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TRAFFIC ENGINEERING
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MEMORANDUM

To: Lynsey Kawski – DeKalb-Sycamore Area Transportation Study (DSATS)
DSATS Technical and Policy Committee
DSATS Staff

From: Tim Sjogren, P.E., PTOE – Metro Transportation Group
Sara Disney – Metro Transportation Group

Date: June 25, 2007

RE: 2007 Truck Routing Study

Metro Transportation Group was retained by DSATS to perform a truck routing analysis and study for the greater DeKalb-Sycamore area. Data was collected at a total of 14 locations and compiled to quantify truck activity within the study area. Of particular interest to DSATS was the percentage of trucks using the major state routes (IL 64, IL 38, IL 23) for travel through the area as opposed to local pickup/delivery. According to DSATS staff, it is the community's perception reflects a belief that a significant percentage of the current truck traffic, particularly within the downtown DeKalb area, is attributable to heavy vehicles that are using the state routes for long-haul (non-local) deliveries. As such, there was interest in quantifying this behavior in order to determine what measures could be taken to alleviate the impact of these vehicles on sensitive pedestrian, business, and residential areas. The count methodology, data collection results, and summary analysis are presented following.

METHODOLOGY

In cooperation with DSATS staff, 14 locations were designated for truck observations as shown on *Figure 1* (attached). On the periphery of the study area, ten common points of ingress and egress from the DeKalb-Sycamore area were chosen to form a loose "cordon", while four stations were assigned within the downtown DeKalb area to track vehicle movements through the IL 38/IL 23 intersection. At each location, traffic monitors observed and recorded heavy vehicle license plate information and the respective direction of travel (inbound or outbound). Each location and the observed directions of travel were as follows:



- Peripheral Locations
 - IL 23 south of Gurler Road (northbound = inbound, southbound = outbound)
 - Peace Road south of Fairview Drive (northbound = inbound, southbound = outbound)
 - Fairview Drive east of IL 23 (westbound = inbound, eastbound = outbound)
 - IL 38 west of Somonauk Road (westbound = inbound, eastbound = outbound)
 - IL 64 east of Airport Road (westbound = inbound, eastbound = outbound)
 - Plank Road east of IL 23 (westbound = inbound, eastbound = outbound)
 - IL 23 north of Plank Road (southbound = inbound, northbound = outbound)
 - IL 64 east of Annie Glidden Road (eastbound = inbound, westbound = outbound)
 - IL 38 west of Annie Glidden Road (eastbound = inbound, westbound = outbound)
 - Annie Glidden Road north of Fairview Drive (northbound = inbound, southbound = outbound)

- Interior Locations
 - IL 23 north of IL 38
 - IL 23 south of IL 38
 - IL 38 east of IL 23
 - IL 38 west of IL 23

Three time periods were chosen for observation to correspond with the highest level of traffic activity: 6AM – 9AM, 10:30AM – 1:30PM, and 3:30PM – 6:30PM. For the purposes of data collection, heavy vehicles were defined as any non-private, long-wheelbase vehicle. This included work trucks and school buses, single-unit trucks (such as garbage and “FedEx-type” delivery vehicles), and multi-unit tractor trailers (semis). Multi-unit truck license plate information was gathered from the front of the vehicle to allow for the appropriate matching of vehicles that arrived pulling one load and left with another. If it could not be definitively determined whether or not a vehicle fit the “heavy vehicle” description on the scene, vehicle information was included in the count data in order reduce errors due to varying judgments by the traffic monitors.

COUNT RESULTS

The license plate survey was conducted on Tuesday, April 24th, 2007. Traffic monitors used digital recording devices to record the last four digits of the license plate number, direction of travel, and time, which was then entered into a database to allow various data queries to be



performed. Given the speed of traffic and number of vehicles in some locations, not all of the license plate data could be accurately collected. To allow for these omissions, monitors were instructed to note the time and direction of missed vehicles. This data was then used to “normalize” the query data to account for both the total volume of truck traffic observed and the percentage of vehicles missed during the data collection periods.

It should also be noted that the data presented in the following tables only includes activity observed during the midday and afternoon observation periods. Issues with equipment, sight distances, and personnel resulted in data irregularities during the morning period that would have adversely skewed the overall survey results. At the locations where these complications were not experienced, data revealed a general consistency with the midday and afternoon periods; as such, it was determined that exclusion of the morning data would allow conclusions to be drawn from the “best” data available without compromising the integrity of the study.

