# Traffic Evaluation Study
# St. Charles Road-Main Street
# Commercial Area
# Lombard, Illinois

**Prepared for**
**The Village of Lombard**

**By Kenig, Lindgren, O'Hara, Aboona, Inc.**
**June 2004**

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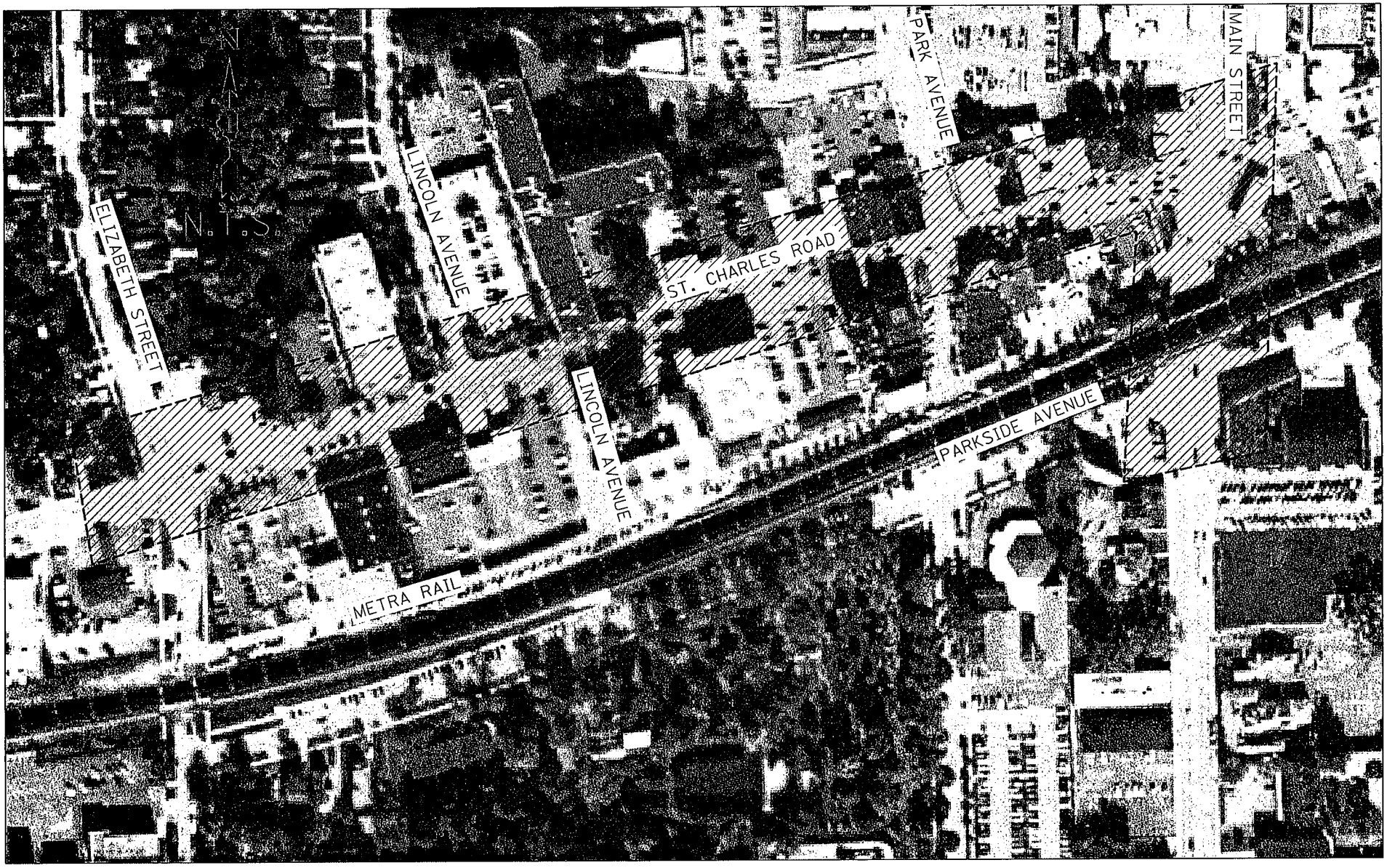
## Tables

# 1. Introduction

This report summarizes the results of a traffic and pedestrian study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) to evaluate traffic flow, access issues, new development impacts, and pedestrian movements in the St. Charles Road-Main Street commercial area (study area). The scope of this study also includes an analysis of a new proposed development to contain an approximate 14,000± square-foot Walgreens store with a drive-through window located in the southwest quadrant of the Elizabeth Street and St. Charles Road intersection. **Figure 1** shows the study area.

The specific objectives of the study are to (1) examine existing traffic conditions and peak period traffic flow; (2) identify traffic problems and deficiencies; (3) identify improvements to be implemented in the study area to mitigate any deficiencies; (4) assesses the impact the new development would have on traffic conditions in the area; (5) determine reasonable roadway and access improvements; and (6) review pedestrian movements and new impacts resulting from the new Metra lot locations.




PROJECT:

VILLAGE OF LOMBARD
TRAFFIC EVALUATION STUDY

TITLE:

STUDY AREA

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PROJECT NO:
03-264

FIGURE NO:
1

# 2.
# Existing Conditions

Transportation conditions in the vicinity of the site were inventoried to obtain a database for projecting future conditions. Four general components of existing conditions were considered: (1) the geographical location of the site; (2) the characteristics of the area street system, including lane usage and traffic control devices; (3) existing traffic volumes; and (4) existing pedestrian movements.

