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MEMORANDUM TO: David Miller
Chief of Police
Kenilworth Police Department

Kelley Kalinich, Ed.D.
Superintendent
Kenilworth School District 38

FROM: Eric D. Russell, P.E., PTOE, PTP, LEED AP ND
Principal

DATE: October 24, 2014

SUBJECT: Neighborhood Traffic Study – Phase 1
Kenilworth, Illinois

This memorandum summarizes the results of the first phase of a neighborhood traffic study for the Kenilworth neighborhood bounded by Winnetka Road on the north, Sheridan Road on the east, Kenilworth Avenue on the south, and the Union Pacific/Metra railroad tracks on the west. Figure 1 shows the study area boundaries. Significant land uses within this neighborhood include The Joseph Sears School, Kenilworth Union Church, and Kenilworth Village Hall. The Winnetka campus of New Trier Township High School is located to the immediate north of the study area.

Study Background

Residents of this neighborhood have raised concerns over the years pertaining to the volume and speed of traffic cutting through the neighborhood to reach New Trier High School. In addition, Kenilworth School District 38 has expressed concerns regarding student safety and the volume of southbound through (non-school) traffic on Abbotsford Road that passes by The Joseph Sears School during the morning drop-off period.

To separate school related traffic safety issues from the larger neighborhood traffic issues, the neighborhood traffic study has been separated into two phases. The first phase of the study, which is the subject of this memorandum, focuses on the implications of reducing the volume of traffic on Abbotsford Road adjacent to the school. The second phase of the study will be performed after a determination has been made on the recommendations from the Phase 1 study, and will evaluate traffic patterns throughout the neighborhood to determine if additional traffic management measures may be appropriate to reduce cut-through traffic and/or create a calmer traffic environment.

It should be noted that the Village of Kenilworth has implemented traffic management measures in the past during school start and/or dismissal times to address traffic congestion and safety in front of The Joseph Sears School, including restricting northbound movements on Abbotsford Road at Kenilworth Avenue and Melrose Avenue, restricting northbound movements on Cumnor Road at Kenilworth Avenue, and restricting eastbound movements on Cumberland Avenue at Abbotsford Road. District 38 has also implemented changes to reduce congestion on Abbotsford Road, including the newly implemented school routing plan that does not utilize southbound Abbotsford Road (between Warwick Road and Ivy Court) in the morning and shifts the drop-off location for 5th- through 8th-grade students onto Melrose Avenue. While these measures have been effective at improving conditions adjacent to the school, the Village of Kenilworth and District 38 desire to further improve student safety.

To advance that goal, the Village of Kenilworth and District 38 have proposed implementing an additional traffic regulation that would restrict southbound traffic movements on Abbottsford Road at Warwick Road during the morning student drop-off period from 7:30 A.M. to 8:30 A.M. to divert more through traffic away from the school. Since the north end of the study area is located within the Village of Winnetka, including the Abbotsford Road/Warwick Road intersection where the proposed traffic restriction would need to be posted, the villages of Kenilworth and Winnetka will need to partner on the approval and implementation of this regulation.

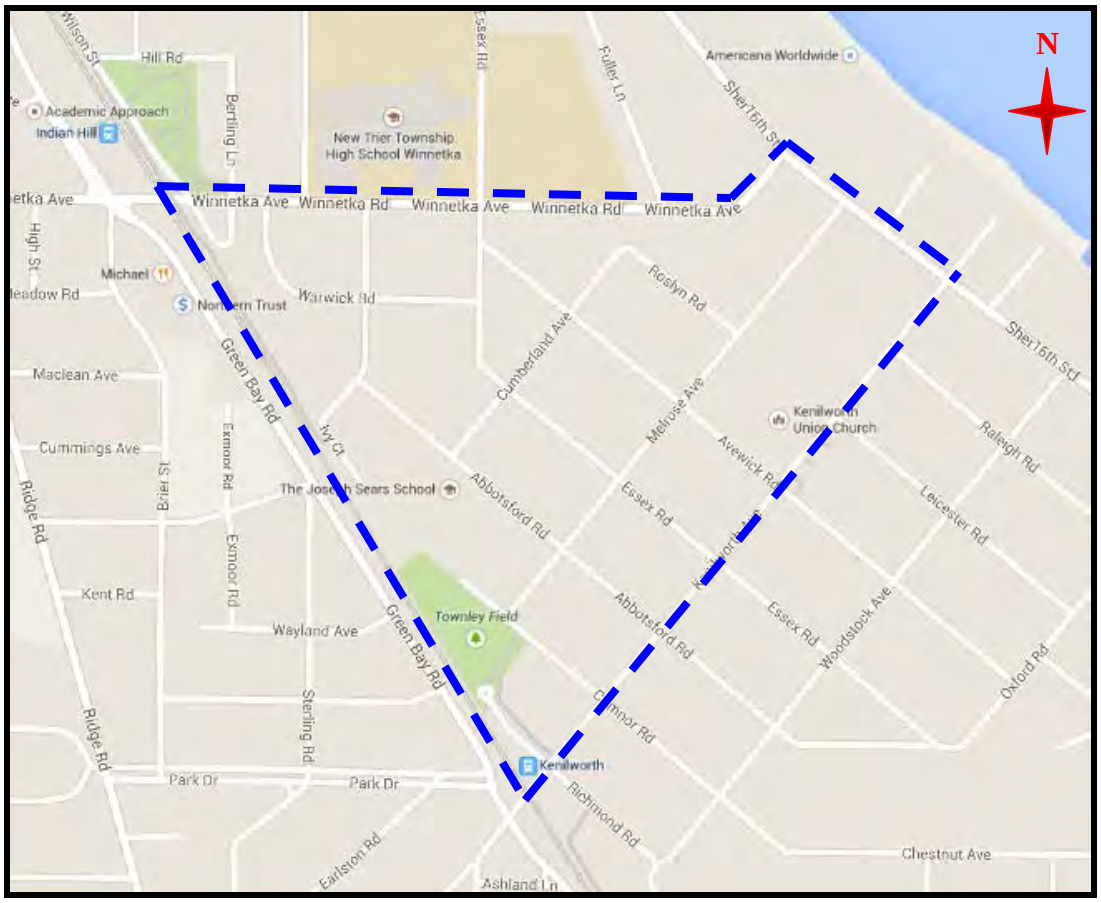


Figure 1
Study Area

Study Purpose and Scope

The proposed southbound traffic restriction on Abbotsford Road at Warwick Road will divert traffic onto other adjacent streets in the two villages during The Joseph Sears School's morning student drop-off period, including Essex Road and Warwick Road. As such, the purpose of Phase 1 of this neighborhood traffic study is to understand the implications that these traffic diversions will have on general traffic conditions in the area.

The study was completed using a multi-step process, as follows:

1. Field Observations and Data Collection. Traffic movements around The Joseph Sears School were observed to document conflict points and times of congestion. Traffic and pedestrian volume counts were conducted to establish existing conditions on Abbottsford Road, Essex Road and Warwick Road, and at several of the intersections in the vicinity of the school. Traffic origin-destination (O-D) surveys were also performed to identify the users of Abbotsford Road and determine the travel routes taken to get there.

