exit on Haines	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T.H. 194/53 Signal Progression Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piedmont Avenue Re-Pavement Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P.M. Peak Hour Projected Traffic Counts
Current Conditions w/ Both Developments

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve the 6-Corners Intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	F	N/A	>60
Improve the Cottonwood Avenue/ North Frontage Road/ Miller Trunk Intersection	C	2700	17.6	C	2500	21.3	C	350	22.9	D	650	39.3	C	6200	21.7
Improve the Burning Tree/ Maple Grove Road Intersection	N/C	900	N/C	N/C	810	N/C	N/C	300	N/C	N/C	530	N/C	N/C	2540	N/C
Improve the Maple Grove Road/ T.H. 53 Sundby Road Intersection	C	480	19.5	D	1020	34.2	D	1890	37.6	D	2610	28.1	D	6000	26.5
Align K-Mart/Target Access Drives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limit Burning Tree Plaza Exit on Haines	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T.H. 194/53 Signal Progression Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piedmont Avenue Re-Pavement Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P.M. Peak Hour Projected Traffic Counts
Both Developments w/ Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve the 6-Corners Intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	F	N/A	>60
Improve the Cottonwood Avenue/ North Frontage Road/ Miller Trunk Intersection	B	2700	11.4	C	2500	15.5	D	350	28.1	D	650	31.5	C	6200	15.9
Improve the Burning Tree/ Maple Grove Road Intersection	B	900	11.7	B	810	12	C	300	17.6	D	530	37.8	C	2540	16.1
Improve the Maple Grove Road/ T.H. 53 Sundby Road Intersection	C	480	22.2	D	1020	26.3	D	1890	25.5	C	2610	22.3	C	6000	23.6
Align K-Mart/Target Access Drives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limit Burning Tree Plaza Exit on Haines	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T.H. 194/53 Signal Progression Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piedmont Avenue Re-Pavement Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P.M. Peak Hour Projected Traffic Counts
2015 Growth Scenario w/ No Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve the 6-Corners Intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	F	N/A	>60
Improve the Cottonwood Avenue/ North Frontage Road/ Miller Trunk Intersection	E	2700	47	D	2500	39.3	F	350	>60	F	650	>60	F	6200	>60
Improve the Burning Tree/ Maple Grove Road Intersection	N/A	900	N/A	N/A	810	N/A	N/A	300	N/A	N/A	530	N/A	N/A	2540	N/A
Improve the Maple Grove Road/ T.H. 5 Sundby Road Intersection	C	450	19.3	E	1320	44.6	C	2160	24.5	D	3010	37.7	D	6940	30.7
Align K-Mart/Target Access Drives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limit Burning Tree Plaza Exit on Haine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T.H. 194/53 Signal Progression Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piedmont Avenue Re-Pavement Projec	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P.M. Peak Hour Projected Traffic Counts
2015 Growth Scenario w/ Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve the 6-Corners Intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	F	N/A	>60
Improve the Cottonwood Avenue/ North Frontage Road/ Miller Trunk Intersection	B	2700	14.3	C	2500	18.9	D	350	31.4	D	650	32.5	C	6200	19.9
Improve the Burning Tree/ Maple Grove Road Intersection	B	900	11.3	B	810	12.4	C	300	22.9	F	530	61.3	C	2540	19.2
Improve the Maple Grove Road/ T.H. 5 Sundby Road Intersection	C	450	21.5	D	1320	30	C	2160	19.6	D	3010	25.1	C	6940	24.6
Align K-Mart/Target Access Drives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limit Burning Tree Plaza Exit on Haine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T.H. 194/53 Signal Progression Project	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piedmont Avenue Re-Pavement Projec	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SECTION C:

LONG TERM RECOMMENDATIONS

Recommendations to accomodate projected levels of traffic growth along the roadways and at key intersections within the Miller Hill Corridor.

RECOMMENDATION: ***Improve Arlington Avenue / Central Entrance intersection. Upgrade Arlington Avenue as warranted.***

DESCRIPTION: Provide dedicated right-turn lane on north leg of intersection for southbound traffic turning westbound onto Central Entrance.

REASON NECESSARY: Long term projected deficiency at this intersection.

CURRENT STATUS: Signalized intersection. LOS - C / Delay = 16.2 seconds. There is a dedicated left-turn lane for southbound traffic plus one lane shared by through and right-turn vehicles.

NEED: To ease current and projected congestion at this intersection for traffic from the growing residential areas to the north and northeast that are using Arlington Avenue for the connection to the Miller Hill Mall commercial corridor. With an improved flow through the intersection for vehicles heading toward the mall, cut-through traffic in the adjoining neighborhoods may decrease. Vehicles would be able to make a right-turn on a red signal plus turn right on a green left-turn arrow.

This recommendation would be especially necessary if a north-south connector route between Miller Trunk Highway and Arrowhead Road is not constructed or if Maple Grove Road is not extended from Swan Lake Road to Arlington Avenue.

In addition, added capacity or other roadway improvements along Arlington Avenue between Arrowhead Road and Central Entrance may be needed in the future. Further analysis and recommendations may be warranted.

PROJECTED STATUS WITHOUT IMPROVEMENTS: With Miller Hill Mall Expansion - LOS - C / Delay = 16.2 -18.6 seconds

With OPUS Development - LOS - C / Delay = 16.2 - 18.6 seconds

With Miller Hill Mall & OPUS Developments - LOS - C, Delay = 18.6 seconds

2015 Model (average growth) - LOS - F / Int. Delay = > 60 seconds

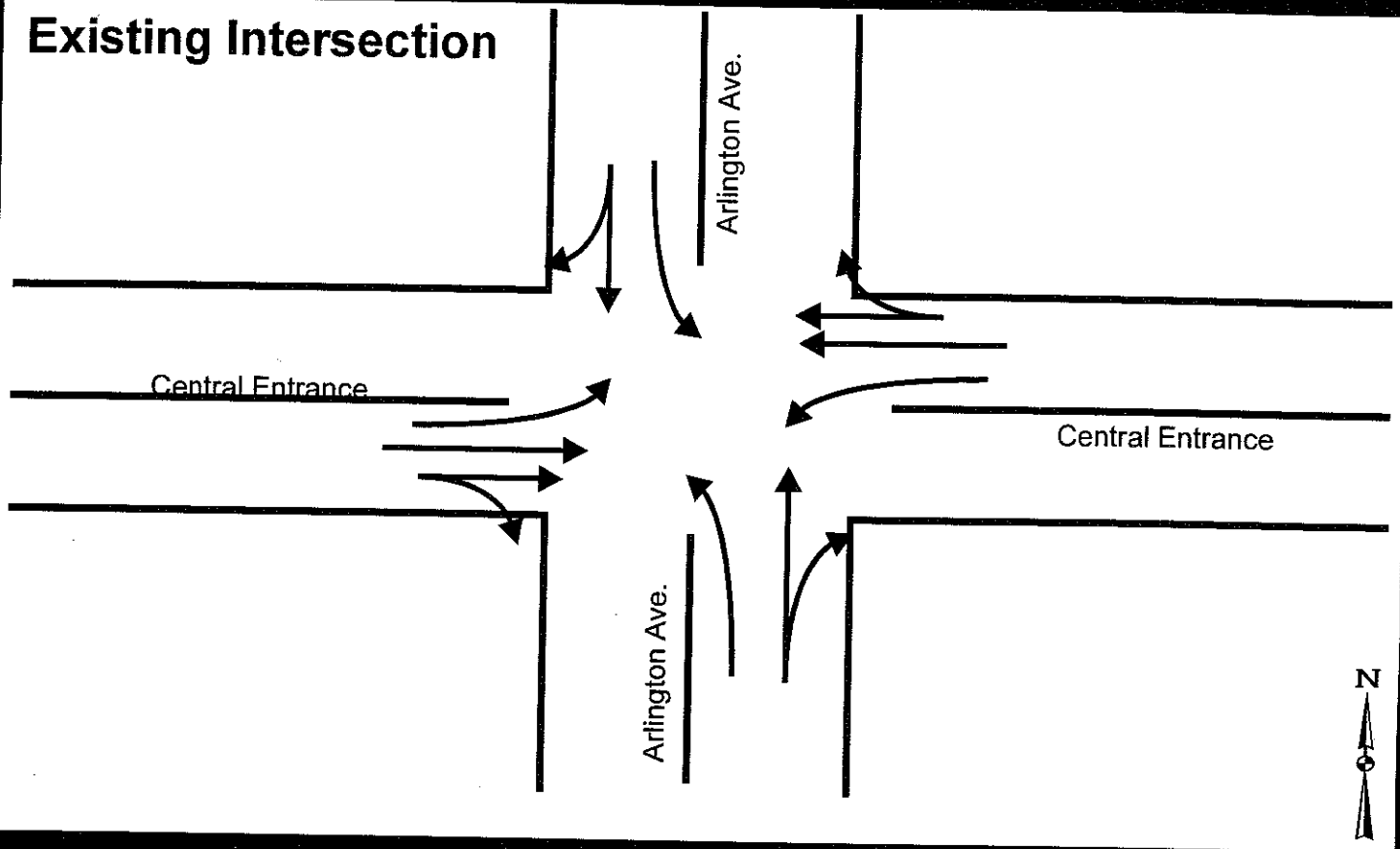
ESTIMATED COST: $75,000 - $100,000

AIR QUALITY/ ENVIRONMENTAL: There is a gas station at the corner where the improvement is recommended. Some right-of-way acquisition may be needed for a dedicated right-turn lane which could increase the scale of this project significantly due to environmental issues. Hot Spot Analysis needed.

TRAFFIC IMPACTS OF RECOMMENDATION: 1996 LOS - C. Safety is improved as all vehicles would have their own lane for movement and stacking purposes. Neighborhood cut-through traffic may be decreased.

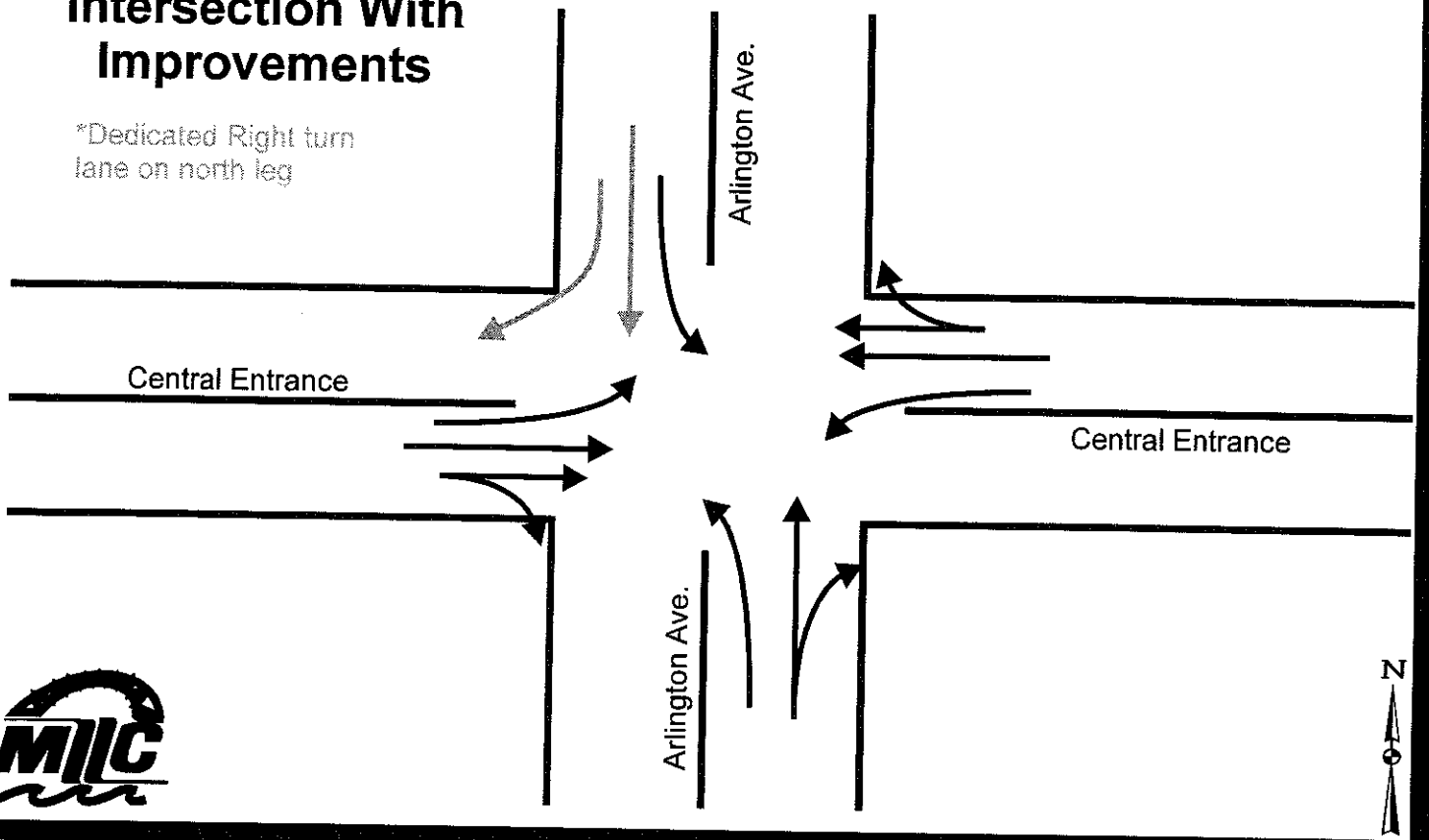
Central Entrance/ Arlington Ave.