Table 1 shows the results of the first query, percentage of through vehicles. The results are broken into two columns: the first shows the percentage of trucks observed entering at each exterior point and exiting at another (not the point of entry) within 45 minutes. Given the distances between some of the cordon locations, it was determined that a 45-minute window would be sufficient to allow a through vehicle to travel between any of the points directly, but not long enough for a local delivery vehicle to enter the study area, load/unload, and exit the perimeter of the study area. As such, the first column should fairly accurately represent the through movements of heavy vehicles. The second column shows the percentage of trucks observed entering the location noted and exiting from another within the total observation period. A small percentage of these vehicles may in fact be non-local, through trucks (stopped for food, drink, gas, etc.), while most presumably made a delivery or pickup and then continued on to their next destination.



Table 1 – Through Trucks, By Time Interval

Location	% of Trucks in 45 Minutes	% of Trucks during Total Count Period
IL 23 south of Gurler Road	6%	8%
Peace Road south of Fairview Drive	5%	9%
Fairview Drive east of IL 23	9%	16%
IL 38 west of Somonauk Road	17%	27%
IL 64 east of Airport Road	9%	13%
Plank Road east of IL 23	7%	12%
IL 23 north of Plank Road	3%	11%
IL 64 west of Annie Glidden Road	7%	8%
IL 38 west of Annie Glidden Road	7%	23%
Annie Glidden Road north of Fairview Drive	6%	11%
<i>Average</i>	<i>7%</i>	<i>19%</i>

Table 2 further refines the query by adding an additional condition: movement through downtown DeKalb. The first column shows the percentage of total trucks observed at a given entry point that passed through the IL 23/IL 38 intersection in downtown DeKalb before exiting at a different exterior location within the 45-minute window. The second column looks only at through heavy vehicle traffic and notes the percentage of this traffic that was observed to utilize this downtown intersection during their trips.

Table 2 – Through Trucks in Downtown DeKalb

Location	% of Trucks in Downtown DeKalb	% of Thru Trucks that use Downtown DeKalb
IL 23 south of Gurler Road	2%	37%
Peace Road south of Fairview Drive	< 1%	7%
Fairview Drive east of IL 23	4%	38%
IL 38 west of Somonauk Road	6%	35%
IL 64 east of Airport Road	1%	17%
Plank Road east of IL 23	2%	26%
IL 23 north of Plank Road	0%	0%
IL 64 west of Annie Glidden Road	1%	9%
IL 38 west of Annie Glidden Road	5%	73%
Annie Glidden Road north of Fairview Drive	1%	15%
<i>Average</i>	<i>1.9%</i>	<i>26%</i>



ANALYSIS

The results of the data collection effort indicate that non-local truck activity accounts for a fairly small percentage of the total heavy vehicle traffic within the study area. On average, only seven percent of the trucks observed during the study period fit this classification, while less than two percent utilized the IL 38/IL 23 intersection for their through movements. These percentages may be applied to recently collected Average Daily Truck Traffic (ADTT) volumes to estimate the number of through trucks, although the differing periods of ADTT data collection limits the precision of this methodology. The results of these calculations suggest that through truck traffic on the state routes in downtown DeKalb accounts for less than 120 of the nearly 1,400 heavy vehicle movements that utilize the intersection everyday. In addition, overall data shows a relatively minor impact of through truck traffic on the study area roadways.

Overall data shows a relatively minor percentage of through truck traffic on study area roadways, though the heavy vehicles present were found to exhibit certain travel patterns. While certainly not conclusive given the relatively small sample size, these trends are listed below.

- *IL 23 south of Gurler Road:* Total through truck traffic (6%) was slightly below the study area average, but less than 40 percent of through traffic entering from this location was noted at the IL 23/IL 38 intersection. Given the survey location's proximity to downtown and the limited routing options available to reach other exterior survey positions, this percentage was lower than expected. Instead, queries show that over half of through truck traffic at this location was observed traveling eastbound on Fairview Drive. A similar (albeit reversed) maneuver was noted on Fairview Drive east of IL 23, where nearly 60 percent of the through traffic observed made a left-turn to travel southbound on IL 23. This data contradicts the perception that a significant percentage of the truck traffic generated by the industrial developments along Fairview Drive is using IL 23 and IL 38 (and the downtown area) as a shortcut to destinations such as Rochelle's intermodal facilities and the I-39 corridor. In reality, the majority of the truck traffic on Fairview Drive is using IL 23 to head south, away from downtown DeKalb. As industrial development continues along the Fairview Drive corridor, this pattern should be monitored to ensure sufficient capacity at the IL 23/Fairview intersection, particularly for northbound right-turning and westbound left-turning movements.
- *Peace Road south of Fairview Drive:* Although this location generated the third-lowest percentage of through truck traffic, the associated travel pattern was noticeable. Almost