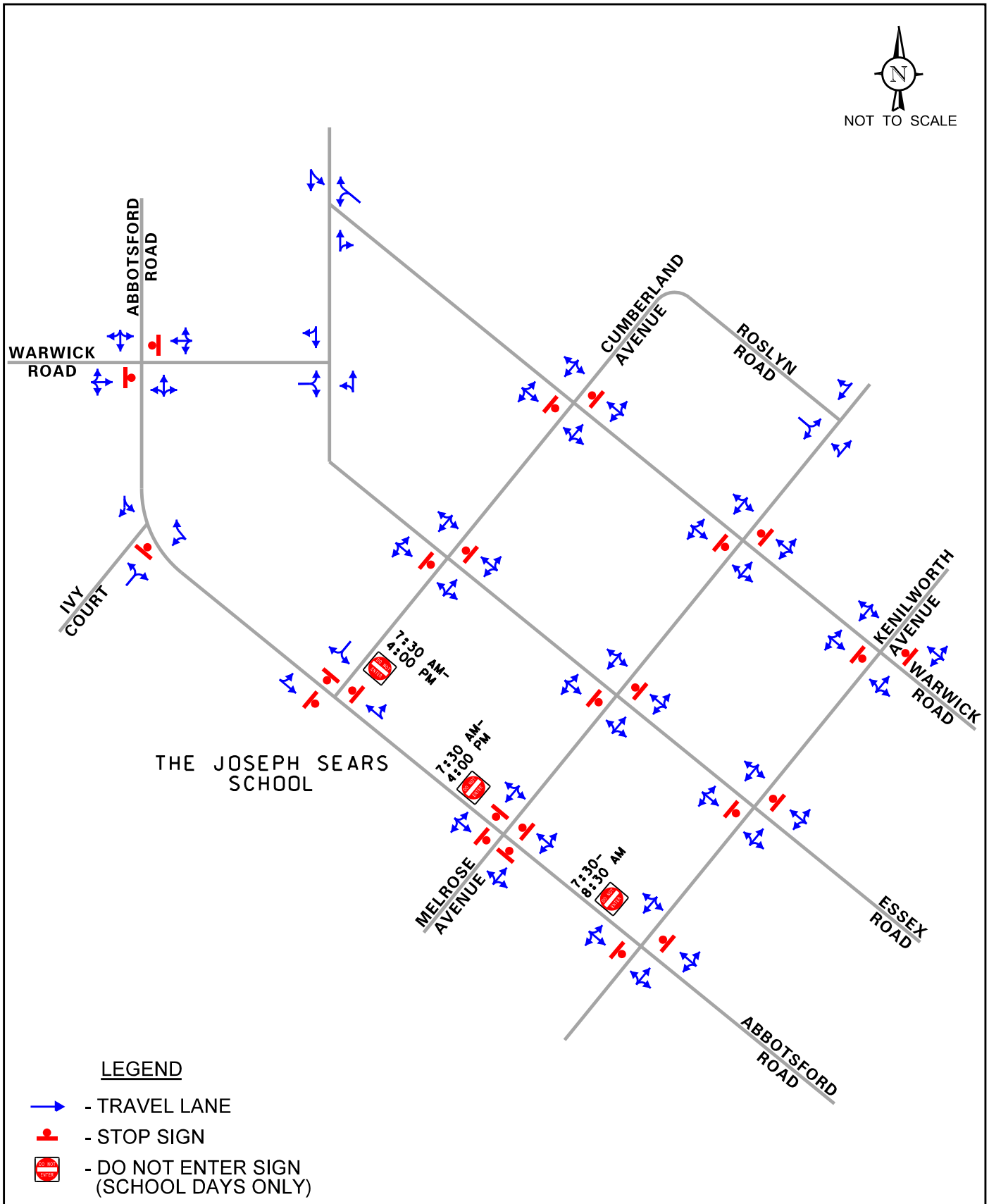
2. Traffic Analysis. The existing intersection operations were analyzed to establish levels of service and delay. Traffic reassignments were performed, based on the traffic count and O-D survey data, to estimate future traffic conditions after implementation of the proposed southbound Abbotsford Road traffic restriction. The intersection operations under future traffic conditions were then analyzed for comparison with existing conditions and to determine the implications of the traffic restriction.

3. Study Documentation, Conclusions and Recommendations. The field observations, data collection, traffic analyses, conclusions and recommendations were then summarized in this memorandum.

Field Observations

A field reconnaissance was performed by KLOA, Inc. to inventory existing lane configurations, traffic controls, speed limits, and turn restrictions. The existing street system characteristics are shown in Figure 2. In addition, traffic movements around The Joseph Sears School were observed on Thursday, September 4, 2014 to review traffic flow, conflict points, pedestrian patterns, and times of congestion. Weather conditions on this day were rainy but warm. The following key observations were made:

- The Joseph Sears School has a start time of 8:20 A.M. New Trier High School has a start time of 8:15 A.M. Traffic movements to and from the two schools generally occurs at overlapping times.
- A crossing guard assists pedestrian movements across Abbotsford Road at Cumberland Avenue. Most pedestrians were observed crossing Abbotsford at this location and very few mid-block pedestrian crossings were observed.
- The curb lane along the school frontage on Abbotsford Road was observed to always be available for student drop-offs and no students were observed being dropped-off in the through (bypass) lane.
- Cumberland Avenue, between Abbotsford Road and Essex Road, was also observed to be a drop-off point for students. Parents were also observed parking on Cumberland to escort students to school.
- Traffic congestion in front of The Joseph Sears School is compressed into a 30-minute period in the morning from 7:50 to 8:20 A.M.



PROJECT:	TITLE:	
Neighborhood Traffic Study - Phase 1 Kenilworth, Illinois	Existing Street System Characteristics	KLOA Job No: 14-192
		Figure: 2

- During this time period, traffic queues developed on southbound Abbotsford Road extending as far back as Ivy Court. Traffic queues also developed on westbound Cumberland Avenue extending as far back as Essex Road. The primary cause of the queuing was the drop-off activity at The Joseph Sears School, combined with the multi-way stop control at the Abbotsford/Cumberland intersection.

Existing Traffic Conditions

To establish existing traffic conditions and travel patterns in the vicinity of The Joseph Sears School, KLOA, Inc. conducted traffic and pedestrian volume counts and traffic origin-destination (O-D) surveys on several of the area streets and intersections.

Traffic and Pedestrian Volumes on Area Streets

To determine the volume of traffic using Abbotsford Road, Essex Road, and Warwick Road on a typical school day, KLOA, Inc. utilized pneumatic road tubes to collect hourly traffic volume data over a 24-hour period starting on Wednesday, September 3, 2014 (at 10:00 A.M.) and ending on Thursday, September 4, 2014 (at 10:00 A.M.). The counts were performed at the following three locations:

- Abbottsford Road between Warwick Road and Ivy Court
- Essex Road between Warwick Road and Cumberland Avenue
- Warwick Road between Essex Road and Cumberland Avenue

To determine the level of traffic and pedestrian activity during the morning student drop-off period at The Joseph Sears School, KLOA, Inc. utilized video cameras to count traffic movements and pedestrian crossings at the seven intersections listed below. The counts were performed on Thursday, September 4, 2014 from 7:30 A.M. to 8:30 A.M.