Existing Intersection



Intersection With Improvements

*Dedicated Right turn lane on north leg

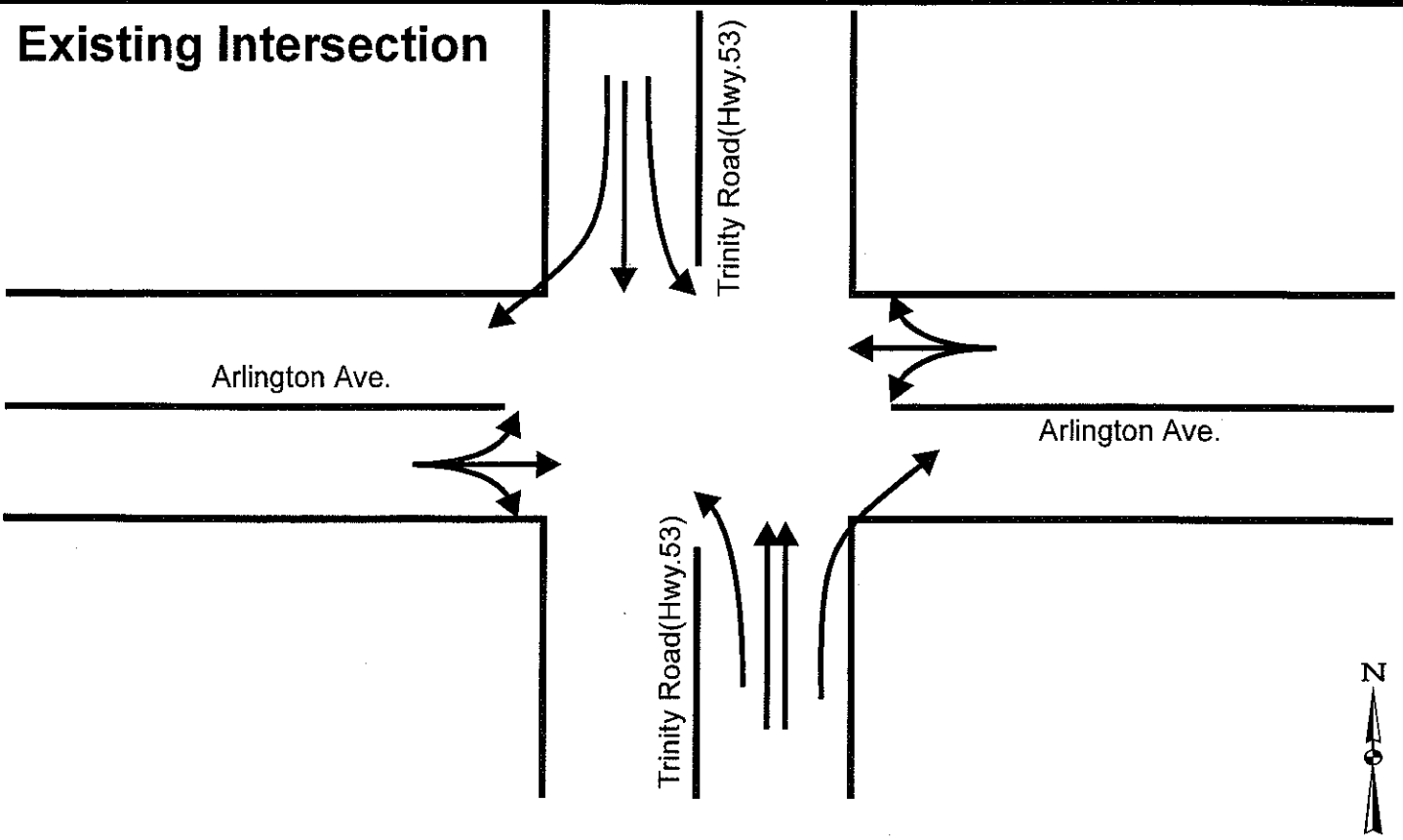


MIC

RECOMMENDATION:	***Improve Arlington Avenue / Lake Superior College Entrance at Trinity Road intersection***
DESCRIPTION:	(A) Add dedicated left-turn lane on east leg for traffic turning southbound onto Trinity Road. (B) Add dedicated left-turn lane on west leg for traffic exiting LSC northbound onto Trinity Road. (C) Add dedicated right-turn lane on west leg for traffic exiting LSC.
REASON NECESSARY:	Long term deficiency at this intersection.
CURRENT STATUS:	Signalized intersection. LOS - B / Int. Delay = 11.9 seconds. Currently only a two-lane road leading to the expanded LSC. Arlington Avenue has one lane for all three movements. There are no dedicated right-turn or left-turn lanes.
NEED:	Traffic leaving LSC is provided one lane for all movements at the intersection which causes stacking and congestion problems at specific times of the day. Arlington Avenue traffic heading southbound on Trinity would benefit from a dedicated turn lane.
PROJECTED STATUS WITHOUT IMPROVEMENTS:	With Miller Hill Mall Expansion - LOS - B, Delay = 9.0 -11.9 seconds With OPUS Development - LOS - B, Delay = 9.0 - 11.9 seconds With Miller Hill Mall and OPUS Developments - LOS - B, Delay = 9.0 - 11.9 seconds 2015 Model (average growth) - LOS - C, Delay = 16.0 seconds
ESTIMATED COST:	$50,000 - $75,000
AIR QUALITY/ ENVIRONMENTAL:	Additional right-of-way that may be needed will not significantly impact any adjoining land use. Hot Spot Analysis needed.
TRAFFIC IMPACTS OF RECOMMENDATION:	1996 LOS - C. Safety is improved with the dedicated turn lanes.

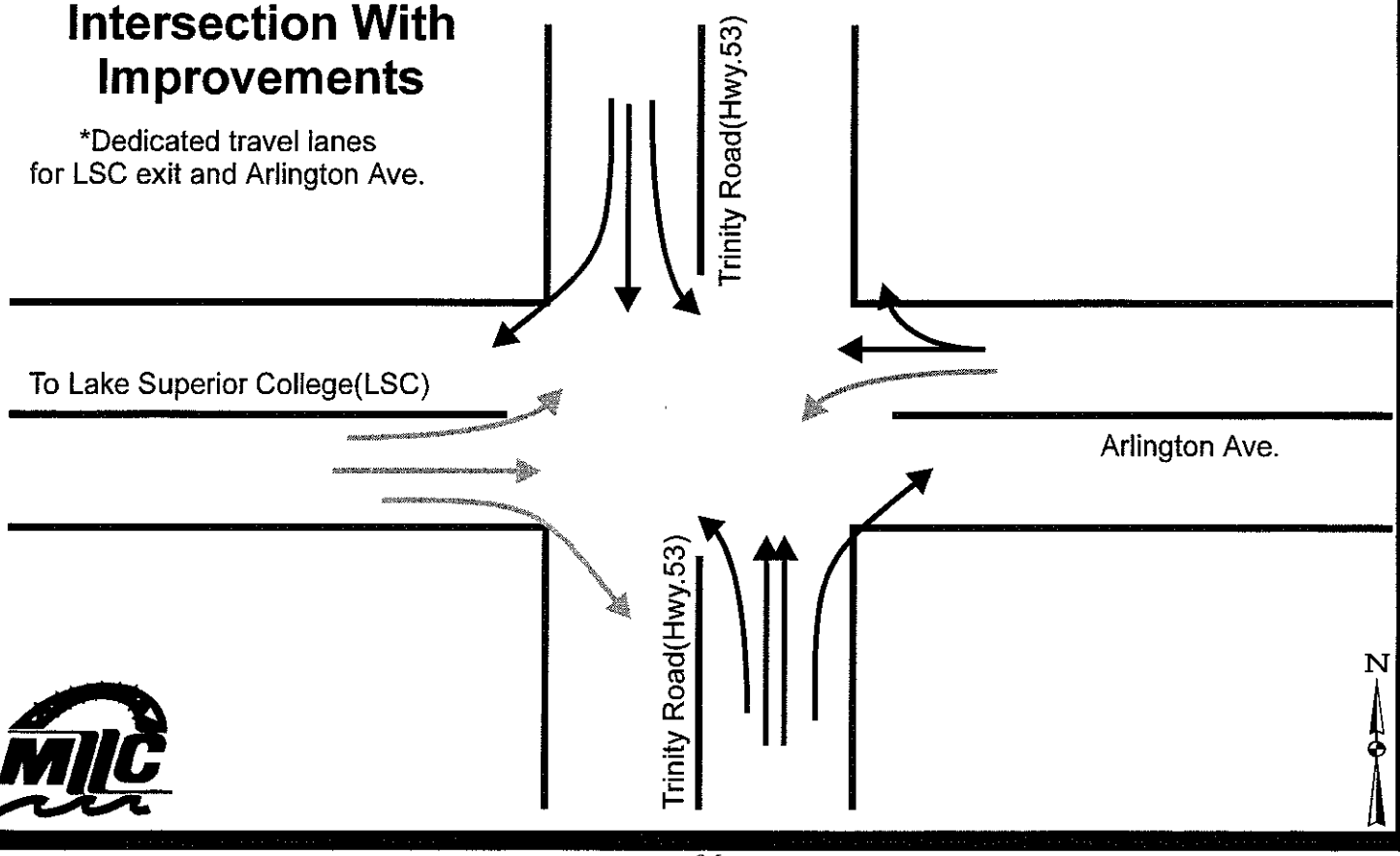
Trinity Road(Hwy. 53)/ Arlington Ave.

Existing Intersection



Intersection With Improvements

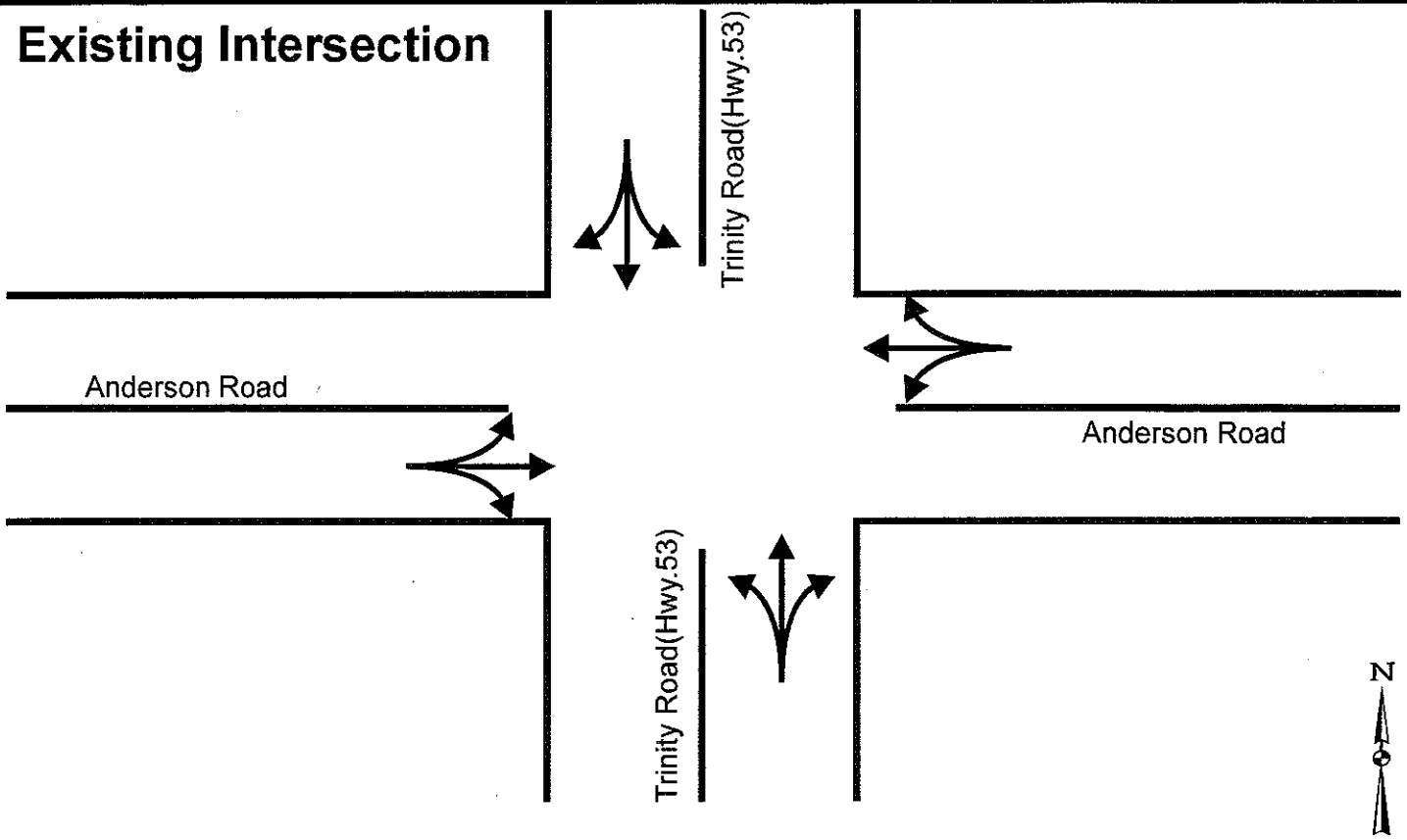
*Dedicated travel lanes for LSC exit and Arlington Ave.



RECOMMENDATION:	***Improve Trinity Road / Anderson Road intersection***
DESCRIPTION:	Add dedicated left-turn lanes on both legs of Trinity Road
REASON NECESSARY:	Long term deficiency and safety problem at this intersection.
CURRENT STATUS:	Signalized intersection. LOS - B, Delay = 10.9 seconds. Two travel lanes on all legs. 45 MPH speed limit.
NEED:	Dedicated left-turn lane will make intersection safer and traffic will no longer stack waiting for vehicles to make left-turn movement onto Anderson Road. This is especially important for northbound traffic that is traveling at high speeds and rounding the corner at the approach of the intersection. Traffic currently swerves to the right outside of the travel lane to go around left-turning vehicles.
PROJECTED STATUS WITHOUT IMPROVEMENTS:	With Miller Hill Mall Expansion - LOS - B, Delay = 10.9 -11.7 seconds With OPUS Development - LOS - B, Delay = 10.9 - 11.7 seconds With Miller Hill Mall and OPUS Developments - LOS - B, Delay = 11.7 seconds 2015 Model (average growth) - LOS - B, Delay = 13.6 seconds
ESTIMATED COST:	$300,000
AIR QUALITY/ ENVIRONMENTAL:	Right-of-way may be needed that could require residential acquisition. Construction impacts to nearby Miller Creek may be significant. Hot Spot Analysis needed.
TRAFFIC IMPACTS OF RECOMMENDATION:	Level of service is maintained at C and safety is improved with this recommendation. It is possible that improvements may promote greater neighborhood cut-through traffic toward Decker Road.

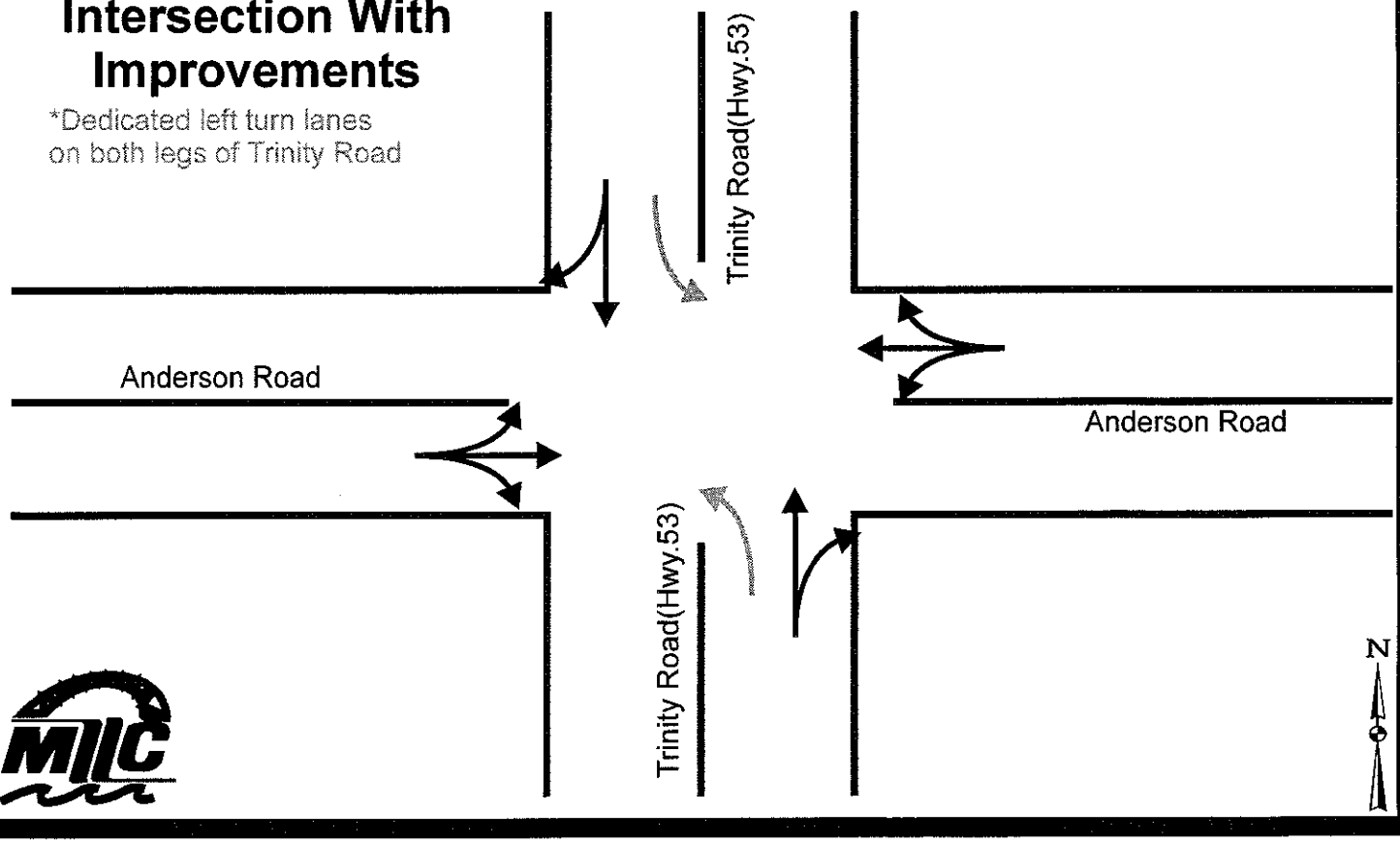
Trinity(Hwy. 53)/ Anderson Road

Existing Intersection



Intersection With Improvements

*Dedicated left turn lanes on both legs of Trinity Road



RECOMMENDATION: ***Increase Capacity on Trinity Road from Miller Hill Mall Entrance to Six-Corners intersection***

DESCRIPTION: Analysis of need for one additional travel lane from south of Miller Hill Mall entrance to Six-Corners intersection.

