Final Report

Geddes Road Corridor Study

Superior Township, MI

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Submitted to:

Superior Township

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INTRODUCTION

Superior Township has been experiencing significant growth in the last decade, with more to come in the future. Based on 2000 census data, this community has seen its population increase to 10,740, a change of 2,020 people or 23 percent, since 1990. Looking ahead, SEMCOG forecasts, based on locally-supplied land use plans, show that Superior Twp. should see its population increase by another 69 percent by the year 2030, a rate considerably greater than the average 12 percent growth expected by the region as a whole.

Not only do projections and forecasts expect significant growth within Superior Township and along the Geddes Road Corridor, tangible traffic generating projects are in the final stages of review and development. As of September 2005, these included but are not limited to:

- Prospect Pointe phase I (Geddes/Prospect Roads) – 108 units, 60% permits issued for construction
- Prospect Pointe phase II (Geddes/Prospect Roads) – 266 units, anticipated construction 2005
- Bromley Park phase I (Geddes Road) – 120 units, 100% permits issued for construction
- Bromley Park phase II (Geddes Road) – 266 units, 100% permits issued for construction
- Bromley Park condo phase I (Geddes Road) – 93 units, 25% permits issued for construction
- Bromley Park condo phase II (Geddes Road) – 135 units, anticipated construction fall 2005
- Prospect Pointe East (east side of Prospect, ¼ mile south of Geddes Road) – 128 units, 2005-2006 construction
- Brookside phase III (Geddes Road) – 84 units, 80% permits issued for construction
- Autumn Woods (east side of Prospect, north of Clark Road) – 64 units, 10% permits issued for construction
- Fairway Glens phase I (Macarthur Boulevard) – 64 units, 20% permits issued for construction

Given these changes, past and future, it became imperative for the Township to have the existing conditions along the Geddes Road corridor evaluated and a plan developed for the changes needed to meet the anticipated growth and development. This study endeavors to identify the critical concerns of the stakeholders, and evaluate the dynamic interaction between the various issues.

In the study, we have identified the development pressures leading to increases in traffic congestion in the study area. We have identified and prioritized various factors, consistent with community values, which were used to evaluate potential changes to Geddes Rd. The study identifies alternative improvements and the general time when they might be needed, based on development projections. The study also creates a

standard model and procedure for analyzing future development proposals in a timely and consistent manner.

The focus of the study is on a 6-mile stretch of Geddes Road from the west border with Ann Arbor Township eastwards to the boundary with Canton Township as shown in Figure 1. Major crossroads were also evaluated within the influence of their intersection with Geddes Road.

Figure 1
Location Map

EXISTING CONDITIONS

Geddes Road in Superior Township is currently a rural arterial roadway. It primarily serves a mixture of commuter traffic passing between residential concentrations of Superior and Canton Townships and the employment centers of Ann Arbor and Ypsilanti. There are currently no line-haul transit services provided along the corridor.

Geddes has a two-lane cross section that is modified at isolated intersections, where center left turn lanes, passing lanes and/or right turn lanes have been provided. An example of this is the entrance to Bromley Park. The road alignment is straight and relatively flat east of Superior Road. As viewed by westbound traffic, Geddes Road curves sharply to the right at Superior Road, to the north, and then bends back to the left to head west again. West of Superior Road, the profile of the road is rolling.

The speed limit along Geddes Road is 40 mph west of Superior Road and 50 mph to the east. The speed limits on the major cross streets are as follows:

- Superior Road is 40 mph,
- Leforge Road is 45 mph south of Geddes Road
- Leforge Road is not posted north of Geddes Road (prima facia 55 mph)
- Prospect Road is 45 mph south of Geddes Road
- Prospect Road is 50 mph to the north,
- Harris Road is not posted (prima facia 55 mph),
- Gotfredson Road is not posted (prima facia 55 mph), and
- Ridge Road is 45 mph.

Currently, the Geddes Road corridor is master planned by WCRC for a 120' wide road right-of-way (ROW). The 60' half ROW has been provided along the frontage of the residential subdivisions and many of the recent developments. However, there are still substantial portions of Geddes where there is only the statutory 33' half ROW provided.

Proposed and On-going Developments

In general terms, Superior Twp. has a master land use plan that uses Geddes Road as a key boundary line. South of Geddes Road, the Township has or will be providing community water and sanitary sewer services. The resultant development densities are relatively high.

North of Geddes Road, the land use goal of the Township is to strictly limit development. They hoped to preserve agricultural uses as much as possible, and residential housing would be on large (acreage) parcels.

As noted in the Introduction, there are currently numerous developments along the corridor that are under construction or in the planning stages be built between 2005 and 2010. These developments include Brookside, Bromley Park, Prospect Pointe, Majestic Oaks, Woodside, Amberwood and Hyundai. All are located south of Geddes Road. Beyond these known developments, the study anticipated the future development of key large parcels, including some on the north side of Geddes Road.

The study followed the Master Land Use Plan of Superior Twp., when seeking to anticipate the potential trip generation for these locations. This information will be further discussed in subsequent sections of the study.

Traffic Data

The Washtenaw County Road Commission provided significant assistance in the study preparation, by performing traffic data collection efforts at key locations throughout the study corridor. 24-hour machine counts were obtained for the intersections of Geddes Road with Superior, Leforge, Prospect and Ridge Roads. Additionally, manual turning movement counts were collected by WCRC for the intersections of Geddes Road with Gale, Harris and Gotfredson Roads.

The balance of the traffic data needed for this study was obtained by "data mining" traffic impact studies that had been previously submitted for developments along the corridor. In this manner, we were able to ensure that the appropriate data was available for all other major intersections.