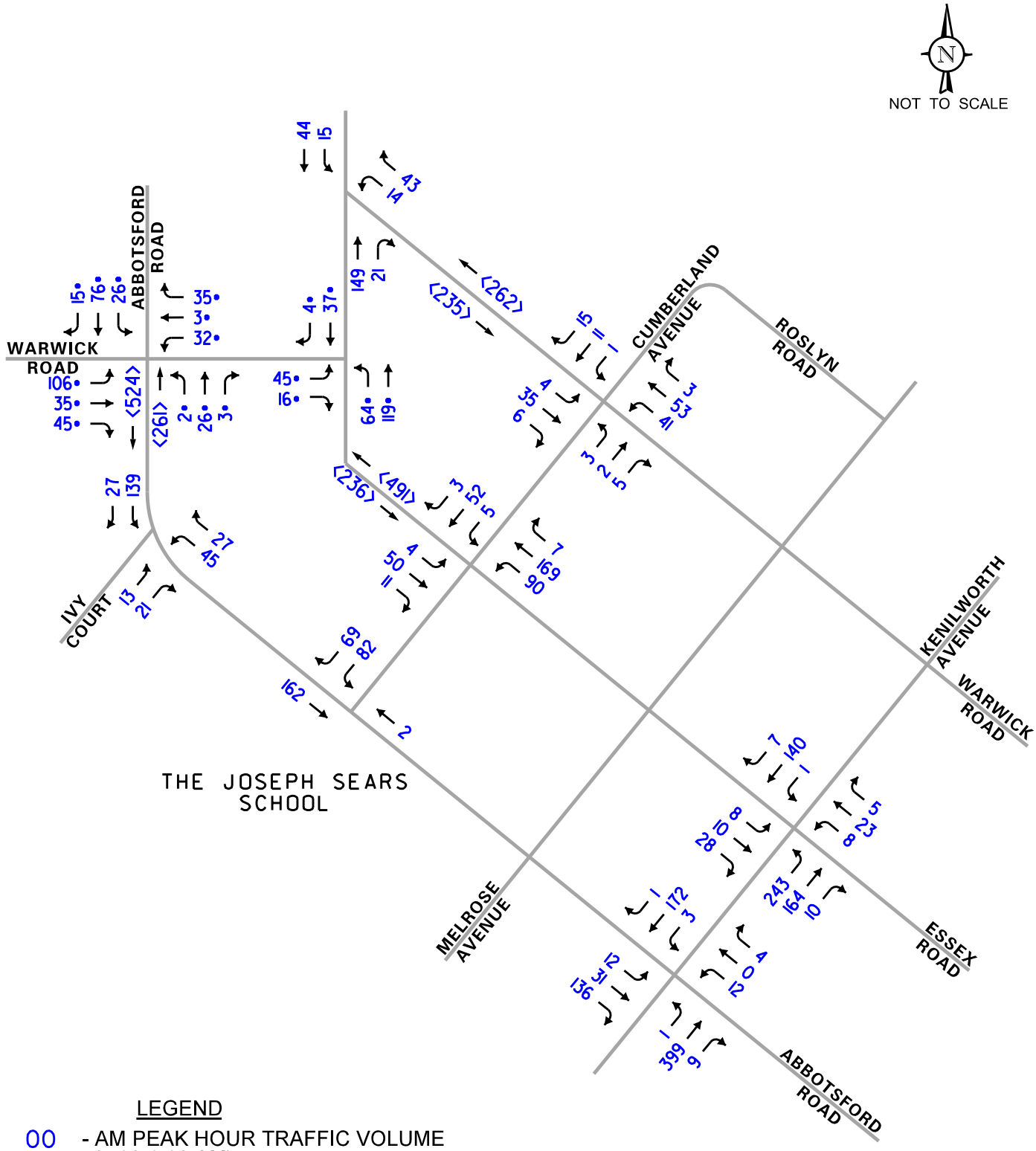
- Essex Road / Warwick Road (Kenilworth segment)
- Essex Road / Cumberland Avenue
- Essex Road / Kenilworth Avenue
- Warwick Road / Cumberland Avenue
- Abbotsford Road / Ivy Court
- Abbotsford Road / Cumberland Avenue
- Abbotsford Road / Kenilworth Avenue

In addition, KLOA, Inc. had previously conducted traffic counts on Tuesday, April 22, 2014 at the following two intersections as part of an analysis of existing conditions for New Trier High School:

- Abbotsford Road / Warwick Road
- Essex Road / Warwick Road (Winnetka segment)

The existing daily (24-hour) and A.M. peak hour traffic volumes are shown in Figure 3. The existing A.M. peak hour pedestrian crossing volumes are shown in Figure 4.

As shown in Figure 3, over a 24-hour period, there were 524 vehicles traveling south on the segment of Abbotsford Road just south of Warwick Road. Approximately 29 percent of the daily southbound volume (153 vehicles) occurred during the A.M. peak hour, of which 63 vehicles (41%) traveled from 7:30-8:00 A.M. and 90 vehicles (59%) traveled from 8:00-8:30 A.M.



