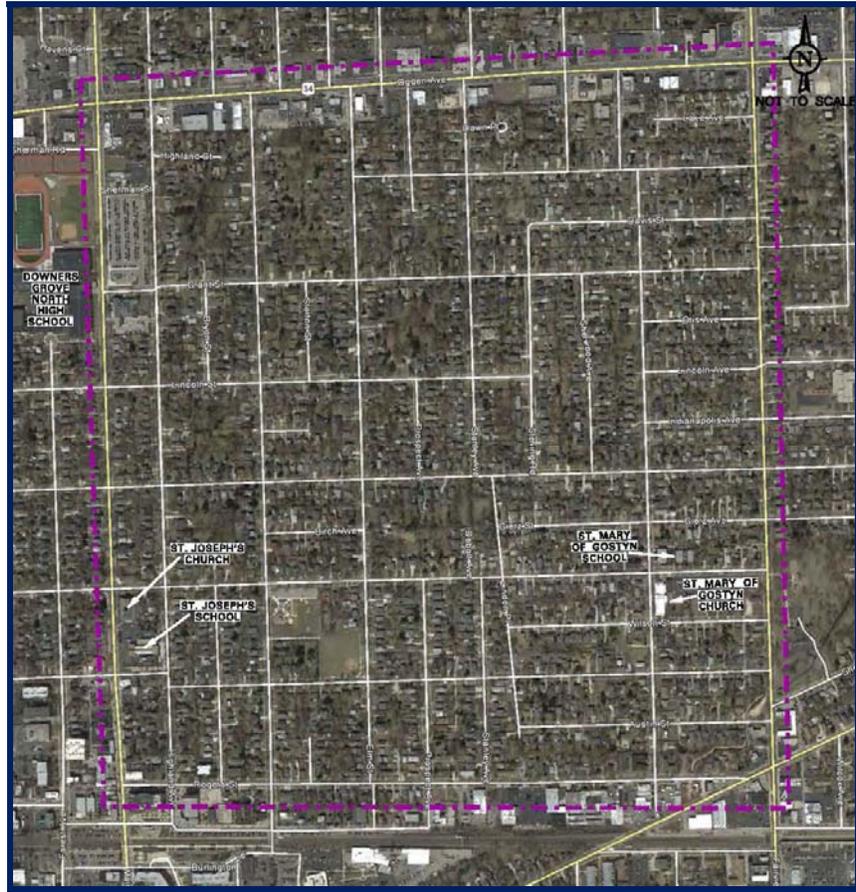


Neighborhood Traffic Study Area Number 4 Downers Grove, Illinois



Prepared for:
Village of Downers Grove

Submitted by:



Kenig, Lindgren, O'Hara, Aboona, Inc.

May 2015

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Area Number 4
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By Kenig, Lindgren, O'Hara, Aboona, Inc.
Rosemont, Illinois
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1. Introduction

The Village of Downers Grove has retained Kenig, Lindgren, O’Hara, Aboona, Inc. (KLOA, Inc.) to conduct the neighborhood traffic study in Area Number 4. Overall, the objective of the study was to thoroughly examine the existing operations within the neighborhood, identify operational deficiencies and recommend modifications and/or improvements to enhance both vehicular and pedestrian operations. In addition this included addressing the primary traffic concerns within a neighborhood, vehicular volume, vehicular speed and overall vehicular and pedestrian safety.

Bounded by Ogden Avenue on the north, Fairview Avenue on the east, Warren Avenue/Rogers Street on the south and Main Street on the west, the neighborhood is located just northeast of downtown Downers Grove. The neighborhood has 15 north-south roads and 20 east-west roads. Primarily consisting of residential homes, the neighborhood also contains: commercial and office land uses, St. Joseph Catholic School, St. Mary of Gostyn Catholic School, the east parking lot and a drop-off/pick-up area for Downers Grove North High School and Washington Park. **Figure 1** shows the location of the neighborhood (all of the figures for this study are provided at the end of the report).

2. **Existing Neighborhood Conditions**

Transportation conditions were inventoried to obtain a database for evaluating the existing operations within the neighborhood and along the roadways bordering the neighborhood. The components of existing conditions that were inventoried within the neighborhood included the following.

- Existing land uses
- Physical and operating characteristics of the roadways (i.e., number of lanes, speed limits, traffic control, etc.)
- Existing traffic control devices
- Existing pedestrian and bicycle facilities
- Existing daily traffic volumes and vehicle speeds
- Existing morning and evening peak hour volumes

Study Area and Existing Land Uses

The neighborhood is bounded by Ogden Avenue on the north, Fairview Avenue on the east Warren Avenue/Rogers Street on the south and Main Street on the west. Located just northeast of downtown Downers Grove, single-family homes are the predominant land use within the neighborhood with some commercial and office land uses located in the north and southwest portions of the neighborhood. The neighborhood contains St. Joseph Catholic School, which is located in the northeast corner of Main Street and Franklin Street, and St. Mary of Gostyn Catholic School, which is located in the northeast corner of the Prairie Avenue and Douglas Road. In addition, the east parking lot for Downers Grove North High School is located in the northwest section of the neighborhood. This parking lot serves students, staff and visitors and also provides a drop-off/pick-up area. Washington Park is located in the southwest quadrant of the neighborhood. Finally, downtown Downers Grove and a Metra commuter rail station (Downers Grove Main Street station) are located within walking distance of the neighborhood.

Existing Roadway System

The five external roadways that border the neighborhood are described below.

Ogden Avenue (U.S. Route 34) is an east-west road that is under the jurisdiction of the Illinois Department of Transportation (IDOT). It has a five-lane cross section with a posted speed limit of 35 mph. Traffic signal control is provided at its intersections with Main Street and Fairview Avenue. IDOT classifies Ogden Avenue as a major arterial.

Main Street is a north-south roadway that is under the jurisdiction of the Village of Downers Grove south of Ogden Avenue and the DuPage County Division of Transportation (DuDOT) north of Ogden Avenue. Between Ogden Avenue and Franklin Street, Main Street has a four-lane cross section and a posted speed limit that varies between 25 and 30 mph. South of Franklin Street, Main Street has a two-lane cross section with on-street parking and a posted speed limit of 25 mph. Traffic signal control is provided at its intersections with Ogden Avenue, Grant Street, Prairie Avenue, Franklin Street and Warren Avenue. The Village of Downers Grove classifies Main Street as a major arterial.

Fairview Avenue is a north-south roadway that is under the jurisdiction of the Village of Downers Grove south of Ogden Avenue and the DuDOT north of Ogden Avenue. It has a three-lane cross section and a posted speed limit of 30 mph. Parking is prohibited along both sides of the road. The Village of Downers Grove classifies Fairview Avenue as a minor arterial road.

Warren Avenue is an east-west roadway that is under the jurisdiction of the Village of Downers Grove. It has a two-lane cross section and a posted speed limit of 25 mph. Parking is generally provided on both sides of the road. Warren Avenue is a recommended bike route. The Village of Downers Grove classifies Warren Avenue as a collector road.

Rogers Street is an east-west roadway that is under the jurisdiction of the Village of Downers Grove. It has a two-lane cross section and a posted speed limit of 25 mph. Parking is provided along the south side of the roadway between Maple Avenue and Highland Avenue and is provided on both sides of the roadway between Main Street and Highland Avenue. The Village of Downers Grove classifies Rogers Street as a collector road.

Internal Neighborhood Roadways

Excluding Ogden Avenue, Main Street, Fairview Avenue, Warren Avenue and Rogers Street the following summarizes the physical and operating characteristics of the neighborhood roadways.

- All of the neighborhood roads provide one lane in each direction except Linden Place. Between Chicago Avenue and Prairie Avenue, Linden Place is a one-way southbound road and between Austin Street and Prairie Avenue, Linden Place is a one-way northbound road.