## Area Overview and Land Uses

The study area is primarily commercial with some newer multi-family residential buildings buffering the corridor. Further north, south and west are more traditional single family neighborhoods. One of the biggest impacts to the study area is the Metra Union Pacific West Line which parallels the area along the south. Its related traffic and pedestrians greatly impact traffic systems and will be evaluated accordingly.

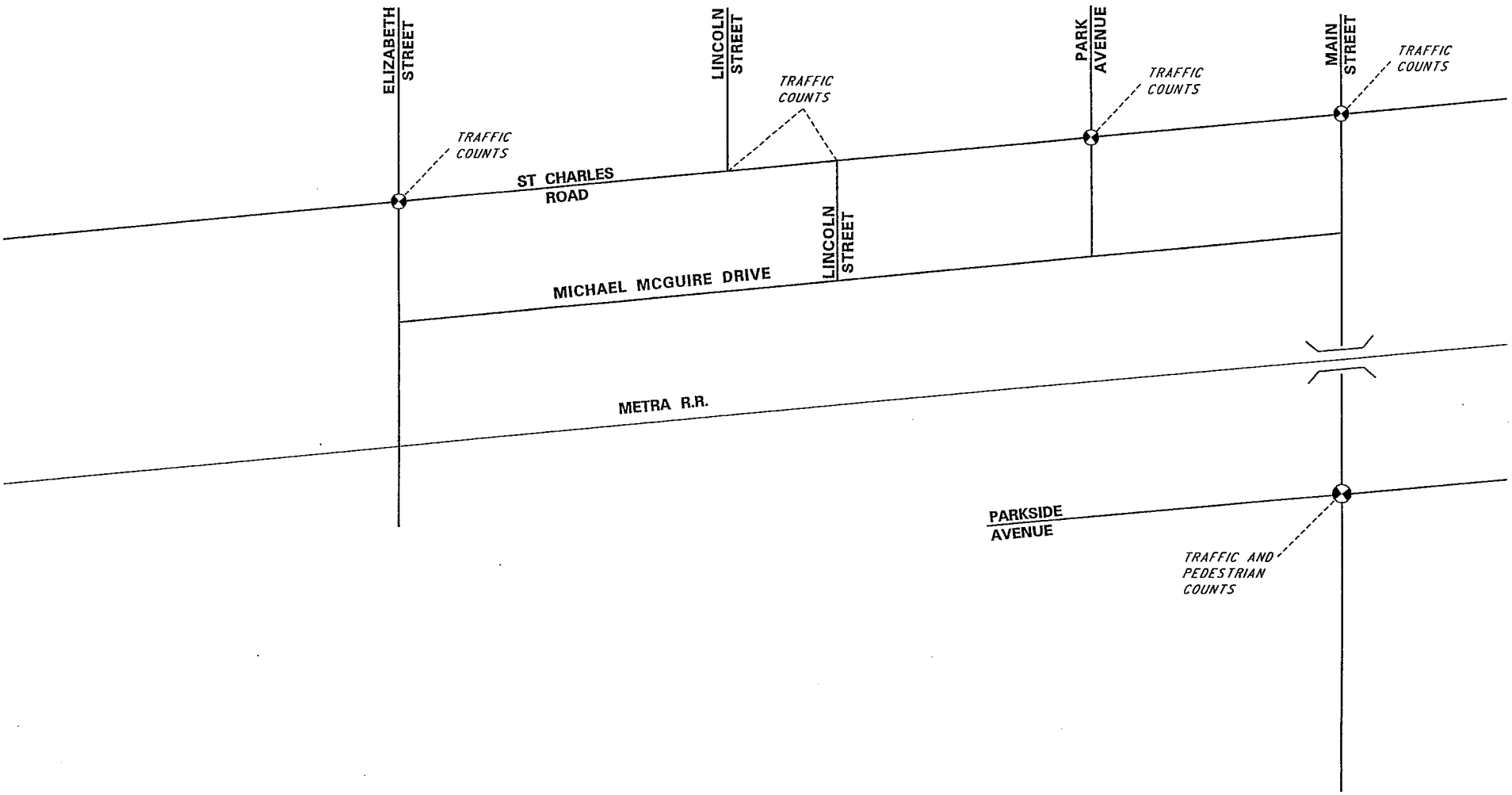
## Existing Roadway System Characteristics

A description of the principal roadways in the study area are discussed below and shown on **Figure 2.**

*St. Charles Road* is an east-west arterial that runs from Klein Road in Wayne Township east to its terminus at 5th Avenue in Maywood, Illinois. At its signalized intersection with Elizabeth Street, St. Charles Road provides one through/left-turn lane and an exclusive right-turn lane on the west approach. A combined through/right-turn lane and a combined through/left-turn lane are provided on the east approach. St. Charles Road, immediately east of Elizabeth Street, narrows down to provide one lane in each direction with a parking lane on both sides of the street. No exclusive turning lanes are provided at its unsignalized intersection with Lincoln Avenue and at its signalized intersection with Park Avenue. At its signalized intersection with Main Street, St. Charles provides an exclusive left-turn lane, a through lane and an exclusive right-turn lane on the west approach. The east approach provides an exclusive left-turn lane and a combined through/right-turn lane. St. Charles Road in the vicinity of the site has a posted speed limit of 25 mph.

*Elizabeth Street* is a two-lane north-south residential roadway. At its signalized intersection with St. Charles Road, Elizabeth Street provides a combined through/left-turn lane and an exclusive right-turn lane on both approaches. Elizabeth Street has a posted speed limit of 25 mph.

*Lincoln Street* is a two-lane north-south residential roadway. At its unsignalized intersection with St. Charles Road, Lincoln Street is offset by approximately 100 feet. Both approaches are under stop sign control at their intersection with St. Charles Road.