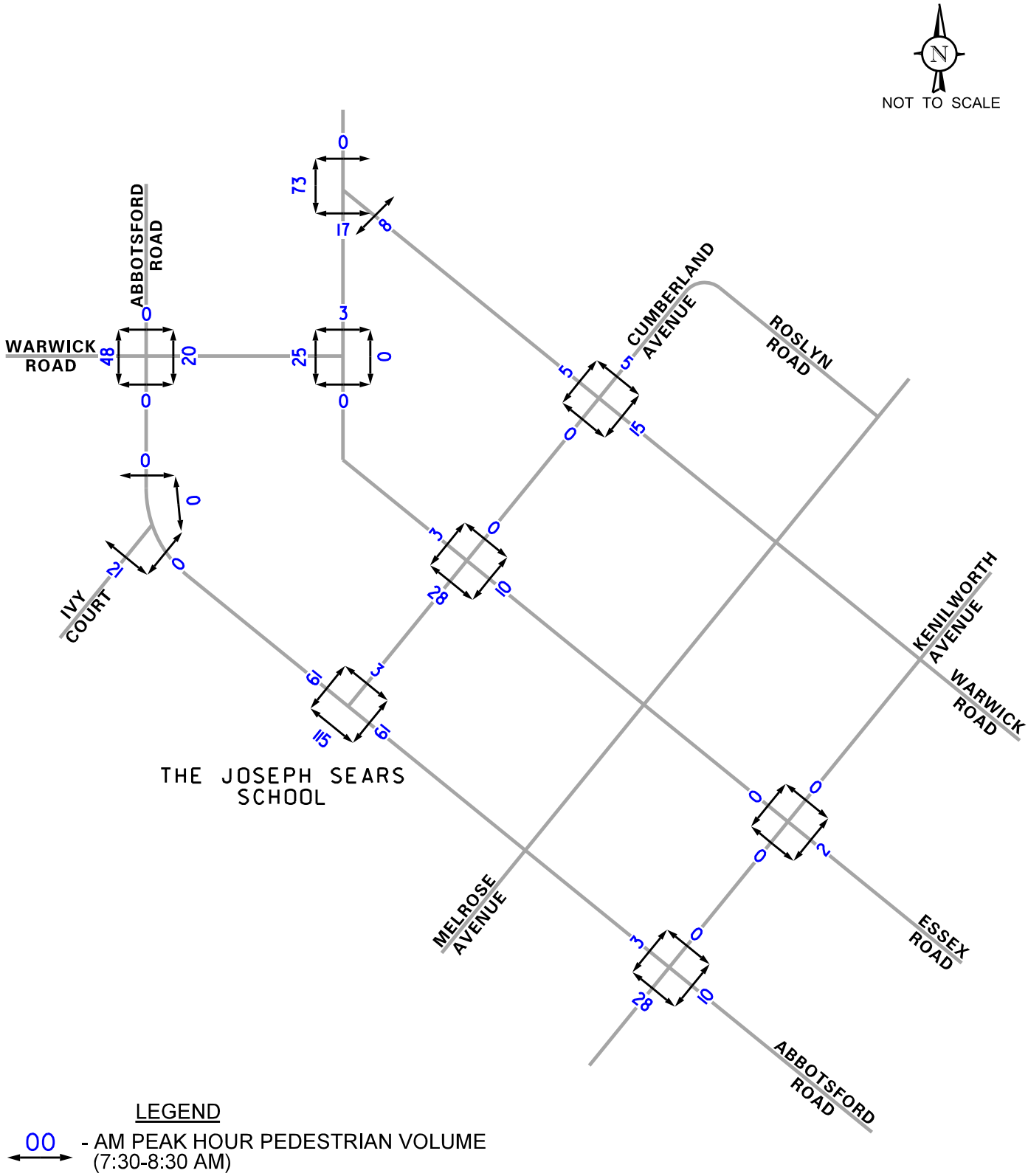
LEGEND

00 - AM PEAK HOUR TRAFFIC VOLUME (7:30-8:30 AM)

<000> - AVERAGE DAILY (24-HOUR) TRAFFIC VOLUME

* - VOLUMES COLLECTED ON 4/22/14

PROJECT:	TITLE:	
Neighborhood Traffic Study - Phase 1 Kenilworth, Illinois	Existing Traffic Volumes	KLOA Job No: 14-192
		Figure: 3



LEGEND

00 - AM PEAK HOUR PEDESTRIAN VOLUME (7:30-8:30 AM)

PROJECT:	TITLE:	
Neighborhood Traffic Study - Phase 1 Kenilworth, Illinois	Existing Pedestrian Traffic Volumes	KLOA Job No: 14-192
		Figure: 4

As shown in Figure 4, there is a heavy volume of pedestrians crossing Abbotsford Road at Cumberland Avenue to reach The Joseph Sears School. A crossing guard is station on the south leg of Abbotsford to assist students across the street, but an equal number of pedestrians were observed crossing the north leg of Abbotsford.

Travel Patterns on Abbotsford Road

KLOA, Inc. performed traffic origin-destination (O-D) surveys to identify the users of Abbotsford Road in front of The Joseph Sears School during the morning student drop-off period, and to determine the travel routes taken to get there. The surveys were also performed on Thursday, September 4, 2014 from 7:30 A.M. to 8:30 A.M. The intent of this effort was to approximate the volume of through traffic on Abbotsford Road that bypasses the school during this time period. For purposes of this study, through traffic is defined as traffic that is not associated with The Joseph Sears School.

The method of data collection utilized in the O-D survey was the documentation of license plate data at a series of locations along Abbottsford Road, Essex Road, and Warwick Road, as shown in Figure 6. License plate surveys are very beneficial and cost-effective for small-scale, limited O-D studies where some of the destinations are known. They are particularly adaptable to studies of single routes where traffic is too heavy to be stopped for driver interviews.

For the purpose of this O-D survey, the origin is the direction/street from which southbound traffic approaches the segment of Abbotsford Road located immediately south of Warwick Road. The destination is either The Joseph Sears School (for school drop-offs or parking) or points beyond the school (for non-school through traffic). The license plate data collected at the origin points were cross-matched against the license plate data collected at the destination points. The matched data proved beneficial in estimating the percentage of vehicles that entered the Village of Kenilworth on southbound Abbotsford Road (at Warwick Road) during the morning student drop-off period and proceeded to either (1) drop off students along The Joseph Sears School curb front on Abbotsford Road or Ivy Court, (2) park off of Ivy Court, or (3) continue past the school en route to other destinations.

Due to the moderate volume of traffic and relatively low travel speeds in the study area, license plate data was able to be collected for almost every vehicle that passed the survey points. However, as often is the case with license plate surveys, only a portion of the vehicles can be traced through the study area. This is because some of the vehicles that were recorded at the origin points do not continue through to the destination points as some motorists pull into adjoining residential driveways or park along Abbotsford Road. Other motorists were observed dropping off students on Abbotsford Road to the north of Cumberland Avenue, then pulling into a private driveway to turn around and head back northbound on Abbotsford Road where license plate data was not collected.

In total, KLOA, Inc. was able to track approximately 68 percent of the vehicles traveling southbound on Abbotsford Road at Warwick Road. Since the quantity of matched license plate data far exceeds the quantity of unmatched data, we believe there is a sufficient sample size to provide meaningful conclusions on the origins and destinations of the users of Abbotsford Road.

Figure 6
License Plate Data Collection Locations

Table 1 shows the distribution of southbound traffic on the segment of Abbotsford Road south of Warwick Road during the A.M. peak hour. Figure 7 shows the directions from which the southbound Abbotsford Road traffic originates and Figure 8 shows the destination of the southbound Abbotsford Road traffic. As can be seen in both Table 1 and Figure 8, approximately 58 percent of the southbound traffic on Abbotsford Road (89 vehicles) is estimated to be through traffic that bypasses The Joseph Sears School en route to other destinations. The remaining southbound traffic on Abbotsford Road (64 vehicles) either stops at The Joseph Sears School to drop-off students along Abbotsford Road or Ivy Court, or parks off of Ivy Court.