Trip Generation of Existing & Proposed Developments

There were several existing minor intersections, typically the entrances to residential developments, where we did not have traffic counts available. Further, there were several parcels that are candidates for future development where Traffic Impact Studies are not yet available. In these cases, peak hour traffic volumes were estimated using a standard engineering reference called *Trip Generation – 7th Edition*, published by the Institute of Transportation Engineers (ITE).

Depending on the site, the appropriate metric was used to estimate the number of trips that could be generated by the developments. For example, residential areas would use the number of dwelling units, office and retail uses would be estimated based on the gross square feet size of buildings, and nursing homes would use the number of beds. Thus, the current number of homes in the existing residential developments was counted. The number of units was then used to calculate the number of peak hour trips using ITE's average rates, or fitted curve equations when available. All counts and trip generation calculations can be found in Appendix A. In the event that some developments were not yet built-out, the balance of units to be constructed was included in the traffic forecasting of other vacant properties, discussed in the next section.

For site generated traffic volumes, the existing traffic patterns along the corridor were used to generate trip distribution percentages for the a.m. and p.m. peak hours. For each 5-year time slice, background traffic growth and new developments were added to the models. This caused the traffic patterns to change slightly, and these shifting patterns are reflected in the models. Trip distribution spreadsheets have been developed due to the high number of intersections and complexity of having numerous trip origin and destination locations. The spreadsheets are included as Appendix B.

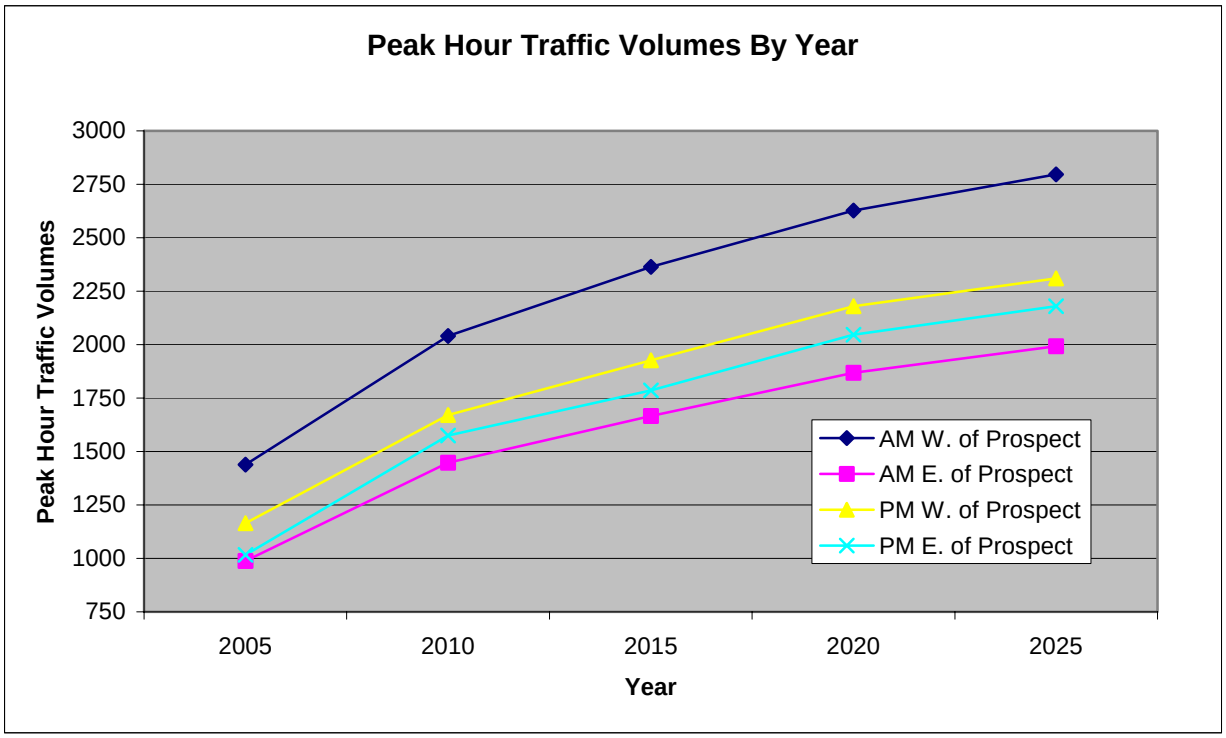
Traffic Forecasting

It is customary for a study of this type to use a long term horizon, or forecast year, when anticipating the changes that may occur within the study corridor. After discussions with Superior Twp. and WCRC, the forecast year for this report is 2025.

The Washtenaw Area Transportation Study (WATS) provided forecast data from 2005 to 2030 from their long-range traffic model. This model is based on population and employment estimates for future years, and is supposed to reflect master land use and water main/sanitary sewer utility planning for the area. The WATS model indicated that the growth rate for the Geddes Road area was 1.3% per year for the next 20 years, not compounded.

In discussions with WCRC and Township staff, this cumulative value of 26% out to the year 2025 was thought to be unreasonably low. From our calculations of trip generation, we knew that the percent changes just due to development of adjacent properties in the corridor would far exceed the WATS forecast. For example, the evening peak hour volumes on the segment of Geddes from Leforge to Prospect will increase by 63.3%. The segment from Prospect to Harris will increase by 75.5%, again in the p.m. peak period. These equate to annual rates of 3.2% and 3.8%, respectively. It was noted that from 1989 to 2003 Geddes Road west of Prospect Road grew at 2.6% per year and Geddes Road east of Prospect Road grew at 4.4% per year.