LEGEND

⊗ - EXISTING TRAFFIC SIGNAL

| PROJECT: | TITLE: | PROJECT NO: 03-264 |
|---|---|---|
| VILLAGE OF LOMBARD<br>TRAFFIC EVALUATION STUDY | AREA ROADWAYS AND COUNT LOCATIONS | KLOA INC. |
| | | FIGURE NO: 2 |

*Park Avenue* is a two-lane north-south roadway with a parking lane on both sides of the street. At its signalized intersection with St. Charles Road, Park Avenue provides a combined left/through/right-turn lane on both approaches.

*Main Street* is a north-south minor arterial that runs from North Avenue south to its terminus at Majestic Drive. At its signalized intersection with St. Charles Road, Main Street provides an exclusive left-turn lane, a through lane and a combined through/right-turn lane on both approaches. Main Street north of St. Charles Road narrows down to one lane in each direction. Main Street has a posted speed limit of 25 mph.

*Parkside Avenue* is an east-west two-lane minor street that runs from Elizabeth Street east to its terminus at Grace Street. At its signalized intersection with Main Street, Parkside Avenue provides a combined left/through/right-turn lane on both approaches.

## Existing Traffic Volumes

Traffic counts were conducted in May and June , 2004 during the morning (7:00 to 9:00 A.M.) and afternoon (4:00 to 6:00 P.M.) peak commuter periods at the intersections shown below. These hours and intersections were chosen to coincide with key traffic, pedestrian and Metra commuter periods.

St. Charles Road with

- Elizabeth Street
- Lincoln Street
- Park Avenue
- Main Street

Main Street with

- Parkside Avenue

The traffic count data indicates that the weekday morning peak hour occurs from 7:00 to 8:00 A.M. while the weekday afternoon peak hour occurs from 4:45 to 5:45 P.M. The existing weekday morning and evening peak-hour traffic volumes are shown in **Figure 3**.

## Existing Pedestrian Volumes

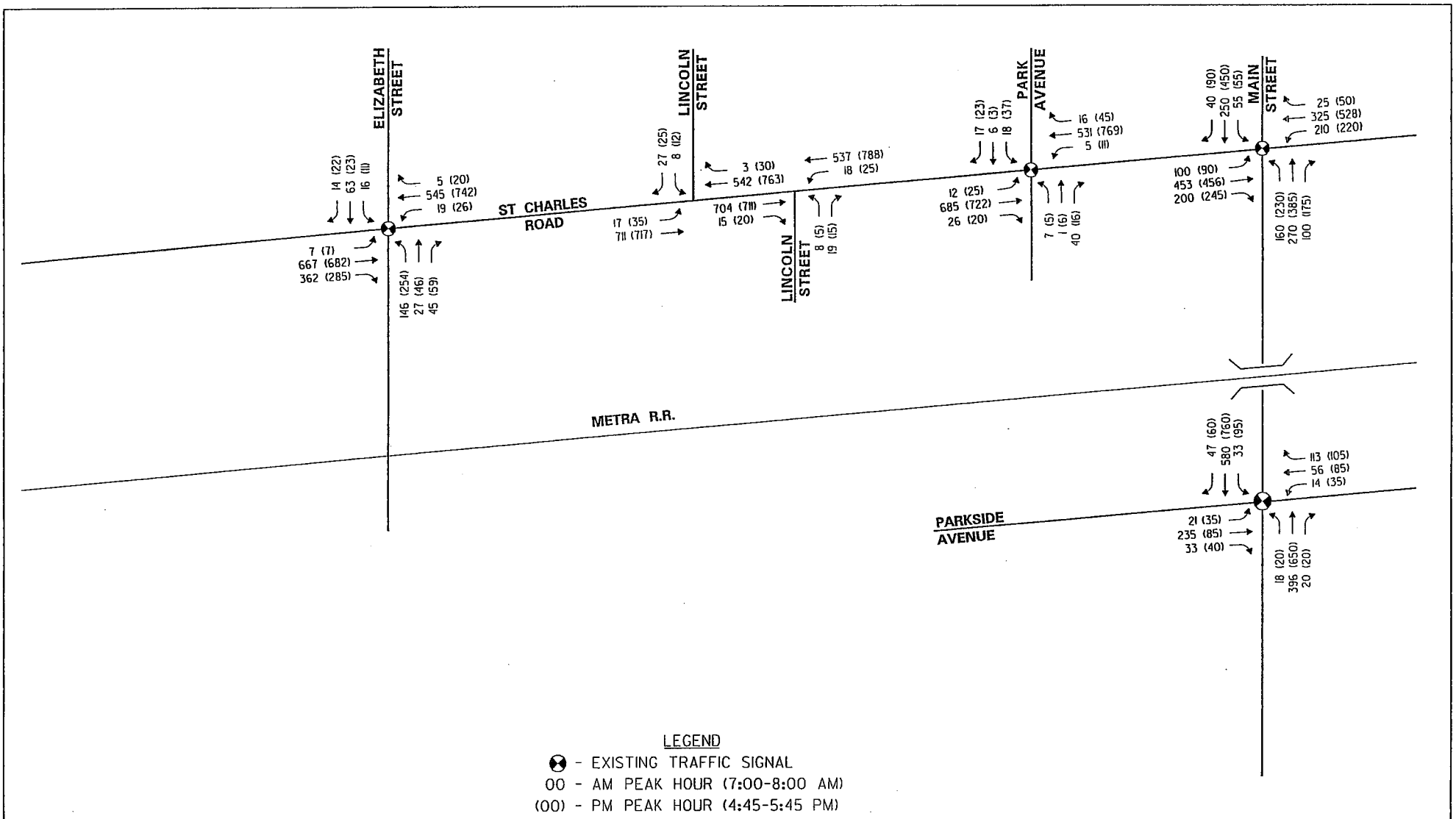
Pedestrian counts were performed at the intersection of Main Street with Parkside Avenue. The purpose was to evaluate pedestrian crossing activity with existing traffic. Currently, the largest movement of pedestrians crossing Main Street is due to the location of 200± parking spaces in the Metra lot located along Parkside Avenue east of Main Street.