- All of the roadways within the neighborhood are classified as local roads except the following which are classified as collector roads:
 - ❖ Warren Avenue
 - ❖ Prairie Avenue
 - ❖ Rogers Street
 - ❖ Washington Street
- Parking is generally provided on one or both sides of the roadways. However, parking restrictions are provided on many of the roadways.
- The posted speed limit within the neighborhood is 25 miles per hour with 20 mph school and park zone speed limits.

Figure 2 illustrates the number of lanes and posted speed limits on each of the roadways and the geometrics at the primary intersections.

Pedestrian and Bicycle Facilities and Traffic Control Devices

The neighborhood contains two schools, the Downers Grove North High School's east parking lot, Washington Park and is located within walking distance of downtown and the Main Street Metra commuter rail station. In order to accommodate the neighborhood pedestrian and bicycle activity, a number of facilities and traffic control devices are provided in the neighborhood. These are illustrated in **Figure 3** and highlighted below.

- The following roads are designated and signed as bike routes:
 - ❖ Grant Street west of Douglas Road
 - ❖ Lincoln Street east of Douglas Road
 - ❖ Douglas Road between Grant Street and Lincoln Street
 - ❖ Rogers Street/Warren Avenue
- Dedicated school crossings at intersections.
- School zones with warning signs and reduced speed limits.
- School crossing guards are provided at the intersections of Highland Avenue/Prairie Avenue, Main Street/Franklin Street and Prairie Avenue/Douglas Road.
- All of the traffic signals provide pedestrian signals.
- Except Linden Place sidewalks are provided on at least one side of all the roadways.

In order to determine the pedestrian activity around the neighborhood school areas, pedestrian counts were conducted at four intersections in the neighborhood in October 2014. The counts were conducted from 2:00 P.M. to 4:00 P.M. at the following intersections:

- Highland Avenue and Franklin Street
- Highland Avenue and Prairie Avenue
- Prairie Avenue and Douglas Road
- Highland Avenue and Grant Street

Figure 3 also illustrates the results of the pedestrian traffic counts.

Existing Intersection Traffic Control

Figure 4 shows the existing intersection traffic control within the neighborhood and the following provides a summary of the existing traffic control at the 106 intersections within the neighborhood and those that are not under traffic signal control.

- Nine traffic signal controlled intersections
- Eight all-way stop sign controlled intersections
- Six two-way or one-way yield sign controlled intersections
- Sixty-five two-way or one-way stop sign controlled intersections
- One intersection where two of the three legs are under stop sign control
- One intersection where three of the four legs are under stop sign control
- Seventeen intersections with no intersection traffic control

Existing Daily Traffic Volumes and Speed Surveys

In order to determine the existing traffic volumes and speeds along the neighborhood roadways, KLOA, Inc. conducted daily machine traffic counts and speed surveys at 55 locations. In addition, previous traffic counts and speed surveys at 15 locations were obtained from the Village of Downers Grove. Of the total traffic counts and speed surveys, 34 were conducted along the north-south roadways and 36 were conducted along the east-west roadways. The KLOA, Inc. traffic counts and speed surveys were conducted during October and November 2014. All of the traffic counts and speed surveys were conducted for a minimum of two days and were broken down by direction and by hour.

Figure 5 shows the two-way daily traffic volumes and **Figure 6** shows the average and 85th percentile speeds observed on the roadways. The average speed is the sum of the observed speeds of all the vehicles divided by the total vehicles on that segment of the road. Average speeds are used to determine the speeds at which motorists are typically traversing a roadway section. Whereas the 85th percentile speed represents the speed at or below which 85 percent of vehicles on a roadway section travel under free flow conditions. The 85th percentile speed is commonly used to establish the posted speed limits along roadways.

Existing Morning and Evening Peak Period Traffic Volumes

In addition to the daily traffic counts and speed surveys, KLOA, Inc. conducted manual peak period traffic counts at the following intersections within the study area.

- Main Street with Franklin Street
- Highland Avenue with Grant Street
- Washington Street with Franklin Street
- Washington Street with Prairie Avenue
- Douglas Road with Chicago Avenue
- Douglas Road with Prairie Avenue

The traffic counts were conducted in October 2014 during the morning (6:00 A.M. to 9:00 A.M.) and the evening (3:00 P.M. to 6:00 P.M.) peak periods. **Figure 7** illustrates the existing morning and evening peak hour traffic volumes.

Planned/Proposed Roadway Improvements

The Village of Downers Grove recently completed the Maple Avenue/Fairview Avenue traffic study in conjunction with two Village initiatives. The first is the Village's near-term plan to reconstruct Maple Avenue between Fairview Avenue and Cumnor Road, and the second is the planned long-term transformation into a Transit-Oriented Development area as identified in the 2011 Village Comprehensive Plan. In order to enhance the flow of traffic through the area, capacity, operational and signal improvements were identified that could be implemented in conjunction with the programmed reconstruction of Maple Avenue. In addition, the study also evaluated significant modifications (realignments, disconnections and one-way conversions) to the roadway system serving the area with the intent of enhancing operations in the area, reducing traffic on Maple Avenue and facilitating or complementing the Transit-Oriented Development concept.

3.

Evaluation of Existing Conditions

To determine how the roadway system is currently functioning, KOLA, Inc. examined the existing operating characteristics within the neighborhood. The purpose of this evaluation was to identify and quantify the current operations and ascertain how the neighborhood's infrastructure and land uses contribute to the existing conditions. This was accomplished by reviewing and analyzing the existing traffic volumes and the speed surveys as well as the physical characteristics of the neighborhood and its transportation system. The evaluation provides the basis to thoroughly analyze and develop recommendations pertaining to the operation and design of the internal roadways.

Daily Traffic Volumes

From **Figure 6**, it can be seen that the collector roads (Prairie Avenue, Rogers Street and Washington Street) carry the highest volume of traffic. This is expected given that collector roads link the local neighborhood roads and land-uses to the external or arterial roadway system. Further, the collector roads generally extend the length of the neighborhood and serve many homes and other land-uses within the neighborhood. In addition, the north-south roads of Highland Avenue, Elm Street and Douglas Road and the east-west roads of Grant Street and Chicago Avenue carry a higher volume of traffic which is due to the length of the road, the fact they extend the entire length of the neighborhood and that they serve the various schools.

Residential Streets, Third Edition^a indicates that local residential roads have a daily volume between 400 and 1,500 vehicles while residential collector roads have a daily volume exceeding 1,500 vehicles. Therefore, even with the characteristics outlined above, the traffic volumes are within the established standards for residential roads.

A review of the existing traffic volumes as well as the roadway system's physical and operating conditions indicates that the neighborhood is likely experiencing some cut-through traffic, particularly along the following roads:

^a *Residential Streets*, Third Edition was developed by the National Association of Home Builders (NAHB), the American Society of Civil Engineers (ASCE), the Institute of Transportation Engineers (ITE) and the Urban Land Institute (ULI)