REASON NECESSARY: Long term deficiency for this major route into the Miller Hill corridor.

CURRENT STATUS: There is currently two travel lanes between Anderson Road and the Miller Hill Mall entrances. The roadway expands to two northbound lanes and one southbound lane between Anderson Road and the Six-Corners intersection. Level of service ranges from B to C along corridor.

NEED: MN/DOT has stated that increasing capacity along Trinity Road may be a long term need. Modeling efforts confirm that a long term capacity deficiency could exist along this link of roadway given average growth. This project could complement the long term Piedmont Avenue permanent improvements south of the Six-Corners intersection thereby increasing capacity along this major artery between I-35 and the Miller Hill area.

The intersection improvements recommended at Trinity Road/Anderson Road and Trinity Road/Arlington Avenue stated previously could be incorporated into this project as two smaller components.

PROJECTED STATUS WITHOUT IMPROVEMENTS: Year 2015 TRANPLAN model indicates LOS - F for the link south of Anderson Road and LOS - E for the link northward to Central Entrance due to roadway capacity deficiencies.

ESTIMATED COST: $ 4 - 5 million.

AIR QUALITY/ ENVIRONMENTAL: Hot Spot Analysis needed. Additional right-of-way needed. Wetland mitigation unknown. Some woodland loss especially south of Anderson Road.

TRAFFIC IMPACTS OF RECOMMENDATION: Level of service is maintained at C along roadway and safety is significantly improved.

RECOMMENDATION:	***Implement Highway 53 / Piedmont Avenue / Trinity Road permanent improvements***
DESCRIPTION:	Permanent improvements include limited access onto Highway 53 and additional through travel lanes with improved geometrics between the Six-Corners intersection and I-35. Upper Piedmont Avenue and 24th Street will be separated from the Highway 53/Skyline Drive intersection. Two signalized intersections will be constructed that will aid traffic flow and improve safety.
REASON NECESSARY:	Long term deficiency for major entrance into Miller Hill commercial corridor.
CURRENT STATUS:	Signalized intersection in 1996 to replace current all-way stop signs. Delays are significant during peak periods leading to LOS-F.
NEED:	Improper intersection geometrics along Piedmont Avenue and six leg intersection causes confusing and unsafe movements. There is no provision for sidewalks for ease of pedestrian movement. Bicycle movement is also unsafe. Capacity deficiency exists south of six leg intersection. Grades are steep causing unsafe travel speeds especially for trucks. Hill grades need to be decreased.
PROJECTED STATUS WITHOUT IMPROVEMENTS:	With Miller Hill Mall Expansion -LOS - F, Delay > 60 seconds With OPUS Development - LOS - F, Delay > 60 seconds With Miller Hill Mall and OPUS Developments - LOS - F, Delay > 60 seconds 2015 Model (average growth) - LOS - F, Delay > 60 seconds
ESTIMATED COST:	$12 million
AIR QUALITY/ ENVIRONMENTAL:	Hot Spot Analysis needed. Residential impact/relocation with right-of-way acquisition. Full construction impacts unknown.
TRAFFIC IMPACTS OF RECOMMENDATION:	Additional capacity and improvements to intersection will significantly improve traffic flow to commercial corridor. Level of service at the Six-Corners intersection with the full improvement is projected to be C.

RECOMMENDATION: ***Provide connector route linking Highway 53 (Miller Trunk) to Arrowhead Road***

OVERVIEW:

A deficiency that has been identified through this study as well as other transportation studies in the past has been the lack of a good north-south connector linking Highway 53 to Arrowhead Road between Arlington Avenue and Haines Road. This connector has been identified as a need for the following reasons:

* A gap exists in the current transportation network. This gap consists of a lack of principal or minor arterial, and/or a good major collector connecting Highway 53 to Arrowhead Road in the vicinity of the Miller Hill commercial district.

* This gap has attributed to increased neighborhood cut-through traffic in the Duluth Heights neighborhoods. This has led to increased congestion and decreased LOS on Highways 53 and 194, especially at the intersections with Arlington Avenue and Haines Road.

OPTIONS:

The Study Advisory Committee established for this project has identified **three potential options** to remedy this deficiency. This study is not choosing one option over the other. Further study is recommended to identify which option(s) or others not yet identified would resolve the deficiency.

The options appear over the following ten pages. It should be noted again that these **options are just conceptual** and would require more detailed planning analysis and engineering, and would need additional public involvement prior to moving forward. The three options are as follows:

1.) Joshua Avenue Connector

2.) Sundby Road Connector

3.) Maple Grove Road Connector

RECOMMENDATION: ***OPTION 1 - Provide north-south connector route linking Highway 53 (Miller Trunk) to Arrowhead Road***

**** Joshua Avenue Connector***

DESCRIPTION: New construction of a two-lane collector/arterial status roadway including 10-foot wide shoulders. Design speed would be 40 MPH.

REASON NECESSARY: Long term deficiency at this location.

CURRENT STATUS: Improperly aligned north-south legs at Highway 53 signalized intersection. LOS - C at intersection with Highway 53. Joshua Avenue provides access only to adjacent businesses and does not proceed through to Maple Grove Road or further north to Arrowhead Road.

NEED: There is a need for a connector route linking the center of the Miller Hill commercial corridor with Arrowhead Road and further points to the north and northeast. There is also a roadway connector deficiency of over two miles between Arlington Avenue and Haines Road that links the Miller Trunk Highway with Arrowhead Road. One logical location for this route is along this corridor (see map) that has been studied many times in the past. Construction of this route would relieve congestion on Highway 53/Central Entrance and reduce vehicle miles traveled (VMT).

The route would also address the problem of traffic cutting through the adjoining neighborhoods to reach their destinations. This problem will likely increase in severity with the recently realigned Swan Lake Road intersection at Arrowhead Road. Improvements to this intersection allow an easy and legal left-turn for eastbound traffic on Arrowhead Road that are destined for the commercial corridor to the south. This alignment did not exist previously. Therefore, the problem of neighborhood cut-through traffic will likely increase.

PROJECTED STATUS WITHOUT IMPROVEMENTS (At Hwy. 53/ Joshua Ave. / Trinity Rd. Intersection):

With Miller Hill Mall Expansion - LOS - F, Delay > 60 seconds

With OPUS Development - LOS - F, Delay > 60 seconds

With Miller Hill Mall and OPUS Developments - LOS - F, Delay > 60 seconds

2015 Model (average growth) - LOS - F, Delay > 60 seconds

ESTIMATED COST: $2.5 - 3.0 million

AIR QUALITY/ ENVIRONMENTAL: Major points from Environmental Assessment conducted by RREM, Inc. for the Joshua Avenue Project in June of 1985:

- Loss of 3.5 acres of woodland;
- Loss of 1.8 acres of wetland;
- Loss of 0.4 acres of brush/grassland;
- Six to seven homes affected by project (still accurate). More homes have been recently constructed to the east of the conceptual alignment, but not immediately adjacent;
- Air conformity analysis would be required for carbon monoxide; no other significant air quality problems since traffic would be in free flow except at Arrowhead Road and Highway 53/Central Entrance;
- Erosion Control Plan for sedimentation will be done; and
- Limit access onto Joshua Avenue with future plats to mitigate noise and congestion issues.

Additional approvals and permits would be required for the project in accordance with the Duluth City Zoning Code. The acquisition and relocation costs have not been calculated for the six to seven homes likely in the path or right-of-way for the roadway extension.

TRAFFIC IMPACTS OF RECOMMENDATION: Connector will help to alleviate neighborhood cut-through traffic that is estimated to be between 35% to 40% of the total traffic that is traveling on the adjoining neighborhood streets. This estimate was generated based on comparisons between existing counts in the neighborhood versus TRANPLAN (modeling software) predictions of traffic for the area given the amount of housing.

Traffic is projected to decrease by 19% on Arlington Avenue between Arrowhead Road and Central Entrance.

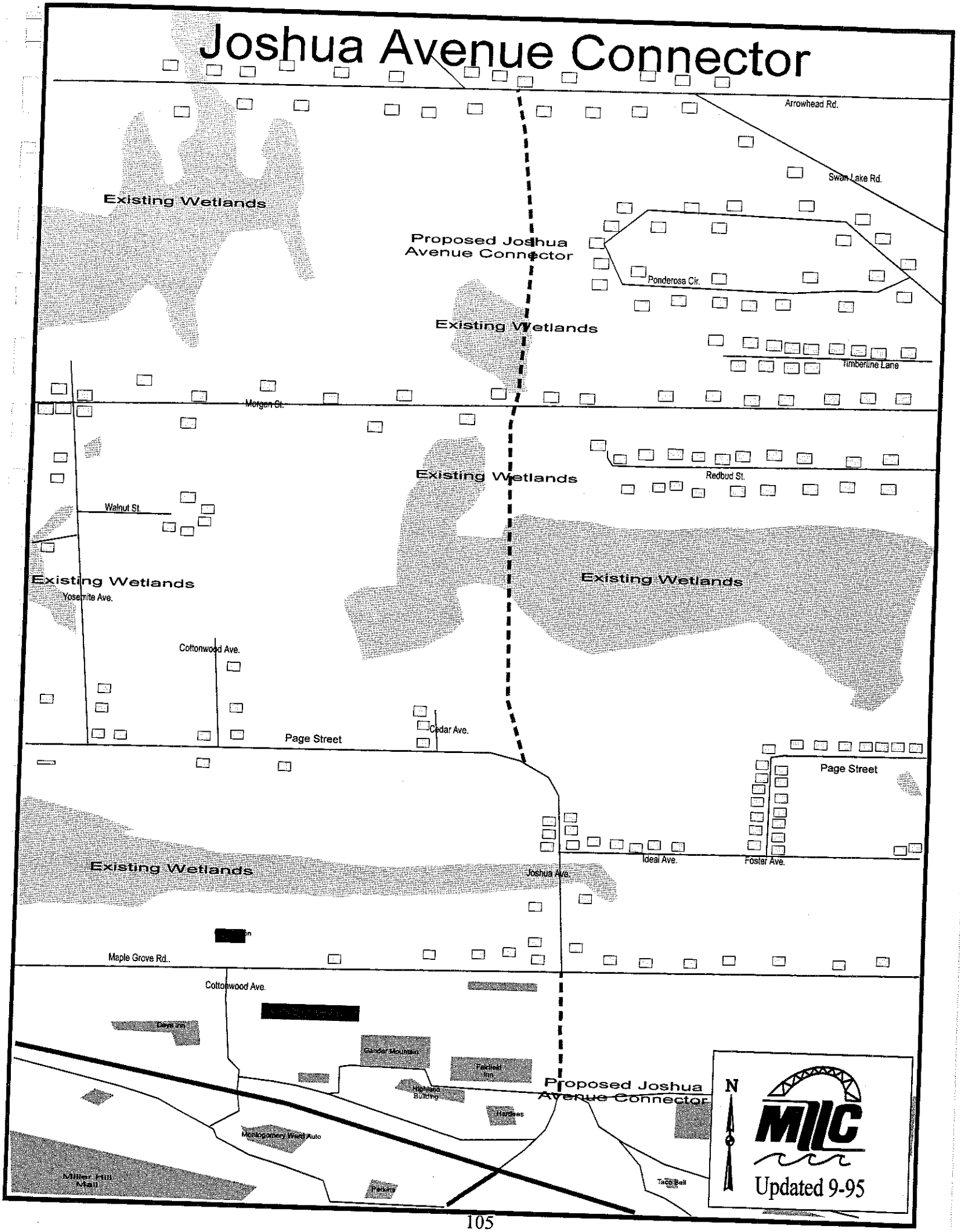
Traffic is projected to decrease by 6% on Haines Road between Highway 53 and Arrowhead Road.

Traffic is projected to increase by 27% on Arrowhead Road between Swan Lake Road and Arlington Avenue.

This option has the potential added benefit of route continuation to Rice Lake Road (CSAH 4) near the intersection with Airport Road. This scenario would further benefit regional traffic movement and have a more significant impact on traffic reduction for the road segments listed above (refer to Appendix).

If this option is joined with a Maple Grove Road extension to Arlington Avenue, traffic reduction on the primary roads in the study area is decreased to a greater extent than with solely the Joshua Avenue connector to Arrowhead Road (refer to Appendix).

Joshua Avenue Connector



RECOMMENDATION: ***OPTION 2 - Provide north-south connector route linking Highway 53 (Miller Trunk) to Arrowhead Road***

**** Sundby Road Connector***

DESCRIPTION: New construction of a two-lane collector/arterial status roadway including 10-foot wide shoulders. Design speed would be 40 MPH.

REASON NECESSARY: Long term deficiency for a facility of this type within this area of the Miller Hill corridor.

CURRENT STATUS: There is no north-south direct connector route between Haines Road and Arlington Avenue linking Highway 53 to Arrowhead Road.

Sundby Road/Maple Grove Road intersection with Highway 53 is improperly aligned, without proper lane channelization and is without stacking distance for vehicles. (Potential options to remedy this problem have been proposed in the "Solutions To Existing Problems" section.)

NEED: There is a need for a connector route linking the center of the Miller Hill commercial corridor with Arrowhead Road and further points to the north and northeast. The Sundby Road option provides this connection (see map). This option could be tied into the intersection detachment recommendation stated in a prior section of this report. A new intersection could be built to take into account proper traffic flow and geometrics. In addition, a new intersection for Sundby Road would provide incentive to continue the connection proposal linking Highway 53 with Arrowhead Road.

PROJECTED STATUS WITHOUT INTERSECTION IMPROVEMENTS: If this option is not feasible and if the intersection is not detached from Highway 53, LOS will decline at the current intersection and at adjacent roadways.

ESTIMATED COST: $2.5 - 3.0 million.

AIR QUALITY/ ENVIRONMENTAL: Air Conformity analysis needed. Other wetland or woodland mitigation measures are unknown at this time.

