Quad Cities Intersection Crash Study

Davenport-Rock Island-Moline Urbanized Area

August 2009

Bi-State Regional Commission
1504 Third Avenue, P.O. Box 3368
Rock Island, IL 61204-3368
Phone: (309) 793-6300 • Fax: (309) 793-6305
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[2] Chairman, Transportation Policy Committee

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[4] The mayors of the cities of Buffalo, Eldridge, LeClaire, Princeton, and Riverdale in the Iowa portion and the cities and villages of Andalusia, Carbon Cliff, Coal Valley, Colona, Hampton, Milan, Oak Grove, Port Byron, Rapids City, and Silvis in the Illinois portion select a representative from their jurisdictions (Iowa and Illinois separately) to represent them on the Policy and Technical Committees.

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Jeff Nelson, General Manager2
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[1] The Technical Committee system allows one vote per agency with delegated representative voting permitted in the absence of an agency-s listed member. The City of Davenport has two votes.

[2] Chairman, Transportation Technical Committee.

[3] Vice-Chair, Transportation Technical Committee.

NOTE: Additional membership may include advisory representatives from the Illinois and Iowa Departments of Transportation, planning and research engineers from the Illinois and Iowa Federal Highway Administration, and a community planning representative from the Federal Transit Administration Region VII.

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Executive Summary

The 2007 Quad Cities Intersection Crash Study provides a source of crash information through which state and local officials may examine and respond to changing traffic conditions in their jurisdiction. This report identifies and analyzes hazardous intersections in the Illinois and Iowa Quad City Area.

The ten highest ranked intersections in each state were identified and scored through an evaluation process based on accident frequency, severity and rate. Ties in ranking in Iowa Quad Cities locations resulted in thirteen intersections being included in the top list. The twenty-three total locations were further analyzed using crash history and conditions.

The top locations in each area (Iowa and Illinois Quad Cities) were found to be:

Iowa: Harrison St. & West Locust St. (Davenport)
Number of Crashes: 16
Score: 26

Illinois: Kennedy Dr. & Avenue of the Cities (East Moline)
Number of Crashes: 38
Score: 45

This report also evaluates the status of intersections ranked in the top ten in the 1993 crash study and what, if any, improvements have been made to those intersections. The appendices included at the end of this report provide possible crash causes and countermeasures, crash reduction factors associated with countermeasures and typical intersection improvement costs.

Introduction

According to the Iowa Comprehensive Highway Safety Plan, intersections constitute 55% of all urban vehicle crashes nationally.[1] An important aspect to reducing this statistic is identifying problem intersections and creating strategies to increase safety. This report analyzes 2007 crash data and identifies the top 10 intersections for crashes in both the Iowa Quad Cities and the Illinois Quad Cities.

The Quad Cities Intersection Crash Study for 2007 is the fifteenth such report prepared by the Bi-State Regional Commission. This year's report provides an analysis for intersections with seven or more crashes per location. The methodology used to rank the intersections in both states uses criteria of frequency, severity and rate. The report gives a detailed analysis of the number and types of crashes at each of the 23 ranked intersections to allow stakeholders to pinpoint problem areas and develop engineering strategies to mitigate hazards, focus on traffic enforcement and/or develop public education strategies to reduce crashes.

As a basis for the study, descriptions of each state's "Safety Plan" are given. "Safety Plans" are required of states by the Safe, Accountable, Flexible Efficient Transportation Equity Act- A Legacy for Users (SAFETEA-LU). The report also explains the Bi-State Long Range Transportation Plan created in 2006. These two sections described in detail how the crash study furthers the goals of the three documents.

Data for the 2007 Intersection Crash Study was provided by the Iowa Department of Transportation (IA DOT), Bureau of Transportation Safety, and the Illinois Department of Transportation (IL DOT), Division of Traffic Safety. The departments of transportation obtain information from police and driver crash reports. Countermeasures for specific crash patterns can be found in Appendix A with corresponding costs and crash reduction factors found in Appendices B and C, respectively.

[1] Iowa Comprehensive Highway Safety Plan (2006), p.A-8

State Highway Safety Plans

As required by the Safe, Accountable, Flexible Efficient Transportation Equity Act- A Legacy for Users (SAFETEA-LU), both Iowa and Illinois have developed state strategic highway safety plans. These plans include strategies to address safety concerns on public roads in each state.

Released in 2006, the Iowa Comprehensive Highway Safety Plan (CHSP) adopts the motto: "One death is too many". The CHSP targets eight areas (including intersections) and outlines 13 strategies to increase safety on Iowa roads. Strategies particularly relevant to this study include:

- Identify "Safety Corridors" and use multidisciplinary strategies to mitigate specific crash factors, e.g., impaired driving, speeding, etc.;
- Promote innovative intersection designs, e.g., roundabouts;
- Create local multidisciplinary safety teams to identify and resolve local crash causes; and
- Enhance data availability to all stakeholders.[2]

More specifically, this Bi-State study fulfills one of the Intersection Target Area Team's strategies of "providing intersection/GIS crash maps to local entities to raise awareness and show locations where mitigation efforts may be needed"[3]. The Intersection Target Area Team's report can be found in Appendix A of the Iowa CHSP.

Like Iowa, the Illinois Department of Transportation developed a highway safety plan in accordance with SAFETEA-LU. The Illinois Strategic Highway Safety Plan (SHSP) also has a "Zero Fatalities" goal, as well as an intersection emphasis area. The Illinois SHSP was last updated in April 2009 and uses the "3 Es" (engineering, enforcement, and education) to propose strategies for improving intersection safety.

This Bi-State crash study aims to implement several strategies including:

- Identify intersections with a disproportionately large number of fatal and life-altering injury crashes; and
- Initiate and participate in intersection Road Safety Assessments.[4]

Identification of problem intersections in the Quad Cities Area gives the local and state governments quick reference to what areas should be targeted to achieve safety planning goals. The information provided in this study is valuable in classifying locations and possible causes of crash patterns, and in offering resources to determine

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[2] Iowa CHSP, p.5.

[3] Iowa CHSP, p.11.

[4] Illinois SHSP, p. 41.

what countermeasures may be the most effective in improving safety. Countermeasures are outlined in Appendix A.

Bi-State Long Range Transportation Plan

The 2035 Long Range Transportation Plan (LRP), developed in 2006, outlines the goal of "develop[ing] a transportation system in the metropolitan area to provide for the safe, secure, efficient and economical movement of people and goods."[5] The LRP was developed in cooperation with local, state and federal agencies and serves as a guide for area transportation development to 2035. The LRP addresses several aspects of transportation planning including the existing and proposed roadway network, public transit network, intermodal network and multipurpose trail and pedestrian network, as well as accessibility to the various networks.

There are seven criteria outlined in the LRP to serve as guidance for meeting the overall goal. One criterion is increased safety. The LRP aims to "support programs that ensure safe, secure operation of the transportation system for motorized and non-motorized users."[6] The plan refers back to this safety guidance (and the other six criteria) to propose improvements to existing networks.

The 2007 Quad Cities Crash Study supports the LRP in its efforts to increase the safety of the Quad City Area's transportation system. The Crash Study provides information on the frequency and severity of crashes occurring at the area's most problematic intersections. With this information, local governments are better able to identify where resources are most needed.

In addition, Chapter 7 of this crash report outlines previously ranked high crash location. Information was collected on intersection improvements made at these locations since 1993 and whether changes resulted in a decrease in crashes. On-going performance monitoring of the high crash intersections will aid local cities with meeting or exceeding regional and state safety goals.

[5] 2035 LRP, p.I-1.

[6] 2035 LRP, p.I-2.

Methodology

This chapter describes the ranking criteria, the calculation of the criteria value for each intersection, and the assignment of evaluation points for ranking of the top crash locations. Based on total number of crashes that can be analyzed in a timely manner, a cut-off line was established for selection of qualified locations from the complete crash data set. The 2007 crash study includes intersections that had seven (7) or more crashes that year. Crashes are defined as incidents involving one or more vehicles resulting in a fatality, injury or property damage valued at $500 or greater.

There are three criteria used for ranking of the crash locations: Crash Frequency, Crash Severity and Crash Rate.

For each criterion, a scoring system awards evaluation points to the intersections. Table 3.1 below provides a complete list of criterion ranges and corresponding evaluation points.

Table 3.1
Evaluation Points for Ranking Crash Locations

Frequency		Severity		Rate[7]	
Crashes	**Points**	**Severity**	**Points**	**Rate (MEV)**	**Points**
≥ 29	15	≥ 56	15	≥ 3.50	15
27-28	14	53-55	14	3.26-3.49	14
25-26	13	49-52	13	3.01-3.25	13
23-24	12	45-48	12	2.76-3.00	12
21-22	11	41-44	11	2.51-2.75	11
19-20	10	37-40	10	2.26-2.50	10
17-18	9	33-36	9	2.01-2.25	9
15-16	8	29-32	8	1.76-2.00	8
13-14	7	25-28	7	1.51-1.75	7
11-12	6	21-24	6	1.26-1.50	6
9-10	5	17-20	5	1.01-1.25	5
7-8	4	13-16	4	0.76-1.00	4
5-6	3	9-12	3	0.51-0.75	3
3-4	2	5-8	2	0.26-0.50	2
1-2	1	1-4	1	0.01-0.025	1

[7] Crashes per million entering vehicles (MEV)

The ranking criteria are explained as follows:

CRASH FREQUENCY

This is the total number of crashes that occurred at each intersection in the subject year. It is frequently used for comparison in crash analysis. All intersections with seven or more reported crashes in 2007 are included in this study.

CRASH SEVERITY

Crashes are classified into three types: Property Damage Only (PDO), Personal Injury Crash and Fatal Crash. A value of 1, 3 or 12, respectively, is assigned to each type of crash. The equation below illustrates the calculation formula:

$$S_i = \left(N_p \times 1\right) + (N_i \times 3) + (N_f \times 12)$$

where:

S_i – Total weighted severity value for intersection *i*;
N_p – Number of Property Damage Only Crashes at intersection *i*;
N_i – Number of Personal Injury Crashes at intersection *i*; and
N_F – Number of Fatal Crashes at intersection *i*.

The total weighted severity value at each intersection is used to obtain the number of severity points found in Table 3.1.

CRASH RATE

The crash rate for an intersection is defined as the ratio of crash frequency over traffic volume for the subject time period. It is usually expressed in terms of crashes per million entering vehicles (MEV) for an intersection. The following formula is used in this study to calculate the intersection crash rates:

$$R_i = \frac{(C_i)(1{,}000{,}000)}{(T)(V_i)}$$

where:

R_i – Crash rate expressed in crashes per million entering vehicles (MEV) for intersection *i*;
C_p – Number of crashes at intersection *i* during the subject year;
T_i –Time period in days (in this case, 365 days); and
V_F – Total of average daily traffic on all approaches entering intersection *i*.

TOTAL SCORE AND RANKING

The values of crash frequency, crash severity and crash rate calculated using the above method were converted to the respective evaluation points using Table 3.1. The sum

of the evaluation points is the total score on which the ranking of top intersections was based. This is further detailed in Chapter 4.

Highest Crash Location Analysis

The method discussed in Chapter 3 is applied here to analyze the intersections that meet the minimum seven crash condition. With the sum of the scores of the three criteria, every intersection analyzed was ranked by state. The highest ranked top ten locations were found using these lists. Tables 4.1 and 4.2 list these top ranked locations and corresponding scores for Illinois and Iowa, respectively. There are thirteen locations in Iowa listed due to tied scoring.

The thirteen intersections on the Iowa QC list were responsible for 175 crashes, resulting in 100 injuries. The top ten Illinois QC intersections had a total of 258 crashes resulting in 119 injuries. While there were no fatalities at any of the top ranked locations, there were a total of 10 fatalities in 2007 when considering all Quad City intersections.

In addition to utilizing the data to rank the top crash locations, crash rate was also used to pinpoint a location that has a larger crash to traffic volume ratio. The average crash rate for the top twenty-three locations was 2.03. This will be used in Chapters 5 and 6 when each of the top locations is examined in detail. A map of top ranked locations is included on the following page.

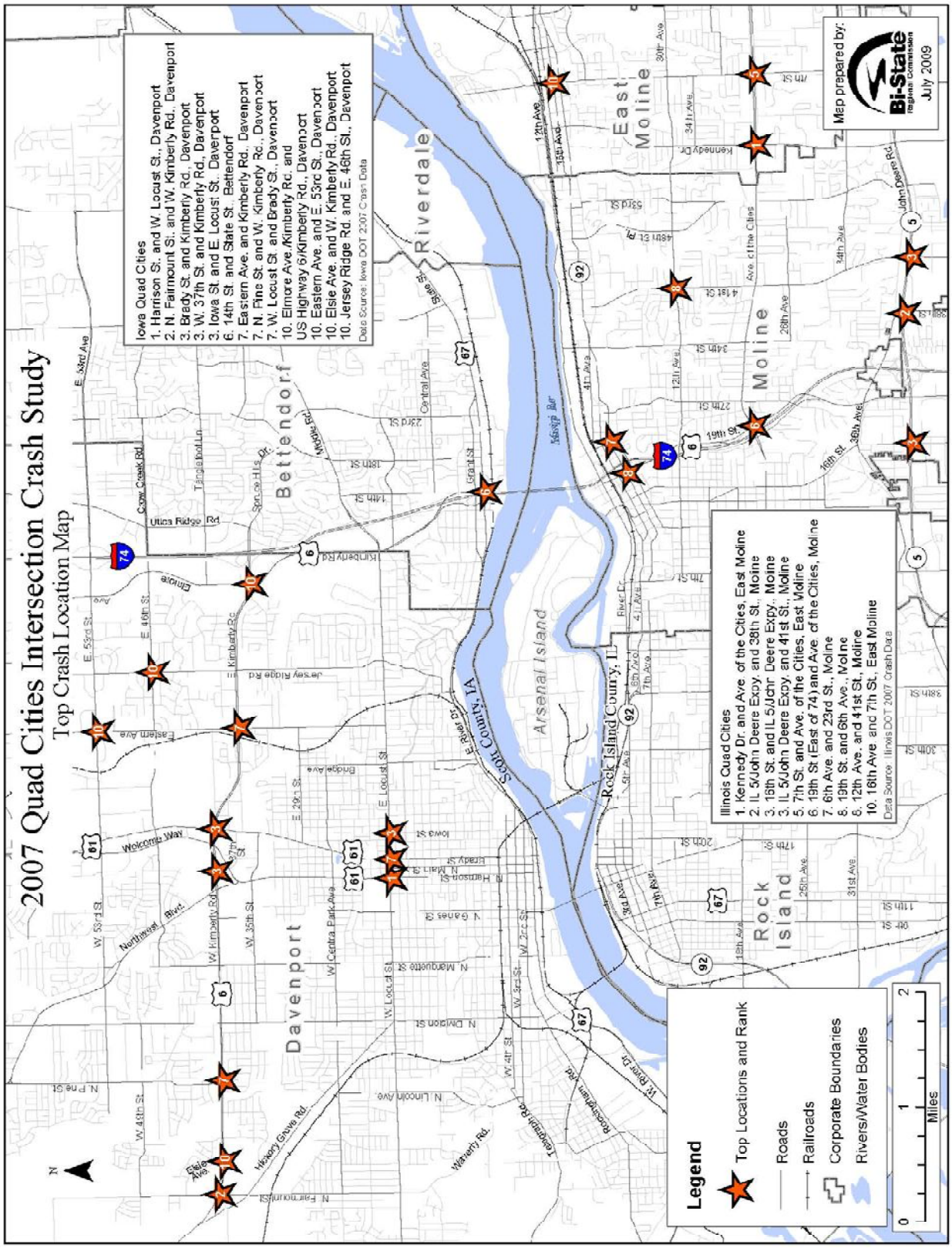
Table 4.1
Top Ranked Intersections in Iowa Quad Cities

Rank	Intersection	# of Crashes	Crash Rate	Score
1	Harrison St. & West Locust St.-Davenport	16	1.53	26
2	North Fairmount St. &West Kimberly Rd.- Davenport	12	2.38	24
3	Brady St. & Kimberly Rd.- Davenport	19	0.87	23
3	West 37th St. & Kimberly Rd.- Davenport	16	1.82	23
3	Iowa St. & East Locust St.- Davenport	15	1.56	23
6	14th St. & State St.- Bettendorf	13	1.49	22
7	Eastern Ave & Kimberly Rd.- Davenport	15	0.91	20
7	North Pine St. & West Kimberly Rd.- Davenport	13	1.31	20
7	West Locust St. & Brady St.- Davenport	13	0.96	20
10	Elmore Ave/Kimberly Rd. & US 6/Kimberly Rd. – Davenport	16	1.11	19
10	Eastern Ave & East 53rd St.- Davenport	11	0.86	19
10	Elsie Ave & West Kimberly Rd.- Davenport	9	1.42	19
10	Jersey Ridge Rd. & East 46th St.- Davenport	7	1.99	19

Table 4.2
Top Ranked Intersections in Illinois Quad Cities

Rank	Intersection	# of Crashes	Crash Rate	Score
1	Kennedy Dr. & Avenue of the Cities- East Moline	38	3.72	45
2	IL 5/John Deere Expy & 38th St- Moline	46	2.43	40
3	16th St & IL 5/John Deere Expy- Moline	33	1.97	38
3	IL 5/John Deere Expy & 41st St- Moline	34	1.98	38
5	7th St & Avenue of the Cities- East Moline	24	2.37	37
6	19th St (East of 74) & Avenue of the Cities- Moline	24	2.37	31
7	6th Ave & 23rd St- Moline	18	5.51	30
8	19th St & 6th Ave- Moline	16	2.88	27
8	12th Ave & 41st St- Moline	13	1.99	27
10	16th Ave & 7th St- East Moline	12	3.27	26

Figure 4.1
2007 Quad Cities Intersection Crash Study- Top Crash Location Map



Detailed Analysis of Iowa Quad Cities Top Locations

In this chapter, top ranked intersections in the Iowa Quad Cities are analyzed individually. Each location analysis includes figures describing frequency of crash type, day of crash, weather and road conditions. As discussed in Chapter 4, the average crash rate for the top twenty-three locations is 2.03. In this chapter, crash rates at each location are compared with the average crash rate. A table comparing each intersection's 2007 performance with 1993 performance is also given. Some intersections ranking in the top ten in 2007, were not ranked in 1993 and are so indicated in that location's comparison table.