- *Washington Street* has the highest daily traffic volume in the neighborhood (a high of 4,657 vehicles). However, this is expected as it is a collector road that extends the length of the neighborhood. Furthermore, the road provides indirect access to St. Joseph Catholic School, Washington Park, the Downers Grove North High School east parking lot and downtown. It is also partially due to motorists who likely traverse the road to access Ogden Avenue from downtown and avoid congestion along Main Street.
- *Prairie Avenue* has daily traffic volumes between 2,351 and 3,319 vehicles. However, this is expected as it is a collector road that extends the length of the neighborhood. Furthermore, the road provides direct access to St. Mary of Gostyn Catholic School and Washington Park and indirect access to St. Joseph Catholic School. It is also partially due to motorists who likely traverse the road to utilize the traffic signals at Fairview Avenue and Main Street.
- *Rogers Street* has daily traffic volumes between 2,091 and 3,155 vehicles. However, this is expected as it is a collector road that extends the length of the neighborhood. Furthermore, Rogers Street provides direct access to downtown. It is also partially due to motorists who likely traverse the roadway to access the downtown area.
- *Grant Street* has daily traffic volumes between 1,222 and 1,850 vehicles between Main Street and Elm Street. The higher traffic volumes are primarily due to the fact that the road provides direct access to the Downers Grove North High School parking lot and drop-off/pick-up area. In addition, the western portion of Grant Street has higher traffic volumes due to the fact that left-turn movements are prohibited from Ogden Avenue to Highland Avenue and, as such, motorists must traverse (1) Elm Street or (2) Washington Street to Grant Street to access the Downers Grove North High School parking lot.
- *Chicago Avenue* has daily traffic volumes between 1,177 and 1,519 vehicles along sections of the road. The higher traffic volumes are primarily due to the fact that Chicago Avenue does extend the length of the neighborhood and is generally located in the middle of the neighborhood.
- *Douglas Road* has daily traffic volumes between 1,018 and 1,417 vehicles. The higher traffic volumes are primarily due to the fact that the road provides direct access to St. Mary of Gostyn Catholic School and partially due to motorists who traverse the road to avoid congestion along Fairview Avenue.
- *Highland Avenue* has daily traffic volumes of between 894 and 1,563 vehicles along the blocks within proximity to the Downers Grove North High School east parking lot. The sections with higher traffic volumes are primarily due to the fact that the road serves the parking lot and drop-off/pick-up area and that many parents drop off and pick up students along Highland Avenue and Grant Street.

Travel Speed Surveys

The main factors affecting travel speeds are the roadway's physical and operating characteristics, including width of road, number of travel lanes, hills, curves, roadway surface and length of free-flow conditions. Many of these attributes are fixed within the neighborhood's infrastructure and are generally difficult and/or costly to change.

The internal neighborhood roads had an observed average speed of approximately 23 mph and an observed 85th percentile speed of approximately 28 mph. As shown in **Figure 7**, the average speeds were generally between 14 and 29 mph. A number of the surveyed road sections did experience 85th percentile speeds that exceeded 30 mph. The higher 85th percentile speeds were primarily observed along those roadway sections that had longer lengths of free-flow conditions. The speed surveys show that the following roadways had 85th percentile speeds that exceeded 30 mph at more than one location.

- Highland Avenue
- Washington Street
- Grant Street
- Sherman Street
- Prairie Avenue
- Rogers Street

4.

Detailed Evaluation and Recommendations

This section of the study provides the detailed evaluation of the internal roadways and pedestrian and bicycle facilities and traffic control devices within the neighborhood. This section provides a thorough analysis of traffic operations, vehicles and pedestrian/bicycle circulation and overall safety along the internal neighborhood roadways. Recommendations were developed for the following components of the neighborhood transportation system.

- Intersection Traffic Control Devices
- Pedestrian and Bicycle Facilities
- External Intersection Improvements

In addition, a number of traffic calming measures and/or tools were identified that can be used to effectively reduce the operating speeds and traffic volumes in the neighborhood.

The recommendations developed in this section were based primarily on accepted engineering practices, conformity with the *2009 Manual on Uniform Traffic Control Devices* (MUTCD), existing Village criteria and the input from Village staff. The MUTCD defines the standards used to install and maintain traffic control devices, including all signs, signals, markings and other devices used to regulate, warn, or guide traffic, on all public streets, highways, bikeways and private roads open to public traffic. While the MUTCD provides guidelines with specific benchmarks, many of the criteria are subjective and are left to engineering judgment and practices.

Intersection Traffic Control

Development of the intersection traffic control plan involves a comprehensive evaluation of each intersection along with the existing overall operating conditions of the neighborhood (see Chapter 3). Any intersection traffic control plan must consider typical neighborhood issues, such as the functional classification, cut-through traffic, speeding, traffic calming, neighborhood circulation and land-use impacts. As such, a systematic approach was employed that examined the neighborhood from the inside (each individual intersection) and outside (the overall neighborhood). It is important to note that to increase the level of standardization and consistency of the neighborhood traffic control, the Village has requested that traffic signal control or some form of stop sign control generally be provided at all of the neighborhood intersections.

The first step consisted of evaluating the physical and operating conditions of each intersection to determine if they meet any of the MUTCD warrants/requirements that control the installation of all-way stop sign control. The second step was to determine which road of the one-way and two-way controlled intersections is to be under stop sign control. **Figure 8** illustrates the recommended traffic control plan which is presented below.

All-Way Stop Sign Controlled Intersections

The following points summarize the all-way stop sign control warrants/requirements as outlined in the MUTCD.

1. Meets the minimum traffic and pedestrian volume
2. Meets the minimum number of intersection crashes
3. Required to control left-turn conflicts
4. Required to control vehicle/pedestrian conflicts
5. Required due to poor intersection sight distance
6. Required to improve traffic operational characteristics of the intersection of two collector roads with similar design and operating characteristics

The characteristics of each intersection were evaluated to verify if the existing operations met any of the warrants and/or requirements that control the installation of an all-way stop sign control. It has been determined that the following ten intersections should be under all-way stop sign control.

- *Washington Street/Rogers Street and Washington Street/Prairie Avenue.* Both of these intersections should continue to operate under all-way stop sign control as they are the intersections of two collector roadways.

- *Highland Avenue/Grant Street and Douglas Road/Prairie Avenue.* Both intersections should continue to operate under all-way stop sign control given that they are located adjacent to the schools in the neighborhood and the fact that Highland Avenue/Grant Street is an off-set intersection. All-way stop sign control is proposed to control the vehicle and pedestrian conflicts at these intersections.
- *Washington Street/Grant Street, Washington Street/Chicago Avenue and Douglas Road/Franklin Street.* All three intersections are proposed to continue to operate under all-way stop sign control to maintain these established locations and to reduce the uninterrupted flow along Washington Street and Douglas Road.
- *Highland Avenue/Warren Avenue and Highland Avenue/Franklin Street.* Both of these intersections are proposed to be converted to all-way stop sign control given their proximity to downtown, the Downers Grove Main Street Metra Station and St. Joseph Catholic School and the fact that both are off-set intersections. The all-way stop sign control is proposed to control the vehicle and pedestrian conflicts at these intersections.
- *Stanley Avenue/Grant Street and Douglas Road/Chicago Avenue.* Both of these intersections are proposed to be converted to all-way stop sign control given the uninterrupted flow along Grant Street and Chicago Avenue as well as the pedestrian activity in proximity to the intersections.

Two-Way/One-Way Stop Sign Control

Once the all-way stop sign control intersections were identified, it was assumed that all of the other intersections were to be controlled via one-way (T-intersections) or two-way (four-legged intersections) stop sign control. The criteria used in determining which road of an intersection should be under stop sign control were based on the following.

1. The guidelines provided in the MUTCD.
2. Minimizing the uninterrupted flow along the local road by providing, if possible, a stop sign at every other cross road along the local roads.
3. If possible, maintaining which road is currently under traffic control (via either yield sign or stop sign) at each intersection in order to minimize the change in the flow of traffic through the neighborhood.

New or Modified Two-Way Stop Sign Controlled Intersections

New or modified two-way stop sign control is proposed at the following intersections.

- *Highland Avenue/Chicago Avenue.* The existing all-way stop sign control is not warranted or required at this intersection and, as such, should operate under two-way stop sign control. Given that Chicago Avenue carries the higher traffic volumes and that the Highland Avenue approaches provide sufficient sight distance, the Highland Avenue approaches should be under stop sign control.
- *Douglas Road/Austin Street.* The Austin Street approaches are proposed to be converted from yield sign to stop sign control.
- *Douglas Road/Sherman Street.* The Douglas Road approaches are proposed to be converted from yield sign to stop sign control.
- *Stanley Avenue/Lincoln Street.* The Lincoln Street approaches are proposed to be converted from yield sign to stop sign control.
- *Prospect Avenue/Sherman Street.* This intersection currently operates with no intersection traffic control. The Prospect Avenue approaches are proposed to be under stop sign control.