Table 1
DISTRIBUTION OF SOUTHBOUND ABBOTSFORD ROAD TRAFFIC IN A.M. PEAK HOUR

	Destination		
Origin	Sears School Drop-Off	Parking Off Ivy Court	Through Traffic
From the North on Abbotsford Rd	13%	4%	24%
From the East on Warwick Rd (via Essex Rd North)	1%	1%	2%
From the East on Warwick Rd (via Essex Rd South)	2%	1%	10%
From the West on Warwick Road	14%	6%	22%
Total	**30%**	**12%**	**58%**

Figure 7
Origin of Southbound Abbotsford Road Traffic in A.M. Peak Hour

Figure 8
Destination of Southbound Abbotsford Road Traffic in A.M. Peak Hour

Future Traffic Conditions

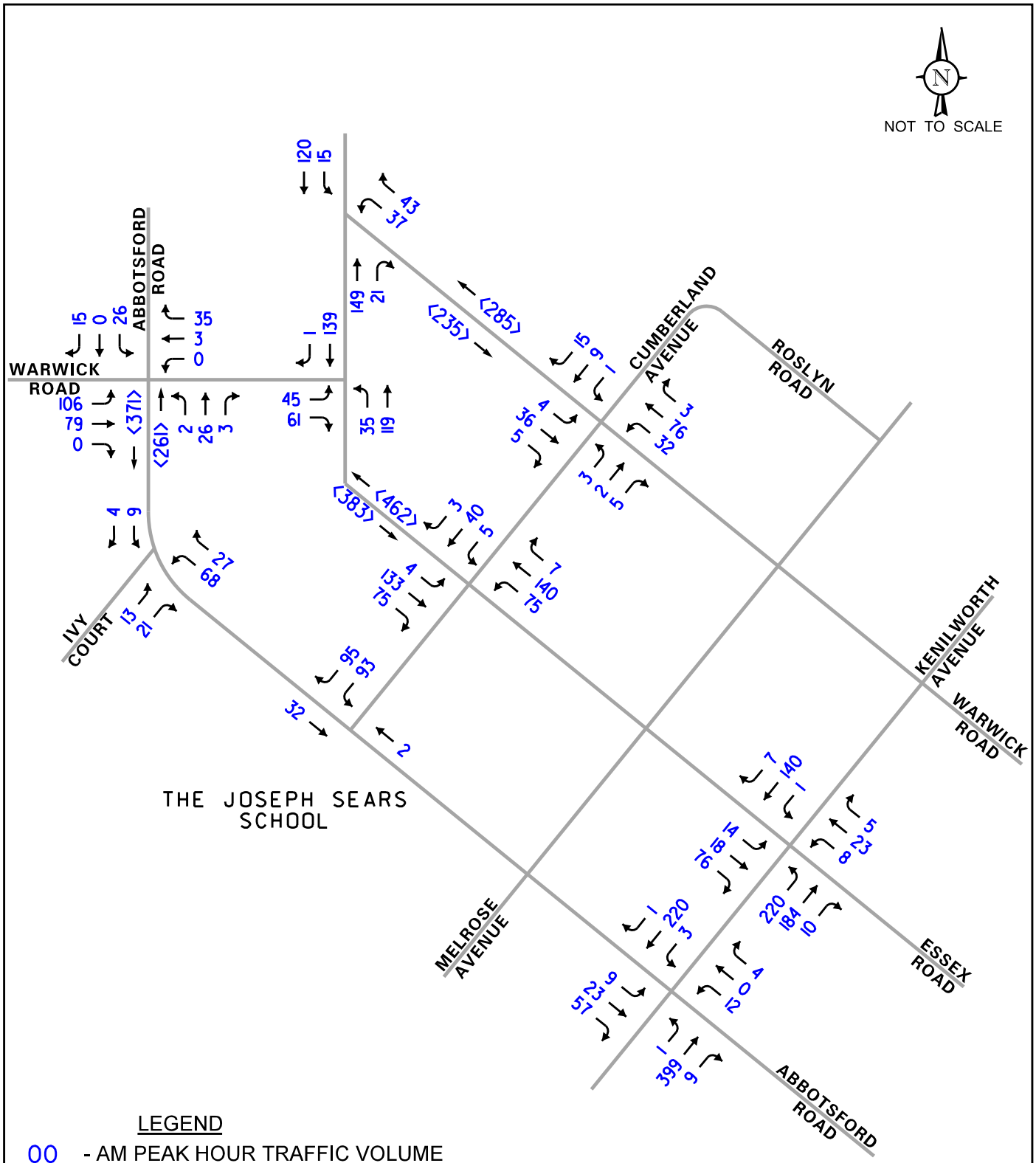
The proposed southbound traffic restriction on Abbotsford Road at Warwick Road during the A.M. peak hour (7:30-8:30 A.M.) would divert approximately 153 southbound vehicles that are presently using the street to either drop-off students at The Joseph Sears School, park off of Ivy Court, or bypass the school en route to other destinations. Using the existing travel patterns and O-D surveys as a guide, these vehicles were reassigned to the street system to estimate future traffic conditions after the restriction was imposed, as shown in Figure 9.

The vehicles that were traveling southbound on Abbotsford Road to drop-off students at The Joseph Sears School or park off of Ivy Court were instead assumed to travel south on Essex Road and turn onto Cumberland Avenue to reach Abbotsford Road or Ivy Court. Southbound Abbotsford Road through traffic that is not associated with the school was assumed to use Essex Road instead to reach Kenilworth Avenue. Motorists that currently travel northbound on Essex Road from Kenilworth Avenue and drop off New Trier High School students along the Winnetka segment of Warwick Road before heading back south on Abbotsford Road were instead assumed to use Warwick Road to travel northbound from Kenilworth Avenue, possibly dropping off the students on the Kenilworth segment of Warwick Road instead, before heading back south to Kenilworth Avenue via Essex Road.

In general, the majority of the diverted southbound traffic would shift over to Essex Road, resulting in an increase of approximately 147 vehicles on southbound Essex Road during the A.M. peak hour, which would triple the southbound volume currently carried on the segment of Essex north of Cumberland Avenue. Just under one-half of this additional southbound volume, however, is associated with The Joseph Sears School and would turn onto westbound Cumberland Avenue rather than continuing south on Essex Road. The northbound volume on Essex Road, on the other hand, would decrease by approximately 29 vehicles or 16 percent during the A.M. peak hour as many of these vehicles would use the Kenilworth segment of Warwick Road instead to travel north from Kenilworth Avenue. Over a daily (24-hour) period, the additional volume during the A.M. peak hour would result in an approximately 16 percent increase in daily two-way traffic on the segment of Essex Road north of Cumberland Avenue.

The remaining diverted southbound traffic would shift over to the Kenilworth segment of Warwick Road where the southbound volume would remain relatively the same during the A.M. peak hour while the northbound volume would increase by approximately 23 vehicles or 40 percent. Over a daily (24-hour) period, the additional volume during the A.M. peak hour would result in an approximately 4.6 percent increase in daily two-way traffic on the Kenilworth segment of Warwick Road.

The southbound traffic restriction on Abbotsford Road during the A.M. peak hour would result in an approximately 19 percent decrease in daily (24-hour) two-way traffic on the segment of Abbotsford Road between Warwick Road and Ivy Court.



LEGEND

00 - AM PEAK HOUR TRAFFIC VOLUME (7:30-8:30 AM)

<000> - AVERAGE DAILY (24-HOUR) TRAFFIC VOLUME

PROJECT:	TITLE:	
Neighborhood Traffic Study - Phase 1 Kenilworth, Illinois	Future Traffic Volumes	KLOA Job No: 14-192
		Figure: 9

Traffic Analysis

Traffic analyses were performed for the study area intersections to compare the operation of the street system under existing and future traffic conditions during the A.M. peak hour. The traffic analyses were accomplished using SYNCHRO computer software, which generally follows the methodologies outlined in the Transportation Research Board's Highway Capacity Manual (HCM), 2010. The methodologies use traffic controls, traffic volumes, and street characteristics to determine the levels of service, average control delay and vehicle queue lengths at an intersection.