IOWA LOCATION #1- HARRISON ST. & WEST LOCUST ST.- DAVENPORT

Ranked first (with a score of 26), this location experienced sixteen (16) crashes in 2007, resulting in 12 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.53 crashes per MEV. Rear-end crashes were the predominant crash type (with the most occurring on the eastbound approach of West Locust Street). Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays, although crashes occurred on ever day of the week except Sundays.

Figure 5.1.
Photo- Harrison St. & West Locust St. (Davenport)

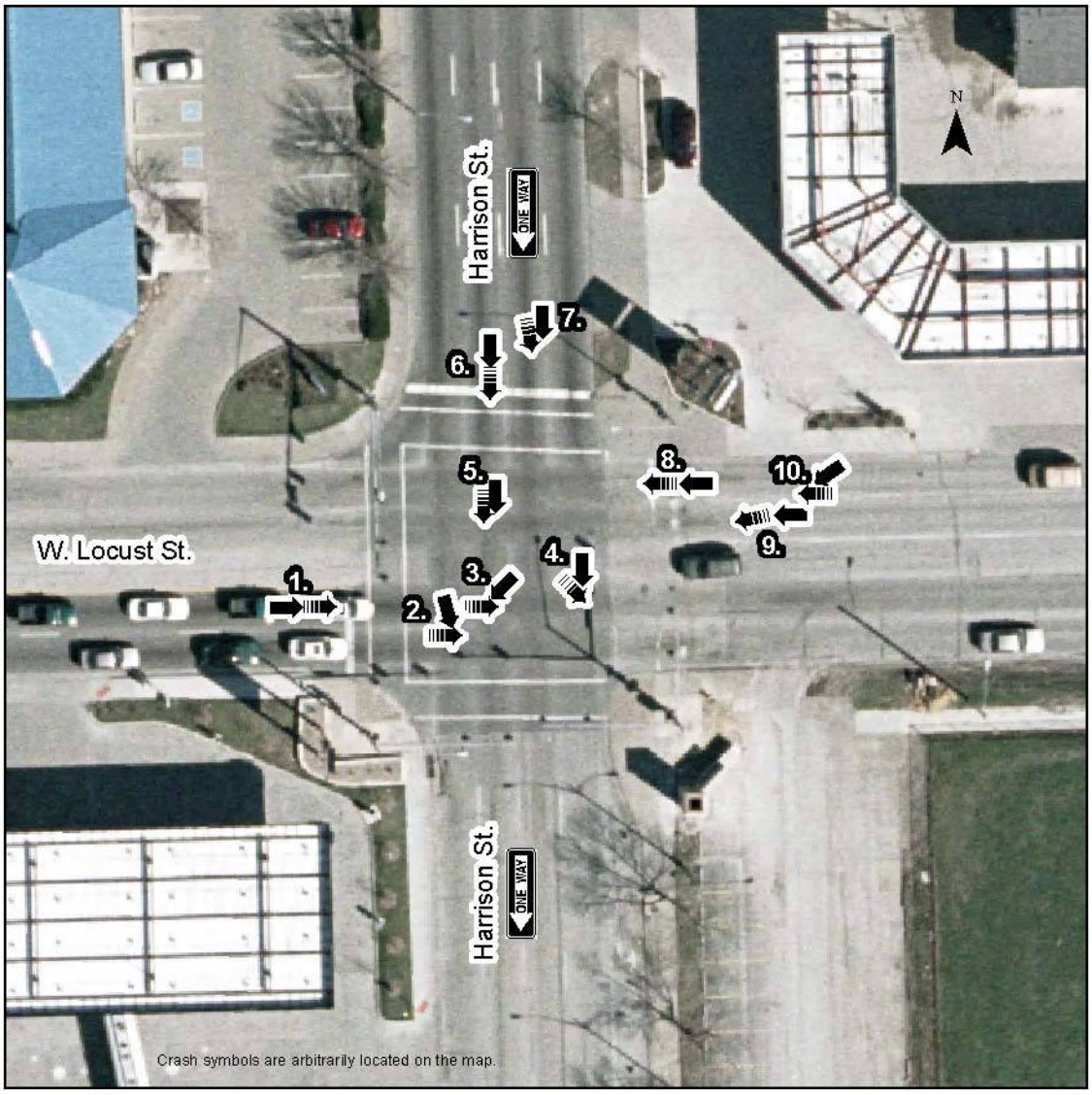
Harrison Street is a four-lane, one way (southbound), undivided highway with a posted speed limit of 35 mph at this location. There are no turn-only lanes. West Locust Street is a four-lane arterial with a posted speed limit of 25 mph at this location. There is one left-turn only lane in the westbound direction onto Harrison Street.

While the posted speed limit of West Locust Street is 25 mph at this location, observations indicate that traveling speeds are much higher. Increased speed coupled with high traffic volume (average daily traffic of 17,700) and several intersections within close proximity could cause the large number of increased rear-end crashes.

Table 5.1
Harrison St. & West Locust St. (Davenport) 1993/2007 Comparison

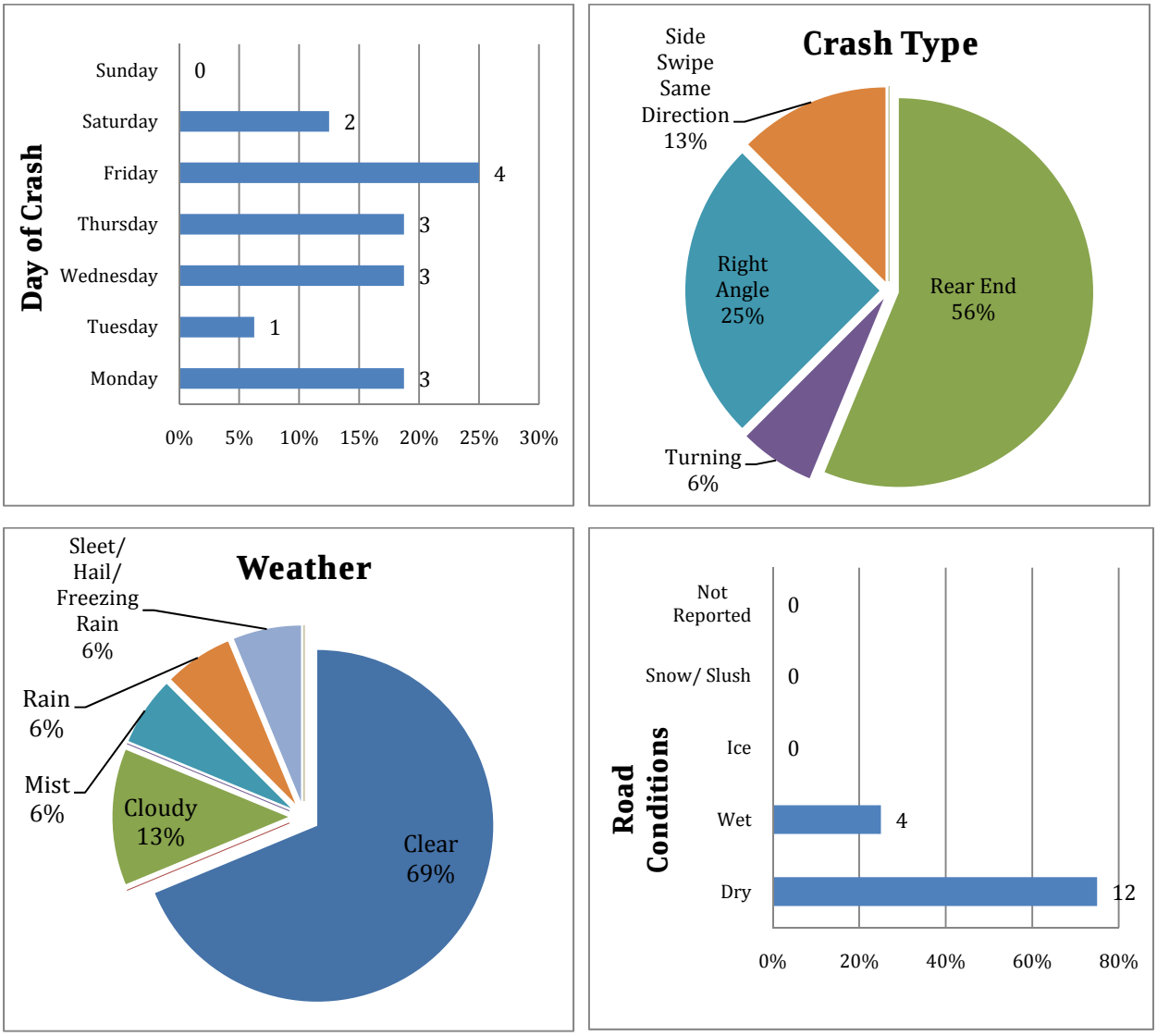
	1993	2007
Total Crashes	Not Ranked	16
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	12
Crash Rate	Not Ranked	1.53
Predominant Crash Type	Not Ranked	Rear-end

Figure 5.2
Iowa Location #1- Harrison St. &West Locust St. (Davenport)



1. East Bound, Rear End (6)
2. East Bound, Broadside (2)
3. East Bound, Angle from Oncoming Left Turn (1)
4. South Bound, Left Turn, Broadside (1)
5. South Bound, Sideswipe (1)
6. South Bound, Rear End (1)
7. South Bound, Changing Lanes, Sideswipe (1)
8. West Bound, Rear End (1)
9. West Bound, Changing Lanes, Rear End (1)
10. West Bound, Broadside (1)

Figure 5.3
Iowa Location #1- Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #2- NORTH FAIRMOUNT ST. & WEST KIMBERLY RD.- DAVENPORT

Ranked second (with a score of 24), this location experienced twelve (12) crashes in 2007, resulting in 7 injuries. Taking into account traffic volume, the crash rate for this intersection was above average at 2.38 crashes per MEV. Crashes involving turning were the predominant crash type, although rear-end crashes accounted for one-third of total crashes. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Sundays with no crashes occurring on Thursdays.

Figure 5.4.
Photo- North Fairmount St. & West Kimberly Rd. (Davenport)

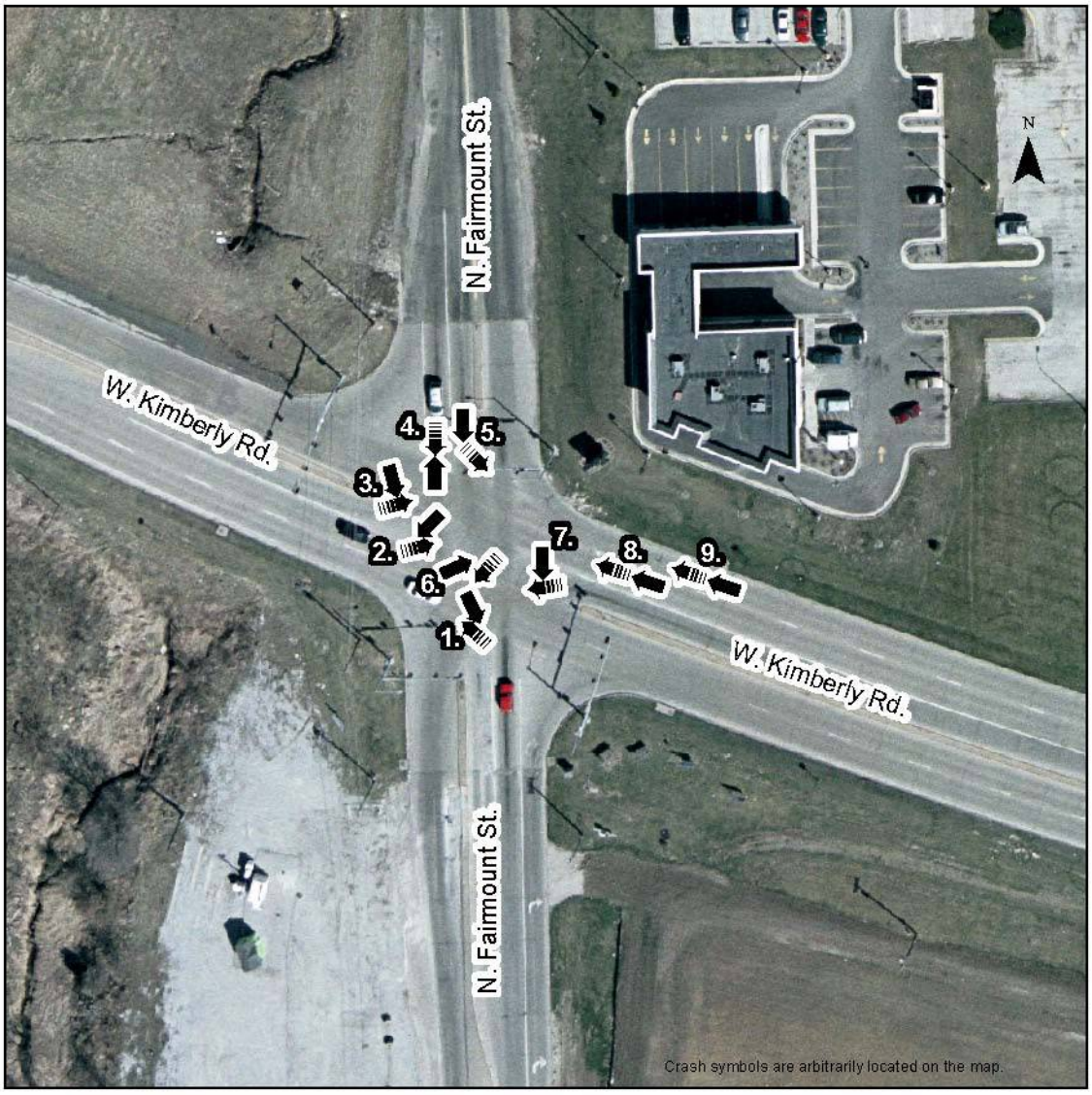
North Fairmount Street is a 2 lane road with a posted speed limit of 35 mph. The road is considered an arterial to the south of the intersection and a minor road to the north. There is one left-turn only lane and one right-turn only lane on both approaches. West Kimberly is a four-lane divided highway with a posted speed limit of 40 mph at this location. There are left-turn only lanes on both approaches.

The eastbound approach of West Kimberly Road is a higher speed rural highway bringing in traffic from I-280 with few intersections before North Fairmount Street. The high number of turning crashes is likely due to the speed of traffic entering the intersection from this approach.