Proposed One-Way Stop Sign Controlled Intersections

The following T-intersections are currently under yield sign control or have no control and are proposed to be converted so the minor approaches are under stop sign control.

- *Highland Avenue/Sherman Street and Highland Avenue/Highland Court.* Sherman Street and Highland Court are proposed to be under stop sign control at their intersections with Highland Avenue. Both intersections currently have no intersection traffic control.
- *Bryon Street/Lincoln Street, Stratton Street/Lincoln Street and Prospect Avenue/Lincoln Street.* Bryon Street, Stratton Street and Prospect Avenue are proposed to be under stop sign control at their intersections with Lincoln Street. All three intersections currently have no intersection traffic control.
- *Elm Street/Birch Avenue.* Birch Avenue is proposed to be under stop sign control at this intersection which currently has no intersection traffic control.
- *Elm Street/Sherman Street.* The Sherman Street approach is proposed to be converted from yield sign to stop sign control.

- *Debolt Avenue/Prairie Avenue.* Debolt Avenue is proposed to be under stop sign control at this intersection which currently has no intersection traffic control.
- *Linden Place/Franklin Street.* The Linden Place approach is proposed to be converted from yield sign to stop sign control.
- *Linden Place/Gierz Street and Linden Place/Wilson Street.* Gierz Street and Wilson Street are proposed to be under stop sign control at their intersections with Linden Place. Both intersections currently have no intersection traffic control.
- *Sterling Road with Lincoln Street.* The Lincoln Street approach is proposed to be converted from yield sign to stop sign control.
- *Sterling Road/Sherman Street.* Sterling Road is proposed to be under stop sign control at this intersection which currently has no intersection traffic control.
- *Elm Street/Warren Avenue.* Elm Street is proposed to be under stop sign control at this intersection which currently has no intersection traffic control.
- *Douglas Road/Otis Avenue, Douglas Road/Lincoln Street and Douglas Road/Indianapolis Avenue.* Otis Avenue, Lincoln Street and Indianapolis Avenue are proposed to be under stop sign control at their intersections with Douglas Road. All three intersections currently have no intersection traffic control.

Summary of Recommended Intersection Traffic Control Plan

Table 1 provides a summary of the intersection traffic control modifications, **Table 2** provides a comparison of the existing and recommended traffic control within the neighborhood and the following summarizes the recommended modifications.

- Under the recommended plan, 105 of the 107 intersections will be under either traffic signal control or some form of stop sign control. This is an improvement over existing conditions where six intersections have yield sign control and 17 intersections have no intersection traffic control.
- Along many of the local roads, a stop sign is provided at least at every other intersection. This type of intersection traffic control is an excellent deterrent to neighborhood traffic concerns such as cut-through traffic and speeding along local roads.
- Modifications to the existing intersection traffic control are recommended at 25 intersections. However, none of the two-way stop sign controlled intersections or two-way yield sign controlled intersections require switching the road which is currently under stop sign or yield sign control.

Table 1
PROPOSED INTERSECTION TRAFFIC CONTROL MODIFICATIONS

Modifications	Intersections
Convert two-way stop sign control to all-way stop sign control	<ul style="list-style-type: none"> • Highland Avenue with Franklin Street • Highland Avenue with Warren Avenue • Stanley Avenue with Grant Street • Douglas Road with Chicago Avenue
Convert all-way stop sign control to two-way stop sign control	<ul style="list-style-type: none"> • Highland Avenue with Chicago Avenue (stop signs on Highland Ave.)
Convert yield signs to stop signs	<ul style="list-style-type: none"> • Sherman Street at Elm Street • Lincoln Street at Stanley Avenue • Lincoln Street at Sterling Road • Linden Place at Franklin Street • Sherman Street at Douglas Road • Austin Street at Douglas Road
Add stop signs at intersections with no intersection traffic control	<ul style="list-style-type: none"> • Highland Court at Highland Avenue • Sherman Street at Highland Avenue • Bryon Street at Lincoln Street • Stratton Street at Lincoln Street • Prospect Avenue at Sherman Street • Birch Avenue at Elm Street • Prospect Avenue at Lincoln Street • Debolt Avenue at Prairie Avenue • Gierz Street at Linden Place • Wilson Street at Linden Place • Sterling Road at Sherman Street • Otis Avenue at Douglas Road • Lincoln Street at Douglas Road • Indianapolis Avenue at Douglas Road • Elm Street at Warren Avenue

Table 2

EXISTING AND RECOMMENDED INTERSECTION TRAFFIC CONTROL

	Existing Intersection Traffic Control	Recommended Intersection Traffic Control
Traffic Signal Control	9	9
All-Way Stop Sign Control	8	11
Two-Way/One-Way Stop Sign Control	65	84
Two of Three Legs Under Stop Sign Control	1	0
Three of Four Legs Under Stop Sign Control	1	1
Yield Sign Control	6	0
No Intersection Traffic Control	<u>17</u>	<u>2</u>
Total	107	107

Pedestrian and Bicycle Facilities and Traffic Control Devices

In addition to the standard pedestrian and bicycle facilities (i.e., sidewalks, crosswalks and bike routes), the neighborhood contains various traffic control devices associated with the two elementary schools and park located in the neighborhood. The neighborhood has several dedicated school crossings and school and park zones, which include appropriate warning signs and reduced speed limits. Overall, these traffic control devices are generally well distributed and located appropriately.

However, recommendations have been developed to further enhance the pedestrian and bicycle circulation and to ensure that the traffic control devices comply with the MUTCD. The proposed recommendations are illustrated in **Figure 9** and summarized in **Table 3**. In addition, all of the signalized intersections in the study area include pedestrian signals. Further, all of the traffic signals have count down pedestrian signals except Fairview Avenue with Maple Avenue and Main Street with Warren Avenue. Therefore, as the traffic signal at the Fairview Avenue/Maple Avenue intersection is replaced and/or upgraded, countdown pedestrian signal should be installed. It should be noted that Illinois Commerce Commission does not permit countdown traffic signal adjacent to railroad crossings and, as such, they can't be installed at the Main Street/Warren Avenue intersection.

Table 3
PROPOSED PEDESTRIAN TRAFFIC CONTROL AND STRIPING MODIFICATIONS

Intersection	Modifications
Main/Grant	<ul style="list-style-type: none"> Relocate School Crossing Assembly signs on Main Street lower to the ground and on near side of the intersection Include arrow plaques that point to the crosswalk on the School Crossing Assembly signs
Main/Franklin	<ul style="list-style-type: none"> Replace School Advance Crossing Assembly signs on Main Street with current MUTCD compliant signs Replace School Crossing Assembly signs on Main Street with current MUTCD compliant signs and relocate the northbound sign to north side of the intersection
Highland/Prairie	<ul style="list-style-type: none"> Relocate westbound School Crossing Assembly Sign on Prairie Avenue to the west side of the intersection. Install School Advance Crossing Assembly sign on south side of Prairie Avenue west of Highland Avenue
Highland/Franklin	<ul style="list-style-type: none"> Relocate southbound School Crossing Assembly sign on Highland Avenue to south side of the intersection Remove crosswalks on north and south sides of the off-set intersection
Washington/Prairie	<ul style="list-style-type: none"> Install a Park Zone Reduced Speed Limit sign on south side of Prairie Avenue east of Bryan Place Replace standard crosswalks with continental crosswalks
Washington/Franklin	<ul style="list-style-type: none"> Replace School Crossing Assembly signs on Washington Street with current MUTCD compliant signs and relocate the northbound sign to north side of the intersection Install In-Street Pedestrian Crossing sign on the Washington Street crosswalk Install a Park Zone Reduced Speed Limit sign on east side of Washington Street north of Franklin Street
Elm/Franklin	<ul style="list-style-type: none"> Replace standard crosswalks with continental crosswalks
Sterling/Lincoln	<ul style="list-style-type: none"> Remove all School Advance Crossing Assembly signs Remove all School Crossing Assembly signs Remove crosswalk on Sterling Road
Douglas/Gierz	<ul style="list-style-type: none"> Replace School Crossing Assembly signs on Douglas Road with current MUTCD compliant signs and relocate the southbound sign to south side of the intersection