The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is a qualitative term developed to express the operating conditions along streets and at intersections. Alpha designations from A to F are assigned based on the average control delay experienced by vehicles passing through the intersection. Control delay is that portion of the total delay attributed to the traffic signal or stop sign control operation, and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay until resumption of free flow speed. Level of service A is the highest grade (best traffic flow, least delays), level of service E represents saturated or at-capacity conditions, and level of service F is the lowest grade (oversaturated conditions, extensive delays). Typically, level of service D is the lowest acceptable grade for peak-hour conditions in a suburban environment such as Kenilworth.

For multi-way stop controlled (MWSC) intersections, an intersection level of service is calculated based on the weighted average of the delay on each of the approaches to the intersection. For two-way stop controlled (TWSC) intersections, levels of service are only calculated for the approaches controlled by a stop sign (not for the intersection as a whole). Level of service F at TWSC intersections occurs when there are not enough suitable gaps in the flow of traffic on the major (uncontrolled) street to allow minor-street traffic to safely enter the major street flow or cross the major street.

The Highway Capacity Manual criteria for levels of service and the corresponding control delay for unsignalized intersections is shown in Table 2. Table 3 summarizes the results of the traffic analyses for the existing and future A.M. peak hour traffic conditions.

Table 2
LEVEL OF SERVICE CRITERIA – UNSIGNALIZED INTERSECTIONS

Level of Service	Average Control Delay (seconds per vehicle)
A	0 – 10
B	> 10 - 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

Source: *Highway Capacity Manual*, 2010.

Table 3
TRAFFIC ANALYSIS RESULTS - A.M. PEAK HOUR

Intersection		Existing Conditions	Future Conditions
Abbotsford Rd / Warwick Rd[2]	EBA	C – 17.4	C – 15.7
	WBA	B – 11.8	A – 9.1
Abbotsford Rd / Ivy Ct[2]	NEBA	B – 10.9	A – 9.6
Abbotsford Rd / Cumberland Ave[1]		A – 9.2	A – 8.4
Abbotsford Rd / Kenilworth Ave[2]	SEBA	C – 19.5	C – 18.2
	NWBA	E – 39.2	D – 29.5
Essex Rd / Warwick Rd (Kenilworth segment)[2]	NWBA	B – 10.6	B – 12.1
Essex Rd / Warwick Rd (Winnetka segment)[2]	EBA	B – 12.4	B – 12.8
Essex Road / Cumberland Avenue[2]	SEBA	B – 10.2	B – 11.6
	NWBA	B – 14.5	C – 16.2
Essex Road / Kenilworth Avenue[2]	SEBA	D – 26.5	D – 29.2
	NWBA	E – 47.8	E – 48.5
Warwick Road / Cumberland Avenue[2]	SEBA	A – 9.6	A – 9.6
	NWBA	B – 10.2	B – 10.3

[1]MWSC = Multi-way stop controlled intersection
[2]TWSC = Two-way stop controlled intersection
EBA = Eastbound approach to the intersection
WBA = Westbound approach to the intersection
NEBA = Northeastbound approach to the intersection
NWBA = Northwestbound approach to the intersection
SEBA = Southeastbound approach to the intersection

While there are clearly traffic delays and vehicle queuing along Abbotsford Road and Cumberland Avenue during the 30-minute period prior to The Joseph Sears School start time, primarily due to the drop-off and parking maneuvers along the two streets, the traffic analysis results indicate that all of the traffic movements at the study area intersections presently operate at satisfactory levels of service during the weekday morning peak hour except for the northwestbound approaches of Abbotsford Road and Essex Road at Kenilworth Avenue. Further, the proposed southbound traffic restriction on Abbotsford Road will not significantly change the intersection operations. A comparison of the operations at each intersection follows.

Abbotsford Road / Warwick Road

The eastbound and westbound traffic movements on Warwick Road, which are under stop control, presently operate at level of service C and B in the A.M. peak hour, respectively. The proposed traffic restriction on Abbotsford would divert some of the traffic approaching from the north on Abbotsford and east on Warwick, resulting in less traffic traveling through this intersection in the A.M. peak hour. As a result, the average vehicle delays would be reduced and the level of service in the westbound direction would improve to A. The level of service in the eastbound direction is not projected to change as these vehicles would continue east to Essex instead of turning right at Abbotsford.

Abbotsford Road / Ivy Court

The eastbound traffic movement on Ivy Court, which is under stop control, presently operates at level of service B in the A.M. peak hour. The proposed traffic restriction on Abbotsford Road would substantially reduce the volume of southbound traffic on Abbotsford making turning movements easier from Ivy Court. As a result, the level of service for traffic on Ivy Court would improve to A.

Abbotsford Road / Cumberland Avenue

This multi-way stop controlled intersection presently operates at level of service A during the A.M. peak hour. While the proposed traffic restriction on Abbotsford Road would divert additional traffic onto westbound Cumberland Avenue, the restriction would reduce the volume of southbound traffic on Abbotsford to a greater degree. As a result, the average vehicle delay would be slightly reduced while the level of service (A) would remain unchanged.

Abbotsford Road / Kenilworth Avenue

The southeastbound and northwestbound traffic movements on Abbotsford Road, which are under stop control, presently operate at level of service C and E in the A.M. peak hour, respectively. The proposed traffic restriction on Abbotsford would divert some of the Abbotsford Road traffic over to Essex Road, which would reduce the average vehicle delays on both of the Abbotsford Road approaches to this intersection. The level of service on the southeastbound approach of Abbotsford would remain the same while the level of service on the northwestbound approach would improve to D.

Essex Road / Warwick Road (Kenilworth segment)

The northwestbound traffic movement on Warwick Road is presently uncontrolled but follows the standard "right-of-way rule" that requires traffic on Warwick Road to yield the right-of-way to traffic on Essex Road since Warwick Road terminates at Essex. Traffic movements on Warwick Road presently operate at level of service B in the A.M. peak hour. The proposed traffic restriction on Abbotsford Road would increase traffic volumes on southbound Essex Road and on Warwick Road, but the overall intersection volumes would still be relatively low and the resulting level of service would remain at B.

Essex Road / Warwick Road (Winnetka segment)

The eastbound traffic movement on Warwick Road is presently uncontrolled but follows the standard "right-of-way rule" that requires traffic on Warwick Road to yield the right-of-way to traffic on Essex Road since Warwick Road terminates at Essex. Traffic movements on Warwick Road presently operate at level of service B in the A.M. peak hour. The proposed traffic restriction on Abbotsford Road would increase southbound volumes on Essex Road and eastbound right-turn volumes on Warwick Road, while decreasing the northbound volume on Essex. The resulting level of service would remain at B.