Table 5.2
North Fairmount St. & West Kimberly Rd. (Davenport) 1993/2007 Comparison

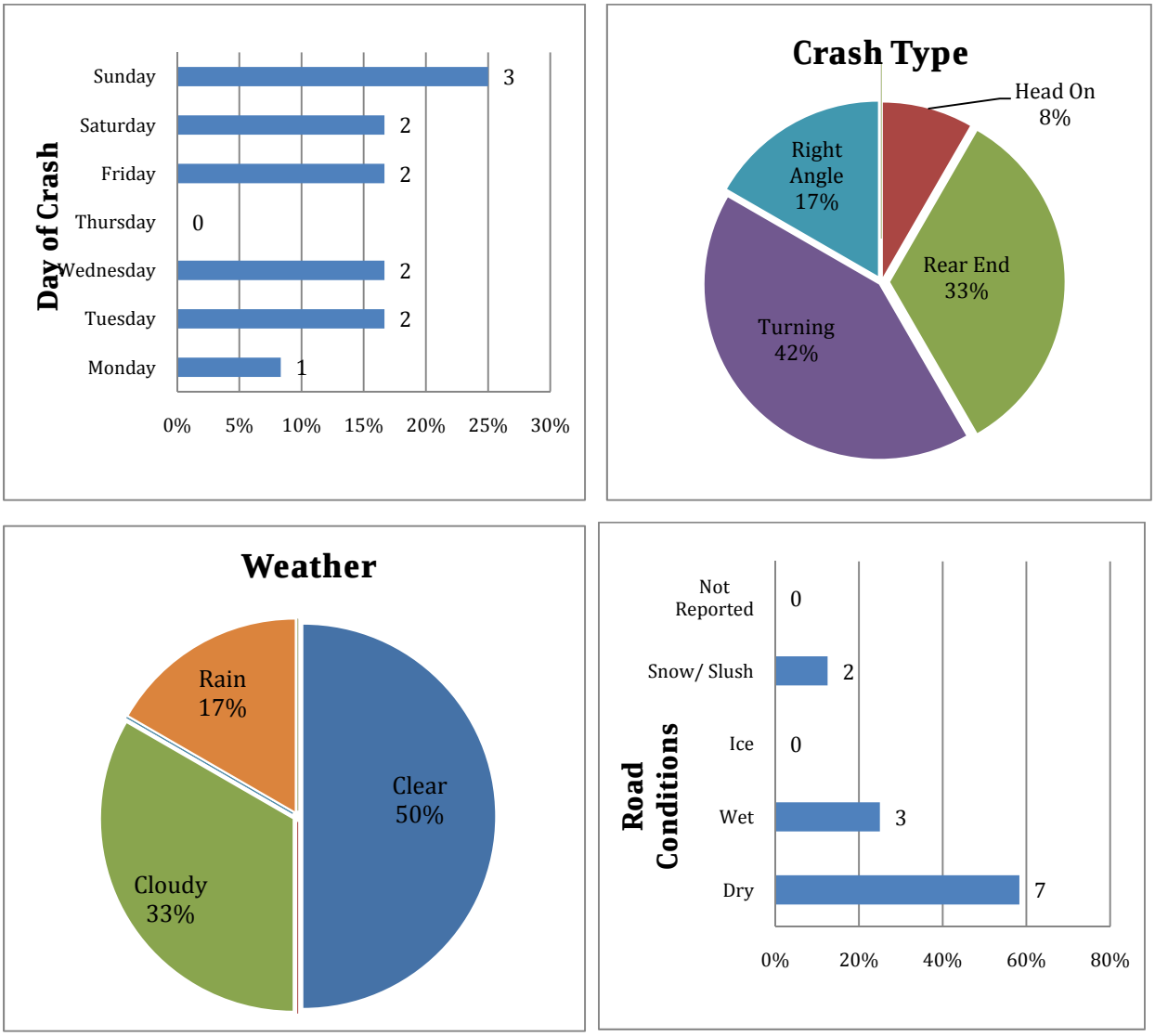
	1993	2007
Total Crashes	Not Ranked	12
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	7
Crash Rate	Not Ranked	2.38
Predominant Crash Type	Not Ranked	Turning

Figure 5.5
Iowa Location #2- North Fairmount St. & West Kimberly Rd. (Davenport)



1. North Bound, Left Turn, Angle, Oncoming Left Turn (1)
2. East Bound, Left Turn, Angle, Oncoming Left Turn (1)
3. East Bound, Left Turn, Broadside (1)
4. South Bound, Stopped for Stop Sign/Signal, Head-on (1)
5. South Bound, Left Turn, Rear-end (1)
6. West Bound, Left Turn, Angle, Oncoming Left Turn (3)
7. West Bound, Left Turn, Broadside (1)
8. West Bound, Straight, Rear-end (2)
9. West Bound, Slowing/Stopping, Rear-end (1)

Figure 5.6
Iowa Location #2- Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #3- BRADY ST. & KIMBERLY RD.- DAVENPORT

Ranked third (with a score of 23), this location experienced nineteen (19) crashes in 2007, resulting in 8 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 0.87 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Saturdays.

Figure 5.7
Photo- Brady St. & Kimberly Rd. (Davenport)

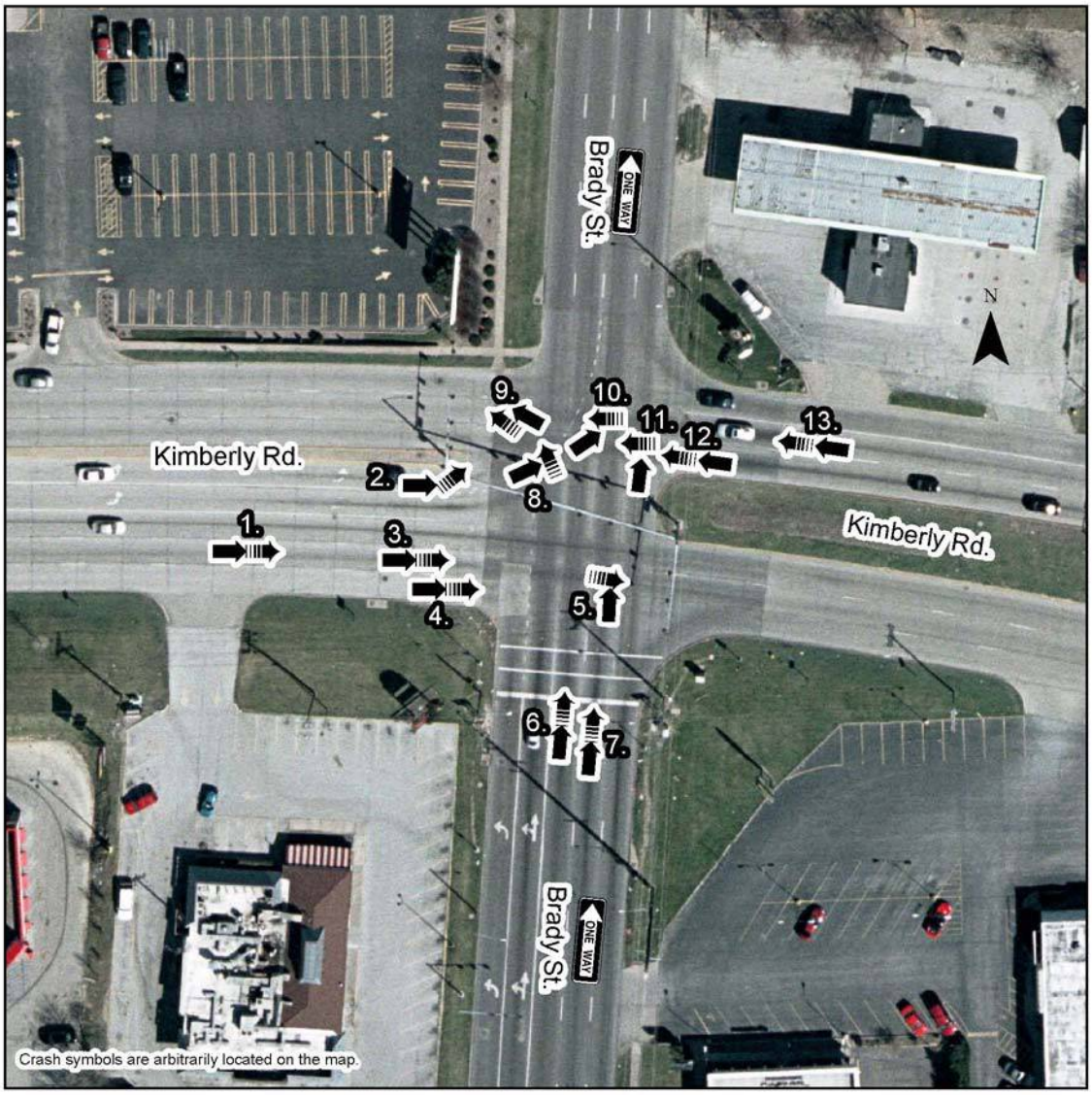
Brady Street is a four-lane, one way (northbound), undivided highway with a posted speed limit of 35 mph. There is one left-turn only lane and one left-turn/straight lane. Kimberly Road is a four-lane divided highway with a posted speed limit of 45 mph east of the intersection and 35 mph west of the intersection. There are two left-turn only lanes in the westbound approach and one right-turn only lane in the eastbound approach.

Both roads are high-traffic (average daily traffic of 34,100 entering the intersection from eastbound Kimberly), multi-lane highways with relatively high traveling speeds. The abundance of commercial activity near the intersection (including North Park Mall) and the size of the intersection may contribute to the number of rear-end crashes. However, it is important to note that even though the intersection is ranked third, the crash rate is well below average at 0.87 crashes per MEV. This low crash rate can be attributed to traffic control devices including red light running and speed cameras.

Table 5.3
Brady St. & Kimberly Rd. (Davenport) 1993/2007 Comparison

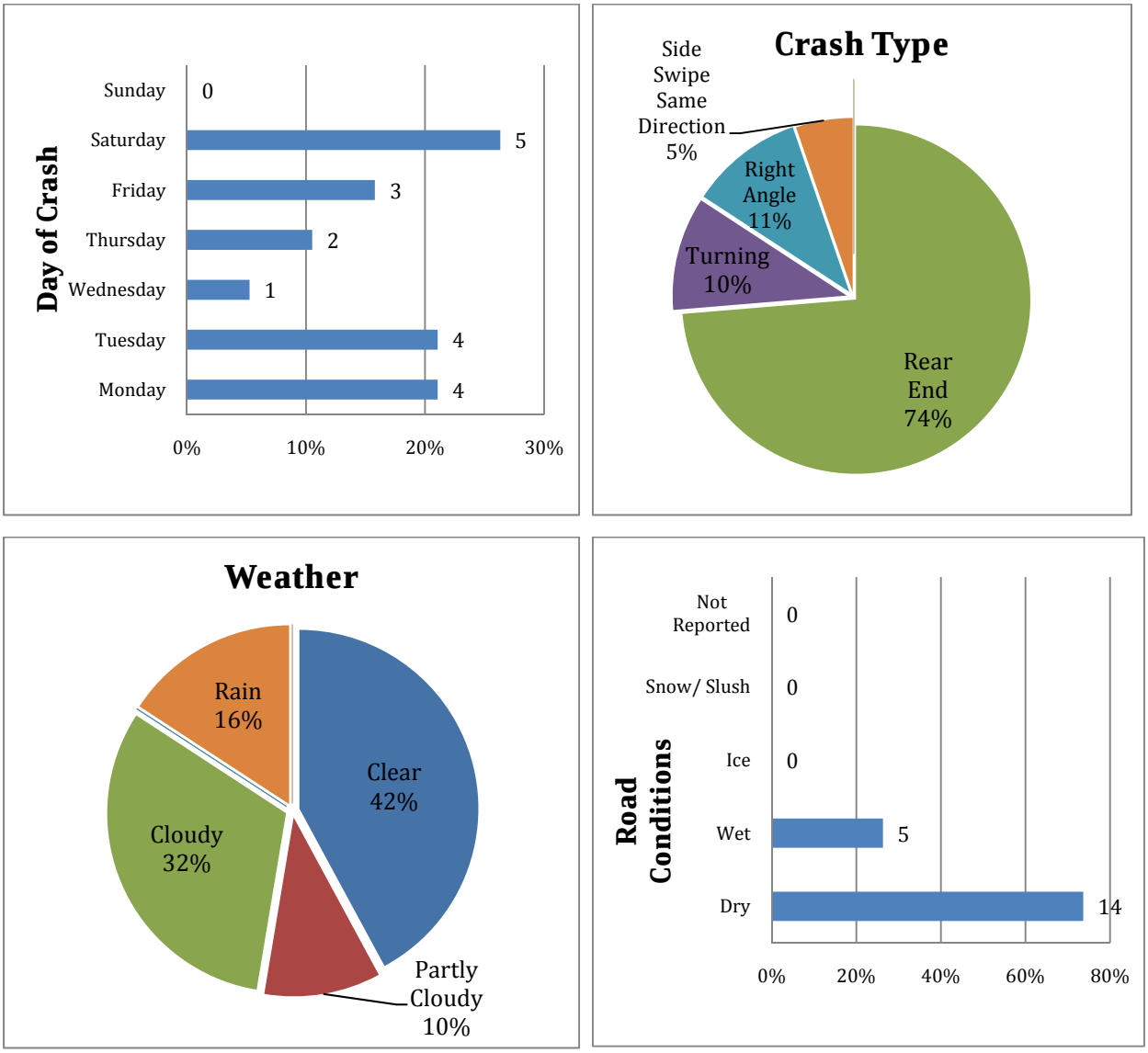
	1993	2007
Total Crashes	Not Ranked	19
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	8
Crash Rate	Not Ranked	0.87
Predominant Crash Type	Not Ranked	Rear-end

Figure 5.8
Iowa Location #3- Brady St. & Kimberly Rd. (Davenport)



1. East Bound, Slowing/Stopping, Rear-end (2)
2. East Bound, Left Turn, Rear-end (1)
3. East Bound, Straight, Rear-end (4)
4. East Bound, Stopped for Stop Sign/Signal, Rear-end (1)
5. East Bound, Slowing/Stopping, Broadside (1)
6. North Bound, Straight, Rear-end (2)
7. North Bound, Stopped for Stop Sign/Signal, Rear-end (1)
8. North Bound, Left Turn, Angle, Oncoming Left Turn (1)
9. North Bound, Left Turn, Sideswipe, Same Direction (1)
10. West Bound, Straight, Angle, Oncoming Left Turn (1)
11. West Bound, Straight, Broadside (1)
12. West Bound, Stopped for Stop Sign/Signal, Rear-end (2)
13. West Bound, Straight, Rear-end (1)

Figure 5.9
Iowa Location #3 (Brady St. & Kimberly Rd.)- Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #3- MAIN ST. & KIMBERLY RD.- DAVENPORT

Tied for third (with a score of 23), this location experienced sixteen (16) crashes in 2007, resulting in 7 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.56 crashes per MEV. Crashes involving turning were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays and Saturdays.