**Figure 4** shows the results of the pedestrian counts performed during the same peak hours of traffic. They also included peak Metra train activity.

## Existing Condition Evaluation

### *Traffic*

Intersection capacity analyses were performed at five study area key intersections to determine the operation of the existing roadway system and determine what improvements should be considered to mitigate existing deficiencies. Additionally, traffic signal timings were reviewed relative to existing and future (diverted) pedestrian movements.



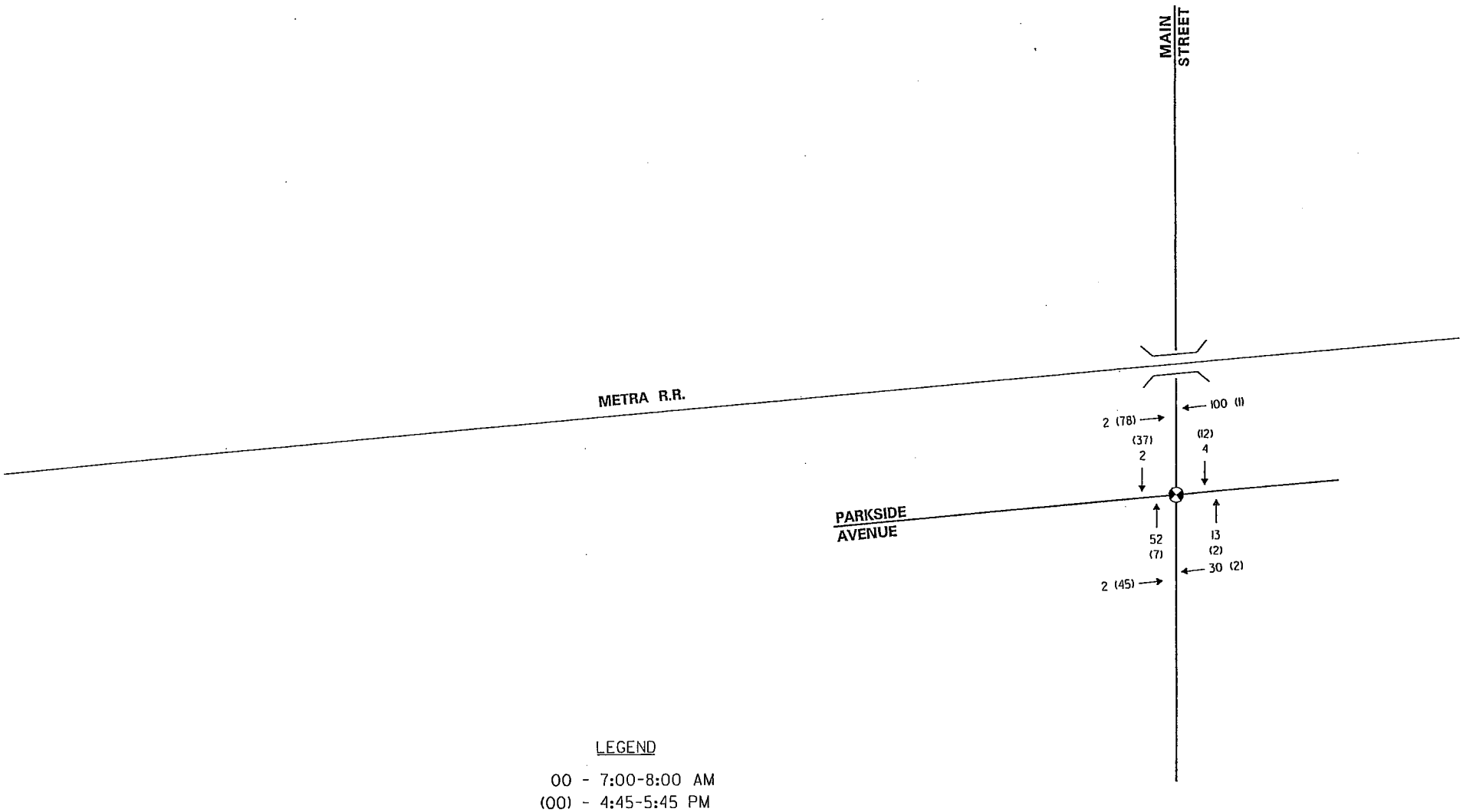

LEGEND

⊗ - EXISTING TRAFFIC SIGNAL

00 - AM PEAK HOUR (7:00-8:00 AM)

(00) - PM PEAK HOUR (4:45-5:45 PM)

| PROJECT: | TITLE: | PROJECT NO: 03-264 |
|---|---|---|
| VILLAGE OF LOMBARD<br>TRAFFIC EVALUATION STUDY | EXISTING TRAFFIC VOLUMES | KLOA INC. |
| | | FIGURE NO: 3 |




LEGEND

00 - 7:00-8:00 AM
(00) - 4:45-5:45 PM

| PROJECT: | TITLE: | PROJECT NO: 03-264 |
|---|---|---|
| VILLAGE OF LOMBARD<br>TRAFFIC EVALUATION STUDY | EXISTING PEDESTRIAN COUNTS & MOVEMENTS | KLOA INC. |
| | | FIGURE NO: 4 |

The traffic analyses were performed using the Synchro 5.0 computer software, which is based on the methodologies outlined in the Transportation Research Board's Highway Capacity Manual (HCM), 2000. In addition, and in order to better gauge the existing traffic condition in the area, the data was simulated using the Sim Traffic software. By virtue of using this simulation program, a better understanding of the downstream and/or upstream intersection's effects on a roadway segment can be achieved.