Essex Road / Cumberland Avenue

The southeastbound and northwestbound traffic movements on Essex Road, which are under stop control, presently operate at level of service B in the A.M. peak hour. The proposed traffic restriction on Abbotsford Road would increase the volume of traffic on Cumberland Avenue, which would slightly increase the average vehicle delays in both directions. The level of service in the southeastbound direction would remain at B while the level of service in the northwestbound direction would degrade to C.

Essex Road / Kenilworth Avenue

The southeastbound and northwestbound traffic movements on Essex Road, which are under stop control, presently operate at level of service D and E in the A.M. peak hour, respectively. The proposed traffic restriction on Abbotsford would divert some of the Abbotsford Road traffic over to Essex Road, which would slightly increase the average vehicle delays on both Essex Road approaches to this intersection. The level of service on both approaches of Essex, however, would remain unchanged.

Warwick Road / Cumberland Avenue

The southeastbound and northwestbound traffic movements on Warwick Road, which are under stop control, presently operate at level of service A and B in the A.M. peak hour, respectively. The proposed traffic restriction on Abbotsford Road would result in a small increase in the volume of traffic on Warwick Road, which would slightly increase the average vehicle delay in the northwestbound direction. The level of service on both approaches of Warwick, however, would remain unchanged.

Implications of Southbound Abbotsford Road Traffic Restriction

Implementation of the proposed southbound traffic restriction on Abbotsford Road during the 7:30-8:30 A.M. time period would create traffic impacts to other area streets, namely Essex Road, Warwick Road (Kenilworth segment), and Cumberland Avenue. As description of these impacts follows:

Essex Road

The segment of Essex Road that is within the Village of Winnetka is a narrow street ranging in width from approximately 16 feet to 18 feet. The narrowness of the street results in slower moving traffic, particularly when vehicles traveling in opposite directions pass one another. Parking is prohibited at all times along both sides of this segment of Essex Road to ensure that two-way traffic flow is not impeded. As the street continues south into the Village of Kenilworth, it widens to approximately 20 feet and parking is permitted on the west side of the street between the curve and Cumberland Avenue. From Cumberland Avenue south to Kenilworth Avenue, the street is approximately 26 feet wide with parking prohibited at all times on the east side of the street while prohibited only on school days from 7:00 A.M. to 4:00 P.M. on the west side.

As noted previously, Essex Road would absorb the majority of the traffic diverted from Abbotsford Road during the 7:30-8:30 A.M. period. The resulting volume of southbound traffic on Essex, between Warwick Road and Cumberland Avenue, would be comparable to the existing volume of northbound traffic on this segment of the street during this morning time period, as shown in Figure 9. While Essex Road is a narrow street, it manages to carry two-way traffic at relatively slow speeds without significant delays. The proposed southbound traffic restriction on Abbotsford Road would increase the volume of traffic passing in opposite directions on Essex, which would further reduce traffic speeds and create a perception of increased congestion. It is also possible that this congestion might cause some southbound motorists to seek other routes that could impact other streets in the Village of Winnetka.

To avert potential conflicts from the additional volume of traffic on Essex Road, two improvements should be considered to clarify which streets have the right-of-way and minimize the potential for two-way flow to be impeded:

1. Install stop signs on both the Kenilworth and Winnetka segments of Warwick Road at Essex Road. Presently there are no traffic control signs posted.

2. Prohibit parking on the west side of Essex Road, between Cumberland Avenue and the Winnetka village limits, from 7:30-8:30 A.M, and modify the existing 60-minute parking regulation from 8:00 A.M.-5:00 P.M. School Days to 8:30 A.M.-5:00 P.M. School Days.

Warwick Road (Kenilworth Segment)

Similar to Essex Road, the segment of Warwick Road between Essex Road and Cumberland Avenue is also a narrow street that ranges in width from approximately 16 feet to 18 feet with parking prohibited on both sides of the street to ensure that two-way traffic flow is not impeded. As the street continues south of Cumberland Avenue, it widens to approximately 24 feet with parking permitted on the west side of the street.

Warwick Road is only anticipated to receive a small amount of additional traffic volume from the proposed southbound traffic restriction on Abbotsford Road. This additional volume may be related more to the northbound movements rather than the southbound movements. But, regardless, the additional volume could be adequately accommodated by the current design of the street without significant traffic delays or changes in the operational characteristics of the street.

The above recommendation for the installation of a stop sign on Warwick Road at Essex Road will more effectively control traffic movements at the intersection where no traffic controls presently exist.

Cumberland Avenue

Cumberland Avenue is also a narrow street in the Village of Kenilworth, ranging in width from approximately 16 feet to 18 feet. Parking is not permitted on the street to the east of Essex Road but 60-minute parking is permitted on the north side of the street between Essex Road and Abbotsford Road primarily for visitors to The Joseph Sears School. Since the parking lane impedes two-way traffic flow, the street is restricted to westbound movements only during school hours (7:30 A.M.-4:00 P.M.).

The proposed southbound traffic restriction on Abbotsford Road is projected to increase the A.M. peak hour traffic volume on Cumberland Avenue (the segment between Essex Road and Abbotsford Road) by approximately 25 percent. The additional volume should be accommodated without significant increases in delay as the conflicting volume of traffic on southbound Abbotsford Road will be diminished to a much greater degree. However, student drop-off and parking maneuvers along Cumberland are cause for the existing queueing that occurs on the street, and the additional traffic that would use Cumberland could potentially result in back-ups into the Cumberland/Essex intersection.

The current traffic control at the Cumberland Avenue/Essex Road intersection stops traffic on Essex Road only. As noted in Figure 4, approximately 28 pedestrians were observed crossing the west leg of Cumberland Avenue at Essex Road. This is the highest pedestrian crossing volume counted at an uncontrolled location in the study area, tied with the Kenilworth Avenue crossing at Abbotsford Road. It should be noted, however, that Cumberland Avenue is a local neighborhood street while Kenilworth Avenue is a major collector street that serves a greater purpose in moving traffic through the community. The proposed southbound traffic restriction on Abbotsford Road is projected to increase the

volume of traffic through this intersection by 23 percent during the A.M. peak hour and will result in marginally more congestion on the segment of Cumberland Avenue between Essex Road and Abbotsford Road.

The additional traffic activity at this intersection necessitates more vigilance on the part of motorists in yielding the right-of-way to crossing pedestrians. This could be achieved by installing higher-visibility crosswalk markings and pedestrian crossing signage. It could also be achieved with multi-way stop control, which would add stop signs to the Cumberland Avenue approaches to the intersection. Further study would need to be completed in Phase 2 of this neighborhood traffic study to collect the additional data necessary to evaluate the need for multi-way stop control against the standards and guidelines contained in the Federal Highway Administration's *Manual on Uniform Traffic Control Devices* (MUTCD).