Figure 2



To better approximate future traffic, the 1.3% per year was used to grow commuter traffic volumes passing between Ann Arbor /Ypsilanti and Canton Twp. The traffic generated by possible future developments along or adjacent to Geddes Road within Superior Twp. was then to be added into this mix.

Level Of Service

The major intersections along Geddes Road were analyzed according to the methodologies published in the Highway Capacity Manual, 2000 Edition. Operational analyses for the existing geometry and traffic volumes were developed for both a.m. and p.m. peak hours. Complete details of the evaluations for the a.m. and p.m. periods are included as Appendix C.

The software program used for this study to determine operational performance was Synchro / SimTraffic™, Version 6. Synchro™ is a complete software package for modeling and optimizing traffic signal timings. Synchro™ can optimize splits, cycle lengths, and offsets. When Synchro™ optimizes timings, it focuses on reducing delay. Synchro™ is also fully interactive; once input values are changed, the results are automatically updated. Signal timing plans are shown in easy to understand timing diagrams. Synchro™ allows for evaluating complex and non-standard phasing.

SimTraffic™ is a microscopic traffic simulation and animation tool. It allows for the evaluation of a network of intersections, whether signalized or not. Thus it can simulate the affects of signals on nearby unsignalized intersections and driveways, especially under heavy congestion. The analyses determine the Level of Service (LOS) of the intersections and were performed for the existing and all future conditions, both under the existing roadway configuration and proposed configurations.

The LOS of an intersection is based on factors such as number and types of lanes, intersection controls such as STOP signs or traffic signals, traffic volumes, pedestrian volumes, etc. LOS is expressed as a letter grade, in a range from A through F. In this context, ‘A’ represents the best conditions, with very little or no average delay to vehicles. LOS ‘F’ is the worst of conditions, equated with very large average delays and few gaps of acceptable length.

The following Table 1 summarizes the range in LOS as it relates to average vehicle delay at intersections under STOP or Yield controls.

Table 1
Level of Service Criteria For Unsignalized Intersections

Level of Service	Average Delay/Vehicle (seconds)	Description
A	0 to 10	Little or no delay, very low main street traffic
B	> 10 to 15	Short traffic delays, many acceptable gaps
C	> 15 to 25	Average traffic delays, frequent gaps still occur
D	> 25 to 35	Longer traffic delays, limited number of acceptable gaps
E	> 35 to 50	Very long traffic delays, very small number of acceptable gaps
F	>50	Extreme traffic delays, virtually no acceptable gaps in traffic

SOURCE: Transportation Research Board, Highway Capacity Manual 2000.

The following Table 2 summarizes the range in LOS as it relates to average vehicle delay at signalized intersections.

Table 2
Level of Service Criteria For Signalized Intersections

Level of Service	Average Delay/Vehicle (seconds)	Description
A	Less than or equal to 10	Most vehicles do not stop at all. Most arrive during the green phase. Little or no delay.
B	> 10 to 20	More vehicles stop than for LOS A. Still good progression through lights. Short traffic delays.
C	> 20 to 35	Significant numbers of vehicles stop, although many pass through without stopping.
D	> 35 to 55	Many vehicles stop. Individual signal cycle failures are noticeable. Progression is intermittent.
E	> 55 to 80	Considered to be the limit of acceptable delay. Individual cycle failures are frequent and progression is poor.
F	>80	Extreme and unacceptable traffic delays.

SOURCE: Transportation Research Board, Highway Capacity Manual 2000.

An intersection LOS 'D' is considered by many traffic safety professions to be the minimum acceptable condition in an urban/suburban area. For rural areas, most highway agencies consider LOS 'C' the minimum. Given the corridor falls within the urban boundary for southeast Michigan, and the suburban characteristics of the existing and proposed developments along the corridor, it was judged that LOS 'D' was the appropriate minimum acceptable goal for Geddes Road. Furthermore, mitigation measures were considered and identified if individual travel movements dropped below LOS 'D', rather than approaches or the entire intersection.

Current Traffic & Conditions

An existing condition model was built in Synchro™, utilizing existing aerial photography to lay out the road network. Once the road network was laid out, traffic volumes, lane geometry, intersection controls, signal timings, etc. were entered into the model. The final step was to calibrate and validate the SimTraffic™ model, to ensure it was representing the actual existing field conditions. This involved the comparison of existing traffic volumes with the model volume outputs from SimTraffic™. The model is considered validated when the difference between the existing and the SimTraffic™ volume outputs are within the range of either ± 10% (or ± 20 vehicles for low flow conditions) of the existing volumes.

The study found that for current traffic conditions, generally all major intersections are operating at acceptable levels-of-service in both the a.m. and p.m. peak periods. There is one exception involving the Superior Road intersection, which operates at LOS F in both the morning and evening peak periods. We note that WCRC is planned to reconstruct this intersection as a roundabout some time in the 2005 to 2010 timeframe. Table 3 indicates the 2005 existing condition levels-of-service for the key intersections in the study area. Intersections to the west of Superior Road have not been included in the tables, as they were not considered to be key intersections due to very low N-S traffic volumes on the side streets. However, these intersections including Gale Road and Hickman Road have been analyzed and do operate at acceptable levels-of-service.

Table 3
Level of Service Analysis for 2005 Existing Conditions

Intersection of Geddes Road with	2005 LOS	
	AM	PM
Superior Road	**F**	**F**
Leforge Road	B	D
Prospect Road	C	B
Harris Road	A	A
Gotfredson Road	A	A
Ridge Road	D	D

Bold indicates intersection fails.