TRAFFIC IMPACTS OF RECOMMENDATION:

Connector will help to alleviate some of the neighborhood cut-through traffic that is estimated to be between 35% to 40% of the total traffic that is currently traveling on Swan Lake Road/Eklund Avenue/Maple Grove Road to reach their destinations. (The decrease would **not** be as significant as with the Joshua Avenue recommendation.) This estimate was generated based on comparisons between existing counts in the neighborhood versus TRANPLAN (modeling software) predictions of traffic for the area given the amount of housing.

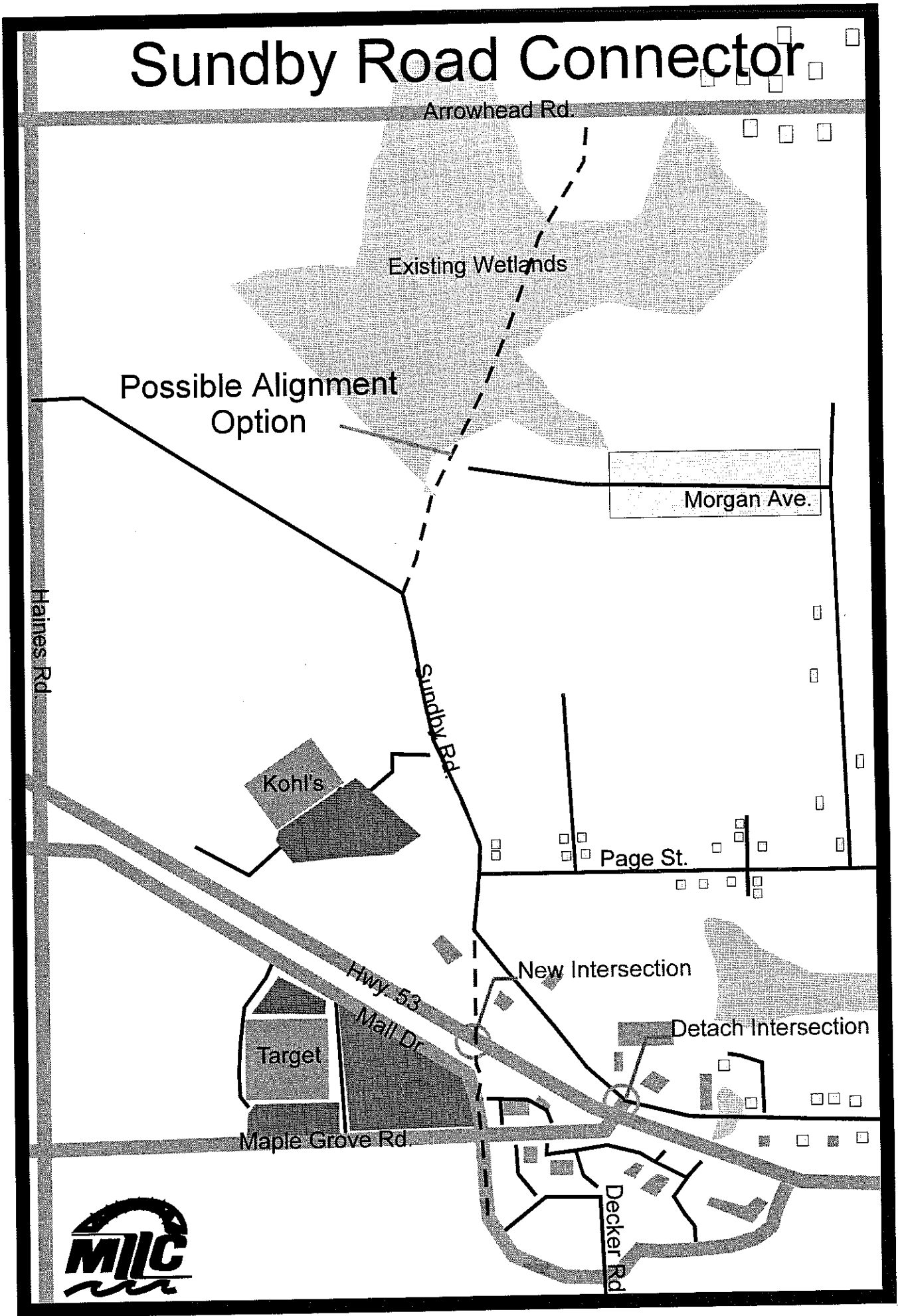
Traffic is projected to decrease by 17% on Arlington Avenue between Arrowhead Road and Central Entrance.

Traffic is projected to increase by 9% on Highway 53 between Cottonwood Avenue and Maple Grove Road.

Traffic is projected to increase by 23% on Arrowhead Road between Swan Lake Road and Arlington Avenue.

This option would not provide for logical continuation of the proposed roadway to Rice Lake Road (CSAH 4).

If this option is joined with a Maple Grove Road extension to Arlington Avenue, traffic reduction on the primary roads in the study area is decreased or increased to a greater extent than with solely the Sundby Road extension to Arrowhead Road (refer to Appendix).


Sundby Road Connector
Arrowhead Rd.
Existing Wetlands
Possible Alignment Option
Morgan Ave.
Haines Rd.
Sundby Rd.
Kohl's
Page St.
New Intersection
Hwy. 53
Mall Dr.
Target
Detach Intersection
Maple Grove Rd.
Decker Rd.
MLC

RECOMMENDATION: ***OPTION 3 - Provide east-west connector route linking Highway 53 (Miller Trunk) to Arlington Avenue and Arrowhead Road***

**** Maple Grove Road Connector***

DESCRIPTION: New roadway construction or an upgrade of existing roadways linking existing Maple Grove Road at the intersection with Swan Lake Road eastward to Arlington Avenue.

REASON NECESSARY: Long term deficiency for a facility of this type within this area of the Miller Hill corridor.

CURRENT STATUS: Low ADT's at the current intersection of Maple Grove Road and Swan Lake Road. Arlington Avenue carries 5,300 vehicles daily near the location where Maple Grove Road would intersect Arlington Avenue.

NEED: Due to increasing traffic congestion there is a need for a connector route linking the center of the Miller Hill commercial corridor with Arlington Avenue, Arrowhead Road and further points to the north and northeast. This recommendation would provide an enhanced parallel route to Highway 53/Central Entrance and help to decrease volumes on that roadway (see map).

A second connection option would entail linking Swan Lake Road at the Basswood Avenue intersection with Arlington Avenue via the existing Mulberry Street. Roadway upgrades and sidewalk construction would be needed along existing Swan Lake Road and Maple Grove Road.

For this option, it is assumed that Joshua Avenue would not be extended to Maple Grove Road. This agreement exists between the City of Duluth and property owners in the immediate area of the intersection with Highway 53/Central Entrance. To make this recommendation more effective in relieving congestion on Highway 53 in front of the Miller Hill Mall, this agreement may have to be reexamined and waived even though homes fronting Maple Grove Road may be adversely affected with increases in traffic.

PROJECTED STATUS WITHOUT IMPROVEMENTS: Without this project, LOS continues to decline on the Miller Trunk Highway.

ESTIMATED COST: $1 million

This cost does not include improvements to existing Maple Grove Road or Arlington Avenue which would need to be upgraded as traffic would significantly increase on these roadway sections.

AIR QUALITY/ ENVIRONMENTAL: Air Conformity analysis needed. Other wetland or woodland mitigation measures are unknown at this time.

Approximately 30 to 40 homes would be affected along Maple Grove Road.

A City Community Center and park area would be disrupted with the alignment options leading to Arlington Avenue.

TRAFFIC IMPACTS OF RECOMMENDATION: This recommendation would likely necessitate upgrading Maple Grove Road between Highway 53 and Swan Lake Road plus upgrading Arlington Avenue from Arrowhead Road to the newly constructed Maple Grove intersection. This would be necessary due to increases in traffic using this route to access the Miller Hill commercial area. The increase in traffic is projected to be 33% on Arlington Avenue. Maple Grove Road traffic is projected to increase by a factor of 18 (e.g. 300 ADT to 5,300 ADT).

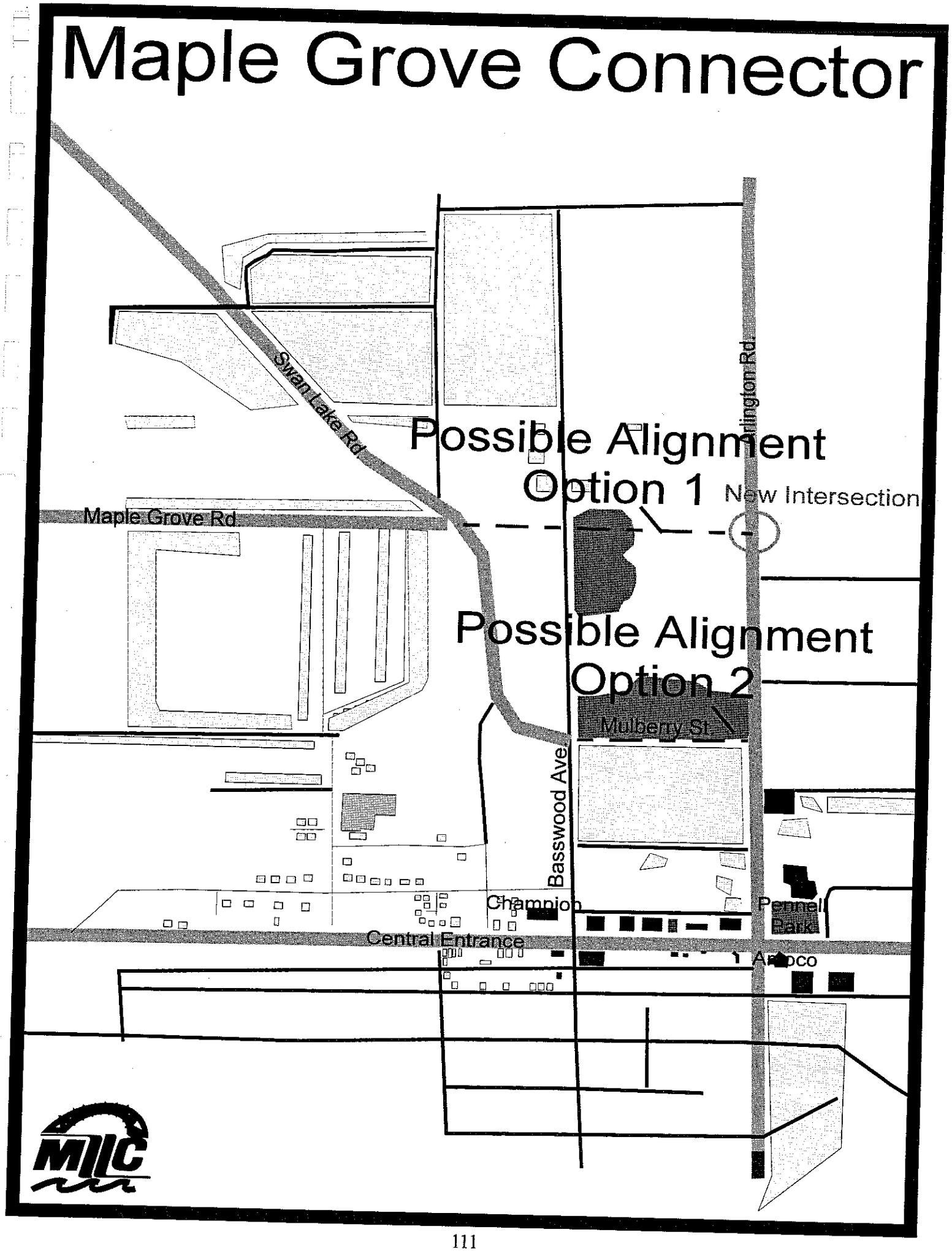
Connector will help to alleviate some of the neighborhood cut-through traffic that is estimated to be between 35% to 40% of the total traffic that is currently traveling on Swan Lake Road/Eklund Avenue/Maple Grove Road to reach their destinations. This estimate was generated based on comparisons between existing counts in the neighborhood versus TRANPLAN (modeling software) predictions of traffic for the area given the amount of housing.

Traffic is projected to decrease by 20% on Arrowhead Road between Swan Lake Road and Arlington Avenue.

Traffic is projected to decrease by 18% on Central Entrance between Anderson Road and Arlington Avenue.

If this option is joined with a Joshua Avenue extension or a Sundby Road extension, traffic reduction on the primary roads in the study area is decreased or increased to a greater extent than with solely the Maple Grove Road connector to Arlington Avenue (refer to Appendix).

Maple Grove Connector



RECOMMENDATION: ***Provide an east-west connector road between Trinity Road and Burning Tree Road as future conditions may warrant***

DESCRIPTION: Like the previous recommendation (dealing with a north-south connector between T.H. 53 and Arrowhead Road), this recommendation is conceptual in nature and only applies as future conditions warrant.

The recommendation has been broken down into two phases. Phase I is a connector between Trinity Road and Decker Road, and Phase II involves extending Burning Tree Road between Mountain Shadow Drive and Decker Road which would provide connection all the way to Maple Grove Road and destinations further west. It should be noted that the actual alignment of any roadway would require a separate engineering study. Again, the alignment shown on the ensuing map is shown for conceptual purposes only.

Phase I: Construct a roadway that would connect Trinity Road to Decker Road. It is recommended that a portion of this new roadway utilize the southern boundary of the Miller Hill Mall parking lot. For the connector road to work properly, the roadway running along the outer edge of the mall parking lot should be separated from the parking lot with curbing, and permit only limited access into the mall. It is also recommended that this roadway connect with Trinity Road at the proposed signalized intersection between the Miller Hill Mall and the proposed OPUS development. This new roadway should not connect to Chambersburg Avenue. Connecting to Chambersburg Avenue would lead to additional neighborhood cut-through traffic, something this study is trying to alleviate.

Phase II: Extend current Burning Tree Road east of Mountain Shadow Drive to Decker Road. Roadway should be constructed with minimal impact to current residential area.

REASON NECESSARY: Lack of an east-west access route linking Trinity Road to the commercial development west of the Miller Hill Mall. The lack of an east-west connector has led to increased short trips taken on TH 53 and increased traffic cutting through neighborhoods. Because part of the proposed new roadway is located on the Miller Hill Mall property, it would be advantageous for the city to get agreements in place for construction of Phase I, if needed, at a later date.

CURRENT STATUS: Burning Tree Road extends east from Maple Grove Road and terminates immediately south of Mountain Shadow Drive. There is no direct connection between Decker Road and Trinity Road immediately south of the Miller Hill Mall.

NEED: To help relieve traffic on the Miller Trunk Highway by providing an alternative route for vehicles traveling between the east end of the corridor (Stone Ridge Mall, proposed OPUS Mall,...) to the west end of the corridor (Target, Burning Tree Plaza...) and vice versa;

To help alleviate traffic cutting through the Anderson Road neighborhood;

To provide a second and more direct access from the southwest to a potential major traffic generator such as Daytons;

To aid the current and long term capacity problems at the Decker Road/Mall Drive intersection.

PROJECTED STATUS: Level of service on Highway 53 continues to decline with no other good option for traffic to move from the west end to the east end of the corridor (and vice versa). Cut-through traffic is projected to increase for vehicles traveling via Anderson Road and Decker Road.

ESTIMATED COST: Phase I - $500,000 to $1,250,000
Phase II - $250,000 to $500,000

Cost based on an estimate of approximately $200 per running foot. Cost includes: site preparation, curb to curb surface cost, restoration and landscaping, curb and gutter and bridge over Miller Creek. No right-of-way costs are reflected. (Phase I = approximately ½ mile of new roadway. Phase II = approximately 1/4 mile of new roadway).