The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is assigned a letter grade from A to F based on the average delay experienced by vehicles passing through the intersection. Delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Level of Service A is the highest grade (best traffic flow and least delay), 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 an urban environment.

For signal-controlled intersections, levels of service are calculated in three ways: Lane groups, intersection approaches; and intersections as a whole. 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 a TWSC intersection occurs when there are not enough suitable gaps in the flow of traffic on the major (uncontrolled) street to allow minor-street traffic to efficiently enter the major street flow or cross the major street.

The *Highway Capacity Manual* definitions for levels of service and the corresponding control delay for signalized and unsignalized intersections are shown in the Appendix to this report. Summaries of the capacity analysis results are presented in Table 1.

Table 1
EXISTING TRAFFIC CONDITIONS

| Intersection | Weekday A.M. Peak Hour LOS | Weekday A.M. Peak Hour Delay | Weekday P.M. Peak Hour LOS | Weekday P.M. Peak Hour Delay |
|---|---|---|---|---|
| St. Charles Road/Elizabeth Street[1] | B | 13.9 | B | 16.9 |
| St. Charles Road/Lincoln Street (North)[2] | C | 16.7 | D | 26.8 |
| St. Charles Road/Lincoln Street (South)[2] | C | 19.2 | C | 21.5 |
| St. Charles Road/Park Avenue[1] | A | 3.2 | A | 4.8 |
| St. Charles Road/Main Street[1] | B | 20.0 | C | 23.5 |
| Main Street/Parkside Avenue[1] | A | 9.7 | A | 9.8 |

LOS - Level of Service
Delay is measured in seconds.
[1]Signalized Intersection
[2]Unsignalized Intersection

As can be seen from **Table 1**, the intersections are operating at very acceptable levels of service. However these levels of service represent the levels of service of the intersection as a single and isolated intersection and do not take into account the effect upstream or downstream intersections might have on other intersections or the roadway segment. Therefore, the Sim Traffic simulation software was used in order to evaluate the efficiency of the traffic plan and signal progression. This software takes into account traffic progressions and interconnection between signals and provides an optimization of signal cycles.

Based on the model run and observations in the field, eastbound traffic on St. Charles Road, during the morning peak hour, queues from Main Street west to almost Lincoln Avenue (north leg). This is due to the lack of coordination between signals (specifically St. Charles Road with Main Street and Park Avenue) as well as the proximity of the St. Charles Road/Park Avenue signalized intersection to the St. Charles Road/Main Street intersection (±360 feet). This queue of traffic has an impact on motorists trying to exit Lincoln Street to turn left or right onto St. Charles Road. It should be noted that this situation was calibrated in the field by visual inspection.

During the P.M. peak hour, a similar situation occurs for eastbound traffic. However, westbound traffic during the P.M. peak hour builds up from Park Avenue to Main Street. This back up of traffic occurs, once again, due to the poor coordination of the traffic signals and the short distance between intersections. During the evening peak hour this back-up also has an effect on the northbound to westbound left-turn movement on Main Street to St. Charles Road as vehicles cannot turn left thus extending beyond the left-turn lane storage.

In order to help alleviate these problems and improve the efficiency with which motorists travel along St. Charles Road, KLOA optimized the intersection's cycle lengths, phasing and offsets using Synchro 5.0 modeling software. The results of this optimization showed a vast improvement in the St. Charles Road operation. The most efficient cycle length for the signals along St. Charles Road is 100 seconds.

It should be noted that with this optimization and coordination of the signals, there will be a great improvement to the traffic flow. However some backups will still occur due to the heavy volumes along St. Charles Road and the fact that there is only one lane in each direction due to the provision of on-street parking on both sides. However, it is unlikely the parking situation will change due to right-of-way and streetscape constraints.

# 3.
# New Development

As discussed previously in the *Introduction*, a new development site at the intersection of Elizabeth Street and St. Charles Road was included in the study and in projected traffic figures. Other new developments in the area are included in the existing traffic counts.

***Pedestrians***

These movements were observed, recorded and evaluated with respect to the Parkside Avenue crossing and signal timings. Currently, one of the primary Metra parking lots that generates pedestrian traffic crossing Main Street is located along Parkside Avenue, east of Main Street. These were discussed and shown previously.

Currently, the Main Street intersection with the Parkside Avenue traffic signal cycle of 100 seconds provides 40± seconds for the east-west movement which is concurrent with the pedestrian movements. A pedestrian actuated signal phase is part of the system. However, this is meant to preempt the north-south phase if there is no traffic identified and would be a rare case during the peak hours.

As previously mentioned, the east-west movements currently are assigned 40 seconds of the 100 second cycle. Our counts indicate a peak 15 minute movement of 35 pedestrians from 7:00 A.M. to 7:15 A.M. The width of Main Street at the marked crossing is 81 feet. This would require approximately 20 seconds for a pedestrian to cross assuming the average pedestrian speed of four feet per second. The signal currently allows 11 seconds for east-west walk time (walk illuminated in white) and 29 seconds of a cautionary flashing "walk."