Table 3, Continued
PROPOSED PEDESTRIAN TRAFFIC CONTROL AND STRIPING MODIFICATIONS

Intersection	Modifications
Douglas/Chicago	<ul style="list-style-type: none"> • Install School Advance Crossing Assembly signs on north side of Chicago Avenue east of Douglas Road, the south side of Chicago Avenue west of Douglas Road and the west side of Douglas Road north of Chicago Avenue. • Remove School Crossing Assembly signs on Chicago Avenue. • Install continental crosswalks on north, south and west legs of the intersection.
Douglas Road	<ul style="list-style-type: none"> • Replace School Advance Crossing Assembly sign on Douglas Road south of Wilson Street with current MUTCD compliant signs
Fairview/Lincoln	<ul style="list-style-type: none"> • Relocate the northbound School Advance Crossing Assembly sign on Fairview Avenue further south • Replace southbound School Crossing Assembly sign on Fairview Avenue with current MUTCD compliant sign and relocate to the south side of the intersection • Replace eastbound School Crossing Assembly sign on Lincoln Street with current MUTCD compliant sign
Fairview/Prairie	<ul style="list-style-type: none"> • Relocate southbound School Advance Crossing Assembly sign on Fairview Avenue further north • Replace School Crossing Assembly signs on Fairview Avenue with current MUTCD compliant signs
Warren Avenue	<ul style="list-style-type: none"> • Remove In-Street Pedestrian Crossing sign located between Washington Street and Highland Avenue

Traffic Calming Measures

One of the major concerns expressed by residents was speeding and cut-through traffic within the neighborhood. As discussed previously, the traffic volumes within the neighborhood are generally within an acceptable range for residential roads and consistent with traffic patterns on other neighborhood roads within the Village. Furthermore, the internal neighborhood roads had an observed average speed of approximately 23 mph and an observed 85th percentile speed of approximately 28 mph. Several of the roads did experience 85th percentile speeds that exceeded 30 mph. The higher 85th percentile speeds were primarily observed along those roadway sections that had longer lengths of free-flow conditions. As such, a review of the existing traffic volumes and speed surveys as well as the roadway system’s physical and operating conditions indicates that the neighborhood is experiencing some higher travel speeds and cut-through traffic.

The recommended traffic control and pedestrian traffic control and striping modifications should help to mitigate the speeds and cut-through traffic in the neighborhood. If these measures are not completely successful, other measures and/or tools that can effectively reduce vehicle speeds and cut-through traffic include the following traffic calming measures.

- Enhanced speed limit signs that increase motorist’s awareness
- Increased police enforcement
- Portable or permanent speed awareness systems such as electronic speed radar signs
- Pavement markings, edge lines, parking lanes and bike lanes that reduce the width of roadways
- Horizontal or vertical deflections (i.e., curb extensions and/or medians at intersections and midblock locations, traffic circles, raised crosswalks, chokers, neck-downs and chicanes)

Table 4 provides a summary of these measures/devices and also shows how they can be implemented incrementally from measures/devices with lower costs and reduced design, coordination and implementation efforts to measures/devices with higher costs and greater design, coordination and implementation efforts.

Table 4
INCREMENTAL TRAFFIC CALMING MEASURES

	Examples
Level 1 Options	
Regulatory Modifications	Speed Limit Reductions
Increased Police Presence/Enforcement	
Level 2 Options	
Advisory Signing	Portable Speed Radar Signs, Enhanced Speed Limit Signs
Pavement Markings	Parking Lanes, Bike Lanes, Crosswalks, Edgelines
Level 3 Options	
Horizontal Deflections	Curb Extensions, Medians, Traffic Circles, Chicanes, Chokers/Neck-Downs
Vertical Deflections	Raised Crosswalks, Speed Humps, Speed Tables, Speed Cushions

The Village has committed to increasing the police presence/enforcement in the neighborhood and the use of portable speed radar signs along select roadways (Level 1 and 2 options) to help mitigate the speeding in the neighborhood. In addition, KLOA, Inc. examined locations that would be appropriate for horizontal deflection measures (curb extensions, median islands, chokers/neck-downs, chicanes, etc.). The review was only preliminary in nature and based on the existing traffic volumes and speed surveys. Before any horizontal deflection measures are

implemented a thorough evaluation will need to be conducted to examine the impact of the measures/devices including emergency vehicle access and response times, diversion of traffic to other neighborhood roads, drainage impacts, costs and long-term maintenance. Based on the results of the traffic counts and speed surveys, the following locations may benefit from the future implementation of horizontal deflection measures.

- Washington Street between Ogden Avenue and Grant Street
- Prairie Avenue between Douglas Road and Washington Street
- Grant Street between Fairview Avenue and Washington Street
- Rogers Street between Fairview Avenue and Washington Street

External Neighborhood Intersections

In addition to evaluating the operations within the neighborhood, the study also examined the operation of two key intersections located on the periphery of the neighborhood.

Maple Avenue with Rogers Street

The T-intersection of Maple Avenue with Rogers Street is located in the southeast corner of the neighborhood. Given that Rogers Street does not intersect Maple Avenue at a 90 degree angle, the Rogers Street approach is very wide and, as a result, does not provide any vehicle channelization and has a long pedestrian crossing. Further, due to the proximity of the intersection to the Maple Avenue/Fairview Avenue intersection to the northeast and the at-grade railroad crossing on Maple Avenue to the southwest, queues from the intersection and the at-grade railroad crossing often extend past the intersection and block access from Rogers Street to Maple Avenue.

As discussed previously, the Village recently completed a traffic study that evaluated alternatives to enhance operations within proximity to the Maple Avenue/Fairview Avenue intersection, including this intersection. In addition, the Village requested that KLOA, Inc. examined what striping and signage improvements could be implemented in the interim to enhance the intersection's existing operation. **Figure 10** illustrates and the following summarize the recommended improvements.

- To better channelize the traffic through this intersection, it is recommended that a striped center median be provided between the eastbound and westbound lanes on Rogers Street.
- To enhance access from Rogers Street to Maple Avenue, it is recommended that "Do Not Block Intersection" signs be placed on Maple Avenue both northeast and southwest of the intersection.

Main Street and Grant Street

This signalized intersection of Main Street and Grant Street is located in the northwest portion of the neighborhood and serves as the primary access between Main Street and the Downers Grove North High School's east parking lot via Grant Street. Given the current operation of the traffic signal, the capacity of the movements to and from Grant Street are limited which results in additional delay and queueing. As such, motorists traveling to/from the east parking lot will traverse through the neighborhood to avoid the congestion at this signalized intersection. To enhance the capacity of these movements and provide more efficient access between Main Street and Grant Street, consideration should be given to implementing the following improvements at this intersection.

- The existing traffic signal could be upgraded to provide a protected left-turn phase (arrow) from southbound Main Street to eastbound Grant Street. Currently, the left-turn movement operates only on a permissive phase (green ball) and the capacity of the left-turn movement is limited due to the volume of northbound Main Street traffic, particularly during the morning peak period.
- In order to improve the capacity of Grant Street, the traffic signal timings could be modified to increase the amount of green time for the Grant Street approach. Currently, during the peak drop-off/pick-up periods, the queue of traffic along the Grant Street approach does not always clear the intersection and, as such, some motorists must wait an additional signal cycle before clearing the intersection.
- To further increase the capacity of Grant Street, the Grant Street approach could be widened to provide one eastbound lane and two westbound lanes striped for a separate right-turn lane and a separate left-turn lane. In addition to operating during the green phase for Grant Street, the right-turn lane could also operate as an overlap phase with the recommended protected Main Street left-turn phase.