AIR QUALITY/ ENVIRONMENTAL: Air Quality Conformity Analysis needed. Other wetland and/or woodland mitigation measures probable. Phase I would require a bridge across the Miller Creek which has been negatively impacted by commercial development in the past, and Phase II would be constructed in an area currently zoned residential.

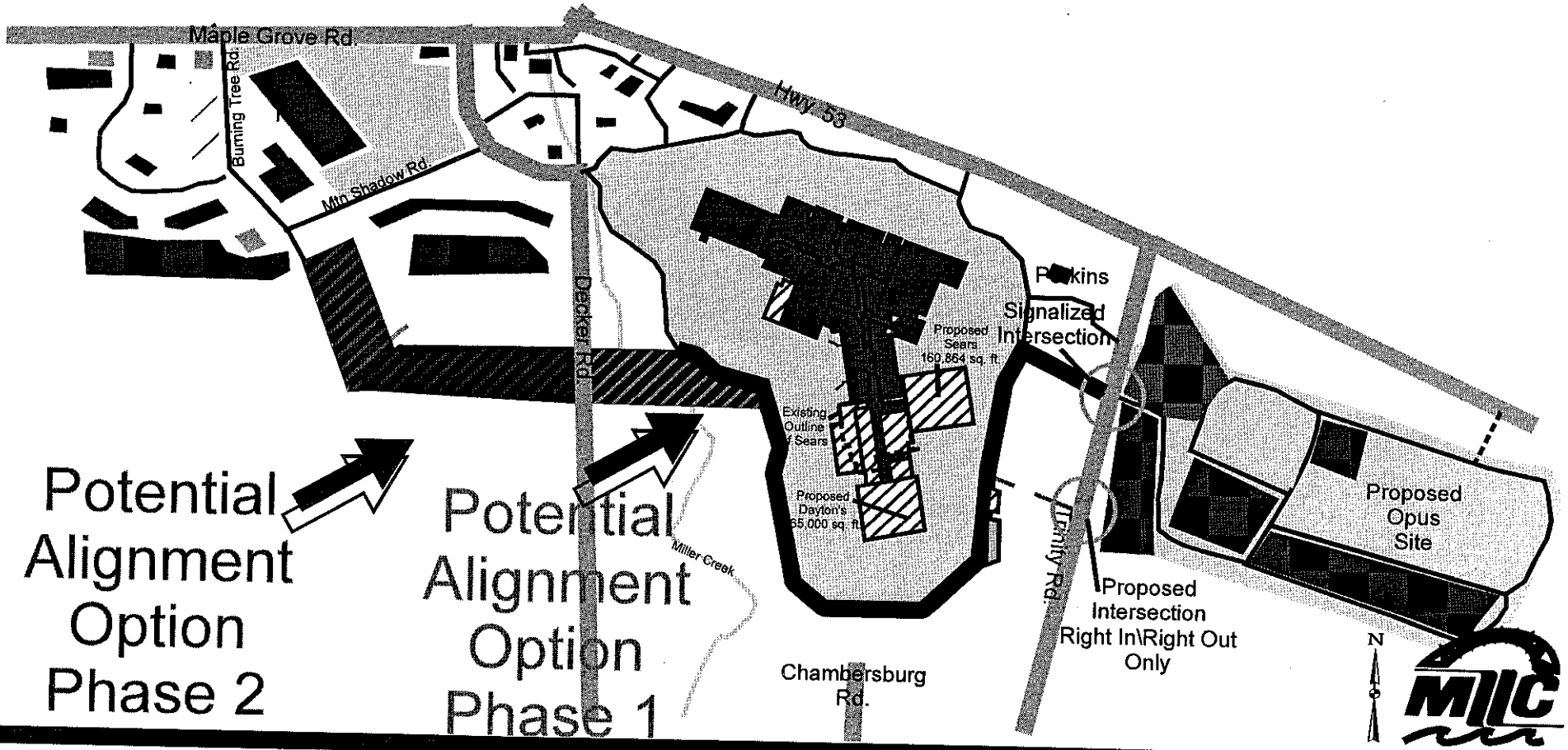
TRAFFIC IMPACTS OF RECOMMENDATION:

Pros: Traffic on Trinity Road, Anderson Road (between Trinity Road and Decker Road), T.H. 53, and at the Mall Drive/Decker Road intersection decreases.

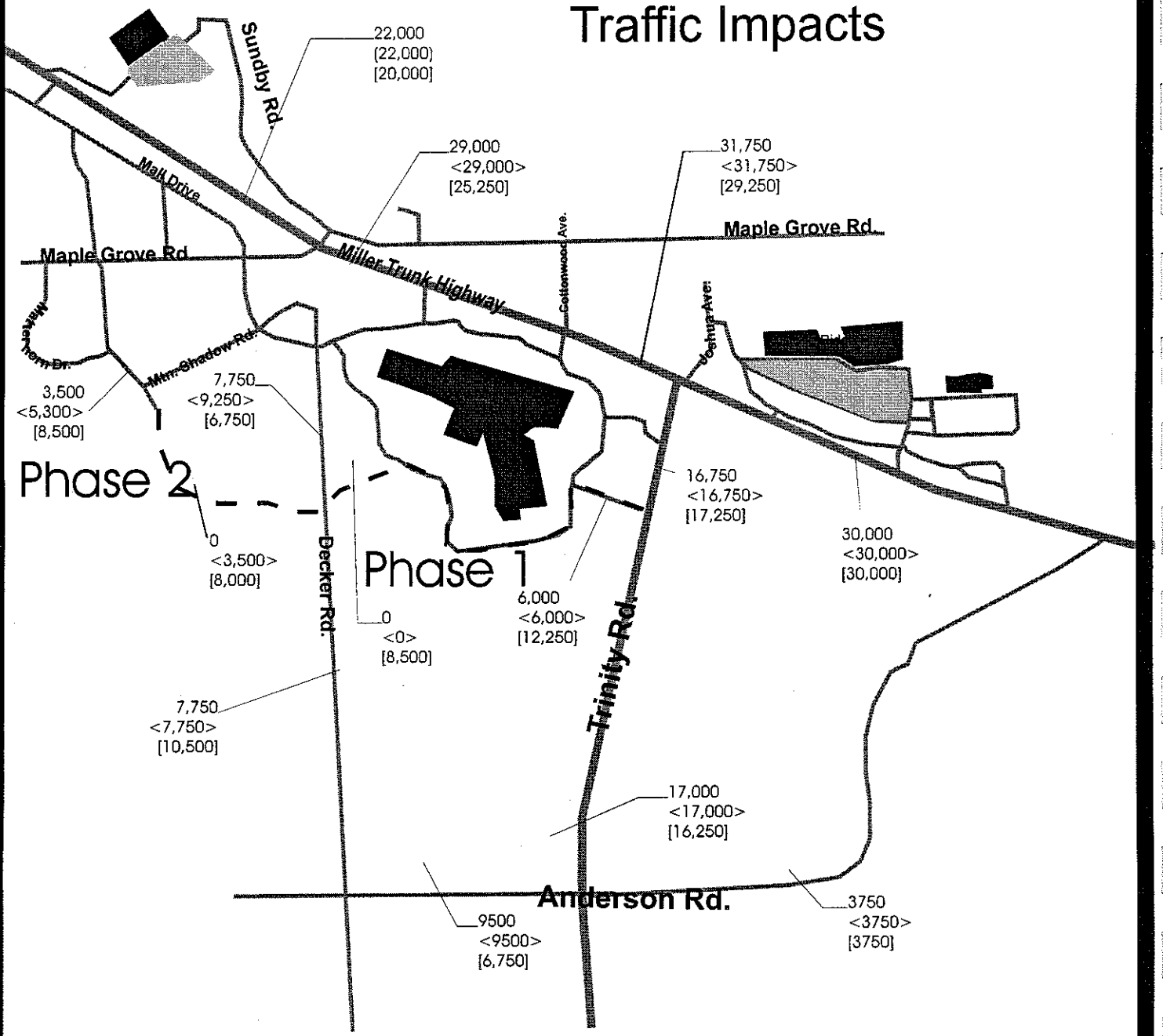
Cons: Traffic on Decker Road would increase.

(See attached 2015 Projected Daily Traffic Forecast Map.)

Burning Tree to Trinity Connector



2015 Trinity to Decker Backage Rd Traffic Impacts



Network Alternatives

xxx = Projected Volumes without 1 and 2

<xxx> = With 2 and without 1

[xxx] = With 1 and 2

Other Long Term Recommendations

DULUTH

The City of Duluth should undertake a Thoroughfare Plan for all major arterial and collector streets. This plan would incorporate analysis of current deficiencies and provide recommendations for long term traffic flow throughout the city. The City of Duluth should also update its comprehensive land use plan for the Miller Hill area.

HERMANTOWN

The City of Hermantown in cooperation with MN/DOT should monitor future access onto Highway 53 from potential commercial or industrial sites in order to prevent congestion problems. Where possible, existing access points should be consolidated to lessen the number of curb cuts. This issue will be essential in maintaining current levels of service for the corridor within Hermantown. As development does occur, additional capacity in the form of turn lanes should be considered at the intersections of Haines Road/Highway 53 and Arrowhead Road/Highway 53.

In addition, with the majority of undeveloped commercial land in the corridor located in Hermantown, a roadway network consisting of frontage or other access routes should be planned that connect development sites with minimal or no impact on the major arterials. Such action should occur at the site design approval stage when negotiations occur with developers.

P.M. Peak Hour Projected Traffic Counts

Current Conditions

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve Arlington Ave / Central Entrance Intersection	B	2080	8.5	B	2190	13.8	D	470	37.1	D	670	31	**C**	**5410**	**16.2**
Improve Trinity Road / Arlington Ave Intersection	D	N/A	37.4	F	330	64.2	A	990	2	A	820	1.7	**B**	**2140**	**11.9**
Improve Trinity Rd / Anderson Rd Intersection	D	240	28.5	D	340	29.4	A	750	4.8	A	710	5	**B**	**2040**	**10.9**
Add SB Lane on Trinity Rd	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**	**N/A**	**N/A**
Construct North-South Connector from Arrowhead Rd To Miller Trunk Highway	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

** Please see appendix for detailed impact analysis of north-south connector route

P.M. Peak Hour Projected Traffic Counts
2015 Growth Scenario w/ No Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve Arlington Ave / Central Entrance Intersection	C	2970	19.4	D	2800	28.1	F	730	>60	D	1230	37.7	F	7730	>60
Improve Trinity Road / Arlington Ave Intersection	D	N/A	39.4	F	N/A	105.9	A	1320	2.4	A	1030	2.1	C	2350	16.0
Improve Trinity Rd / Anderson Rd Intersection	D	500	26.6	C	3900	24.6	B	960	7.9	B	930	9.1	B	6290	13.6
Add SB Lane on Trinity Rd	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construct North-South Connector from Arrowhead Rd To Miller Trunk Highway	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

** Please see appendix for detailed impact analysis of north-south connector route

P.M. Peak Hour Projected Traffic Counts
2015 Growth Scenario w/ Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve Arlington Ave / Central Entrance Intersection	C	2970	16.8	C	2800	22.8	D	730	31.3	D	1230	34.6	C	7730	23.9
Improve Trinity Road / Arlington Ave Intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1320	N/A	N/A	N/A	N/A	N/A	1320	N/A
Improve Trinity Rd / Anderson Rd Intersection	N/A	500	N/A	N/A	3900	N/A	N/A	960	N/A	N/A	1030	N/A	N/A	6390	N/A
Add SB Lane on Trinity Rd	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construct North-South Connector from Arrowhead Rd To Miller Trunk Highway	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

** Please see appendix for detailed impact analysis of north-south connector route

P.M. Peak Hour Projected Traffic Counts

Current Conditions w/ Both Developments

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve Arlington Ave / Central Entrance Intersection	B	2420	8.9	B	2290	13.6	E	510	58.5	D	710	33.4	C	5930	18.6
Improve Trinity Road / Arlington Ave Intersection	D	N/A	38.3	F	580	72	A	1060	1.9	A	880	1.6	B	2520	11.9
Improve Trinity Rd / Anderson Rd Intersection	D	370	28.3	D	260	29.3	B	800	5.1	B	760	5.3	B	2190	11.3
Add SB Lane on Trinity Rd	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construct North-South Connector from Arrowhead Rd To Miller Trunk Highway	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

** Please see appendix for detailed impact analysis of north-south connector route

P.M. Peak Hour Projected Traffic Counts

Both Developments w/ Improvements

Intersection	East Leg			West Leg			North Leg			South Leg			INTERSECTION TOTAL		
	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	L.O.S.	ADT (x10)	Delay	Avg. LOS	Total ADT (x10)	Avg. Delay
Improve Arlington Ave / Central Entrance Intersection	B	2420	10.4	C	2290	15.2	D	510	33.1	D	710	36.7	C	5930	17.6
Improve Trinity Road / Arlington Ave Intersection	N/A	N/A	N/A	N/A	580	N/A	N/A	1060	N/A	N/A	880	N/A	N/A	2520	N/A
Improve Trinity Rd / Anderson Rd Intersection	N/A	370	N/A	N/A	260	N/A	N/A	800	N/A	N/A	760	N/A	N/A	2190	N/A
Add SB Lane on Trinity Rd	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construct North-South Connector from Arrowhead Rd To Miller Trunk Highway	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

** Please see appendix for detailed impact analysis of north-south connector route

SECTION D:

TRANSIT IMPROVEMENTS

TRANSIT RECOMMENDATIONS

Transit Modifications if Simon Expands:

If the Miller Hill Mall expands, no significant changes to the DTA's transit network will need to be made. The Miller Hill Mall's entrance fronting Highway 53 will continue to be the Mall Area Connector's (MAC) main hub. Regular route service will continue as it currently exists.

Transit Modifications if OPUS Develops:

If OPUS develops, minor modifications will have to be made to the MAC route. On the east loop, the MAC will travel out of the Southeast Miller Hill Entrance across Trinity Road and into the OPUS site. From the OPUS site, the MAC will travel out of the main OPUS entrance, across Central Entrance and into the Stone Ridge site. This modification can be done without adding any time to the current east loop.

Transit Modifications if Both Developments Occur:

The same modifications will be made as those if OPUS develops. These modifications are described above.

Mid to Long Term Transit Recommendations:

1. *Add MAC service to other retail sites in the Miller Hill Corridor.*

   Many stores are not being serviced in the corridor. These include Gander Mountain, Marty Irvin, Village II Mall, Kohl's, and Wal-Mart. If demand warrants, the DTA should examine potential MAC service to these sites. This may mean having to use the second low-floor bus. Currently the cost of providing another low-floor bus to complement the existing MAC service is prohibitive. With expanded and new malls, demand might be great enough to supply this extra service.

2. *Add more direct service routes from other parts of the city.*

   With the increased expansion taking place in the Miller Hill Corridor, demand may warrant more direct service from other parts of the city. Currently the DTA has direct service from the Lakeside area and the Downtown area. Direct service from West Duluth and/or Proctor may be a future option as well as more service from downtown and the UMD/Kenwood area. Also, as Hermantown, Proctor and other surrounding townships continue to grow, transit services in the form of circulators and/or dial-a-ride may be warranted.