Summary of Key Findings

The key findings from this first phase of the neighborhood traffic study are summarized below:

- The Joseph Sears School has a start time of 8:20 A.M. New Trier High School has a start time of 8:15 A.M. Traffic movements to and from the two schools generally occurs at overlapping times.
- Traffic congestion occurs in front of The Joseph Sears School, compressed into a 30-minute period in the morning from 7:50 to 8:20 A.M.
- During this time period, traffic queues on southbound Abbotsford Road extend as far back as Ivy Court and traffic queues on westbound Cumberland Avenue extend as far back as Essex Road, primarily due to the student drop-off activity at The Joseph Sears School, combined with the multi-way stop control at the Abbotsford/Cumberland intersection.
- From 7:30-8:30 A.M. there were 122 pedestrians crossing Abbotsford Road at Cumberland Avenue to reach The Joseph Sears School. A crossing guard is stationed on the south leg of Abbotsford to assist students across the street but ½ of the pedestrians cross the north leg of Abbotsford.
- Over a 24-hour period, there were 524 vehicles traveling south on the segment of Abbotsford Road just south of Warwick Road. Approximately 29% of the daily southbound volume (153 vehicles) occurred during the 7:30-8:30 A.M. time period, of which 63 vehicles (41%) traveled from 7:30-8:00 A.M. and 90 vehicles (59%) traveled from 8:00-8:30 A.M.
- The traffic using southbound Abbotsford Road primarily originates from the north on Abbotsford Road and the west on Warrick Road.
- Approximately 58% of the southbound A.M. peak hour traffic on Abbotsford Road (89 vehicles) is estimated to be through traffic that bypasses The Joseph Sears School en route to other destinations. The remaining southbound traffic on Abbotsford Road (64 vehicles) either stops at The Joseph Sears School to drop-off students along Abbotsford Road or Ivy Court, or parks off of Ivy Court.
- The proposed southbound traffic restriction on Abbotsford Road at Warwick Road during the A.M. peak hour (730-8:30 A.M.) would divert the 153 southbound vehicles that are presently using the street onto other area streets.

- The majority of the diverted traffic would shift over to Essex Road, resulting in an increase of approximately 147 vehicles on southbound Essex during the A.M. peak hour. The resulting southbound volume on the segment of Essex north of Cumberland Avenue would be comparable to the current volume of northbound traffic.
- The remaining diverted traffic would shift over to the Kenilworth segment of Warwick Road.
- Just under one-half of the additional southbound volume on Essex Road would be associated with The Joseph Sears School and would turn onto westbound Cumberland Avenue rather than continuing south on Essex.
- The northbound volume on Essex Road would decrease by approximately 29 vehicles (or 16%) during the A.M. peak hour as many of these vehicles that presently drop-off New Trier students on Warwick Road (Winnetka segment) and loop back south via Abbotsford Road would use the Kenilworth segment of Warwick Road instead to travel north from Kenilworth Avenue and loop back south via Essex Road.
- Over a daily (24-hour) period, the traffic shift during the A.M. peak hour period would result in an approximately 16% increase in two-way traffic on the segment of Essex Road north of Cumberland.
- While Essex Road is a narrow street, it manages to carry two-way traffic at relatively slow speeds without significant delays. The proposed southbound traffic restriction on Abbotsford Road would increase the volume of traffic passing in opposite directions on Essex, which would further reduce traffic speeds and create a perception of increased congestion. It is possible that the increased congestion on Essex could cause some southbound motorists to seek alternate travel routes that could impact other streets in the Village of Winnetka. With the regulatory changes recommended below, it is anticipated that two-way traffic flow on Essex Road would continue to be maintained without significant increases in delay, albeit at slower speeds.
- The additional volume of traffic diverted onto the Kenilworth segment of Warwick Road could be adequately accommodated by the current design of the street without significant traffic delays or changes in the operational characteristics of the street.
- The additional volume of traffic diverted onto Cumberland Avenue (via Essex Road) should also be accommodated without significant increases in delay as the conflicting volume of traffic on southbound Abbotsford Road, at the Cumberland/Abbotsford intersection, will be diminished to a much greater degree. However, student drop-off and parking maneuvers along Cumberland are cause for the existing queueing that occurs on the street, and the additional traffic on Cumberland could potentially result in back-ups into the Cumberland/Essex intersection.
- All of the traffic movements at the study area intersections presently operate at satisfactory levels of service during the A.M. peak hour, with the exception of the Kenilworth Avenue intersections with Abbotsford Road and Essex Road, and will generally continue to operate at the same levels of service with the proposed southbound traffic restriction on Abbotsford Road.

Conclusions and Recommendations

The findings from this study suggest that the proposed southbound traffic restriction on Abbotsford Road at Warwick Road during the 7:30-8:30 A.M. period would not create significant negative traffic impacts in the neighborhood if the following improvements were implemented.

- The installation of stop signs on the Kenilworth and Winnetka segments of Warwick Road at Essex Road to clarify the right-of-way where no traffic controls currently exist.
- The prohibition of parking on the west side of Essex Road, between Cumberland Avenue and the Winnetka village limits, from 7:30-8:30 A.M, and the modification of the existing 60-minute parking regulation from 8:00 A.M.-5:00 P.M. School Days to 8:30 A.M.-5:00 P.M. School Days, to ensure that two-way traffic flow is efficiently maintained.
- The installation of high-visibility crosswalk markings and pedestrian crossing signage on the west leg of Cumberland Avenue at Essex Road. The implementation of multi-way stop control at this intersection is another potential solution, but will require further study.

Furthermore, the substantial reduction in southbound through traffic on Abbotsford Road that would result from the traffic restriction would reduce conflicts with The Joseph Sears School's morning drop-off operation and pedestrian crossing activity, which would effectively achieve the Village of Kenilworth and District 38's desire to further improve student safety at the school.

Before the traffic restriction is permanently imposed, however, KLOA, Inc. recommends that a test case be considered to provide assurance to the both the Village of Kenilworth and the Village of Winnetka that the implications of the traffic restriction can be sustained without deleterious impacts to traffic circulation in the area. The test case can be conducted by installing a portable barrier during the traffic restriction period (school days 7:30-8:30 A.M.). The two villages would need to coordinate on the duration of the test run and the department that would install and remove the barrier each school day. An assessment would need to be made on traffic conditions during the test case based on simple field observations, which could be further supported with additional data collection and analysis, if desired.

If the test case does not demonstrate acceptable traffic conditions that are consistent with this study, other options could be considered to reduce the volume of southbound through traffic that bypasses The Joseph Sears School on Abbotsford Road during the morning drop-off period, including:

1. Limiting the southbound traffic restriction period on Abbotsford Road to 30 minutes (8:00-8:30 A.M.) instead of 60 minutes (7:30-8:30 A.M.) since the traffic congestion in front of The Joseph Sears School is primarily compressed within the 30-minute period prior to the school start time. The 30-minute restriction would still reduce traffic conflicts during the majority of the morning drop-off period but would divert less traffic onto Essex Road, Warwick Road (Kenilworth segment), and potentially other streets within the Village of Winnetka.
2. Modifying The Joseph Sears School start time (8:20 A.M.) to increase the time gap between the start time at New Trier High School (8:15 A.M.) instead of imposing a traffic restriction on Abbotsford Road. The change would diminish the impact of the through volume bypassing The Joseph Sears School and reduce the potential for conflicts with arriving Sears School students.