This would appear to be adequate time for the peak hour assuming pedestrian arrive and cross Main Street in platoons, which is what was observed. The total time indicated previously is 40 seconds. However, the pedestrian has no way of knowing where they are in the phase as halfway through the caution (flashing) phase still provides an adequate 20 seconds. Beyond that, a pedestrian could be caught in the middle with the signal changing. Consequently, new signal hardware should be considered that identifies the time remaining in the phase for the pedestrian.

# 4.
# Future Conditions, Evaluation and Recommendations

The study area was evaluated relative to major concerns:

1. Traffic flow along St. Charles Road.
2. Future development at Elizabeth Street and St. Charles Road.
3. Pedestrian movements to and from the Metra lots.
4. Special traffic and parking modifications.

Accordingly, the paragraphs below and the figures that follow address these specific concerns and include our recommendations.

*Traffic Flow Along St. Charles Road*

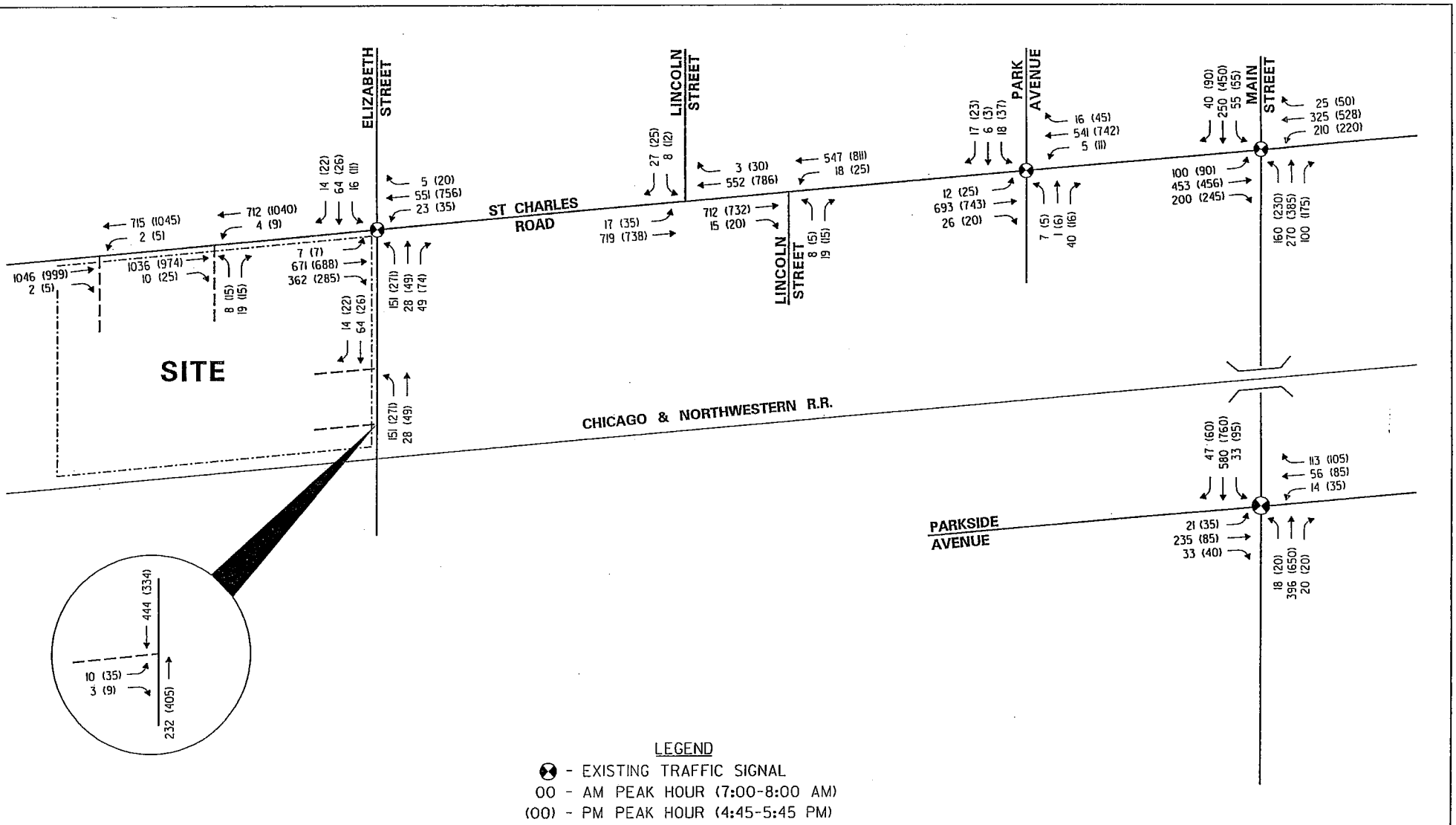
- The traffic signals along the St. Charles Road study area need to be coordinated and optimized. Our preliminary analysis shows a 100 second cycle length to be optimal. A progression and offset synchronization is needed by the contractor maintaining the signals. These signals were evaluated using Synchro 5.0 software. Total traffic is illustrated on **Figure 5**.
- Parking removal during peak hours would have little effect due to right-of-way and roadway narrowing along the roadway.
- The original phasing at Elizabeth Street and St. Charles Road should be changed. The westbound movement during the P.M. peak hours should function as a lead phase of 7± seconds allowing the heavier movements, as well as new development traffic, extra opportunity to turn southbound.
- The existing exclusive right-turn lane on the south approach of Elizabeth Street should be extended south to Michael McGuire Drive in order to provide a larger by-pass lane for northbound traffic in the event the through/left-turn lane is queuing up to the railroad tracks.

*Future Redevelopment at St. Charles and Elizabeth Street*

- This issue is discussed in a separate memorandum to the Village and generally identifies access drives and traffic/parking impacts.