3. *Examine the potential for a transit hub in the Miller Hill Corridor.*

If the DTA adds routes to the Miller Hill area from other parts of the city, a transit hub may be a worthwhile investment. A hub would provide a transit stop for buses and shelters for people to use. A transit hub would allow all regular and express routes to originate and terminate at one location. Anyone wishing to travel to the retail sites could utilize the MAC. This recommendation would require expansion of the current MAC services to two buses.

4. *Implement Park & Ride Lots in the Miller Hill Corridor*

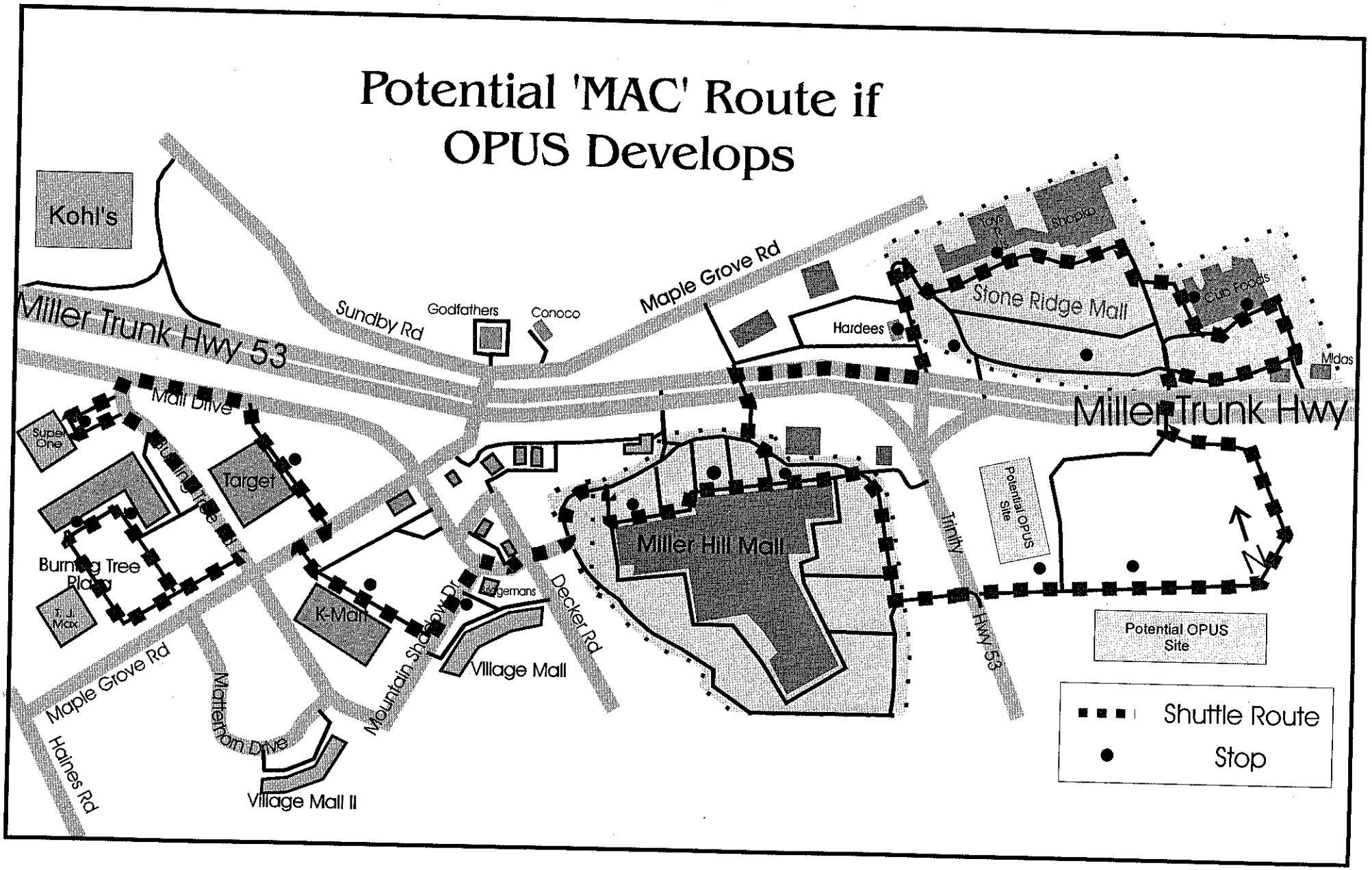
The 1992 Metropolitan Park & Ride Lot Study identified several sites in the Duluth-Superior area that could be used as Park and Ride Lots. Among these were two in the Miller Hill Corridor. The Cinema 8 parking lot and the Burning Tree Plaza parking lot were both identified as having the potential to be used for this exact purpose.

5. *Implement Travel Demand Management Strategies in the Miller Hill Corridor.*

Travel Demand Management (TDM) refers to creative strategies that get people out of single occupant vehicles (SOV) and into car-pools and/or onto public transit. These strategies include incentives to ride transit and car-pool and parking management activities. TDM strategies could reduce the number of vehicles that travel through the corridor on a daily basis.

6. *Transit Site Design Issues*

City staff needs to ensure that developers take transit into account in the site design process. Detailed analysis of specific site design strategies can be seen in the appendices.


Potential 'MAC' Route if OPUS Develops
Kohl's
Miller Trunk Hwy 53
Sundby Rd
Godfathers
Conoco
Maple Grove Rd
Hardees
Stone Ridge Mall
Old Navy
Sheplers
Cub Foods
Midas
Miller Trunk Hwy
Mall Drive
Super One
Target
Burning Tree Plaza
T. J. Max
K-Mart
Bergemans
Mountain Shadow Dr
Village Mall
Decker Rd
Miller Hill Mall
Trinity
Potential OPUS Site
HWY 53
Potential OPUS Site
Maple Grove Rd
Haines Rd
Matterhorn Drive
Village Mall II
Shuttle Route
Stop

SECTION E:

BICYCLE/PEDESTRIAN IMPROVEMENTS

PEDESTRIAN/BICYCLE RECOMMENDATIONS

Recommendations follow for pedestrian and bicycle movement within the Miller Hill corridor. Included are recommendations to connect store fronts with roadside sidewalks or bike paths. Dedicated walkways through a parking lot are needed to encourage inter-connectivity of sites without having to drive short distances via private automobile. These walkways could lead to sidewalk that does exist immediately in front of a commercial establishment. Such a facility would accomplish this objective and at the same time increase safety and allow an opportunity for aesthetic enhancement of a commercial site. Curb cuts allowing wheelchair access to sidewalks should be a mandatory component of all planned improvements.

Responsible parties for implementing each recommendation have not been identified at this time. This issue is best discussed between the developer or owner and government jurisdiction. Projects described below should be considered and implemented as a component of any roadway reconstruction project. Such a policy would ensure that bicyclist and pedestrian needs are accounted for in the design stages of project development.

All implemented recommendations need to account for maintenance of the finished facility. This aspect is often overlooked in cost projections, yet is critically important to ensure a safe and usable facility for many years to follow. Winter maintenance of walkways will ensure year-round use by pedestrians and greatly increase safety.

The bicycle facility recommendations stated in this report reflect those described in the **Duluth - Superior Metropolitan Bikeways Plan** recently completed by the Metropolitan Interstate Committee. This plan discusses many other facility improvements that can aid and encourage bicycle travel.

Cost estimates for walkways within a commercial site have not been calculated. Design of such a facility could vary significantly depending on location. Exact sidewalk specifications including cost is best left for the developer/owner of a commercial site and the appropriate governmental jurisdiction to negotiate. These recommendations only state that internal sidewalk/bikeway facilities should be accounted for in development review of a commercial site.

Cost estimates have also not been calculated for a fully signalized intersection with crosswalk indicators. Intersection signalization costs are included in the roadway recommendations in prior sections of this report.

NOTE: With regard to state-aid monies for use in transportation projects, a municipality is reimbursed for provision of sidewalks as a component of a roadway project. However, this is not true for a roadway that is under County jurisdiction. Additionally, the county does not assess landowners for sidewalk improvements. This situation forces the county to use local funds (tax dollars), if possible, for sidewalk improvements adjacent to a roadway.

Recommendations are divided into three categories by general location (refer to map). Italicized text indicates how each facility recommendation would be liked with other sidewalk/bikeway segments to provide for a complete transportation network.

Maple Grove Road / Mall Drive Area

- Widen and improve existing sidewalk on the south side of Maple Grove Road between Haines Road and Mall Drive. Provide internal walkway/access to K-Mart from Maple Grove Road. Construct new sidewalk on the south side of Maple Grove Road to the intersection with Highway 53. *Links to Miller Trunk Highway proposed sidewalk/pathway. Links to Haines Road existing sidewalk.*

- Construct sidewalk on the north side of Maple Grove Road between Haines Road and Mall Drive. Provide internal walkway/access to Target from Maple Grove Road. *Links to Miller Trunk Highway proposed sidewalk/pathway. Links to Haines Road proposed sidewalk.*

- Construct sidewalk on the south and west side of Mall Drive from Haines Road to Decker Road. Provide internal walkway/access to Target/K-Mart/Village Mall East from Mall Drive. *Links to Haines Road existing sidewalk. Links to Decker Road existing sidewalk.*
- Construct sidewalk link on east side of Haines Road between Mall Drive and Maple Grove Road. *Link would connect with existing sidewalk that runs north to Highway 53 and south to Anderson Road/Piedmont Avenue.*

- Construct sidewalk on the west side of Burning Tree Road between Mall Drive and Mt. Shadow Drive. Provide internal walkway/access to Super One Grocery Store, Burning Tree Plaza and Village Mall West. *Links to proposed Mall Drive sidewalk. Links to proposed Mt. Shadow Drive sidewalk.*

- Construct sidewalk on the south side of Mt. Shadow Drive between Burning Tree Road and Mall Drive. Provide internal walkway/access to Village Mall East. *Links to proposed Burning Tree sidewalk. Links to proposed Mall Drive sidewalk.*

- Construct sidewalk on the west side of Sundby Road from the intersection with Highway 53 to Haines Road including a walkway to Kohl's Department Store. Multi-family residential development along this segment would benefit greatly by construction of sidewalks. *Links to Highway 53 proposed sidewalk/pathway where a crosswalk signal is also recommended.*

- Construct sidewalk along one side of Maple Grove Road between Highway 53 and Swan Lake Road. *Links to Highway 53 proposed sidewalk/pathway. Links to Central Entrance sidewalk.*

- Construct sidewalk along one side of Swan Lake Road between Arrowhead Road and Basswood Avenue. *Links to Central Entrance sidewalk.*

- Crosswalks with full signalization and pavement markings are recommended at the following intersections:
  - Maple Grove Road/Haines Road. Intersection signals are planned for installation in 1995;
  - Maple Grove Road/Burning Tree Road. Intersection signals are recommended as a short term traffic improvement at this location;
  - Maple Grove Road/Mall Drive. Intersection signals are planned for installation in 1995;
  - Maple Grove Road/Highway 53. Pedestrian movement is important here with commercial development expanding along Sundby Road. This crosswalk project could be coupled with traffic improvements necessary at this intersection.

Miller Hill Mall Area

- Construct sidewalk and/or bike pathway on the south side of Highway 53 between Maple Grove Road and Trinity Road. This would provide a non-motorized method of travel adjacent to the roadway. Right-of-way does exist to build such a facility. Internal walkways should be provided to link the proposed facility with the mall. *Links to proposed Maple Grove Road sidewalk. Links to proposed Central Entrance pathway.*

- Construct sidewalk on both sides of Cottonwood Avenue between Highway 53 and Maple Grove Road. This facility would provide direct access to Miller Hill Mall from the motel, the large multifamily apartment building and neighborhood residents to the north. A crosswalk exists at the intersection. *Links to Miller Trunk Highway proposed sidewalk/pathway.*

- Construct sidewalk and/or bike pathway on the north side of Highway 53 between Cottonwood Avenue and Joshua Avenue. *Links to proposed Cottonwood Avenue sidewalk. Links to proposed Joshua Avenue sidewalk.*

- Construct sidewalk on the west side of Joshua Avenue between Highway 53 and a proposed bike/pedestrian path that would extend eastward toward the Stone Ridge Plaza. *Links to proposed Miller Trunk Highway sidewalk/pathway. Links to proposed Stone Ridge Plaza sidewalk/pathway.*

- Crosswalks with full signalization and pavement markings are recommended at the following intersections:
  - Highway 53/Central Entrance/Trinity Road/Joshua Avenue;
  - Decker Road/Mall Drive/Miller Hill Mall Entrance (*Contingent on development of SIMON project);*
  - Trinity Road/Miller Hill Mall Entrance/OPUS Entrance (*Contingent on development of SIMON or OPUS project).* Estimated sidewalk only cost (internal to the OPUS site) on one side of roadway = $10,500.

Central Entrance Area

- Construct a bike/pedestrian pathway through the Stone Ridge Plaza from Joshua Avenue eastward to the Sundby Road cul-de-sac east of Cub Foods. Internal walkways should be provided to the major retail stores at this shopping center from the main pathway. *Links to proposed Joshua Avenue sidewalk. Links to Central Entrance existing sidewalk.*

- Construct a bike/pedestrian pathway from the intersection of Highway 53/Central Entrance/Trinity Road that would run south and east through or around proposed development along the south side of Central Entrance between Trinity Road and Anderson Road (OPUS site). Alignment of such a route could be a condition of development at this site. Internal walkways should be provided to the major retail stores at a proposed shopping center from the main pathway. *Links to proposed Miller Trunk Highway sidewalk/pathway. Links to Anderson Road which has been designated as a bicycle route.*

- Construct sidewalk on the south side of Central Entrance from the Anderson Road intersection to the point where the sidewalk does exist (near Teak Avenue; approximately 500 feet). Sidewalk would then exist on both sides of Central Entrance between Anderson Road and Arlington Avenue. *Links to Anderson Road which is a designated bicycle route. Links to Central Entrance Bike Path.*

- Crosswalks with full signalization and pavement markings are recommended at the following intersection:

    - Central Entrance/Stone Ridge Plaza/OPUS Entrance (*Contingent on development of OPUS project).* Estimated sidewalk only cost (internal to the OPUS site) on one side of roadway = $6,000.