Illegal On-Street Parking

A number of residents expressed concern over illegal parking along the roads within the neighborhood, particularly within proximity to Washington Park. To improve the operation of Elm Street and Franklin Street and enhance pedestrian safety, the Village recently prohibited parking from April 1 to November 1 on the west side of Elm Street and north side of Franklin Street within proximity of Washington Park. However, field observations and residents input have confirmed that many Washington Park patrons continue to park within these no parking zones. In addition, many parents/visitors of the two schools and patrons/guests of the various religious facilities within the neighborhood also park illegally on the roads within proximity to these institutions. To reduce the illegal parking, the Village should consider (1) increasing the parking enforcement in the neighborhood and (2) painting the curbs along those no parking zones that have not already been painted to further identify that parking is prohibited.

Operation of St. Joseph School and St. Mary Gostyn School

As part of the traffic study, KLOA, Inc. examined the student drop-off/pick-up, bus loading and pedestrian operations of both St. Joseph School and St. Mary Gostyn School. Based on the following, both schools generally operate well.

- The peak activity at both schools occurs for only 15 to 20 minutes in both the morning and afternoon peak periods.
- While some localized congestion occurs along the roadways within proximity to the schools, it generally only lasts for a short period (15 to 20 minutes) and is common and inherent with most schools due to the fixed start and end times.
- Both schools have established drop-off/pick-up, bus loading and parking procedures which provide for more efficient and orderly operations.
- Both schools provide bus service and some students live within walking distance of the schools which reduces the volume of drop-off/pick-up traffic.
- To help manage and control the flow of vehicle and pedestrian traffic, crossing guards are provided at one intersection within proximity of St. Mary Gostyn School (Douglas Road/Prairie Avenue) and at two intersections within proximity of St. Joseph School (Highland Avenue/Prairie Avenue and Main Street/Franklin Street). In addition, both schools use staff to assist in the drop-off/pick-up operations and the bus loading.
- For the most part, both schools generally segregate the bus loading from the drop-off/pick-up activity, which only provides for more efficient and orderly operations. It should be noted that the both bus loading and student drop off occur on Prairie Avenue in front of St. Mary Gostyn School during the morning peak period.
- Dedicated school crossings are provided at several intersections and school zones, which include appropriate warning signs and reduced speed limits, are located along several roads within the vicinity of the two schools.

Village staff recently met with representatives of both schools to discuss the current operations. According to Village staff, representatives at both schools are generally pleased with the current operations and do not have any major concerns that they feel need to be addressed at this time. Further, both schools indicated that they will continue to work with Village staff and the residents to refine, if necessary, the traffic and parking operations so to minimize the impact of the schools on the neighborhood and the neighborhood roads.

While both schools are generally operating well, some localized congestion does occur at both schools during the peak 15 to 20 minute periods in the morning and afternoon. This is often due to parents that do not follow the parking restrictions and/or the school's drop-off/pick-up procedures. School officials should continue to educate and enforce the drop-off/pick-up procedures. Further, as discussed above, the Village should consider (1) increasing the parking enforcement in the neighborhood and (2) painting the curbs along those no parking zones that have not already been painted to further identify that parking is prohibited.

5. Conclusion

This study summarizes the results and findings of the neighborhood traffic study for Area Number 4. The neighborhood is bounded by Ogden Avenue on the north, Fairview Avenue on the east, Warren Avenue/Rogers Street on the south and Main Street on the west. Overall, the objective of the study was to thoroughly examine the existing traffic operations within the neighborhood, identify operational deficiencies and recommend modifications and/or improvements to enhance both vehicular and pedestrian operations. In addition to addressing the primary traffic concerns within any neighborhood, vehicular volume, vehicular speed and overall vehicular and pedestrian safety, the study examined the operation of several intersections bordering the neighborhood. The recommendations developed in the study were based primarily on accepted engineering practices, conformity with the 2009 MUTCD, existing Village criteria and the input from Village staff and residents.

Tables 5, 6 and 7 summarize the short-term, mid-term and long-term recommendations of the neighborhood traffic study. Short-term improvements generally have lower costs, are easier to implement and/or are needed to address immediate concerns. Long-term improvements are generally more costly, require additional planning/engineering, can be implemented with other improvement projects or may only be required depending on the effectiveness of previous efforts.

Table 5
 SHORT-TERM (0 TO 6 MONTHS) RECOMMENDATIONS

Recommendations	Location
Intersection Traffic Control Modifications	
Convert two-way stop sign control to all-way stop sign control	<ul style="list-style-type: none"> • Highland Avenue with Franklin Street • Highland Avenue with Warren Avenue • Stanley Avenue with Grant Street • Douglas Road with Chicago Avenue
Convert all-way stop sign control to two-way stop sign control	<ul style="list-style-type: none"> • Highland Avenue with Chicago Avenue (stop signs on Highland Avenue)
Convert yield signs to stop signs	<ul style="list-style-type: none"> • Sherman Street at Elm Street • Lincoln Street at Stanley Avenue • Lincoln Street at Sterling Road • Linden Place at Franklin Street • Sherman Street at Douglas Road • Austin Street at Douglas Road
Add stop signs at intersections with no intersection traffic control	<ul style="list-style-type: none"> • Highland Court at Highland Avenue • Sherman Street at Highland Avenue • Bryon Street at Lincoln Street • Stratton Street at Lincoln Street • Prospect Avenue at Sherman Street • Birch Avenue at Elm Street • Prospect Avenue at Lincoln Street • Debolt Avenue at Prairie Avenue • Gierz Street at Linden Place • Wilson Street at Linden Place • Sterling Road at Sherman Street • Otis Avenue at Douglas Road • Lincoln Street at Douglas Road • Indianapolis Avenue at Douglas Road • Elm Street at Warren Avenue

Table 5, Continued
 SHORT-TERM (0 TO 6 MONTHS) RECOMMENDATIONS

Recommendations	Location
Pedestrian Traffic Control and Striping Modifications	
Replace existing signs with MUTCD compliant signs	<ul style="list-style-type: none"> • Douglas Road south of Wilson Street
Relocate existing signs	<ul style="list-style-type: none"> • Highland Avenue with Prairie Avenue • Highland Avenue with Franklin Street
Replace existing signs with MUTCD compliant signs and relocate signs	<ul style="list-style-type: none"> • Main Street with Grant Street • Fairview Avenue with Lincoln Street • Fairview Avenue with Prairie Avenue • Douglas Road with Gierz Street
Install new MUTCD compliant signs	<ul style="list-style-type: none"> • Highland Avenue with Prairie Avenue • Washington Street with Prairie Avenue • Douglas Road with Chicago Avenue
Install new signs, replace existing signs with MUTCD compliant signs and relocate signs	<ul style="list-style-type: none"> • Washington Street with Franklin Street • Main Street with Franklin Street
Remove existing signs	<ul style="list-style-type: none"> • Bryon Place at Franklin Street • Sterling Road with Lincoln Street • Douglas Road with Chicago Avenue • Warren Avenue between Washington Street and Highland Avenue
Add, modify or remove crosswalks	<ul style="list-style-type: none"> • Washington Street with Prairie Avenue • Elm Street with Franklin Street • Sterling Road with Lincoln Street • Douglas Road with Chicago Avenue
Traffic Calming Measures	
Increase police awareness/enforcement	Throughout the neighborhood
On-Street Parking	
Increase parking enforcement	Throughout the neighborhood
Paint curbs along no parking zones	Where required within the neighborhood
School Operations	
School officials should continue to enforce drop off/pick up and parking procedures	St. Joseph School and St. Mary Gostyn School
Village and School officials should continue to monitor operations	St. Joseph School, St. Mary Gostyn School and Downers Grove North High School