*Pedestrian Movements*

- As discussed in Section 2, adequate time for pedestrians is given at Parkside Avenue and Main Street. New signal equipment should be considered indicating "countdown" time remaining on the pedestrian phase.

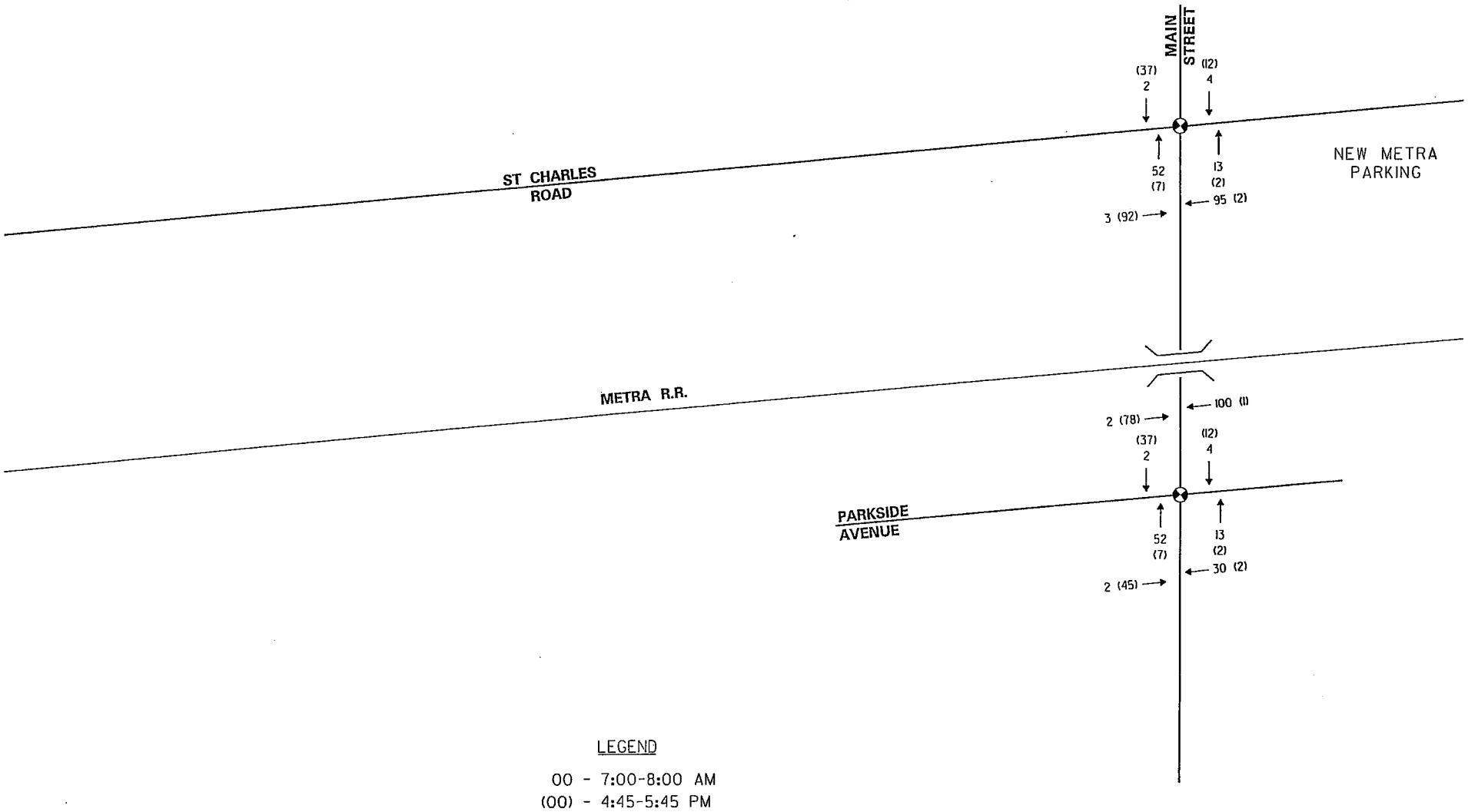



LEGEND

- EXISTING TRAFFIC SIGNAL
- 00 - AM PEAK HOUR (7:00-8:00 AM)
- (00) - PM PEAK HOUR (4:45-5:45 PM)

| PROJECT: | TITLE: | PROJECT NO: 03-264 |
|---|---|---|
| VILLAGE OF LOMBARD<br>TRAFFIC EVALUATION STUDY | TOTAL TRAFFIC VOLUMES | KLOA INC. |
| | | FIGURE NO: 5 |

- The new Metra lot, located along St. Charles Road east of Main Street, will generate new pedestrian activity at the St. Charles Road/Main Street intersection. The new lot will contain approximately 150± spaces. Accordingly the east-west pedestrian activity, currently occurring at Parkside Avenue and serving the existing Metra parking lot (200 spaces) was prorated and new volumes assigned to the intersection (**Figure 6**). St. Charles Road at its intersection with Main Street currently receives 60 percent of the cycle length. If the cycle is changed to 100 seconds, the east-west movement will be assigned 60 seconds. After removing the 14-19 seconds for peak hour eastbound and westbound left turns, pedestrians will be allocated approximately 43-45 seconds for movements (this includes the cautionary "flashing" sign). Since higher pedestrian movements appear to be accommodated at Parkside Avenue, with less time for that movement, the time should be more than adequate at St. Charles Road for new pedestrian movements.
- Special Traffic and Parking Improvements
  - A No Right Turn On Red Parkside Avenue sign should be posted for westbound traffic movements at the intersection. Sight restrictions to the south force autos to intrude into the intersection and over the crosswalk. Additionally, the lack of northbound gaps frequently block the intersection prohibiting outbound movements.
  - Improvements to St. Charles Road signal timings should reduce queuing and blockage at Lincoln Street.
  - On-street parking at the northwest corner of Main Street and St. Charles Road (north side) should be reduced by two car lengths to improve turn geometrics.