Figure 5.10
Photo- Main St. & Kimberly Rd. (Davenport)

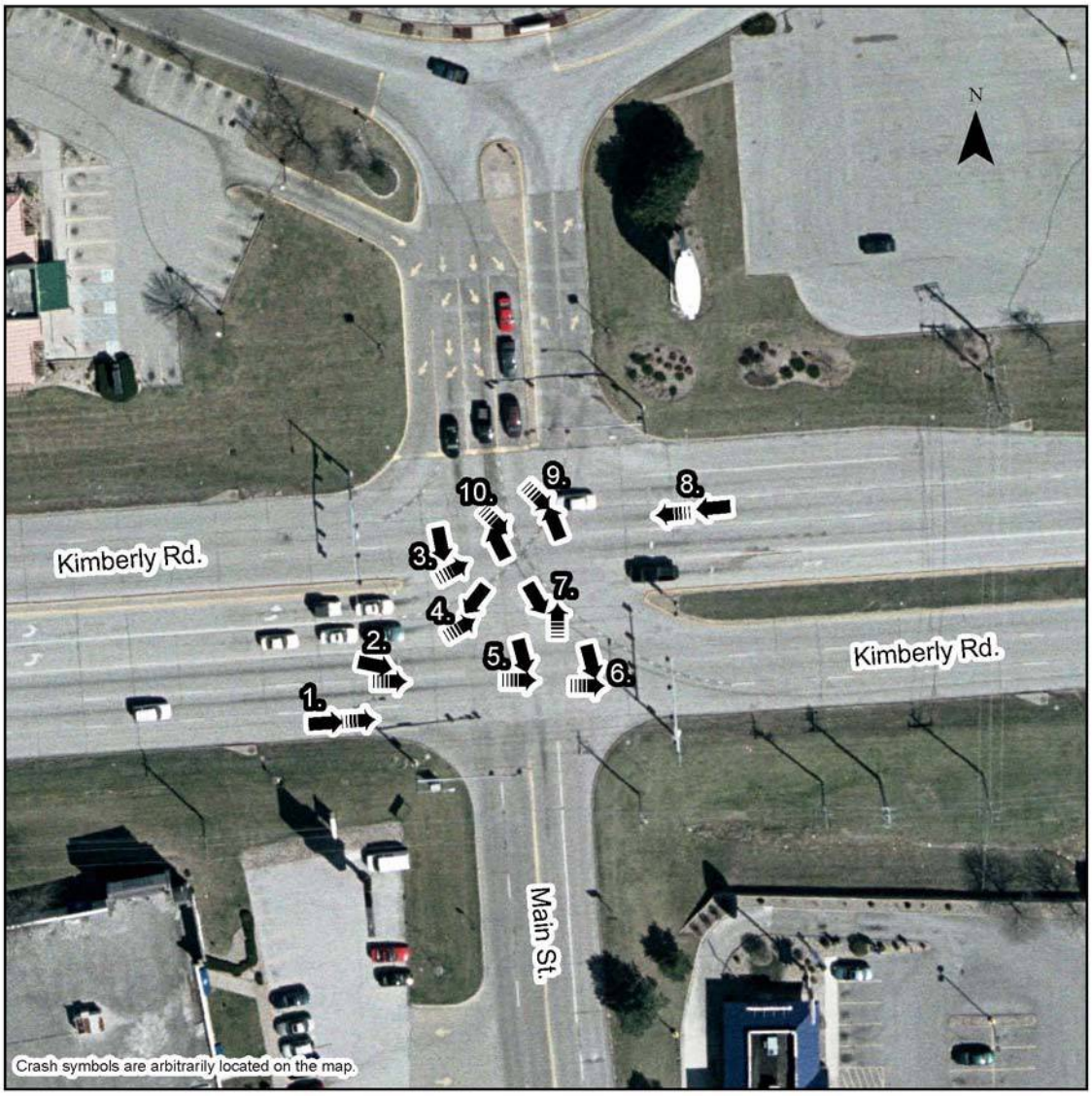
Kimberly Road is a five-lane divided highway with a posted speed limit of 35 mph at this location. The westbound direction has three lanes of traffic. There are two left-turn only lanes on the eastbound approach and one left-turn only lane on the westbound approach. There are right-turn only lanes on both approaches. Main Street is four-lane minor road. The southbound approach acts as an exit for the Northpark Mall parking lot. There is one left-turn only lane and one right-turn only lane at this approach.

The distribution of crash types indicates that no one aspect of the intersection is largely responsible for crashes. Crashes at this location are most likely due to the speed of traffic on Kimberly Road and the commercial activity in the area. However, a larger proportion of crashes occurred between southbound, left-turning vehicles and on-coming traffic, which, observation noted, could be due to the poor lane markings of the southbound, left-turning lanes.

Table 5.4
Main St. & Kimberly Rd. (Davenport) 1993/2007 Comparison

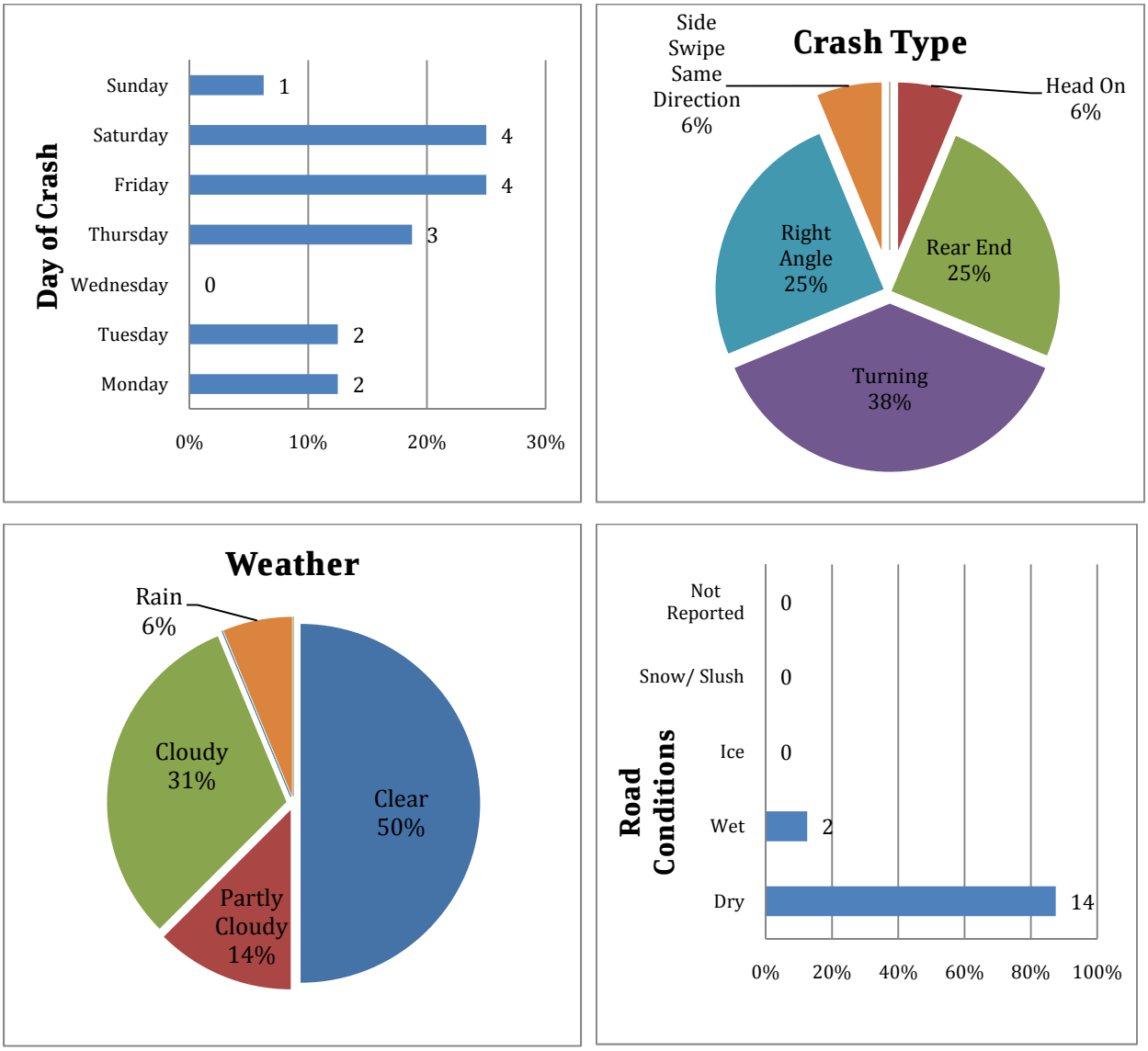
	1993	2007
Total Crashes	Not Ranked	16
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	7
Crash Rate	Not Ranked	1.56
Predominant Crash Type	Not Ranked	Turning

Figure 5.11
Iowa Location #3- Main St. & Kimberly Rd. (Davenport)



1. East Bound, Straight, Rear-end (2)
2. East Bound, Straight, Sideswipe/Same Direction (1)
3. East Bound, Left Turn, Broadside (1)
4. East Bound, Left Turn, Angle, Oncoming Left Turn (1)
5. East Bound, Straight, Broadside (2)
6. East Bound, Stopped for Stop Sign/Signal, Broadside (1)
7. North Bound, Straight, Angle, Oncoming Left Turn (1)
8. West Bound, Straight, Rear-end (2)
9. South Bound, Left Turn, Head-on (1)
10. South Bound, Left Turn, Angle, Oncoming Left Turn (4)

Figure 5.12
Iowa Location #3 (West 37th St. & Kimberly Rd.)- Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #3- IOWA ST. & EAST LOCUST ST.- DAVENPORT

Tied for third (with a score of 23), this location experienced fifteen (15) crashes in 2007, resulting in 5 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.82 crashes per MEV. Crashes involving turning were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays.

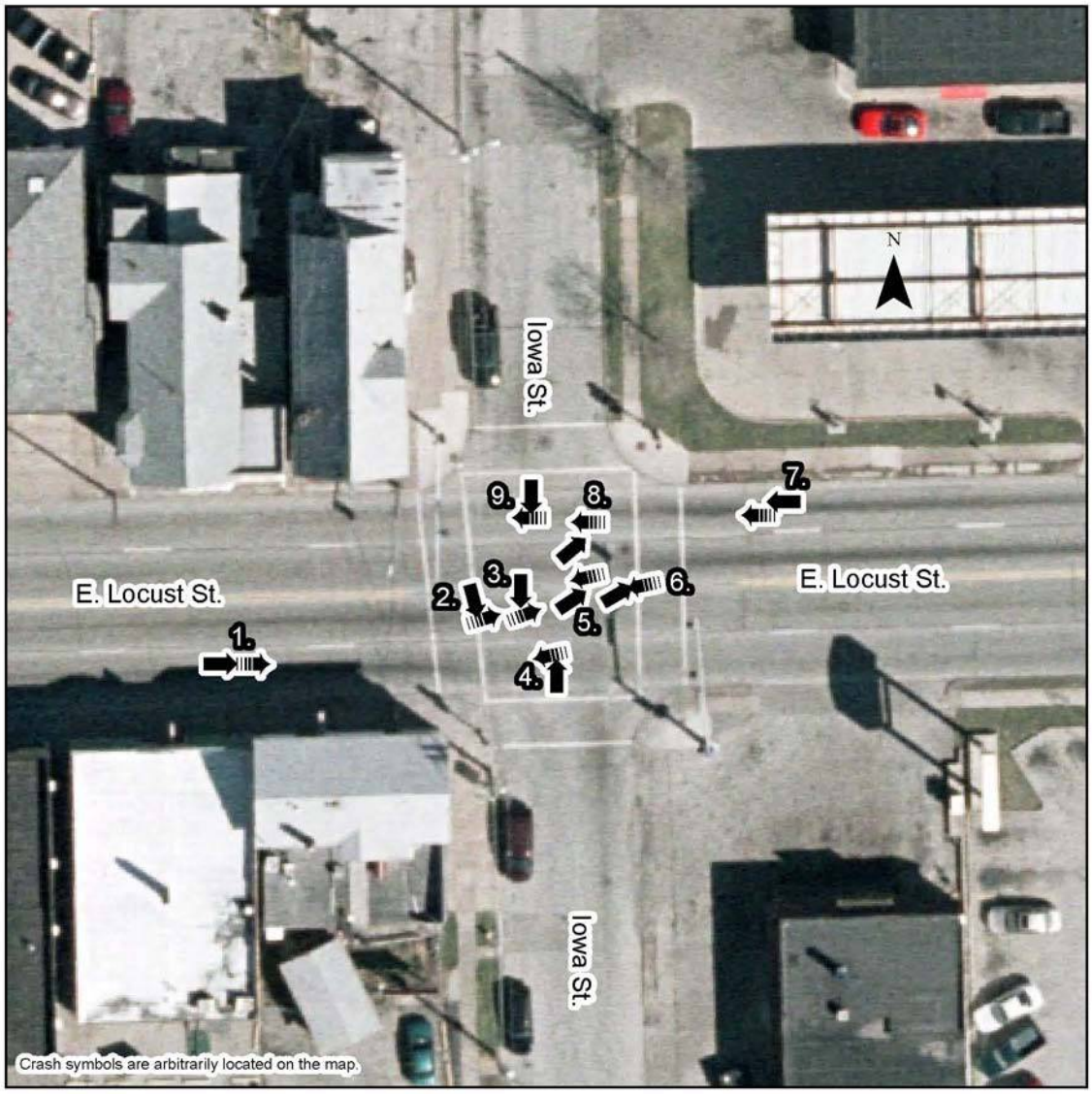
Figure 5.13
Photo- Iowa St. & East Locust St. (Davenport)

Iowa Street is a two-lane minor road with a posted speed limit of 25 mph. East Locust Street is a four-lane arterial with a posted speed limit of 35 mph. There are no designated turn lanes from any approach. Because of this, crashes involving turning vehicles are more likely to occur.

Table 5.5
Iowa St. & East Locust St. (Davenport) 1993/2007 Comparison

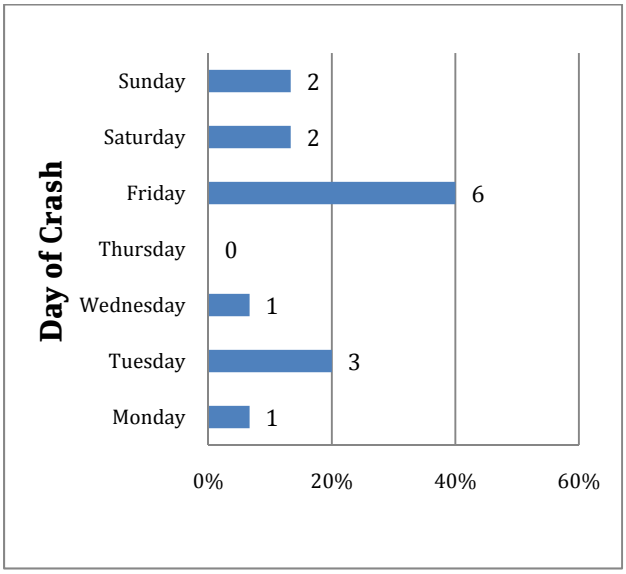
	1993	2007
Total Crashes	18	15
# of Fatalities	0	0
# of Injuries	11	5
Crash Rate	2.31	1.82
Predominant Crash Type	Angle	Turning

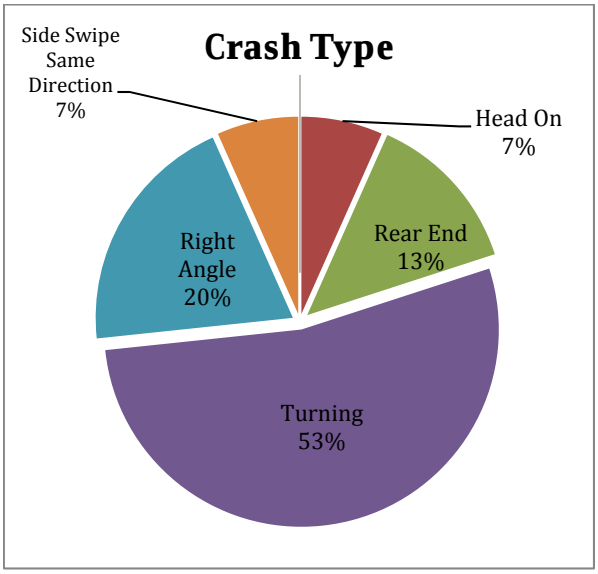
Figure 5.14
Iowa Location #3- Iowa St. & East Locust St. (Davenport)

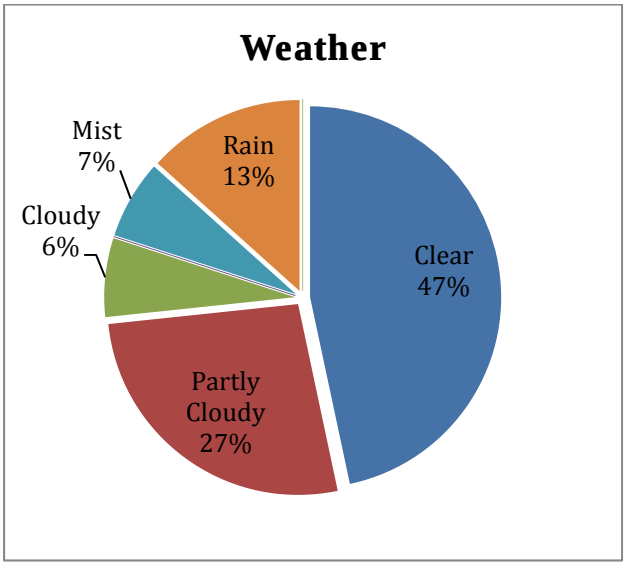


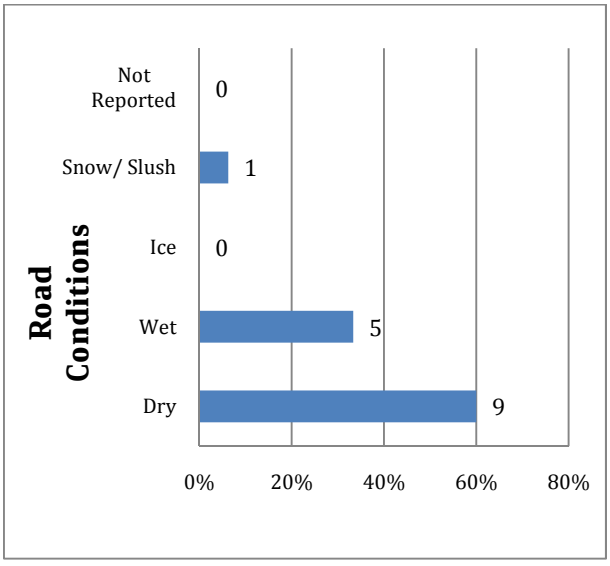
1. East Bound, Straight, Rear-end
2. East Bound, Left Turn, Angle, Oncoming Left Turn
3. East Bound, Left Turn, Broadside
4. West Bound, Left Turn, Broadside
5. West Bound, Left Turn, Angle, Oncoming Left Turn
6. West Bound, Left Turn, Head-on
7. West Bound, Straight, Sideswipe, Same Direction
8. West Bound, Straight, Angle, Oncoming Left Turn
9. West Bound, Straight, Broadside

Figure 5.15
Iowa Location #3 (Iowa St. & East Locust St.)- Crash Frequency by Crash Type and Under Various Conditions









IOWA LOCATION #6- 14TH ST. & STATE ST.- BETTENDORF

Figure 5.16
Photo- 14th St. & State St. (Bettendorf)

Ranked sixth (with a score of 22), this location experienced thirteen (13) crashes in 2007, resulting in 9 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.49 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Saturdays.