40 percent of the inbound through traffic was observed to be outbound at IL 38 west of Somonauk. A similar pattern (again reversed) was observed at IL 38, where nearly 40 percent of the inbound through traffic was observed southbound on Peace Road. This reveals the strong influence of the I-88/Peace Road interchange on local travel patterns, particularly for the eastern portion of the study area. With the next access to I-88 east over 25 miles away at Orchard Road, the continued development of Cortland and the IL 38 corridor east of Peace Road is likely to have a much larger impact on the capacity of the Peace Road corridor than may be initially realized or anticipated. Any study of a potential new interchange with the I-88 Tollway east of Peace Road should pay close attention to this existing travel pattern in order to properly model the impact of these “diverted” trips.

- *IL 38 (Lincoln Highway) Corridor:* Two of the highest percentages of through trucks noted in this study were observed on opposite ends of the Lincoln Highway corridor. Not surprisingly, these two locations (IL 38 east of Somonauk Road and IL 38 west of Annie Glidden Road) were also the highest in terms of percentage of through trucks in downtown DeKalb. Just under half of all the through truck traffic observed within the downtown area originated from one of these two exterior points. Theoretically, these results would seem to be consistent with the community perception that a significant percentage of the truck traffic on Lincoln Highway is through vehicles, maneuvers that could potentially be accommodated by the development of a truck route “by-pass” around the downtown area. The application of these percentages to actual truck volumes, however, yields a different perspective. For example, 2007 ADTT data for IL 38 west of Somonauk Road shows that 930 heavy vehicles travel this roadway segment on a daily basis. Assuming a 50/50 split between eastbound and westbound vehicles and applying the 6.1 percent shown in Table 2 for through trucks in the downtown area, approximately 28 heavy vehicles per day travel through downtown. This same exercise yields a total of 26 vehicles (per day) for movements on IL 38 from the west. Even with 100 percent compliance for any developed alternate route, the net reduction in heavy vehicles within the downtown area would likely be less than five per hour. Given the current vehicle traffic (cars and trucks) and a gradually increasing number of trains through the IL 23/IL 38 intersection, this small reduction would likely have a negligible impact on improved pedestrian safety and noise conditions within the DeKalb downtown area.



- *IL 64 Corridor:* Both ends of the IL 64 corridor (east of Airport Road and west of Annie Glidden) were shown to have through truck traffic percentages that are slightly higher than the study area average. Analysis of these travel patterns reveals that just over 40 percent of the total through truck traffic was between these two points. Applying the same methodology to this corridor as was applied to IL 38, it can be estimated that just under 40 heavy vehicles per day are using the IL 64 corridor in downtown Sycamore for non-local movements. Since overall truck traffic in this corridor is lighter than that experienced in downtown DeKalb, the relative impact of relocating these vehicles would be marginally greater, but would still be so small as to be essentially unnoticeable.

These travel patterns are illustrated on *Figure 2*. This graphic also presents an estimated number of through trucks that are performing these movements daily. Note that these volumes are not indicative of the total number of trucks on these roadway segments or even the total number of through trucks. The number displayed represents an estimate of daily through trucks making these specific maneuvers, based on ADTT counts and license plate surveys performed in April 2007.

CONCLUSIONS

Analysis of the data collected shows a relatively small percentage of non-local heavy vehicle activity within the study area. Less than ten percent of the trucks observed entered and exited quickly enough to be considered through traffic, and less than two percent of the total utilized the IL 23/IL 38 intersection for these maneuvers. Individual analysis of specific survey locations contradicts commonly held perceptions that the downtown DeKalb area is used heavily by non-local truck traffic as a “Tollway bypass” for destinations in Rochelle and along the I-39 corridor. Even in areas where the through traffic seemed to be the most concentrated, the relative impact of removing these heavy vehicles from the DeKalb and/or Sycamore downtown area (via the use of truck bypass routes) would be so minimal that it would likely go unnoticed.