Table 6
MID-TERM (6 TO 18 MONTHS) RECOMMENDATIONS

Recommendations	Location
Traffic Calming Measure	
Install portable/permanent speed radar signs (Only implement if objective of other measures are not sufficiently met.)	Key areas in the neighborhood, including <ul style="list-style-type: none"> • Highland Avenue • Washington Street • Grant Street • Sherman Street • Prairie Avenue • Rogers Street
Install pedestrian countdown signals	<ul style="list-style-type: none"> • Fairview Avenue with Maple Avenue
External Intersection Improvements	
Striping and signage modifications	<ul style="list-style-type: none"> • Maple Avenue with Rogers Street
Traffic signal modifications	<ul style="list-style-type: none"> • Main Street with Grant Street

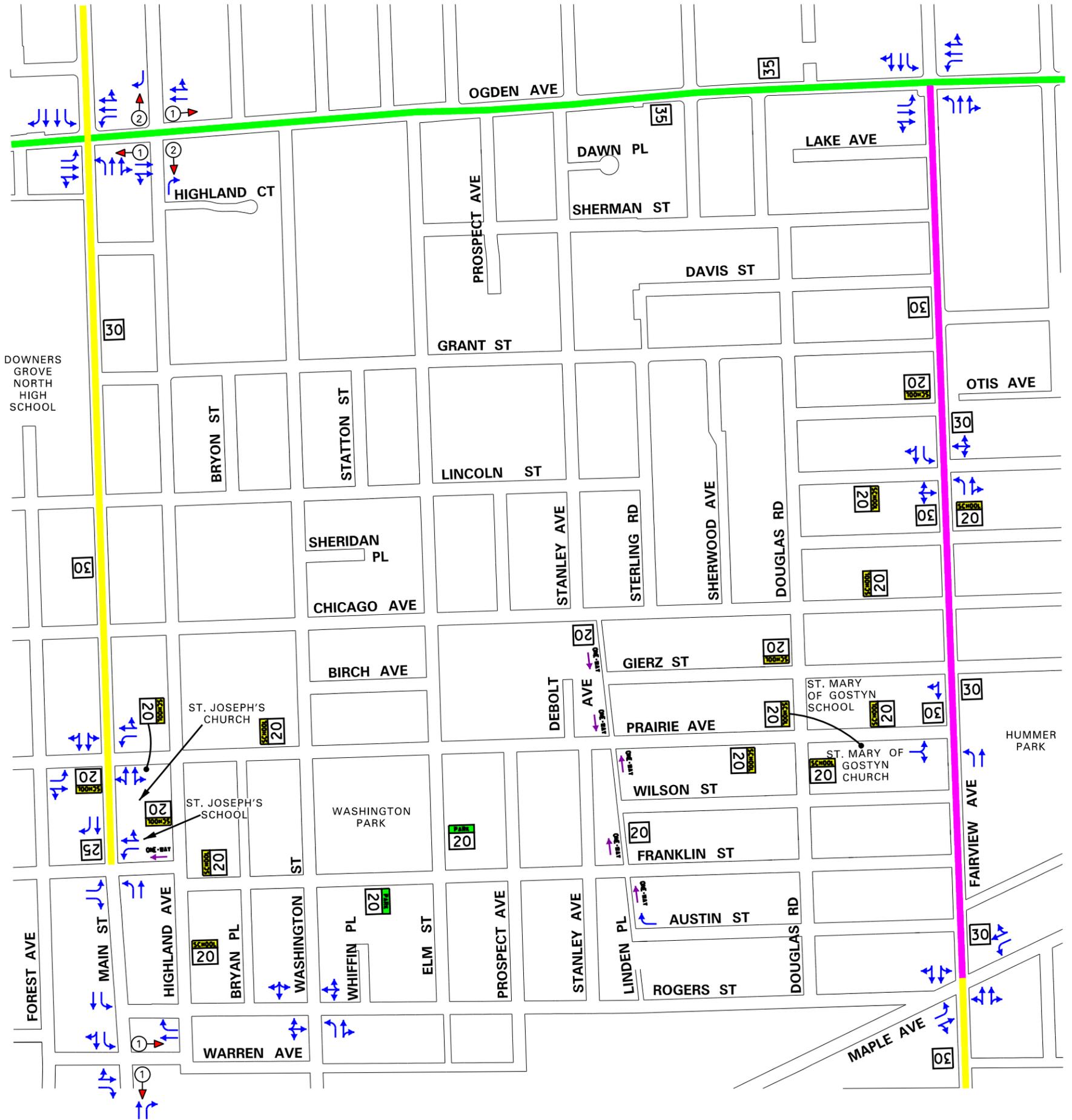
Table 7
LONG-TERM (18 TO 36 MONTHS) RECOMMENDATIONS

Recommendations	Location
Traffic Calming Measure	
Install horizontal deflection measures, including curb extensions, median islands, chokers/neck-downs and chicanes (Implement only if objective of other measures are not sufficiently met and a thorough evaluation of the impact of the measures/devices are performed.)	Possible locations for consideration include <ul style="list-style-type: none"> • Washington Street between Ogden Avenue and Grant Street • Prairie Avenue between Douglas Road and Washington Street • Grant Street between Fairview Avenue and Washington Street • Rogers Street between Fairview Avenue and Washington Street
External Intersection Improvements	
Widen Grant Street approach	<ul style="list-style-type: none"> • Main Street with Grant Street
Implement recommendations from Maple Avenue/Fairview Avenue traffic study	<ul style="list-style-type: none"> • Maple Avenue with Fairview Avenue • Maple Avenue with Rogers Street

Appendix



NOT TO SCALE



LEGEND

- 2 LANE ROAD
- 3 LANE ROAD
- 4 LANE ROAD
- 5 LANE ROAD
- NO LEFT TURN
- RIGHT-TURN ONLY
- TURNING LANE
- ONE-WAY

- PARK SPEED LIMIT
- SCHOOL SPEED LIMIT
- POSTED SPEED LIMIT (MPH)

* ALL ROADS HAVE A 25 MPH SPEED LIMIT UNLESS OTHERWISE POSTED
 * ALL ROADS HAVE ONE LANE IN EACH DIRECTION UNLESS DENOTED DIFFERENTLY