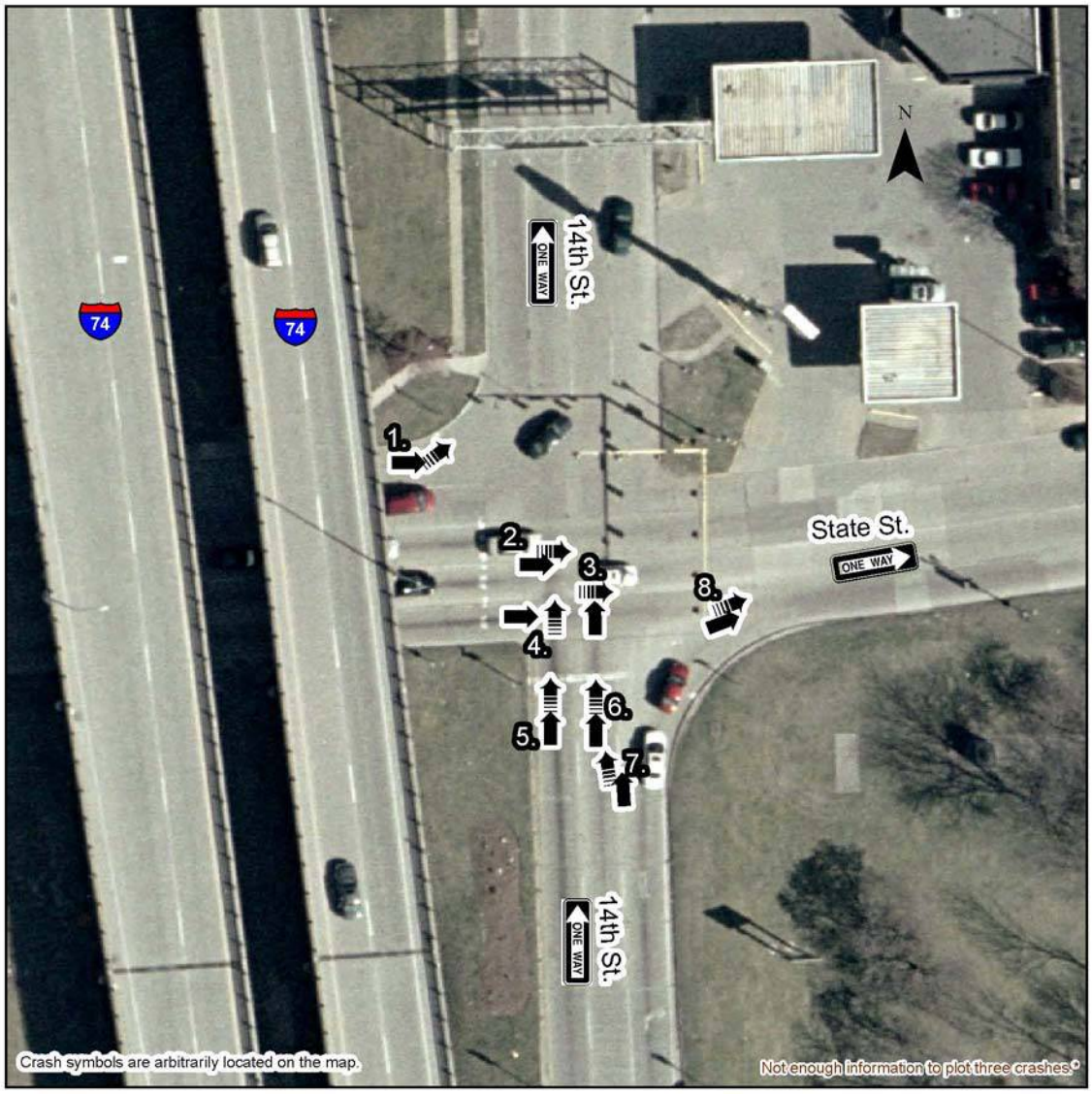
Fourteenth Street is a three-lane, one-way (northbound) road that serves as an I-74 off-ramp from the south approach and a minor road to the north of the intersection with a posted speed limit of 30 mph. There is one right-turn only lane and one right-turn, straight lane. State Street is a three-lane, one-way (eastbound), undivided highway with a speed limit of 30 mph at this location. There are two left-turn only lanes onto 14th Street.

Because Fourteenth Street serves as an off-ramp, high speeds can be expected at this approach, which may contribute to rear-end crashes and red-light running. Likewise, signal visibility may be an issue on State Street as traffic lights for the intersection are located on the far side of the I-74 underpass. Placing another set of traffic lights on the State Street approach side of the I-74 underpass might be useful in decreasing rear-end crashes.

Table 5.6
14th St. & State St. (Bettendorf) 1993/2007 Comparison

	1993	2007
Total Crashes	Not Ranked	13
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	9
Crash Rate	Not Ranked	1.49
Predominant Crash Type	Not Ranked	Rear-end

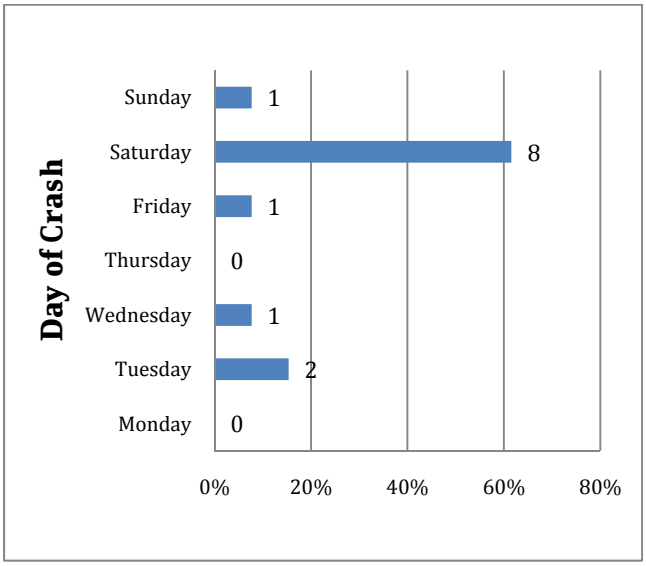
Figure 5.17
Iowa Location #6- 14th St. & State St. (Bettendorf)

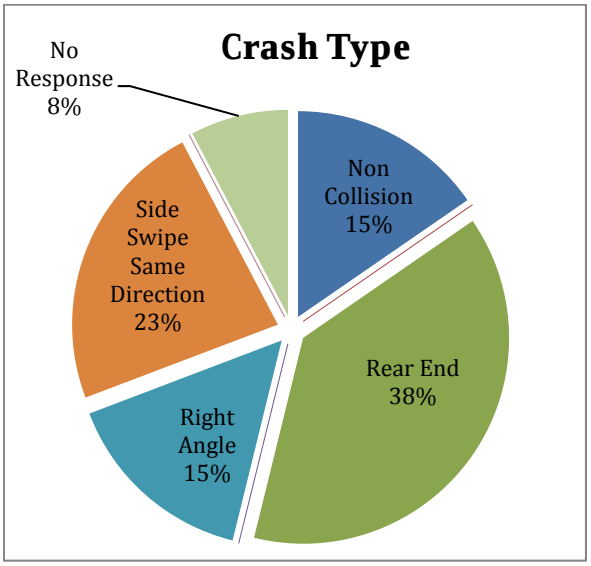


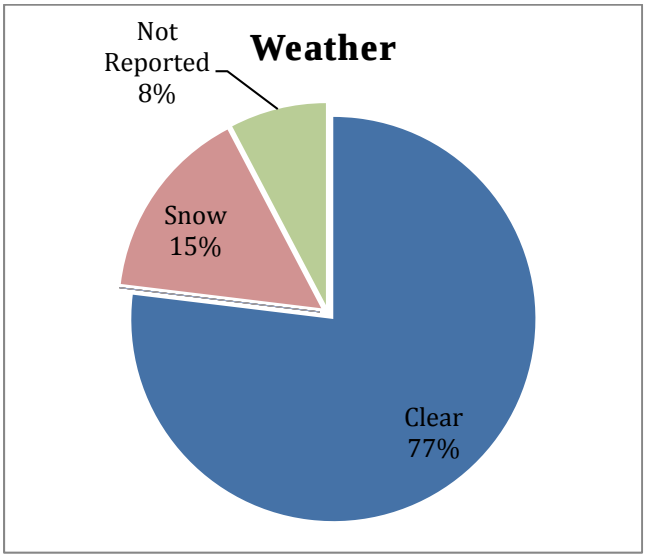
1. East Bound, Left Turn, Rear-end (1)
2. East Bound, Straight, Sideswipe, Same Direction (1)
3. East Bound, Straight, Broadside (1)
4. North Bound, Straight, Broadside (1)
5. North Bound, Stopped for Stop Sign/Signal, Rear-end (2)
6. North Bound, Straight, Rear-end (2)
7. North Bound, Change Lanes, Sideswipe, Same Direction (1)
8. North Bound, Left Turn, Sideswipe, Same Direction (1)

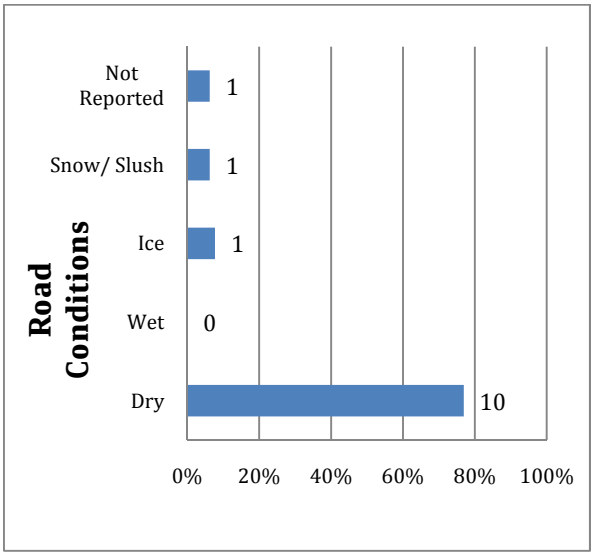
* Three crashes not plotted on map: North Bound, Straight, crash type was not reported; North Bound, Straight, non-collision crash type; East Bound, Straight, non-collision crash type

Figure 5.18
Iowa Location #6 - Crash Frequency by Crash Type and Under Various Conditions









IOWA LOCATION #7- EASTERN AVE & KIMBERLY RD.- DAVENPORT

Ranked seventh (with a score of 20), this location experienced fifteen (15) crashes in 2007, resulting in 7 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 0.91 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Thursdays and Fridays.

Figure 5.19
Photo- Eastern Ave & Kimberly Rd. (Davenport)

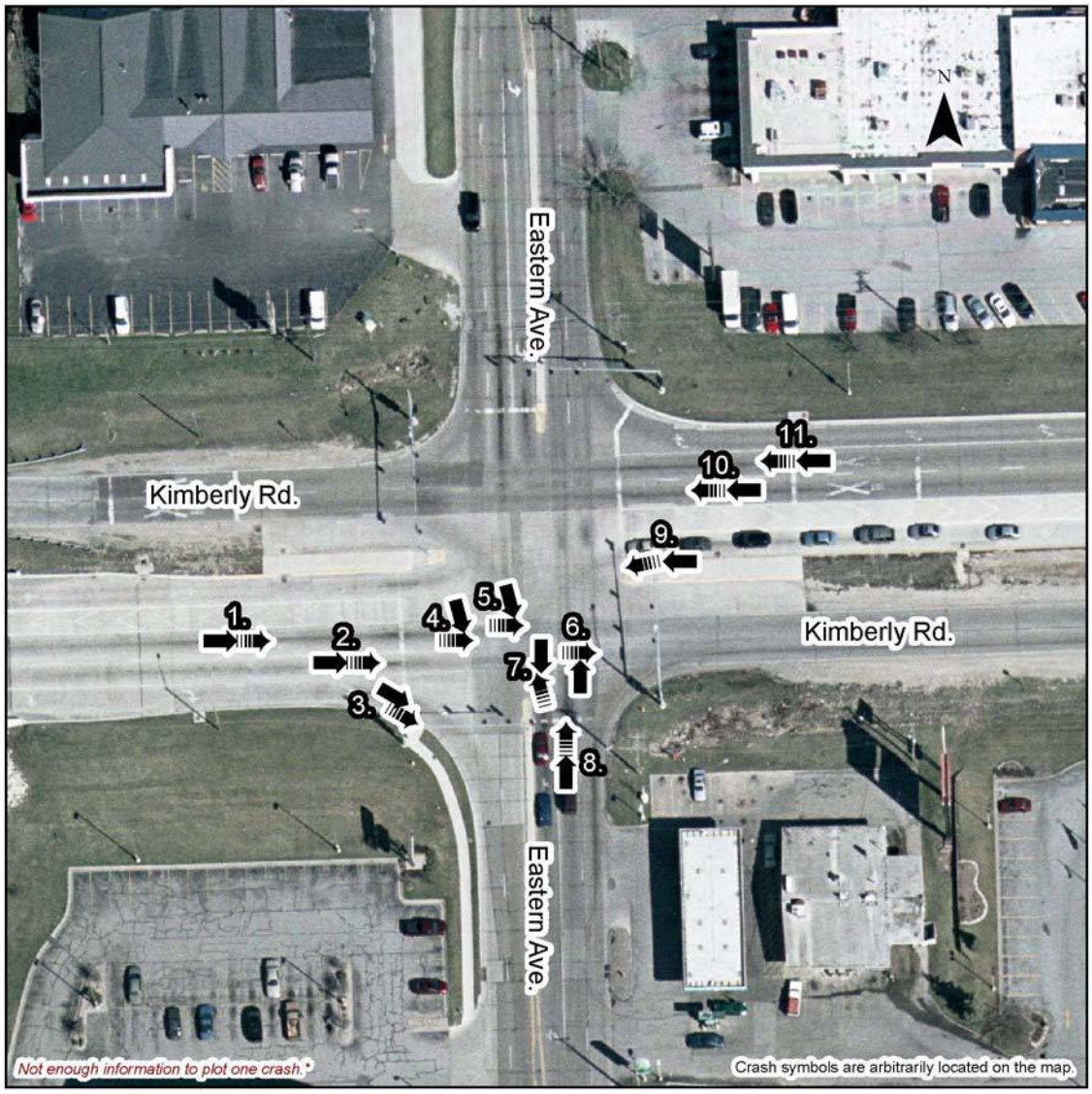
Eastern Avenue is a four-lane arterial with a speed limit of 35 mph. There are left-turn only lanes on both approaches. Kimberly Road is a four-lane divided highway with a posted speed limit of 45 mph. There are left-turn and right-turn only lanes on both approaches. Currently, the intersection is undergoing major construction.

The predominance of rear-end crashes at this location may be explained by high speeds as well as downhill approaches in both directions on Kimberly Road.