Future Traffic With No Improvements (Baseline or Do-Nothing Option)

After identifying the existing conditions, the study evaluated how this roadway network would function under future traffic volumes for both a.m. and p.m. peak periods. Without improving the road network, future traffic volumes were added to the model in 5-year increments. Please note that there are only four locations on Geddes Rd east of Superior Rd that do not have left turn treatments at this time. They are: Paddock Way, ENL Nursery, Fairfax Manor and Andover. All of these side streets have very minor traffic volumes, and the baseline option does not include adding left turn lanes at these locations.

Future traffic volumes include a yearly growth of 1.3% per year plus traffic generated by possible future developments along Geddes Road or directly impacting Geddes Road. The following list details the existing or future developments that were incorporated into each model:

- 2005 – Brookside, Bromley, Woodside, Hyundai 2005, Majestic Oaks, Prospect Pointe
- 2010 – Eyde R4, Amberwood, Fairway Glens, Geddes Ridge, Leforge Clark, Meadows Pointe, Michigan Memorial West, Rolling Oaks, Timber Creek, Hyundai
- 2015 – Eyde A2, Eyde PM, Corlina Condos
- 2020 – Ford A1, Ford A2, Rock A1, Rock A2, Rock R1, Rock R2

As each new development was added to the model, it was assumed that a left turn lane would be provided on Geddes Rd at their entrances. Thus, the baseline option was essentially the 3-lane option, excepting the four minor intersections noted above. A map showing the locations for the existing and future developments is located in Appendix D.

Each 5-year time slice was analyzed for LOS to determine when each intersection would break down under existing geometry. The following tables detail the a.m. and p.m. LOS through 2025 without any roadway improvements.

Table 4
AM Peak Hour – Without Improvements
Level of Service Analysis

Intersection of Geddes Road with	AM LOS w/o Improvements				
	2005	2010	2015	2020	2025
Superior Road	**F**	-	-	-	-
Leforge Road	B	**F**	**F**	**F**	**F**
Prospect Road	C	**E**	**F**	**F**	**F**
Harris Road	A	**F**	**F**	**F**	**F**
Gotfredson Road	A	A	B	**E**	**F**
Ridge Road	D	**F**	**F**	**F**	**F**

Bold indicates intersection fails.

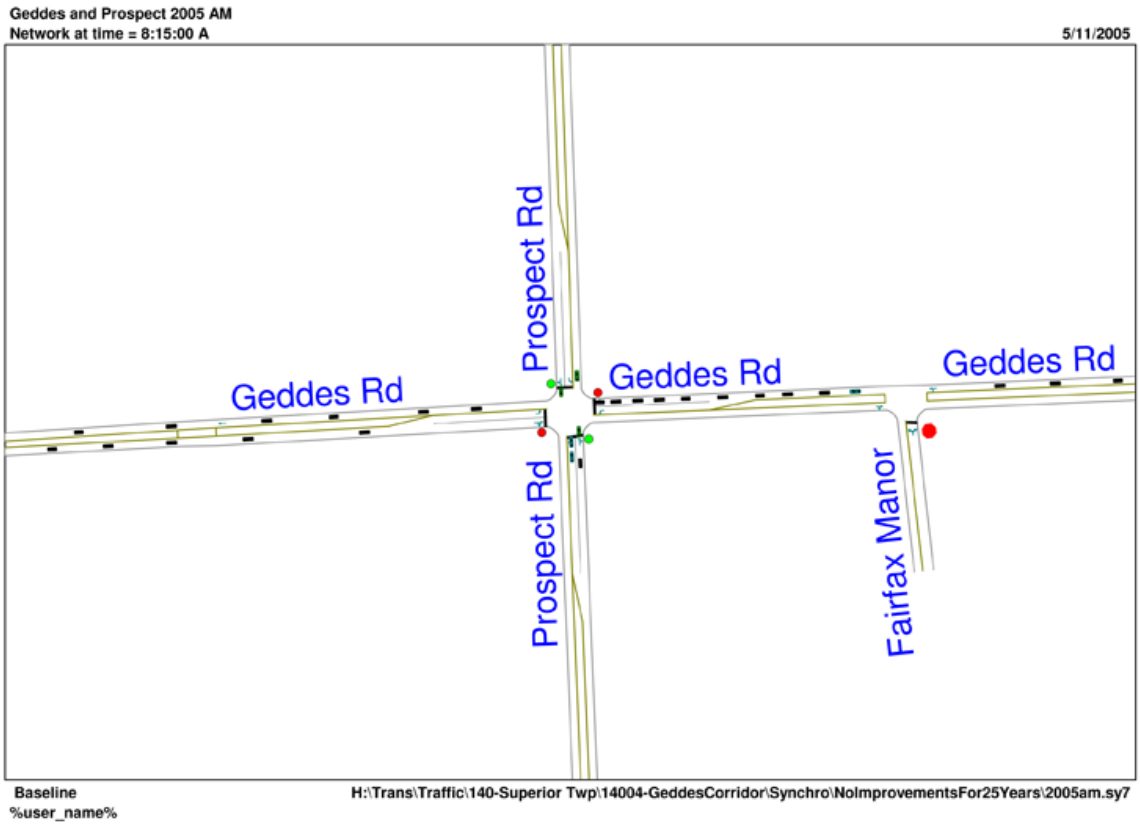
Table 5
PM Peak Hour – Without Improvements
Level of Service Analysis

Intersection of Geddes Road with	PM LOS w/o Improvements				
	2005	2010	2015	2020	2025
Superior Road	**F**	-	-	-	-
Leforge Road	D	**F**	**F**	**F**	**F**
Prospect Road	B	C	**E**	**F**	**F**
Harris Road	A	D	**F**	**F**	**F**
Gotfredson Road	A	A	A	C	D
Ridge Road	D	**F**	**F**	**F**	**F**

Bold indicates intersection fails.