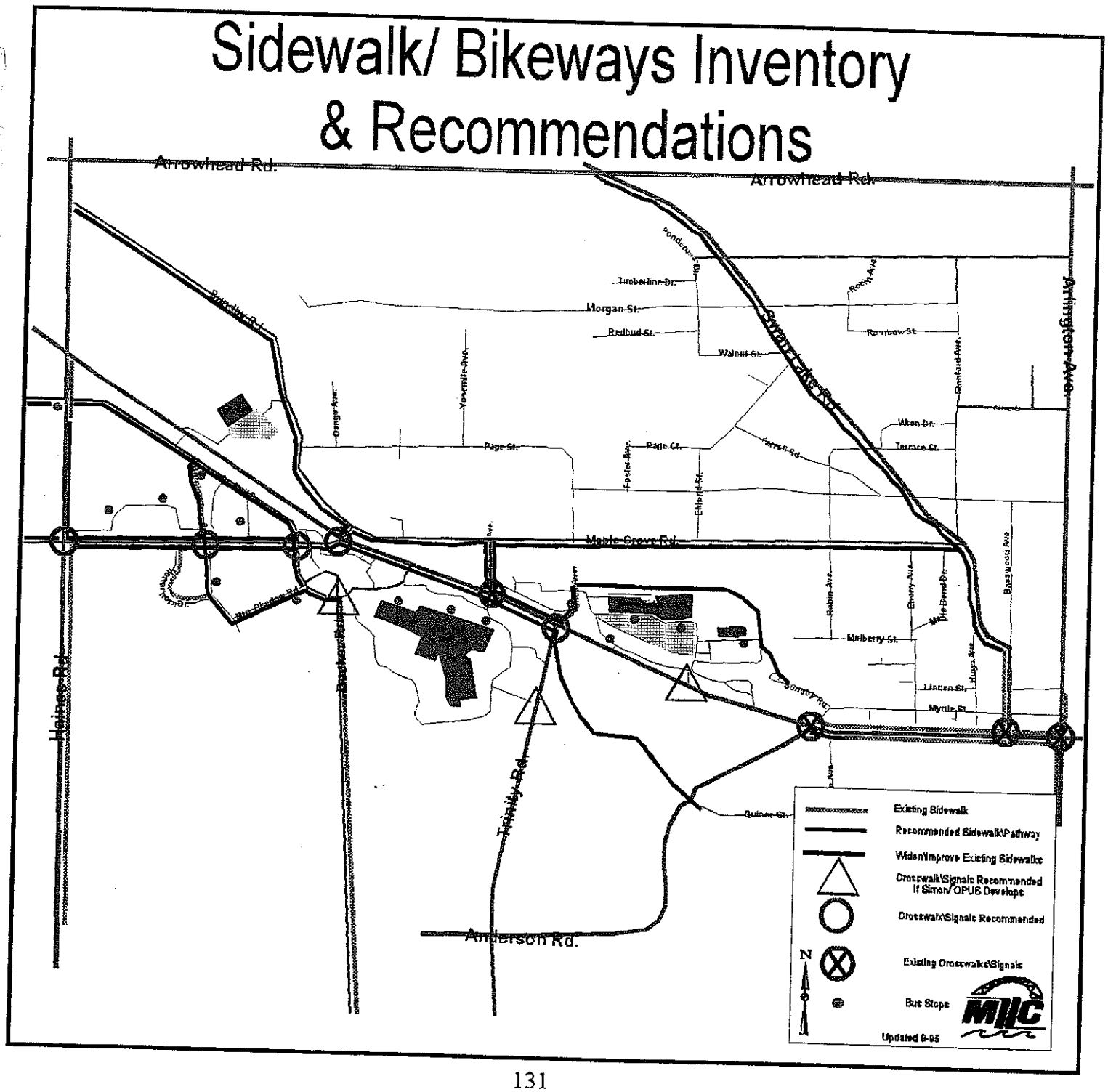
Other Recommendations

Hermantown

- Sidewalk should be extended westward along Mall Drive on the north and/or south side from Haines Road to the Wal-Mart location in Hermantown. An internal walkway should also be provided. Sidewalk fronting Mall Drive could exist prior to development to serve future sites.

- Sidewalk should be extended along Maple Grove Road on the north and/or south side from Haines Road westward to serve existing and future sites. Internal walkways should be provided to larger developments as needed.

Sidewalk/ Bikeways Inventory & Recommendations



SECTION F:

COMMODITY MOVEMENT RECOMMENDATIONS

ALTERNATIVE TRUCK ROUTES

Truck traffic adds to the level of service problems in the Miller Hill Corridor. Some truck traffic could be diverted from the corridor by encouraging trucks to use the proposed bypass routes. Trucks are free to use any state-aid route, but by erecting signs directing through-truck traffic onto these bypasses, a good number of trucks can be removed from the corridor every day and thereby improving level of service in the corridor. It is recommended that this issue be further examined with the Freight Flow study currently being conducted by the MIC. Some of the potential bypass routes include:

- ***Midway Road*** (TH 53 to TH2) and ***TH2*** (Midway Road to I35) and ***I35*** (TH2 to 21st Ave. W)
  By sending through-truck traffic onto this route, it is estimated up to 43% (183) of trucks entering the corridor via Miller Trunk could be taken out of the corridor. Sixty percent (225) of trucks entering the corridor on Trinity Road could also use this bypass of the Miller Hill area.

  For trucks entering and traveling through the corridor on Miller Trunk and Trinity/Piedmont, this proposed route would be 3.3 miles farther, and take an additional 1 minute and 39 seconds longer to get to and from Interstate 35 at 21st Ave. West, than using Miller Trunk and Trinity/Piedmont to link with the Interstate.

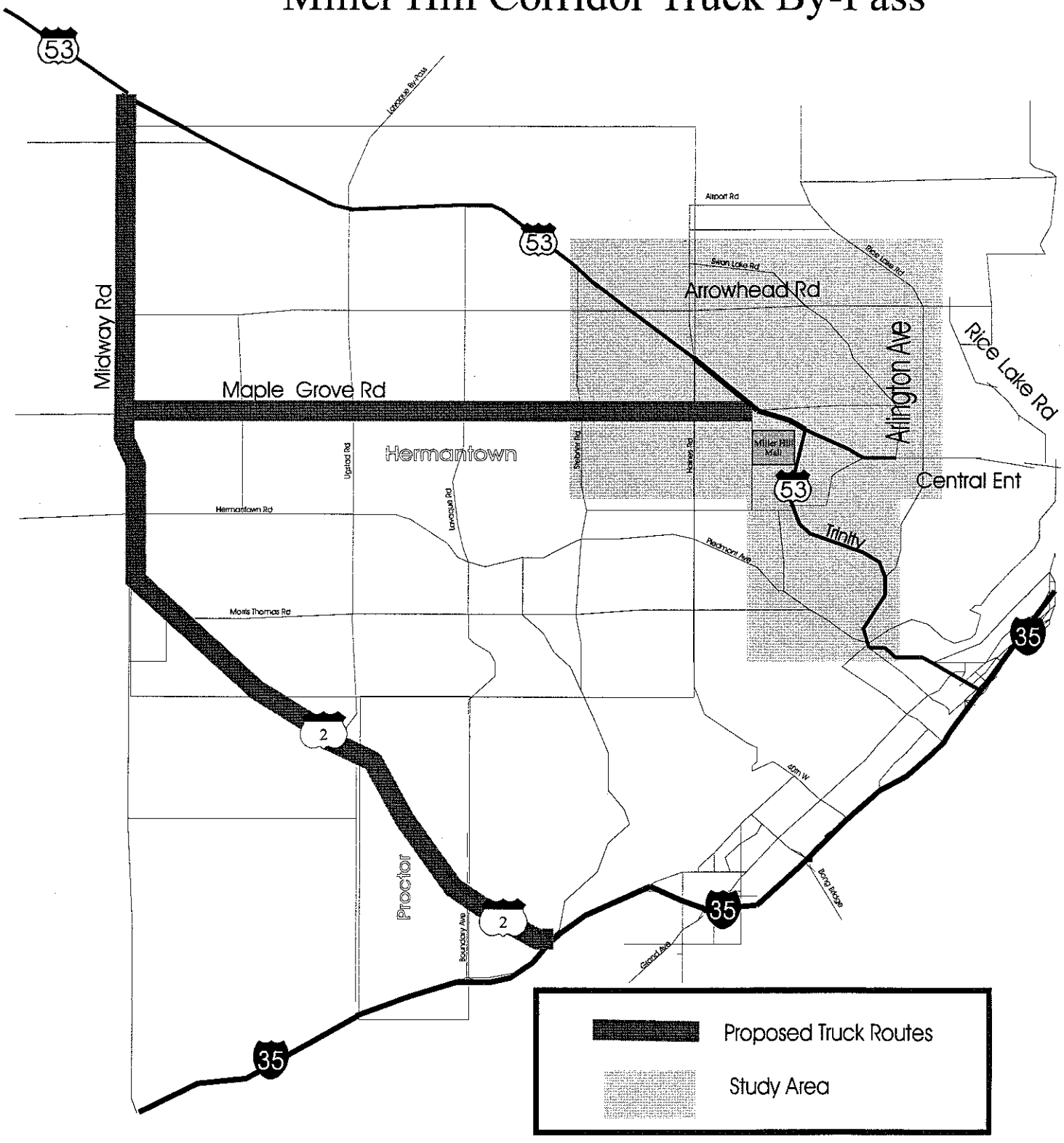
In addition to through-truck traffic, trucks destined for the Miller Hill area could be encouraged to use routes other than Miller Trunk or Trinity Road to enter the corridor. This survey highlights one route in particular.

-***Midway Rd.*** (I35 to Maple Grove Rd.) and ***Maple Grove Rd.*** (Midway Rd. to mall area)
  On average, 32%(240) of trucks entering the corridor on Trinity Road stop in the corridor area. Many of these trucks enter and leave the Twin Ports on I35 from the south. By encouraging these trucks to use this proposed route, fewer trucks would be using Trinity Road while at the same time saving 0.5 miles and about 1 minute and 31 seconds for trucks traveling to and from the corridor area from I-35 south of the Twin Ports.

  It is unclear how many trucks this would remove from the Trinity Road section of the corridor. It is thought that many of the trucks that would find this route useful are delivery and service type vehicles. By routing these delivery vehicles onto this proposed bypass, level of service in the corridor can be improved without major impacts to the neighborhoods served by Maple Grove Road. On the negative side, a good portion of Maple Grove Road runs through residential areas.

Potential Truck Routes

Miller Hill Corridor Truck By-Pass



SOURCES OF REVENUE

SOURCES OF REVENUE / FINANCIAL SITUATION

This section attempts to project funds that might be available in the Duluth-Superior region over the next ten years.

Although this financial plan contains estimates of future funds available, it is important to note that beyond 1998, these are merely theoretical projections and speculative at best. Past experience has shown that funding can vary widely, depending on the state of the economy and the Congressional budget. In addition, Cities and townships in Minnesota operate as part of a larger Area Transportation Partnership (ATP). Under this arrangement, the entire Mn/DOT district, which consists of all the cities and townships in the seven Arrowhead Counties of Northeastern Minnesota plus Pine County, compete for the allotted federal funding. This differs from the past where the metropolitan area received an allotted amount of federal funds. Without this guaranteed allotment, the available transportation funding in the Duluth area is very difficult to project.

In addition to uncertainties at the Federal level, the amount of funding available from the state (through the fuel tax) may fluctuate. For the purpose of the forecasts made in this chapter, it was assumed that the Duluth-Superior region would receive a share of the federal and statewide funds similar to what it has received in the past.

In developing the funding projections (1995-1998 currently identified in the TIP), five main sources of transportation funding were analyzed. These five sources are;

- Federal Transportation Funding
- State Matches to Federal Funding
- State Funded Projects
- Municipal State Aide (MSA)
- County State Aide Highway (CSAH)

A projection was made for each of the five sources. The totals from each projection were then combined to develop the forecast for total transportation funding to the Twin Ports Area for 1995 through 2005.

The following is an outline of the projected funding levels, and a brief description of the methods used to project the future levels from each of the sources. It should be noted that projects utilizing federal funds have been scheduled through the year 1998. Given this, it is highly unlikely that any additional projects using federal funding would occur before 1999. State and local funding options (MSA, CSAH) are somewhat more flexible, however funding in these areas are also in short supply.

Federal (STP) Transportation Funding

The projection of future Federal Transportation funds was developed using a regression analysis of the federal funding allotted to the Twin Ports in the years 1990 through 1998.

The nine years of data is sufficient to develop a realistic trend line. Data from before 1990 is difficult to obtain and is not as reliable as more recent data.

No Interstate Substitution or Interstate Construction funds were used in the projections since the Twin Ports will not receive funding from these special sources after 1995. No Congestion Mitigation Air Quality (CMAQ) funds were used in the forecast because it is unlikely that these funds will be available to the Duluth area in the future since it is no longer classified as an air quality non-attainment area.

Federal Surface Transportation Program (STP) funds used for DTA capital expenditures are included in the projection, but Federal Transit Administration (FTA) operational and capital funds are not.

Identified below is the projected 1995 through 2005 federal funding for the MIC Minnesota communities.

Projected Federal Funding - Minnesota MIC
(funding in thousands)

Estimated Actual 1995-1998	Projected 1999-2005	Total 1995-2005
$16,950	$35,797	$52,747

State Highway Funds

The projection for future State Funding (for state projects and federal matching funds) was developed using a regression analysis as of the state funds that have been available from 1990 through 1998.

Identified below is the projected 1995 through 2005 State Funds for the MIC Minnesota communities.

Projected State Funding - Minnesota MIC
(funding in thousands)

Estimated Actual 1995-1998	Projected 1999-2005	Total 1995-2005
$6,294	$13,097	$19,391

Municipal State Aid

The projection for Municipal State Aid (MSA) was developed using a regression analysis of total Minnesota MSA from 1988 through 1995.

The Twin Ports portion of MSA funding is estimated at 3% of each year's total MSA funding. Three percent is used as an estimate because the Twin Ports area received an average of 3% of MSA funds from 1993 through 1995. It should be noted that the projected MSA funding is for the entire MIC Minnesota jurisdiction not only for the City Duluth.

Below is the projected 1995 through 2005 MSA for the MIC Minnesota communities.

Projected MSA Funding - Minnesota MIC
(funding in thousands)

Estimated Actual 1995-1998	Projected 1999-2005	Total 1995-2005
$7,978	$15,044	$23,022

County State Aid Highway

The projection for future County State Aid Highway (CSAH) was developed by doing a regression analysis of CSAH funds allotted to St. Louis County from 1993 through 1995. While there is only three years of data to draw from, the regression output is statistically significant.

The Twin Port's share of St. Louis County's CSAH allotment is estimated at 10%. This estimate is used because the St. Louis County Highway department has stated that only a minority of the county's CSAH funds are spent in the Duluth area.

The CSAH data was gathered from information provided by MN/DOT.

Identified below is the projected 1995 through 2005 CSAH funds for the MIC Minnesota communities.

Projected CSAH Funding - Minnesota MIC
(funding in thousands)

Estimated Actual 1995-1998	Projected 1999-2005	Total 1995-2005
$3,547	$7,359	$10,906

Total STP, State Highway, MSA, CSAH, Funding

The Total Funding projection for the Minnesota (MIC) communities was developed by combining the annual totals of each of the funding sources.

Below is the projected total funding (federal, state, local) available for the Duluth urbanized area through 2005.

Projected Total MIC Funding (STP, State, MSA, CSAH)
(funding in thousands)

Estimated Actual 1995-1998	Projected 1999-2005	Total 1995-2005
$34,769	$71,297	$106,066

Tip Project Lists

Listed on the following pages are the project lists from the 1996-1998 Transportation Improvement Program (TIP). The purpose of showing this information is to provide an understanding as to what projects are currently programmed utilizing federal funds.

Other Revenue Options

There are a number of other revenue generating options used for transportation projects in Minnesota and across the country. Listed in this section are the various other options to consider. However, the MIC is not advocating the use of any of these options. They are listed for informational purposes only.