Table 5.7
Eastern Ave. & Kimberly Rd. (Davenport) 1993/2007 Comparison

	1993	2007
Total Crashes	31	15
# of Fatalities	0	0
# of Injuries	17	7
Crash Rate	1.78	0.91
Predominant Crash Type	Rear-end	Rear-end

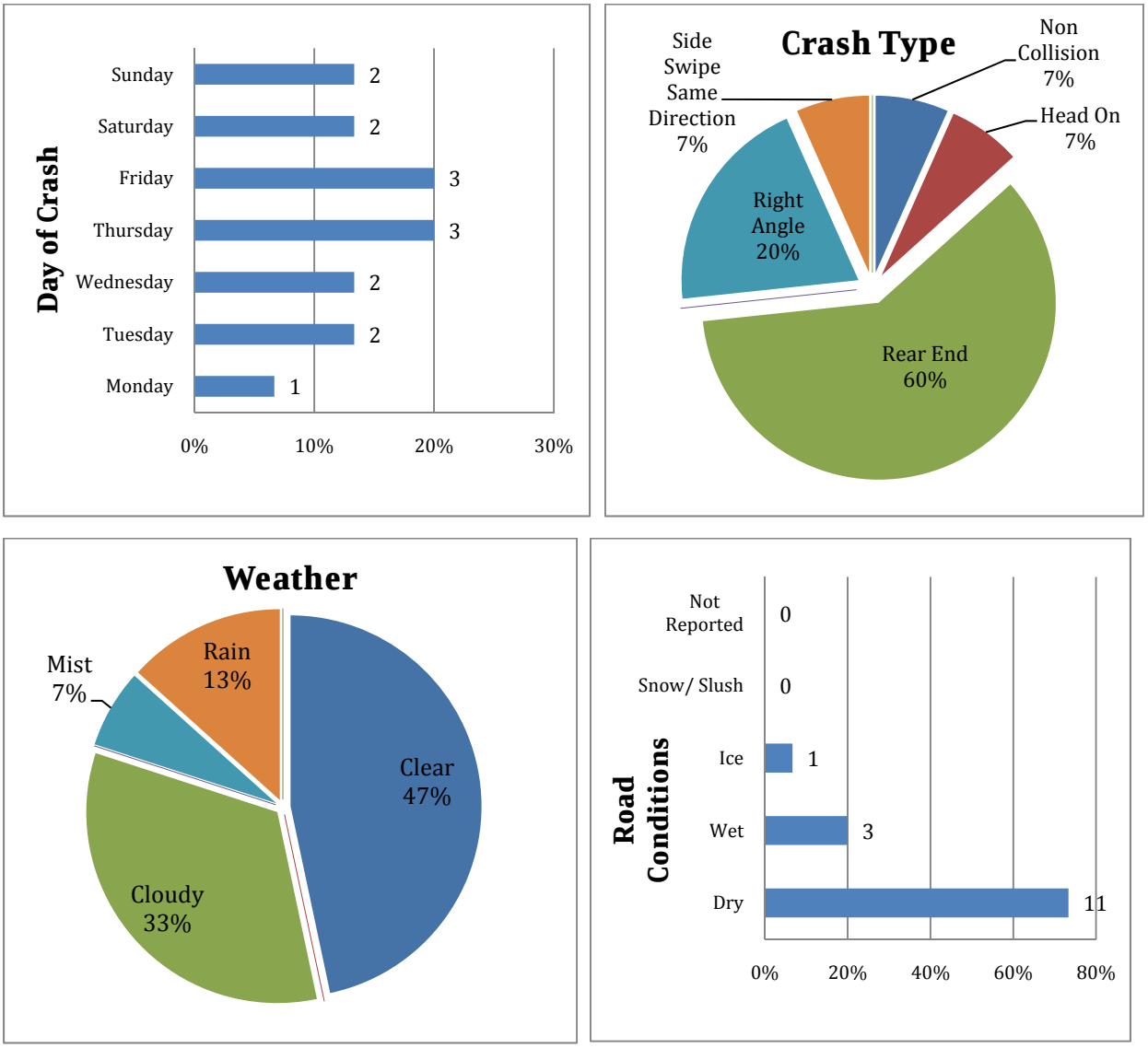
Figure 5.20
Iowa Location #7- Eastern Ave. & Kimberly Rd. (Davenport)



1. East Bound, Straight, Rear-end (1)
2. East Bound, Slowing/Stopping, Rear-end (1)
3. East Bound, Right Turn, Sideswipe, Same Direction (1)
4. East Bound, Stopped for Stop Sign/Signal, Broadside (1)
5. East Bound, Slowing/Stopping, Broadside (1)
6. East Bound, Straight, Broadside (1)
7. North Bound, Left Turn, Head-on (1)
8. North Bound, Straight, Rear-end (1)
9. West Bound, Left Turn, Rear-end (1)
10. West Bound, Slowing/Stopping, Rear-end (2)
11. West Bound, Straight, Rear-end (3)

*One crash not plotted on map: West Bound, Slowing/Stopping, non-collision crash type

Figure 5.21
Iowa Location #7 (Eastern Ave & Kimberly Rd.) - Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #7- NORTH PINE ST. & WEST KIMBERLY RD.- DAVENPORT

Tied for seventh (with a score of 20), this location experienced thirteen (13) crashes in 2007, resulting in 5 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.31 crashes per MEV. Side-swipes from the same direction were the predominant crash type, although right-angle, turning and rear-end crashes account for 61% of incidents. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Wednesdays.

Figure 5.22
Photo- North Pine St. & West Kimberly Rd. (Davenport)

North Pine Street is a two-lane road considered to be an arterial north of the intersection (with a speed limit of 30 mph) and a minor road south of the intersection (with a speed limit of 25 mph). There is one left-turn only lane on the south approach, one left-turn/straight lane on the north approach and one signalized, right-turn only lane on the north approach. West Kimberly Road is a four-lane divided highway with a posted speed limit of 40 mph at this location. There are left-turn only lanes from both on both approaches.

One important factor that may contribute to the number and variety of types of crashes at this intersection are the numerous access points to the retail center on the east approach of West Kimberly Road. The southbound approach of North Pine Street also serves strictly as an access to the retail center which may contribute to crash frequency.

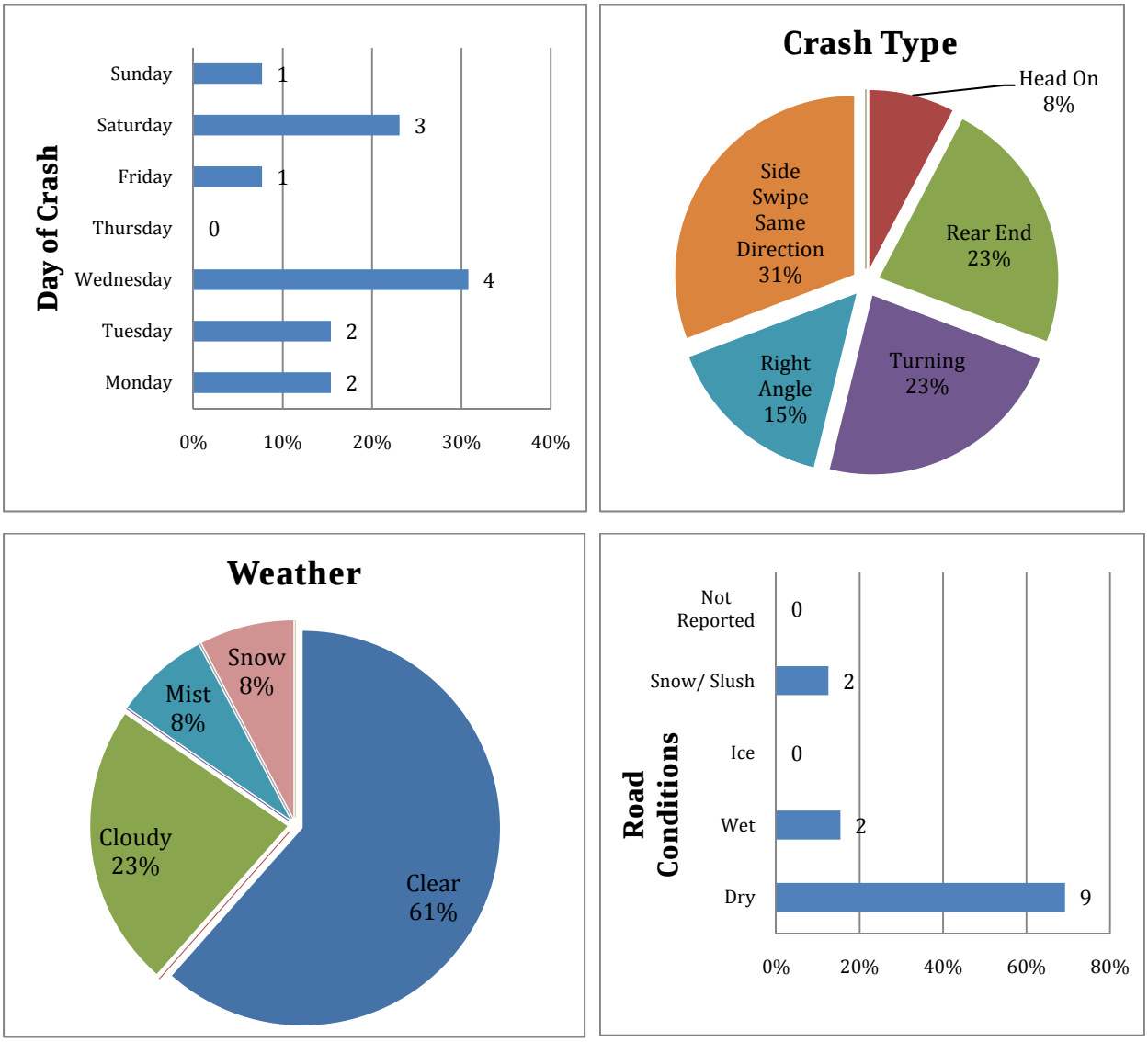
Table 5.8
North Pine St. & West Kimberly Rd. (Davenport) 1993/2007 Comparison

	1993	2007
Total Crashes	Not Ranked	13
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	5
Crash Rate	Not Ranked	1.31
Predominant Crash Type	Not Ranked	Side Swipe Same Direction

Figure 5.23
Iowa Location #7- North Pine St. & West Kimberly Rd. (Davenport)

1. East Bound, Left Turn, Angle, Oncoming Left Turn (2)
2. West Bound, Straight, Angle, Oncoming Left Turn (1)
3. West Bound, Straight, Head-on (1)
4. West Bound, Straight, Rear-end (1)
5. West Bound, Right Turn, Sideswipe, Same Direction (2)
6. West Bound, Right Turn, Broadside (1)
7. South Bound, Left Turn, Broadside (1)
8. South Bound, Right Turn, Sideswipe, Same Direction (2)
9. South Bound, Stopped for Stop Sign/Signal, Rear-end (1)
10. South Bound, Straight, Rear-end (1)

Figure 5.24
Iowa Location #7 (North Pine St. & West Kimberly Rd.) - Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #7- WEST LOCUST ST. & BRADY ST.- DAVENPORT

Tied for seventh (with a score of 20), this location experienced thirteen (13) crashes in 2007, resulting in 8 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 0.96 crashes per MEV. Right-angle crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Sundays.

Figure 5.25
Photo- West Locust St. & Brady St. (Davenport)

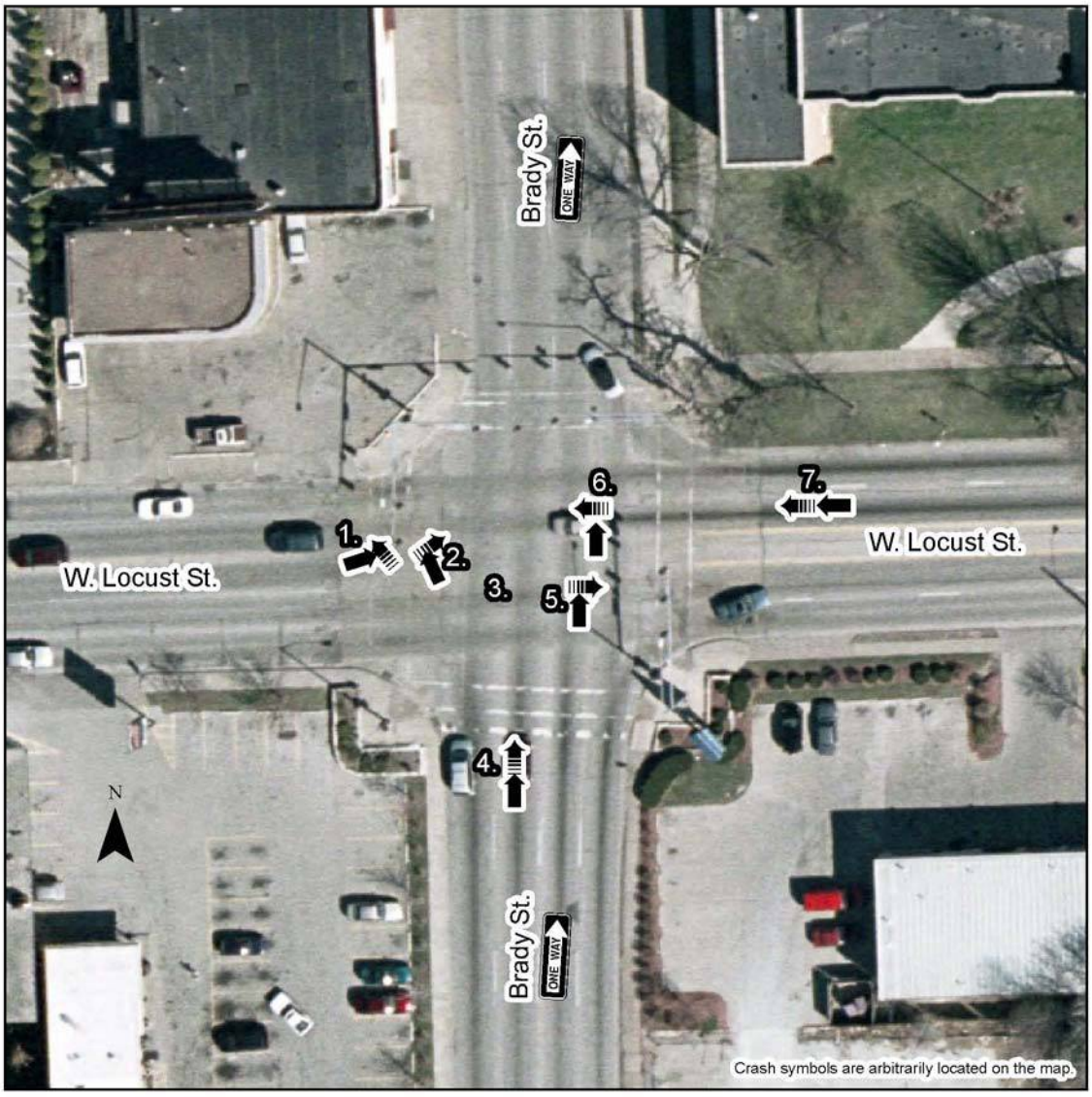
West Locust Street is a four-lane arterial with a posted speed limit of 25 mph at this location. There is one left-turn only lane on the eastbound approach. Brady Street is a four-lane, one-way (northbound), undivided highway with a speed limit of 35 mph.

Located two blocks east of the intersection of Harrison Street and West Locust Street, this intersection has many of the same issues. Again, while the posted speed limit of West Locust Street is 25 mph at this location, observations indicate that traveling speeds are much higher. However, unlike the number one ranked location where rear-end crashes were predominant, right-angle crashes account for 62% of incidents at the Brady Street and West Locust Street intersection. Increased speed, high traffic volume (average daily traffic of 20,700) and an uphill approach on Brady Street may be responsible for the large number of right-angle crashes.