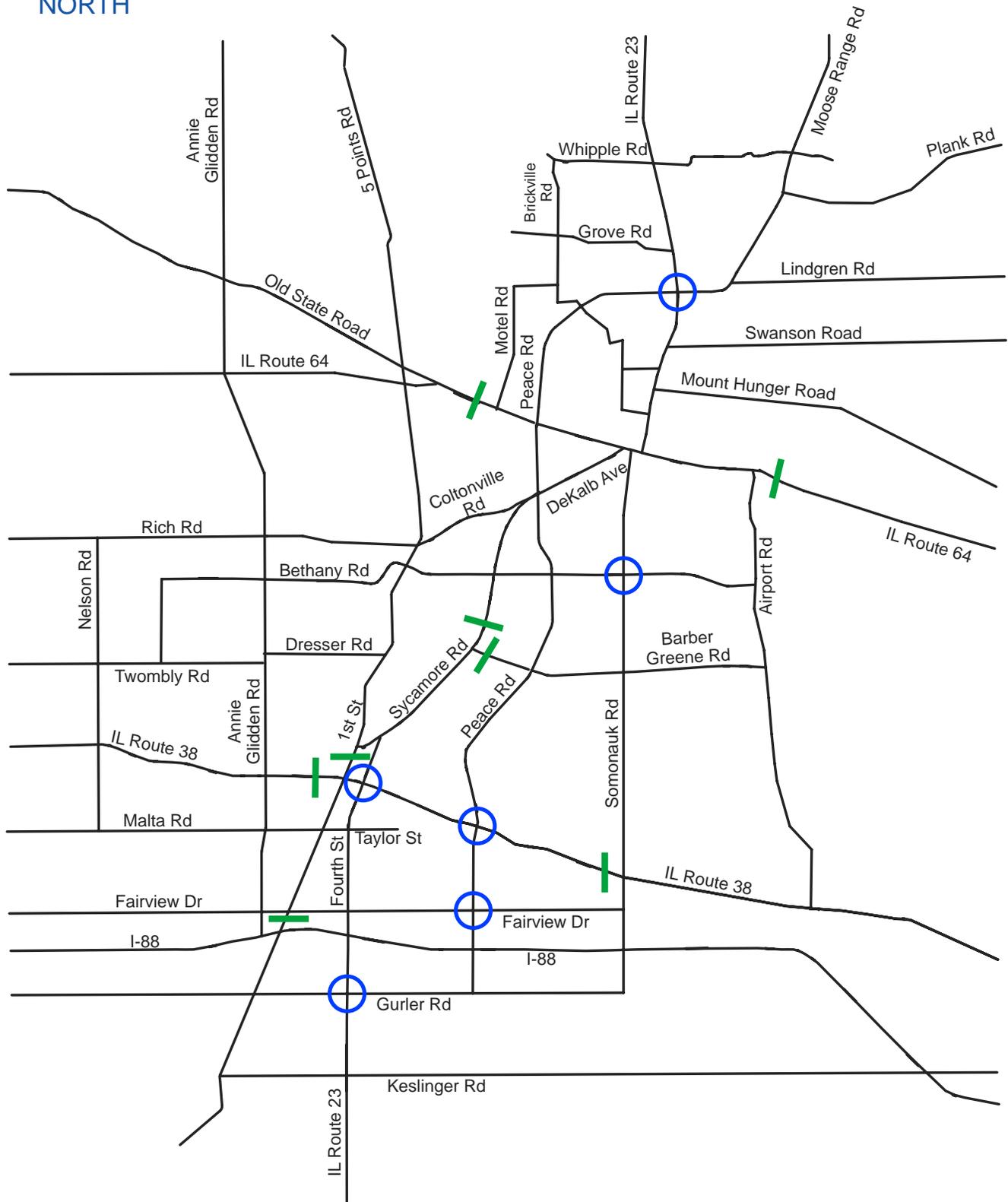
Originally, the scope of this study included the identification of potential truck bypass routes in order to reduce the impact of heavy vehicle traffic in the downtown areas of DeKalb and Sycamore. Yet because state law allows heavy vehicles to use most routes within two miles of their destination, only through truck traffic would have been subject to any rerouting scenarios. With a relatively minor number of through trucks noted in this study, the potential effectiveness of any alternate route would be greatly limited. Given the costs (financially, politically, and environmentally) associated with identifying, designing, implementing, and enforcing even the simplest of bypass routes, it is unlikely that the benefits would be worth the



expenditure. As such, Metro recommends that an engineering study to identify and delineate these potential routes not be undertaken at this time. Should significant changes in the development characteristics of the communities within the study area take place, resulting in a greater density of heavy vehicles along the state routes, this recommendation may need to be reexamined.

Though the percentage of through trucks was so low that even a 100 percent increase in the results would be unlikely to change the study recommendations, care should be taken not to assign an overly optimistic confidence level to any of the specific percentages outlined in Tables 1 and 2. These percentages are based on observations conducted during six hours on a single day and were subject to a number of errors, both human and mechanical. Data collected for the DSATS ADT/ADTT study earlier in the year revealed daily fluctuations in total vehicle traffic as high as 20 percent, with hourly variations of 300 percent or more in some cases. Given the small sample size generated by the length of the study period and the fact that data was only collected on one day, it is not recommended that the individual percentages contained within this report be used for any purposes other than to draw general conclusions about travel patterns and network utilization. Additional data collection may allow for a greater confidence interval in the individual percentages to be established, but it is unlikely that the results would be so markedly dissimilar as to significantly change the conclusions reached within this study.