LEGEND

00 - 7:00-8:00 AM
(00) - 4:45-5:45 PM

| PROJECT: | TITLE: | PROJECT NO: 03-264 (G) |
|---|---|---|
| VILLAGE OF LOMBARD TRAFFIC EVALUATION STUDY | ESTIMATED FUTURE PEDESTRIAN MOVEMENTS | KLOA INC. |
| | | FIGURE NO: 6 |

- Crosswalk striping should be implemented along the south, east and west legs of the St. Charles-Main Street intersection. This striping should be in accordance with the *Manual of Uniform Traffic Control Devices* (MUTCD), Section 3B.19 (see Appendix).

# 5.
# Conclusion

This report examined traffic flow and pedestrian movement in the St. Charles Road-Main Street commercial area within the Village of Lombard. The study examined existing conditions and future conditions. Capacity analyses were performed for critical intersections along St. Charles Road between Elizabeth Street and Main Street and the pedestrian movement at the Main Street intersection with Parkside Avenue was evaluated. Roadway modifications and improvements were recommended to mitigate existing conditions and improve the flow of traffic and pedestrians.

Based on the data collected and the analyses performed, the following conclusions were reached.

1. In order to improve traffic flow along the St. Charles Corridor, the cycle length of the traffic signals should be set to 100 seconds and should be coordinated. This would help move traffic along St. Charles Road in a more efficient manner.

2. A lead phase for westbound traffic during the P.M. peak hour on St. Charles Road at its intersection with Elizabeth Street should be considered. This would allow Walgreens traffic an opportunity to turn south on Elizabeth Street and enter the site thus reducing the amount of traffic that would use the St. Charles Road access drive.

3. Consideration should be given to the installation of a new pedestrian signal equipment indicating the time remaining on the pedestrian phase.

4. A No Right Turn On Red sign for westbound to northbound right-turn movements at the Main Street intersection with Parkside Avenue should be posted due to sight restrictions and the lack of northbound gaps that frequently block the intersection.

5. The removal of two additional parking spaces on the northwest corner of Main Street and St. Charles Road (north side) should be considered to provide a less restricted flow for northbound to westbound left-turn traffic.

# Appendix

- **LOS Impact**
- **MUTCD Striping Plan**
- **Synchro Analysis Worksheets**

## LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

| Level of Service | Interpretation | Delay per Vehicle (seconds) |
|---|---|---|
| A | Very short delay, with extremely favorable progression. Most vehicles arrive during the green phase and do not stop at all. | ≤10.0 |
| B | Good progression, with more vehicles stopping than for Level of Service A, causing higher levels of average delay. | >10 and ≤20.0 |
| C | Light congestion, with individual cycle failures beginning to appear. Number of vehicles stopping is significant at this level though many still pass through the intersection without stopping. | >20 and ≤35 |
| D | Congestion is more noticeable, with longer delays resulting from combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and the proportion of vehicles not stopping declines. | >35 and ≤55 |
| E | Limit of acceptable delay. High delays result from poor progression, high cycle lengths and high V/C ratios. | >55 and ≤80 |
| F | Unacceptable delay occurring, with oversaturation. | >80.0 |

Source: *Highway Capacity Manual,* 2000.

## LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

| Level of Service | Average Total Delay (SEC/VEH) |
|---|---|
| A | ≤10 |
| B | >10 and ≤15 |
| C | >15 and ≤25 |
| D | >25 and ≤35 |
| E | >35 and ≤50 |
| F | >50 |

Source: *Highway Capacity Manual,* 2000.

*Figure 3B-16. Examples of Crosswalk Markings*

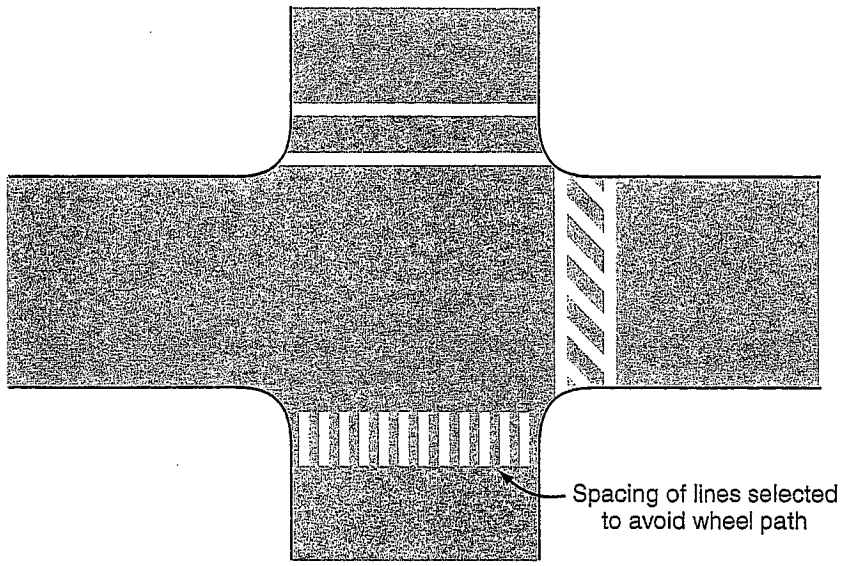



*Figure 3B-17. Example of Crosswalk Markings for Exclusive Pedestrian Phase That Permits Diagonal Crossing*