Please note that this study did not include a capacity calculation of the proposed roundabout for the future years. This is because the Synchro™ software does not support this calculation. However, we did review and evaluate the simulation of this location for potential operational problems.

Figure 3 - 2005 Traffic with Existing Conditions

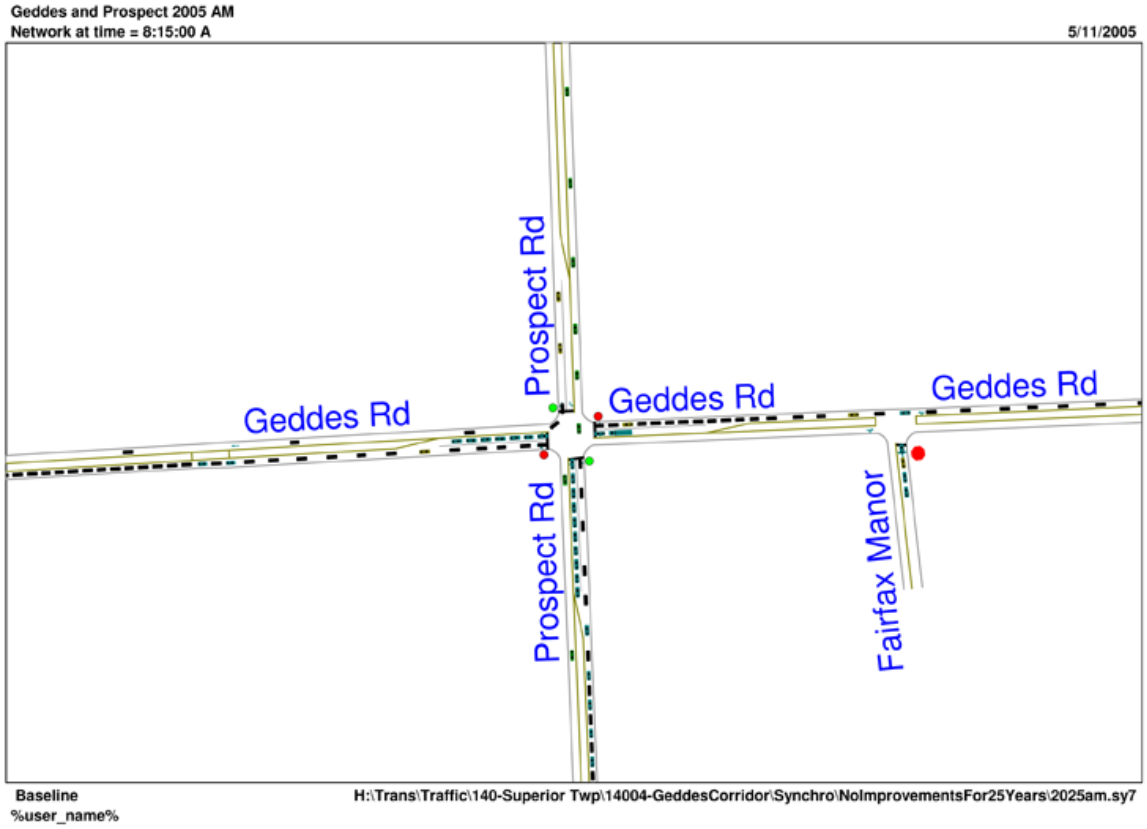


From the above pair of tables, it is evident that the a.m. peak period is the controlling timeframe when it comes to significant congestion in the corridor. The Gotfredson Road intersection survives the longest at an acceptable LOS, before failing in 2020. The intersections with Harris Road, Ridge Road, Prospect Road and Leforge Road will all fail

by 2010 if improvements are not made. Again, intersections to the west of Superior Road have not been included in the tables due to low traffic volumes in the N-S directions. From this information we conclude that Geddes Rd is not viable as a 3-lane corridor east of Superior Rd.

However, some corridor improvements are already in the works. At the intersection of Geddes Road and Leforge Road, left turn lanes will be added to all approaches as well as an eastbound right turn lane. This intersection will be signalized, with improvements scheduled for implementation between 2005 and 2010.

Figure 4 - 2025 Traffic with Existing Conditions



Simulations were run using SimTraffic™ for each of the models. Example screen captures of SimTraffic™ are shown in Figures 3 and 4 for the intersection of Geddes Road and Prospect Road. Figure 3 shows existing traffic and roadway conditions, while Figure 4 shows 2025 future traffic volumes on the existing roadway network. The 2005 and 2025 screen captures represent LOS C and LOS F respectively.

CORRIDOR IMPROVEMENT ALTERNATIVES

In a traditional corridor study, the next step would be to begin identifying various improvement scenarios focused on resolving the congestion pressures for the ultimate target year. Certain fundamental roadway cross-sections, such as a 5-lane road or 4-lane boulevard, would be applied to the entire corridor and evaluated under future traffic.

This study undertook to evaluate the issues in a slightly different context. Our goal was to identify the incremental steps needed for each five-year period, which would accumulate to a final set of improvements that satisfies the congestion pressures for the ultimate target year.

Thus, we began with the existing conditions model. We looked at the projected traffic volumes for 2010 and how they would function with the 2005 existing road geometrics

and traffic control. After analyzing each intersection, problem areas were uncovered. Improvement could then be identified and included into the model for the intersections and road network to keep all the major intersections operating at acceptable levels-of-service. We then looked at how 2015 traffic volumes would perform on the proposed 2010 roadway geometrics and traffic control. The same process was followed for each 5-year time slices out through the year 2025. Screen captures from SimTraffic™ software are provided in Appendix E to give visuals of the improvements to each intersection.