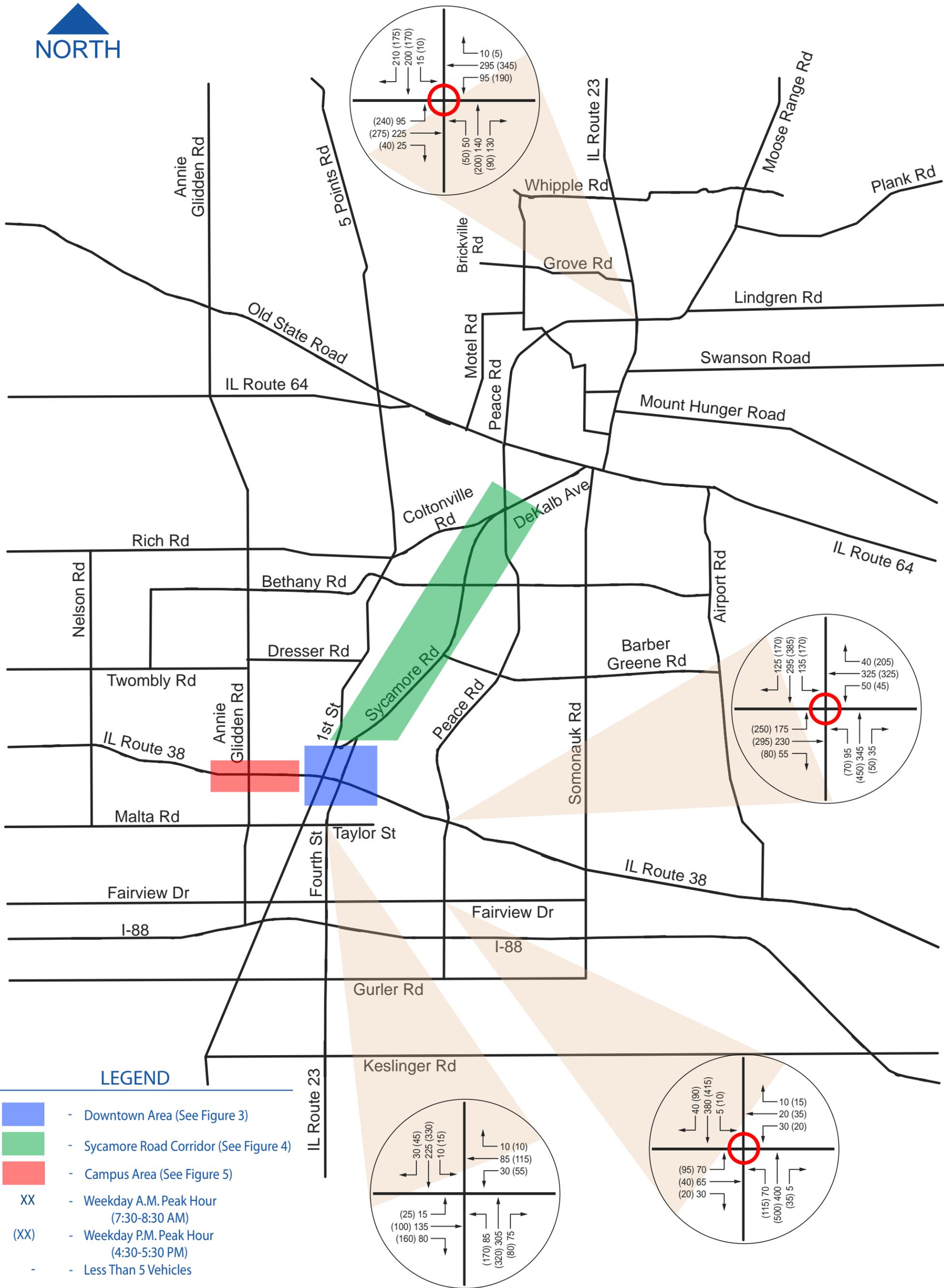
Please feel free to contact this office with any questions or comments regarding the data, analysis, or conclusions contained within this memorandum.



LEGEND

-  - Intersection Count (All Legs)
-  - Roadway Segment





Note: Turning movement count data was provided to DSATS by Christopher B. Burke Engineering. Data for intersections marked with a red circle was collected by Metro Transportation Group to supplement the previous counts.