1996 Transportation Improvement Program Projects

Priority Order & Map #	Project Description & Location	Proposer	Estimated Cost & Funding Sources (In $1000's)				1996	1997	1998	*2015 LRTP
			Total	Federal	State	Local	CSTN	CSTN	CSTN	PAGE #
1	**Arrowhead Rd (MSAS 160) & Howard Gnesen Rd (CSAH 34) Reconstruction** H. Gnesen Rd-Arrowhead Rd to 2400' north & Arrowhead Rd to 1000' east Safety Improvement ** $90,000 additional PE costs* ** additional CE costs*	City of Duluth St. Louis Co.	$990	$792 STP	$0	$198	$990			5-5
2	**Skyline Pkwy (MSAS 179) Bridge Replacement** Skyline Pkwy .7 mi. east of Kenwood Ave. Bridge Replacement/Construction ** $51,000 additional PE costs* ** additional CE costs*	City of Duluth	$289	$231 BROS	$0	$58	$289			5-5
3	**Woodland Ave (MSAS 157) Signals & Turning Lane Construction** 19th Ave E to St Marie St Safety Improvement ** $38,000 additional PE costs* ** additional CE costs*	City of Duluth	$425	$340 STP	$0	$85	$425			5-6
4	**St. Louis River Rd (CR 696) Bridge Replacement & Approach** Hermantown, State Bridge # 7803 ** $216,000 additional PE costs* ** $10,000 additional ROW costs*	St. Louis Co.	$1,200	$640 BROS	$0	$560	$1,200			5-5
5	**Regular Route Bus Replacement** 10 vehicles Transit/Safety Imprvmnt., Econ. Dvlp., ADA Improvmnt	DTA	$2,200	$1,760 STP	$0	$440	$2,200 Capital			5-7
6	**Keane Creek/Ped/Bike Trail** Lesure St to Polk St Enhancements	City of Duluth	$221	$177 Enhance	$0	$44	$221			5-8 5-13
7	**Lakewalk - East End Access** 26th Ave E to I-35 parallel to St Louis Co Railroad Enhancements	City of Duluth	$99	$79 Enhance	$0	$20	$99			5-8 5-13
8	**Museum Rehabilitation of Trackage** Lake Superior Museum of Transportation Enhancements	St. Louis Co.	$109	$87 Enhance	$0	$22	$109			5-13
9	**City of Duluth Local Streets** Citywide - Phase V Residential Street Improvements	City of Duluth	$965	$820 I-SUB	$0	$145	$965			5-5
10	**Areawide Bridge Scour Evaluation**** Areawide bridge scour evaluation for NE Minnesota	NE MN ATP	$310	$248	$0	$62	$310			5-5
		TOTALS	$6,498	$4,926	$0	$1,572	$6,498	$0	$0	

PE = Preliminary Engineering
ROW = Right of Way Acquisition
CE = Construction Engineering

PE, ROW & CE are not eligible for federal funding

* NOTE: Page references are for the Second Draft Version of the "2015 Long Range Transportation Plan (LRTP)"

** Areawide projects may include some projects in the Duluth metropolitan area. Estimated costs are not added to the total for 1996.

1997 Transportation Improvement Program Projects

Priority Order & Map #	Project Description & Location	Proposer	Estimated Cost & Funding Sources (in $1000's) Total	Federal	State	Local	1996 CSTN	1997 CSTN	1998 CSTN	*2015 LRTP PAGE #
11	**Regular Route Bus Replacement** 10 vehicles Transit/Safety Imprvmnt., Econ. Dvlp., ADA Imprvm	DTA	$2,300	$1,840 STP	$0	$460		$2,300 Capital		5-7
12	**Areawide Bridge Scour Evaluation **** Areawide bridge scour evaluation for NE Minnesota	NE MN ATP	$310	$248 BR/BRO	$0	$62		$310		5-5
		TOTALS	$2,300	$1,840	$0	$460	$0	$2,300	$0	

PE = Preliminary Engineering
ROW = Right of Way Acquisition
CE = Construction Engineering

PE, ROW & CE are not eligible for federal funding

* NOTE: Page references are for the Second Draft Version of the "2015 Long Range Transportation Plan (LRTP)"

** Areawide projects may include some projects in the Duluth metropolitan area. Estimated costs are not added to the total for 1997.

1998 Transportation Improvement Program Projects

Priority Order & Map #	Project Description & Location	Proposer	Estimated Cost & Funding Sources (In $1000's)				1996	1997	1998	*2015 LRTP
			Total	Federal	State	Local	CSTN	CSTN	CSTN	PAGE #
13	**Arrowhead Road (CSAH 32) Reconstruction** Haines Rd (CSAH 91) to Rice Lake Rd (CSAH 4) Major Investment/Reconstruction	St. Louis Co.	$1,400	$1,120 STP	$0	$280			$1,400	5-5
14	**Trunk Highway 2 Preservation** Interstate 35 to Solway Road Preservation/Resurfacing/Paving Shoulders	Mn/DOT	$890	$712 NHS	$178	$0			$890	5-5
15	**Regular Route Bus Replacement** 5 vehicles Transit/Capacity Improv./Improve A.Q./Intermodal Impr	DTA	$1,305	$1,044 STP	$0	$261			$1,305 Capital	5-7
16	**City of Duluth Street Signs Upgrade** citywide Safety Improvement/Signing ** $25,000 additional CE costs*	City of Duluth	$450	$360 STP	$0	$90			$450	5-5
17	**N. Shore Erosion Control/Congdon Blvd (MSAS 18** Trunk Highway 61 to north corporate limits Non-roadway/Shoreline Erosion Control ** $50,000 additional CE costs*	City of Duluth	$500	$400 STP	$0	$100			$500	5-5
18	**Seven Bridges Road Bridge Preservation** Glenwood St to Maxwell Rd Enhancements	City of Duluth	$120	$96 Enhance	$0	$24			$120	5-13
		TOTALS	$4,665	$3,732	$178	$755	$0	$0	$4,665	

PE = Preliminary Engineering
ROW = Right of Way Acquisition
CE = Construction Engineering

PE, ROW & CE are not eligible for federal funding

* NOTE: Page references are for the Second Draft Version of the "2015 Long Range Transportation Plan (LRTP)"

SOURCES OF FUNDS FOR HIGHWAY PROJECTS IN MINNESOTA
SRF JULY 15, 1994

1. **City Property Tax** (general funds) -- Can be used directly or to pay back general obligation bonds (20 percent of revenue to pay off general obligation bonds must come from other sources e.g., special assessment).

2. **Special Assessments** -- Assess benefiting landowners based on benefit. Can extend beyond abutting properties if city can prove it increases value of property. Up front financing can be based on special assessment bond tied to assessment payback schedule. State Aid projects can be "surcharged" with special assessment to produce additional source of funds.

3. **Tax Increment** (from tax increment district serving project) -- Up to 1990, used to develop land access interchanges. Normally utilizes bonding for initial investment. TIF laws changed in 1990. Current law causes local governmental aids or Housing and Ag Credit Assistance to be lost depending on how district or purpose defined.

4. **Enlightened Self-Interest**--Developer/landowner pays for specific improvements (e.g., right-of-way) with private dollars in response to need or impact created by their development.

5. **Development Permit fees** (e.g., building permit fee) -- A fee or surcharge of existing fee is established as part of new construction based on such things as land area served, vehicle trips generated or related measure (e.g., $20,000 per acre, $2,000 per peak hour trip or 15 to 20 percent of land value). Must be citywide but can be tiered.

6. **City-based special service district** -- Takes legislation to set up district for purposes of levying special property tax. Twenty-five percent of landowners must ask for the district. Thirty-five can veto. Nicollet Mall is case study.

7. **Economic Development Authority/Port Authority** -- Can raise property tax for operations. Can do GO bonding for private buildings. Have similar powers to Cities but limited tax raising powers.

8. **County Property Tax** -- General tax budgeted for road and bridge projects. County policy is usually to cost share county road project costs in cities (e.g., Dakota County policy is 55/45 county/city on road improvements, 50/50 on traffic signals).

9. **County Special Assessment** -- Similar to City; requires City approval (Chapter 478 Laws of Minnesota, H.F. 1032).

10. **State Highway User Funds** -- Proceeds from 20 cents state gasoline tax -- $449 Million in FY 93 and vehicle license/fees -- $380 Million in FY 93 -- distributed as state highway funds (e.g., 100 percent state funded projects, match for federal aid, county state aid funds or municipal state aid funds). MSA is a 9 percent of total (74 Million in FY 93) and subject to many criteria and standards including 2,500 mile limit statewide.

11. **Federal highway user gasoline tax** -- Proceeds from dedicated portion of federal gas tax (14 cents with 2.5 cents to General fund) and truck fees distributed under ISTEA as National Highway System, Interstate (Construction and Maintenance), Bridge, Interstate and Bridge Discretionary, Surface Transportation Program (including Enhancement) and Congestion Mitigation, Air Quality (CMAQ) and Special Project/Demonstration funding. $174 Million in FY 93.

12. **Turnback funds** -- One time funds from County or State received by City for accepting jurisdictional responsibility.

13. **Investment income** -- Unused special assessments, funds not currently in use, or cost savings can be invested to produce additional income through interest on unused balances. Generally not dedicated to any use.

14. **Motor Vehicle Excise Tax** (MVET) -- Sales tax on new vehicles. Not in current use in Minnesota. Would have produced $250 Million in 1990 dollars.

15. (Future) **Transportation Utility Fee** -- Transportation services (especially expansion, heavy maintenance or reconstruction) properties are charged a fee for use of roadways as a transportation utility service. (Similar to a water utility). MPWA active on this.

16. (Future) **Congestion pricing** (or Public Toll Roads/Bridges) -- Used to collect usage fees for roads (usually freeways) based on use; and, to affect peak hour congestion. More feasible with electronic collection technology. Up-front financing usually by means of a revenue bond. Bond repayment linked to revenue stream produced by tolls.

17. (Future) **Ton-mile tax** -- Also called third structure tax; for trucks based on actual use.

18. (Future) **Toll Road/Bridges** (Privatization) -- Private company develops, finances and owns road. Pays off private note using tolls. New Minnesota legislation applies.

19. **Packaging** -- Using one source of funds to leverage another not otherwise possible.

FINANCING METHODS FOR CITY PROJECTS
SRF JULY 1994

1. **General Obligation Bonds** -- limited to fraction of taxable value of property in City.

2. **Revenue Bonds** -- linked to repayment by stream of revenue from facility to be constructed (e.g., toll road or parking garage). Riskier than general obligation bonds.

3. **Special Assessment Bond** (Municipal Bonds) -- up front cash for street improvements where assessments are revenue stream.

4. **Bond in Anticipation of**.. -- used by Cities to provide up front dollars to be paid back later by others (e.g., Mega Mall legislation allowing Bloomington to build Cedar Avenue and I-494/24th Avenue interchange with Mn/DOT pay cost six years later assuming this is when Mn/DOT priorities/programming would "catch up" with this need.

POTENTIAL FUNDING ALTERNATIVES

Special Assessments (in proportion to trips generated)

- Abutting properties
- Contributing properties (excluding residential)

Development permit fees (tied to building permit)

Tax Increment

Private Contributions (right-of-way)

Special Projects/Demo Funds

STP (limited dollars problem)

County State Aid (in proportion to sub-regional trips)

Municipal State Aid Street (eligibility)

SUMMARY

SUMMARY

The Miller Hill Corridor Traffic Study has set forth recommendations that will mitigate the potential negative traffic effects of the two proposed developments. The study also details strategies that will help alleviate current problems and deficiencies in the corridor with a series of short and long term recommendations. In addition, the plan has identified needs for transit and pedestrian access between commercial and residential sites. It is important to understand that some of the short and longer term recommendations are conceptual. Many of these recommendations (i.e. Joshua Avenue Connector, Sundby Road Connector, Maple Grove Road Connector, Trinity to Burning Tree Road Connector, and the Maple Grove Road/Miller Trunk Highway intersection realignment) will need separate more detailed studies that will involve the neighborhoods and business communities associated with these areas.

This plan, now approved by the Metropolitan Interstate Committee (MIC) and included as part of the Metropolitan Long Range Transportation Plan, will be submitted to the City of Duluth, the City of Hermantown, the Minnesota Department of Transportation, and St. Louis County. Implementation of any recommendation is a function of each governmental agency listed above. Since the MIC is an advisory body, it has no implementing powers on any part of the plan. However, as the Metropolitan Planning Organization (MPO), the MIC does have approval power for any projects requesting federal funding. It is anticipated that some of the recommendations outlined in this plan will request federal funding for implementation. This plan made no attempt to allocate any costs associated with recommendations to specific agencies or jurisdictions. Since the MIC is not an implementing body, and did not assign costs to jurisdictions, it will be very important to create a mechanism for implementation and funding of the recommendations set forth in this document.

It is also important to understand that this is a only a transportation study. There are other factors that need to be taken into consideration with any large scale retail development proposal or general growth in the corridor. These issues include environmental impacts, social impacts, economic impacts as well as others. Many environmental impacts need to be addressed when the appropriate agencies begin implementation of specific recommendations.

Finally, it is very important that all involved agencies/jurisdictions continue with the current spirit of cooperation that is already taking place. Currently, as well as in the future, funding will be harder and harder to secure, and it is important that everyone work together toward the best possible solutions for the corridor.

The following pages give a summary of the public comments that were received on this plan. All of the actual comments can be seen in the appendices.

MILLER HILL CORRIDOR TRAFFIC STUDY

PUBLIC INFORMATIONAL MEETING
October 17, 1995

SUMMARIZED COMMENTS

- Roles unclear between MIC / City / County / MN/DOT; Discussion revolved around these recommendations being final at this point; Statement was made that recommendations will be taken into consideration by City of Duluth in negotiations with developers; MIC's role is an advisory one focusing only on transportation improvements, though environmental and social impacts have been highlighted.

- Comments on issues that were beyond the scope of this traffic study and that should be directed to the appropriate governmental agency such as snow removal, litter control and environmental effects of development on Miller Creek.

- Some people wanted more time to review the findings of the study prior to Study Advisory Committee taking final action on plan recommendations. One person stated that comment period should be thirty days before final approval.

- Neighborhood cut-through traffic was discussed by a number of individuals through Piedmont Heights and Duluth Heights neighborhoods. All stated that development could make this situation worse. Some stated that other existing roads should be upgraded to handle traffic as opposed to constructing new roads; for example, making Arlington Avenue four lanes. It was stated that a primary goal of the study was to develop recommendations that would help alleviate the cut-through traffic issue.

- Upgrade of existing roads is needed now to handle increased traffic; for example, Sundby Road and Maple Grove Road.

- Some expressed confusion on conceptual diagrams of proposed new intersections or new roadways within the corridor. For example, a new intersection for Sundby Road/Maple Grove Road at Highway 53. Statement was made that the best option for a new intersection or new roadway alignment has not been decided at this time nor is there a schedule to begin implementation of any proposed recommendation. Such an action would be conducted by the City and/or MN/DOT at their schedule that would include more in-depth analysis of each recommendation and public comment. A Plan Commission meeting is set for November 14th, 1995 for review of the mall proposals at which time citizens will be able to express their comments.

- Proposed creation of sidewalks, signalized crosswalks and bike paths was encouraged. Curb and gutter for new roadways should also be taken into consideration.

- Question was raised on how new roadway improvements would be financed; effects on taxpayer.

- Issue was raised concerning feasibility of Piedmont Avenue to Haines Road acting as a bypass route for Highway 53 through traffic. Statement was made that Piedmont was scheduled to be improved by the County and that this option would still have neighborhood impacts especially if traffic increased significantly.

- Residents on Chambersburg Road have endorsed the concept of a parking deck to handle mall expansion proposal. They state this would have a lesser impact on their neighborhood than expanded surface parking. An additional statement was made indicating that this study did not or ever intend to connect Chambersburg Road to the Miller Hill Mall expansion proposal.

- One person stated that the project was being pushed along for approval too fast and being unduly influenced by the City of Duluth to the developer's benefit.

- It was stated that the two developer's have not commented on aspects of the study to this date. Both have been informed of the progress of the study and received all draft material.

- One person expressed concern about the OPUS development having an access point onto Anderson Road as indicated by a current street reservation. Statement was made that the City of Duluth would decide this matter, however the MIC would not recommend this action.