Community Values, Ranking and Evaluation Weights

It was a fundamental goal of the study to make sure that the improvements reflected the interests of the Township. For example, in initial discussions with Township officials, we learned that they viewed the roundabout planned for Geddes and Superior as a special test case, and were not considering their use at other locations through the corridor. Subsequently, Township officials have attended a roundabout workshop sponsored by the Road Commission and are now interested in exploring their expanded use.

Appendix H has been added to the report to discuss the evaluation of a roundabout at the intersection of Geddes and Prospect, as this is and will be the busiest, most congested intersection in the corridor. We concluded that this location it is suited for improvement as a roundabout, and surmise that the other locations through the corridor will also be strong candidates for roundabouts.

The balance of this report assumes the use of more conventional improvements to address the safety and mobility needs of Geddes Road. Toward that end, we used a method to measure the ranking and relative importance placed on various factors by representatives of the community.

An evaluation form was developed which noted six evaluation factors common to roadway improvement proposals. The form was filled out by members of Superior Township Board, Superior Township Planning Commission and planning and traffic staff from the

Washtenaw County Road Commission. Each of the factors were to be ranked from "1" to "6", with "1" indicating the factor believed to be most important and "6" indicating the factor that is believed to be least important. Next, the form asks for how much emphasis, or weight should be put on the various factors. It uses a sliding scale of 1 to 100, where a higher number represents greater importance. As OHM identified alternatives for improving Geddes Road, each would have different impacts and consequences for the community. The weights assigned to the various factors were used to identify the alternatives best suited to meeting the expectations of Superior Township.

The evaluation forms were handed out at the project kick-off meeting attended by select members of the Township Board and at a Planning Commission meeting. Seven forms were filled out at the kick-off meeting, while the board at the Planning Commission meeting completed five forms. The following table details the six factors with their corresponding ranks and weights. All completed evaluation forms are included in Appendix F.

Table 6
Local Rankings of Evaluation Factors for Roadway Improvements

Factors	Rank	Weight
Safety	1	96
Displacement of homes/businesses	Tied for 2	65
Traffic Flow	Tied for 2	65
Aesthetics	4	58
Farmland and open space preservation	5	56
Engineering difficulty/cost	6	42

From the results of the community ranking and weighting exercise, it is apparent that safety is the community's number one priority. While traffic flow and displacement of homes and businesses tied for second most important, there was close emphasis also placed on aesthetics and preserving farmland and open space. Significantly, in last place by a wide margin is the community's concern for the relative difficulty of engineering a set of roadway improvements or their cost. These results also affirm the use of level of service (LOS) as a key measure of the effectiveness of proposed roadway modifications to deal with the transportation shortcomings in the corridor.

We note that enhancements that target improved safety and traffic flow (ranked 1 and 2 respectively) tend to go hand in hand. There is a well-documented correlation between crashes and congestion. With the breakdown of traffic flow, the number of traffic crashes tends to increase. Measures that can be taken to improve traffic flow, such as the addition of intersection turn lanes or continuous center left turn lanes, all have pronounced impacts on improving safety. This is because the additional lanes allow turning vehicles to be removed from the thru lanes, reducing the number of potential rear end crashes. Other measures with both safety and traffic flow benefits include left turn phasing and additional thru lanes.

Another conclusion we derived from this survey involves the ranking and weight given to displacement of homes/businesses, which tied for number 2. This ranking tells us the

sensitivity the community will have for measures that may require significantly more road right-off-way (ROW). It would be difficult to implement a boulevard cross section along this corridor within the existing planned 120' ROW. Most Michigan-style boulevards, which utilize indirect or U-turns, are developed in ROW that exceeds 200' in width. This can potentially lead to the displacement of homes and businesses. It is because of the potential for impacts from ROW purchases, not the fact that boulevards are costly (engineering difficulty and cost were ranked number 6) that the Michigan style boulevard cross-section was dropped from further consideration in this study.

On the other hand, the Ann Arbor area has numerous examples of boulevards that allow direct left turns to and from the roadway. In terms of the 'footprint' of these narrow boulevards, they are the functional equivalent of a 5-lane road, where the center left turn lane area is raised and landscaped when not needed for access to and from a side street. Thus, whenever the analysis notes that a 5-lane roadway may be the appropriate and preferred option for improvement, it is inferred that the community and the WCRC should also be considering a narrow boulevard with direct left turns allowed.