Table 5.9
West Locust St. & Brady St. (Davenport) 1993/2007 Comparison

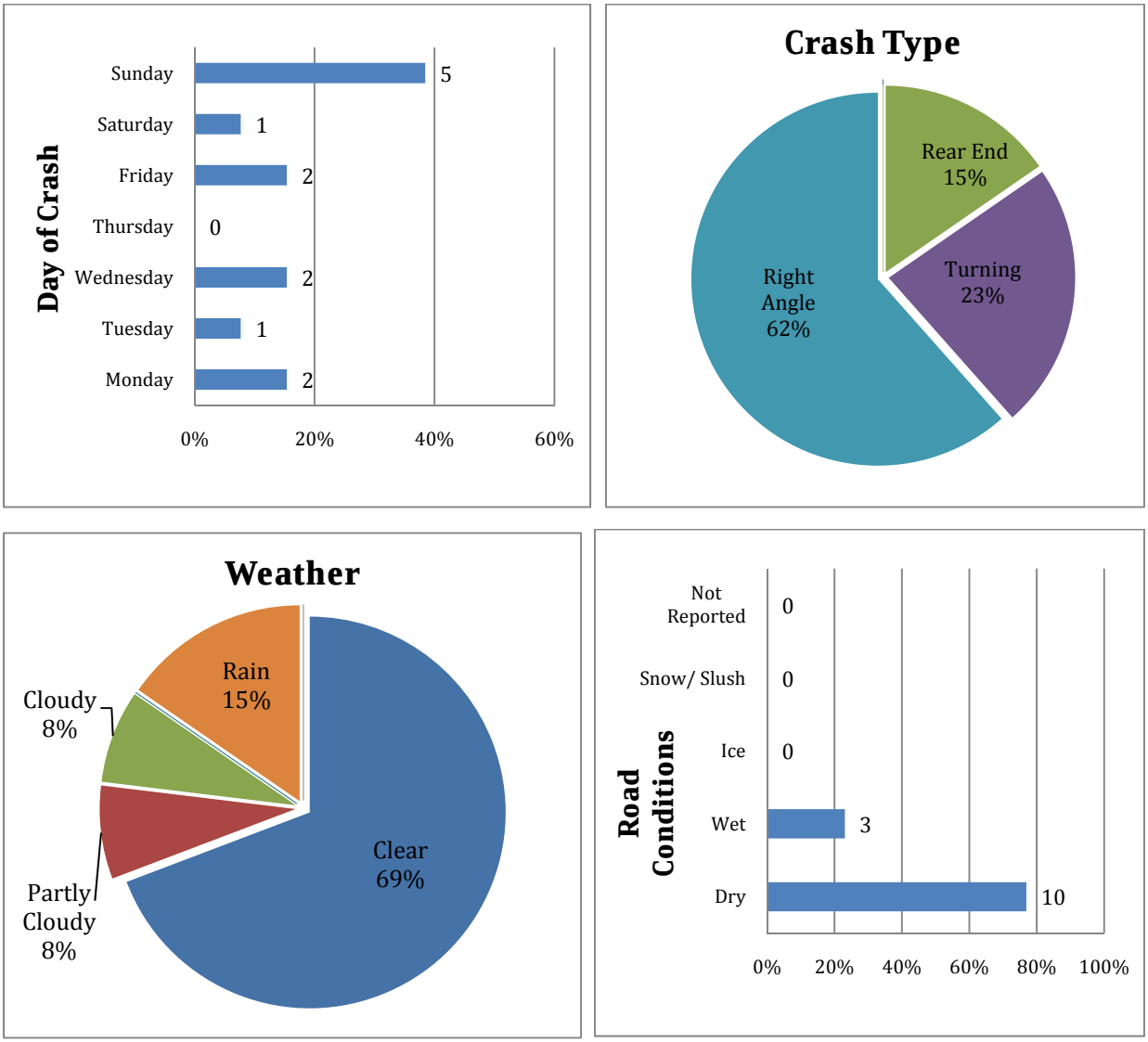
	1993	2007
Total Crashes	Not Ranked	13
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	8
Crash Rate	Not Ranked	0.96
Predominant Crash Type	Not Ranked	Right Angle

Figure 5.26
Iowa Location #7- West Locust St. & Brady St. (Davenport)



1. North Bound, Left Turn, Angle, Oncoming Left Turn (1)
2. East Bound, Left Turn, Angle, Oncoming Left Turn (2)
3. North Bound, Straight, Broadside (2)
4. North Bound, Straight, Rear-end (1)
5. East Bound, Straight, Broadside (5)
6. West Bound, Straight, Broadside (1)
7. West Bound, Straight, Rear-end (1)

Figure 5.27
Iowa Location #7 (West Locust St. & Brady St.) - Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #10- ELMORE AVE/KIMBERLY RD. & US 6/KIMBERLY RD.- DAVENPORT

Ranked tenth (with a score of 19), this location experienced sixteen (16) crashes in 2007, resulting in 6 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 0.86 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Tuesdays.

Figure 5.28
Photo- Elmore Ave/ Kimberly Rd. & US 6/Kimberly Rd. (Davenport)

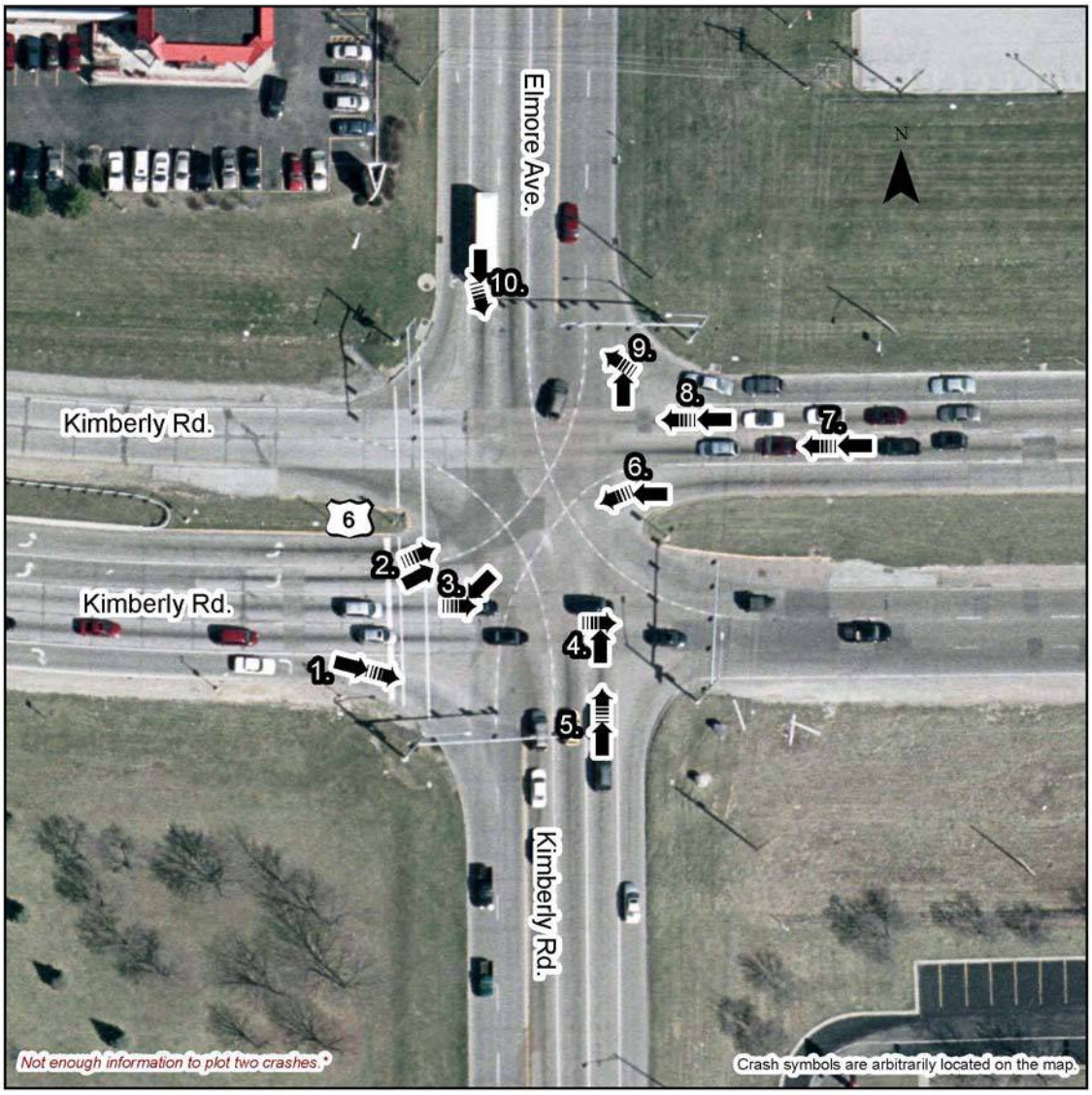
Elmore Avenue, the southbound approach, turns into Kimberly Road south of the intersection and is a four-lane arterial highway. The speed limit on Elmore Avenue is 35 mph, transitioning to 25 mph just south of the intersection at a large bend in the road. The speed limit again increases to 35 mph after the bend. There is one left-turn only lane, one left-turn/straight lane and one right-turn only lane on both approaches. Leading under I-74 from Bettendorf, the westbound approach of US 6 turns into Kimberly Road west of the intersection. The speed limit is 45 mph. There are two left-turn only lanes on the northbound approach, one left-turn only lane on the southbound approach and one right-turn only lane on both approaches.

The complexity and high speeds at this intersection contribute to the high number of rear-end crashes.

Table 5.10
Elmore Ave/Kimberly Rd. & US 6/ Kimberly Rd. (Davenport) 1993/2007 Comparison

	1993	2007
Total Crashes	22	16
# of Fatalities	0	0
# of Injuries	9	6
Crash Rate	1.32	0.86
Predominant Crash Type	Rear-end	Rear-end

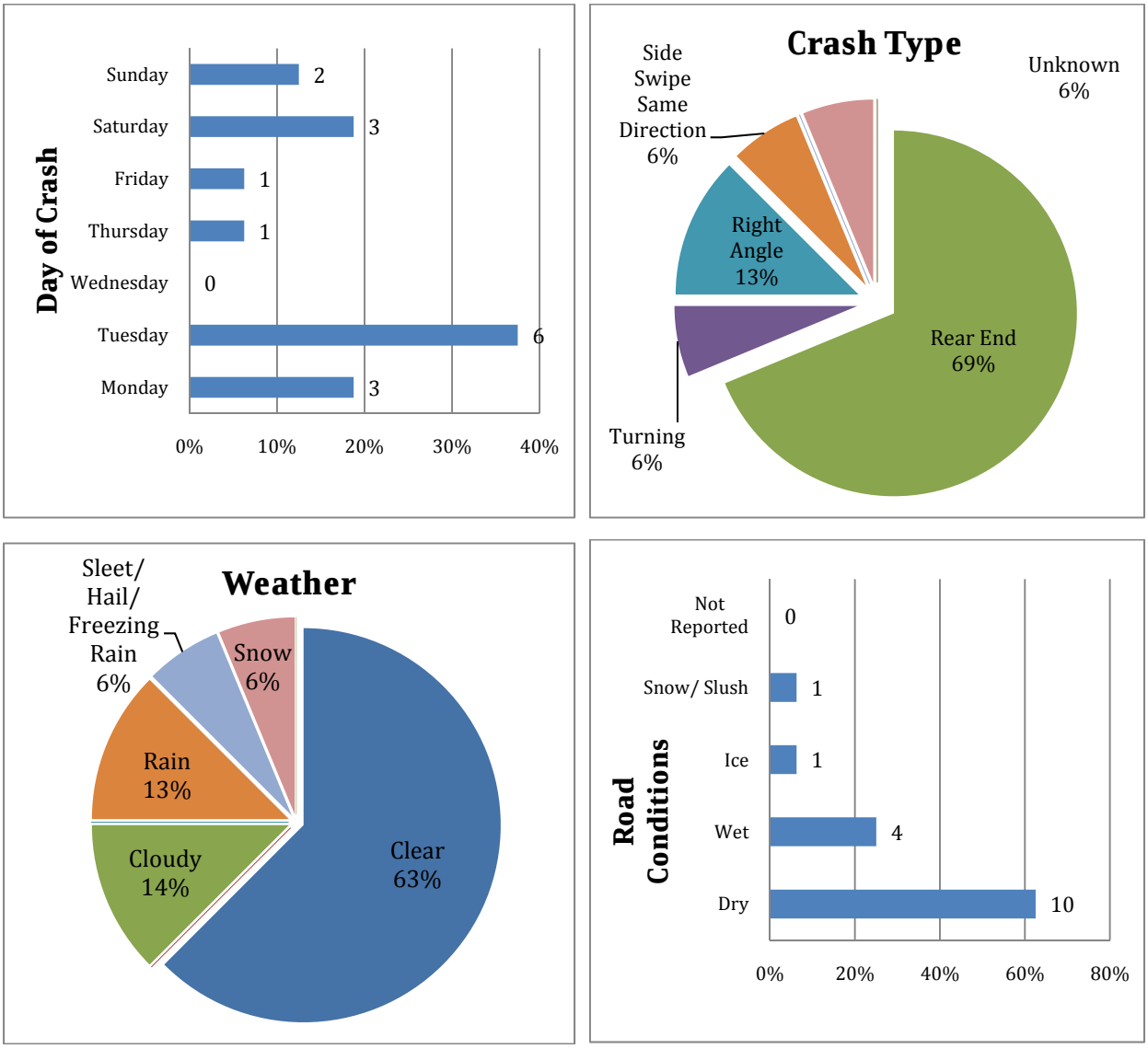
Figure 5.29
Iowa Location #10- Elmore Ave/Kimberly Rd. & US 6/ Kimberly Rd. (Davenport)



1. East Bound, Right Turn, Rear-end (1)
2. East Bound, Left Turn, Sideswipe, Same Direction (1)
3. East Bound, Straight, Angle, Oncoming Left Turn (1)
4. East Bound, Straight, Broadside (1)
5. North Bound, Stopped for Stop Sign/Signal, Rear-end (1)
6. West Bound, Left Turn, Rear-end (1)
7. West Bound, Straight, Rear-end (4)
8. West Bound, Slowing/Stopping, Rear-end (2)
9. West Bound, Right Turn, Broadside (1)
10. South Bound, Change Lanes, Rear-end (1)

*Two crashes not plotted on map: East Bound, Rear-end, initial vehicle action reported as 88 which has no meaning; East Bound, Straight, unknown manner of crash/collision.

Figure 5.30
Iowa Location #10 (Elmore Ave/Kimberly Rd. & US 6/Kimberly Rd.) - Crash Frequency by Crash Type and Under Various Conditions



IOWA LOCATION #10- EASTERN AVE & EAST 53RD ST.- DAVENPORT

Tied for tenth (with a score of 19), this location experienced eleven (11) crashes in 2007, resulting in 9 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.11 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays.

Figure 5.31
Photo-Eastern Ave & East 53rd St. (Davenport)

Eastern Avenue is a two-lane road serving as an arterial to the south and a minor road to the north of the intersection. The speed limit is 45 mph. There is one left-turn only lane and one right-turn only lane on both approaches. The northbound approach is slightly uphill. East 53rd Street is a four-lane arterial with a posted speed limit of 45 mph. There is one left-turn only lane on both approaches. Both approaches are also slightly uphill.

Observations at this intersection indicate that crashes are most likely due to high speeds from all approaches (except Eastern Avenue north of the intersection) as well as decreased visibility.