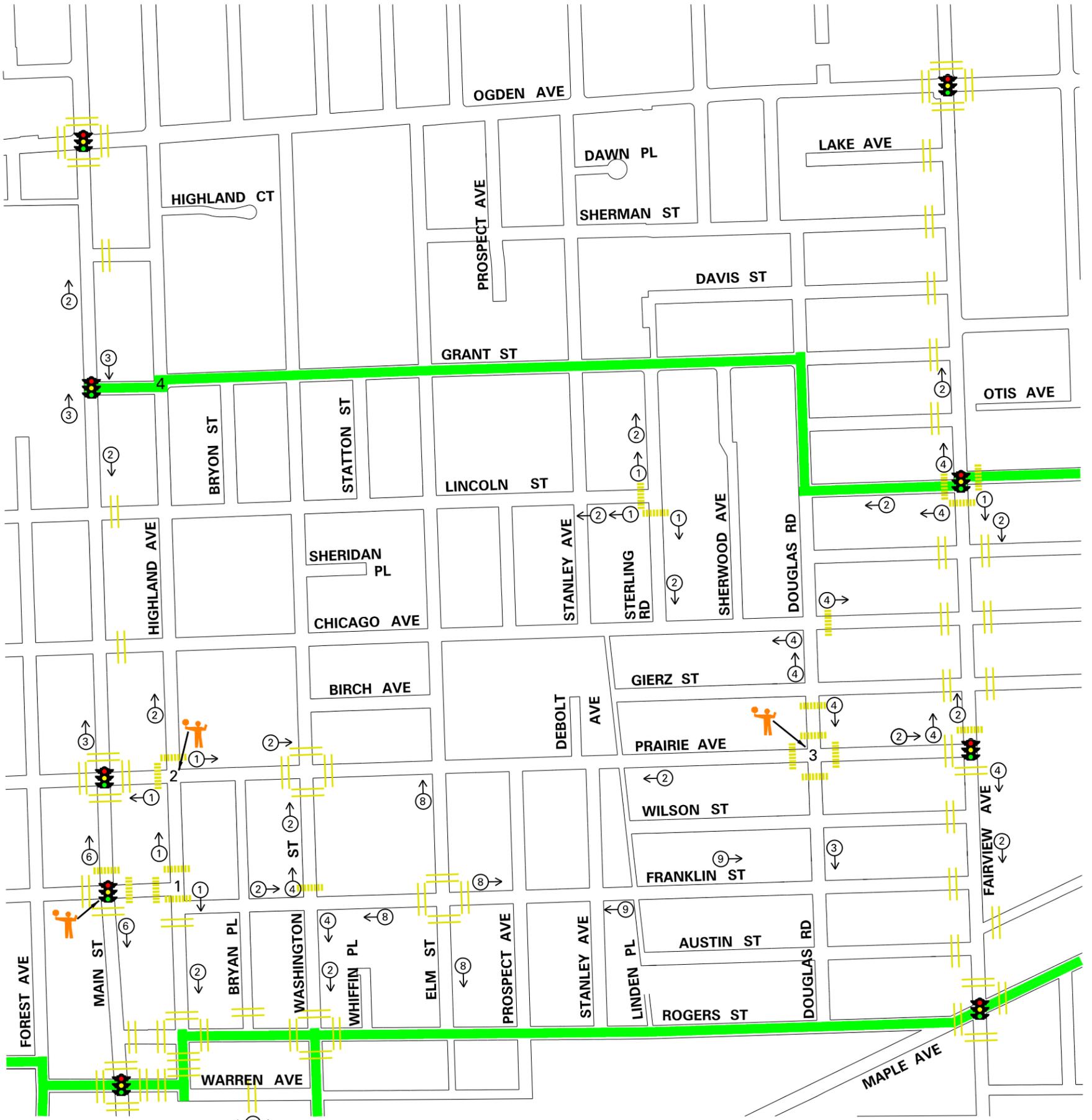
PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

TITLE:
 EXISTING ROADWAY CONDITIONS

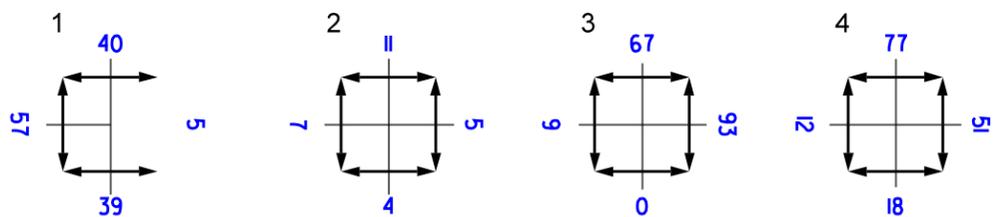
Job No: 14-209
 Figure: 2



NOT TO SCALE

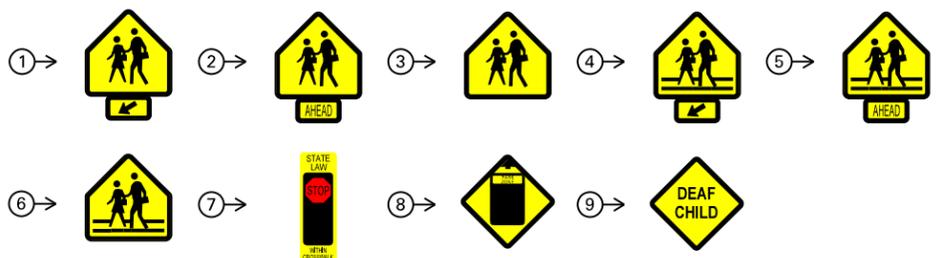


PEDESTRIAN VOLUMES



LEGEND

- TRAFFIC SIGNAL WITH PEDESTRIAN SIGNAL HEADS
- CROSSING GUARD
- STANDARD CROSSWALK
- CONTINENTAL CROSSWALK
- BIKE ROUTE
- 00 - MORNING PEAK HOUR PEDESTRIAN VOLUME
- (00) - AFTERNOON PEAK HOUR PEDESTRIAN VOLUME



PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

TITLE:
 EXISTING PEDESTRIAN AND BICYCLE FACILITIES AND
 TRAFFIC CONTROL DEVICES

KLOA
 Job No: 14-209
 Figure: 3



NOT TO SCALE



LEGEND

-  - TRAFFIC SIGNAL
-  - STOP SIGN
-  - YIELD SIGN

PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

TITLE:
 EXISTING INTERSECTION TRAFFIC CONTROL



Figure: 4



NOT TO SCALE



LEGEND

00 - DAILY TRAFFIC BY DIRECTION

PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

TITLE:
 EXISTING DAILY TRAFFIC VOLUMES



Job No: 14-209
 Figure: 5



NOT TO SCALE



LEGEND

00 - AVERAGE SPEED (MPH)

(00) - 85TH PERCENTILE SPEED (MPH)

PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

TITLE:
 EXISTING SPEED SURVEYS



Figure: 6



NOT TO SCALE



LEGEND

- 00 - AM PEAK HOUR
- (00) - PM PEAK HOUR

PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

TITLE:
 EXISTING INTERSECTION PEAK HOUR VOLUMES

KLOA
 Job No: 14-209
 Figure: 7



NOT TO SCALE



LEGEND

-  - TRAFFIC SIGNAL
-  - STOP SIGN
-  - YIELD SIGN
-  - PROPOSED STOP SIGN
-  - REMOVE EXISTING SIGN

PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

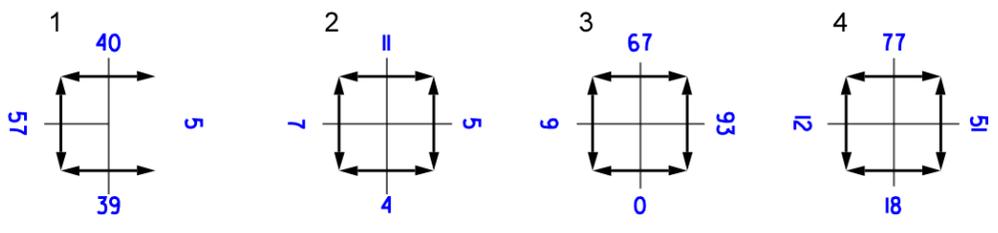
TITLE:
 RECOMMENDED INTERSECTION TRAFFIC CONTROL



Figure: 8



AFTERNOON PEDESTRIAN VOLUMES



LEGEND

-  - TRAFFIC SIGNAL WITH PEDESTRIAN SIGNAL HEADS
-  - CROSSING GUARD
-  - STANDARD CROSSWALK
-  - CONTINENTAL CROSSWALK
-  - REMOVE STANDARD CROSSWALK
-  - PROPOSED CONTINENTAL CROSSWALK
-  - BIKE ROUTE
-  - REMOVE EXISTING SIGN

- ① → 
- ② → 
- ③ → 
- ④ → 
- ⑤ → 
- ⑥ → 
- ⑦ → 
- ⑧ → 
- ⑨ → 

PROJECT:
 Neighborhood 4
 Traffic Study
 Downers Grove, Illinois

TITLE:
 RECOMMENDED MODIFICATIONS TO THE
 PEDESTRIAN AND BICYCLE FACILITIES AND
 TRAFFIC CONTROL DEVICES


 Job No: 14-209
 Figure: 9