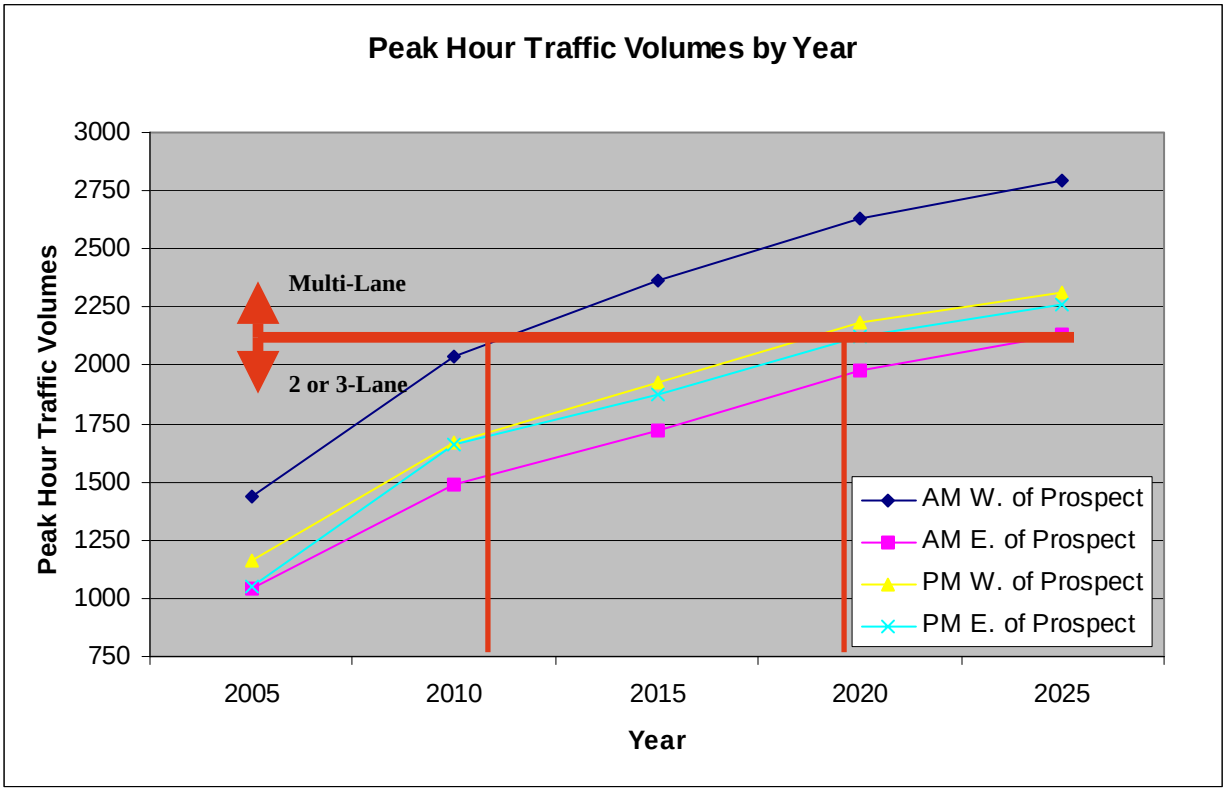
The final step to ensure adequate consideration of local comments and concerns was to consider the feedback we receive on the draft study report. Appendix I has been added detail the comments we receive and our responses to the points raised.

After determining which factors were most important, the next step was to take a look at what improvements would be needed to keep all major intersection along the corridor operating at acceptable levels-of-service for each 5-year time slice. The following details the improvements made for each time period beginning with 2010, out to the horizon year 2025, including before and after improvement levels-of-service.

Although, the intersections on Geddes to the west of Superior Road are not considered to be major intersections, they have been analyzed through the horizon year. It is recognized that the southbound LOS at the Gale Road and Hickman Road intersections begins to degrade over time to unacceptable levels-of-service. However, the volumes on these side streets are so low that there are no cost effective countermeasures to improve the LOS. Therefore, intersections to the west of Superior Road have not been included in the improvement alternatives.

Figure 5 below details the peak hour traffic volumes by year and shows an approximate range used to determine when a road should change from a 2-lane road to a 5-lane road. This figure indicates that west of Prospect Road should become a 5-lane section between 2010 and 2015, while east of Prospect Road will most likely require a 5-lane section between 2015 and 2020. This is further discussed in the shortcomings and mitigation measures section.

Figure 5



2010 Shortcomings and Mitigation Measures

In this first period, the Harris Road, Ridge Road, and Prospect Road intersections all had failed under the traffic growth anticipated. At the Leforge Road intersection (assuming improvements have been made), although the overall intersection has an acceptable LOS, there are individual movements, which failed. Through an iterative process of identifying traffic flow bottlenecks and testing geometric changes in the computer model, we have identified the following improvements to the 2010 model:

- Superior Road – Construct a roundabout. This improvement is already funded and scheduled to be built between 2005 and 2010. Our understanding is that it will have two circulating lanes with single-lane approaches and departures.

- Leforge Road – Add additional E-W thru lanes to the intersection. Changing this to a 5-lane on Geddes will provide additional capacity at the intersection to aid in reducing traffic congestion.

- Prospect Road – Add additional E-W thru lanes to the intersection. Changing this to a 5-lane on Geddes will provide additional capacity to aid in reducing traffic congestion. Add 2-way left turn phasing for E-W directions.

- Harris Road – Install a two-phase traffic signal.

- Ridge Road – Add center lanes for left turns on all approach legs, add an EB right turn lane, and install a two-phase traffic signal.

In all cases of signalized intersections, we assume that the signal timings would be optimized for the then current traffic volumes. The following table details the a.m. and p.m. LOS for 2010 traffic conditions before and after the improvements noted above.

Table 7
2010 AM and PM Peak Hour
Level of Service Analysis Before and After Improvements

Intersection of Geddes Road with	2010 AM		2010 PM	
	Before	After	Before	After
Superior Road	**-**	**-**	-	-
Leforge Road	B*	A	C*	A
Prospect Road	**E**	C	C	C
Harris Road	**F**	B	D	A
Gotfredson Road	A	A	A	A
Ridge Road	**F**	B	**F**	A

*Assumes traffic signal installation and lane improvements at Leforge Road between 2005 and 2010.
Bold indicates intersection fails.

2015 Shortcomings and Mitigation Measures

In 2015, all the intersections generally operate at an acceptable overall levels-of-service. However, there are individual movements at both Leforge Road and Prospect Road, which failed. Further, we note that the simulation is showing problems with most all of the minor side streets between Superior and Prospect Roads not finding adequate gaps in traffic on Geddes to exit the residential developments in the a.m. peak period. To improve the levels-of-service for these individual movements, the following improvements are recommended for 2015:

- Superior Road – Consider adding a NB to EB slip ramp to the roundabout to facilitate the high number of vehicles making this right turn movement in the p.m. peak hour.

- Leforge Road – Add an EB right turn lane.

- Prospect Road – Add a WB right turn lane, and additional N-S thru lanes at the intersection. Changing this to a 5-lane on Prospect will provide additional capacity to aid in reducing traffic congestion.

- 5-Lane Section – The 2010 model incorporated isolated 5-lane sections along Geddes Road at the intersections with Leforge Road and Prospect Road. For the 2015 model, a continuous 5-lane section is proposed from Superior Road to east of Prospect Road.

In all cases of signalized intersections, we assume that the signal timings would be optimized for the then current traffic volumes. The following table details the a.m. and p.m. LOS for 2015 traffic conditions before and after the above improvements.

Table 8
2015 AM and PM Peak Hour
Level of Service Analysis Before and After Improvements

Intersection of Geddes Road with	2015 AM		2015 PM	
	Before	After	Before	After
Superior Road	**-**	**-**	-	-
Leforge Road	A	A	B	B
Prospect Road	D	C	C	C
Harris Road	B	B	B	B
Gotfredson Road	B	B	A	A
Ridge Road	B	B	B	B

Bold indicates intersection fails.

2020 Shortcomings and Mitigation Measures

When viewing 2020 traffic on the 2015 roadway network, there continue to be problems with individual movements at various intersections. We also continue to note that the simulation is showing problems with the minor side streets east of Prospect Road not finding adequate gaps in traffic on Geddes to exit the residential developments in the a.m. peak period. To improve the levels-of-service for these individual movements, the following improvements are recommended for 2020:

- Prospect Road – Add SB right turn lane and EB right turn lane.

- Leforge Road – Add 2-way left turn phasing for E-W directions.

- 5-Lane Section – Continue the continuous 5-lane section from east of Prospect Road to the east boundary of the Township.

As before, we assume that all signal timing plans would be optimized for the then current traffic volumes. The following table details the a.m. and p.m. LOS for 2020 traffic conditions before and after the above improvements.

Table 9
2020 AM and PM Peak Hour
Level of Service Analysis Before and After Improvements

Intersection of Geddes Road with	2020 AM		2020 PM	
	Before	After	Before	After
Superior Road	**-**	**-**	-	-
Leforge Road	A	B	B	C
Prospect Road	D	C	C	B
Harris Road	C	B	C	B
Gotfredson Road	**E**	B	C	A
Ridge Road	D	B	B	B

Bold indicates intersection fails.

Please note that the p.m. LOS for Leforge Road appears to degrade with the after improvement condition. This is due to adding 2-way left turn phasing at this intersection. Prior to adding the left turn phasing, the left turn movements for WB and NB were operating at LOS F. With the addition of E-W left turn phasing, all movements at the intersection operate at LOS D or better, but the overall LOS goes from a B to a C as green time is taken from the through movements to serve the left turns phases.

2025 Shortcomings and Mitigation Measures

There were no additional improvements needed for the 2020 model for it to handle 2025 traffic. The following table details the a.m. and p.m. LOS for 2025 traffic conditions.

Table 10
2025 AM and PM Peak Hour
Level of Service Analysis

Intersection of Geddes Road with	2025 LOS	
	AM	PM
Superior Road	**-**	**-**
Leforge Road	B	C
Prospect Road	C	C
Harris Road	B	B
Gotfredson Road	C	A
Ridge Road	B	B

Bold indicates intersection fails.

Right-Of-Way Requirements

The Washtenaw County Road Commission has master-planned Geddes Road for a total right-of-way width of 120'. This is consistent with a 5-lane cross-section or narrow boulevard with direct left turns allowed, and would not require additional right-of-way beyond that planned. The platted subdivisions and many of the recent non-platted developments have already dedicated the 60' half right-of-way for their frontage to Geddes. Otherwise, there is only the 33' statutory half right-of-way available for the balance of the properties along the corridor.

Cost Estimates

We have provided preliminary opinion of costs for the improvements suggested in previous sections. This information is contained in Appendix G. All costs are considered to be in 2005 constant dollars.

RECOMMENDED IMPROVEMENT PROGRAM

2010

- Superior Road – Construct a roundabout. This improvement is already funded and scheduled to be built between 2005 and 2010. Our understanding is that it will have two circulating lanes with single-lane approaches and departures.

- Leforge Road – Add additional E-W thru lanes at the intersection. This provides additional capacity at the intersection to aid in reducing traffic congestion. East and west of the intersection will remain 2-lane.

- Prospect Road – Add additional E-W thru lanes at the intersection. This will provide additional capacity to aid in reducing traffic congestion. East and west of the intersection will remain 2-lane. Add 2-way left turn phasing for E-W directions.

- Harris Road – Install a two-phase traffic signal.

- Ridge Road – Add center lanes for left turns on all approach legs, add an EB right turn lane, and install a two-phase traffic signal.

2015

- Superior Road – Consider adding a NB to EB slip ramp to the roundabout to facilitate the high number of vehicles making this right turn movement in the p.m. peak hour.

- Leforge Road – Add an EB right turn lane.

- Prospect Road – Add a WB right turn lane, and additional N-S thru lanes at the intersection. Changing this to a 5-lane on Prospect will provide additional capacity to aid in reducing traffic congestion.

- 5-Lane Section – The 2010 model incorporated isolated 5-lane sections along Geddes Road at the intersections with Leforge Road and Prospect Road. For the 2015 model, a continuous 5-lane section is proposed from Superior Road to east of Prospect Road.

2020

- Prospect Road – Add SB right turn lane and EB right turn lane.

- Leforge Road – Add 2-way left turn phasing for E-W directions.

- 5-Lane Section – Continue the continuous 5-lane section from east of Prospect Road to the east boundary of the Township.

2025

No improvements needed.