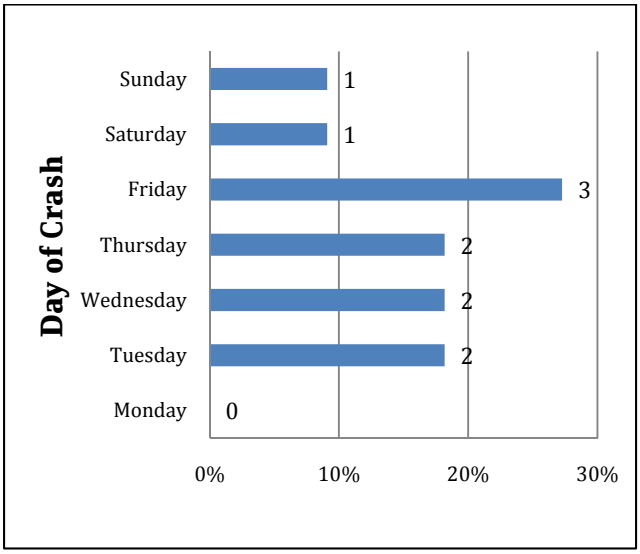
Table 5.11
Eastern Ave & East 53rd St. (Davenport) 1993/2007 Comparison

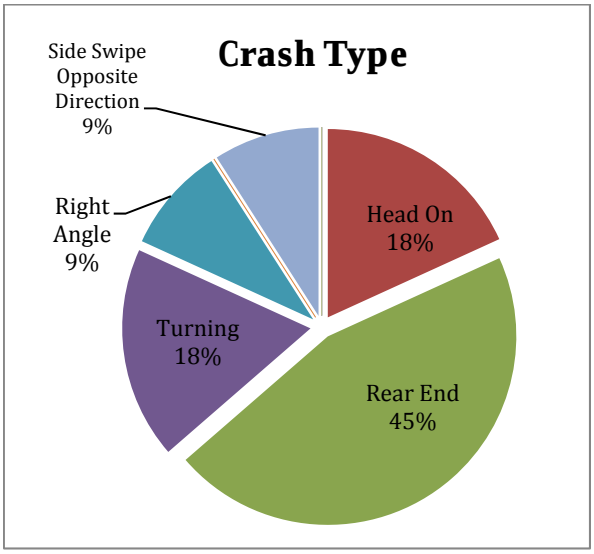
	1993	2007
Total Crashes	Not Ranked	11
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	9
Crash Rate	Not Ranked	1.11
Predominant Crash Type	Not Ranked	Rear-end

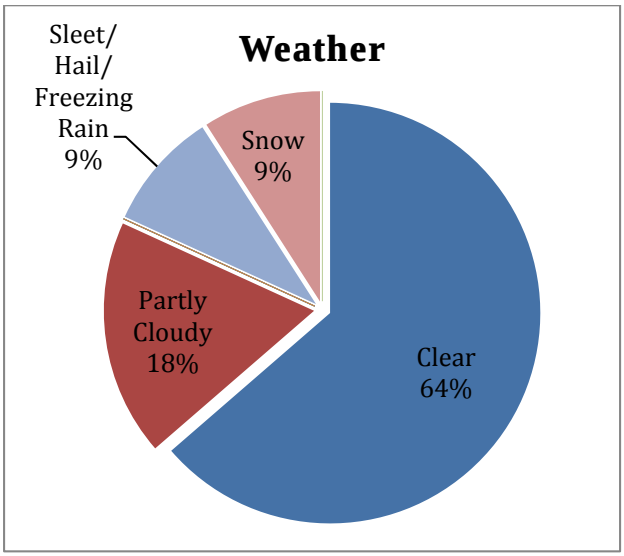
Figure 5.32
Iowa Location #10- Eastern Ave & East 53rd St. (Davenport)

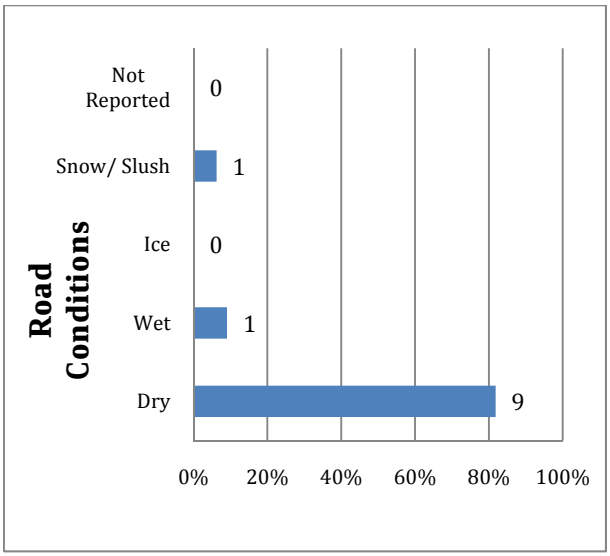
1. East Bound, Straight, Rear-end (2)
2. East Bound, Stopped for Stop Sign/Signal, Rear-end (1)
3. South Bound, Right Turn, Sideswipe, Opposite Direction (1)
4. South Bound, Straight, Head-on (1)
5. West Bound, Left Turn, Angle, Oncoming Left Turn (2)
6. West Bound, Left Turn, Broadside (1)
7. West Bound, Left Turn, Head-on (1)
8. West Bound, Stopped for Stop Sign/Signal, Rear-end (1)
9. North Bound, Straight, Rear-end (1)

Figure 5.33
Iowa Location #10 (Eastern Ave & East 53rd St.) - Crash Frequency by Crash Type and Under Various Conditions









IOWA LOCATION #10- ELSIE AVE & WEST KIMBERLY RD.- DAVENPORT

Tied for tenth (with a score of 19), this location experienced nine (9) crashes in 2007, resulting in 9 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.42 crashes per MEV. Rear-end and right-angle crashes accounted for 33% of total crashes each. Most crashes occurred during daylight hours in clear, dry conditions. Crash frequency was equally distributed over all days of the week except Mondays and Wednesdays.

Figure 5.34
Photo- Elsie Ave & West Kimberly Rd. (Davenport)

Elsie Avenue is a two-lane minor road with a speed limit of 25 mph. The road south of the intersection serves solely as an access to a WalMart. There are two left-turn only lanes on the northbound approach (exiting WalMart) and one left-turn only lane on the southbound approach. West Kimberly Road is a four-lane divided highway with a speed limit of 40 mph. There is one left-turn only lane on both approaches and one right-turn only lane on the eastbound approach (entering WalMart).

The distribution of crash types indicates that no one aspect of the intersection is responsible for crashes. Crashes at this location are most likely due to the speed of traffic on West Kimberly Road and the commercial activity in the area.

Table 5.12
Elsie Ave & West Kimberly Rd. (Davenport) 1993/2007 Comparison

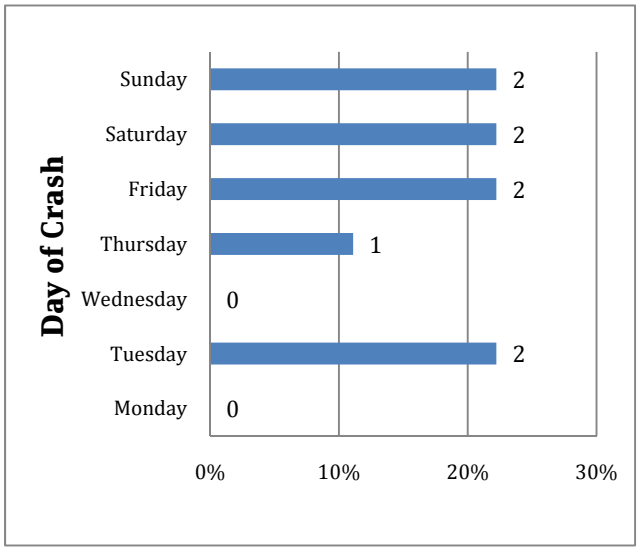
	1993	2007
Total Crashes	Not Ranked	9
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	9
Crash Rate	Not Ranked	1.42
Predominant Crash Type	Not Ranked	Rear-end/Right angle

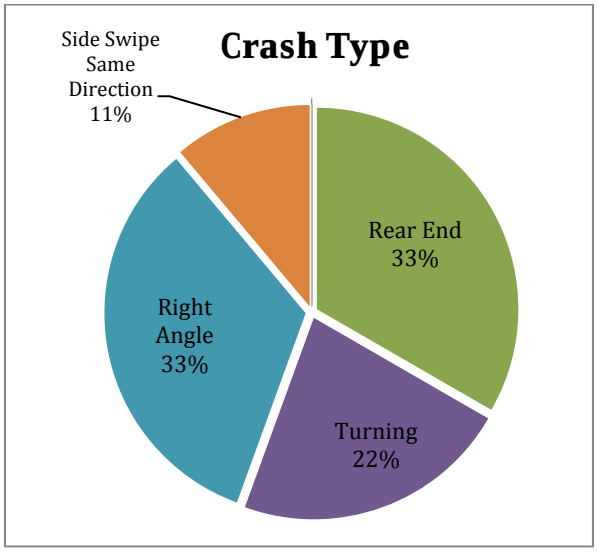
Figure 5.35
Iowa Location #10- Elsie Ave & West Kimberly Rd. (Davenport)

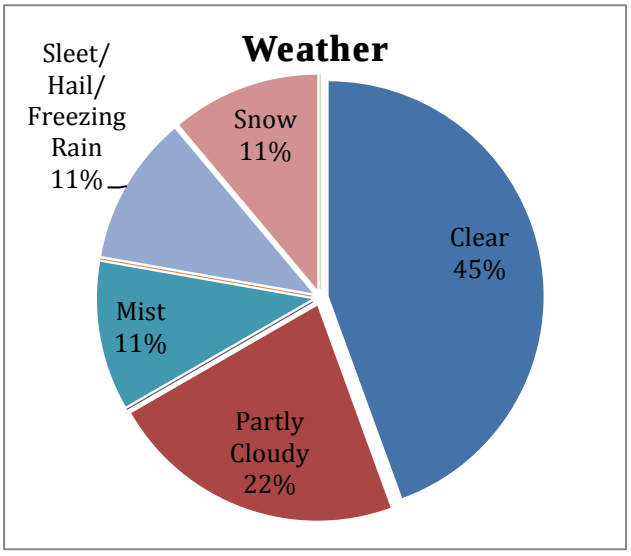
1. East Bound, Right Turn, Broadside (1)
2. East Bound, Straight, Sideswipe, Same Direction (1)
3. East Bound, Straight, Angle, Oncoming Left Turn (1)
4. West Bound, Straight, Broadside (2)
5. West Bound, Left Turn, Angle, Oncoming Left Turn (1)
6. West Bound, Slowing/Stopping, Rear-end (1)
7. West Bound, Straight, Rear-end (1)

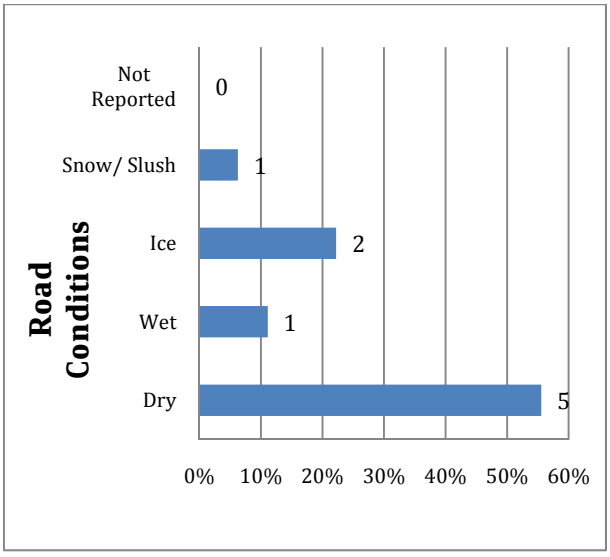
*One crash not plotted on map: East Bound, Rear-end, initial vehicle action was reported as 99 which may be unknown.

Figure 5.36
Iowa Location #10 (Elsie Ave & West Kimberly Rd.) - Crash Frequency by Crash Type and Under Various Conditions









IOWA LOCATION #10- JERSEY RIDGE RD. & EAST 46TH ST.- DAVENPORT

Tied for tenth (with a score of 19), this location experienced seven (7) crashes in 2007, resulting in 8 injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.99 crashes per MEV. Right-angle crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays.

Figure 5.37
Photo- Jersey Ridge Rd. & East 46th St. (Davenport)

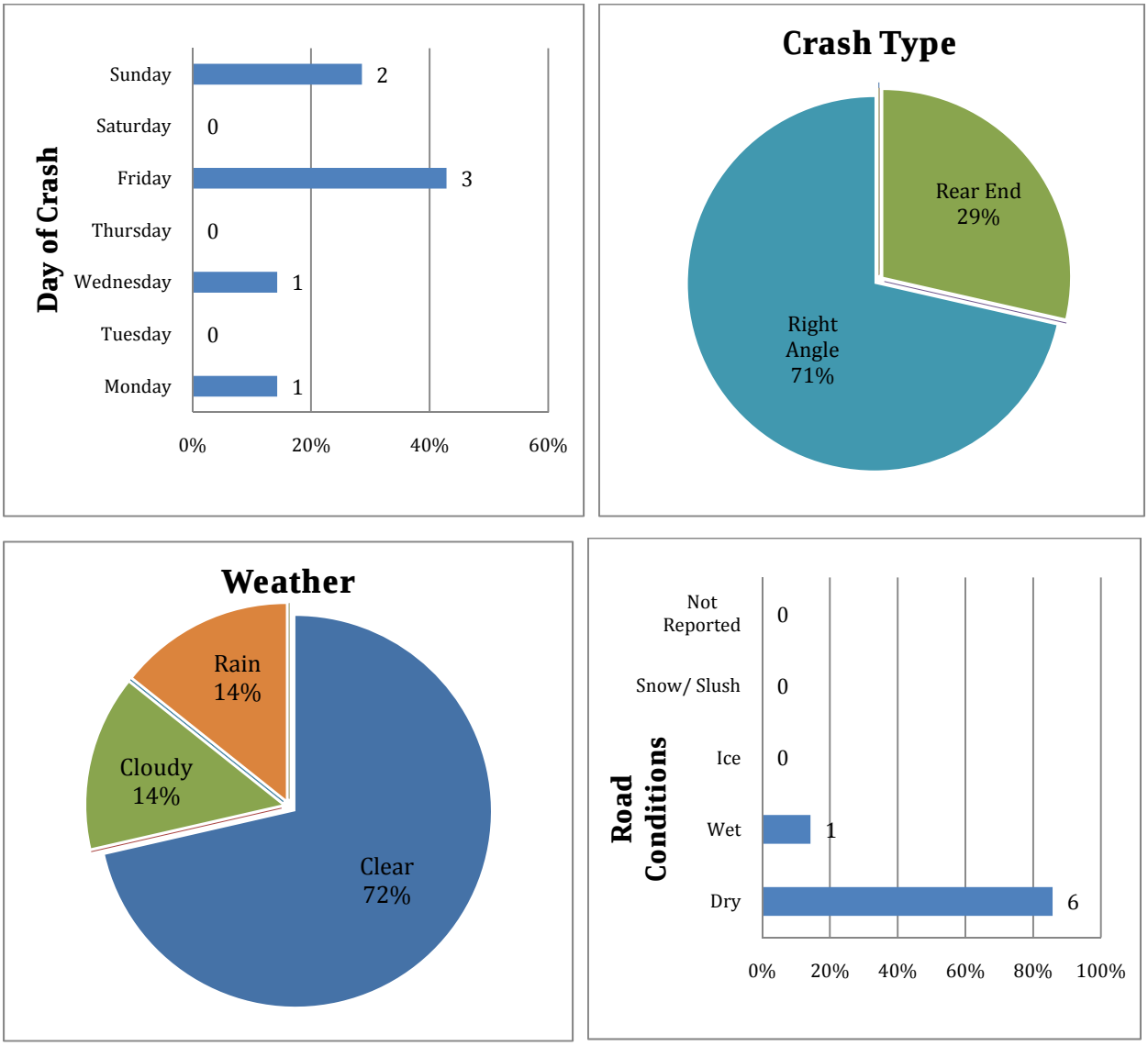
Jersey Ridge Road is a four-lane arterial with a posted speed limit of 45 mph. Although there are left-turn only lanes on both approaches, the intersection is not signalized and the cross-traffic on Jersey Ridge Road does not stop. East 46th Street is a two-lane road serving as an arterial to the west of the intersection and a minor road to the east of the intersection. The speed limit is 25 mph with stop signs at both approaches. There is one left-turn only lane and one right-turn only lane on both approaches.

The high level of right-angle crashes may be explained by the limited sight distance for vehicles on the westbound approach of East 46th Street. Ability to see northbound traffic on Jersey Ridge Road is obstructed by residential structures as well as the slope of both roads.

Table 5.13
Jersey Ridge Rd. & East 46th St. (Davenport) 1993/2007 Comparison

	1993	2007
Total Crashes	Not Ranked	7
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	8
Crash Rate	Not Ranked	1.99
Predominant Crash Type	Not Ranked	Right angle

Figure 5.38
Iowa Location #10 (Jersey Ridge Rd. & East 46th St.) - Crash Frequency by Crash Type and Under Various Conditions



Detailed Analysis of Illinois Quad Cities Top Locations

In this chapter, top ranked intersections in the Illinois Quad Cities were analyzed individually. Each location analysis includes figures describing frequency of crash type, day of crash, weather and road conditions. As discussed in Chapter 4, the average crash rate for the top twenty-three locations is 2.03. In this chapter, crash rates at each location are compared with the average crash rate. A table comparing each intersection's 2007 performance with 1993 performance is also given. Some intersections ranking in the top ten in 2007, were not ranked in 1993 and are so indicated in that location's comparison table.

ILLINOIS LOCATION #1- KENNEDY DR. & AVENUE OF THE CITIES- EAST MOLINE

Ranked first (with a score of 45), this location experienced thirty-eight (38) crashes in 2007, resulting in twenty-eight (28) injuries. Taking into account traffic volume, the crash rate for this intersection was above average at 3.72 crashes per MEV. Crashes involving turning vehicles were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Mondays.

Figure 6.1
Photo- Kennedy Dr. & Avenue of the Cities (East Moline)

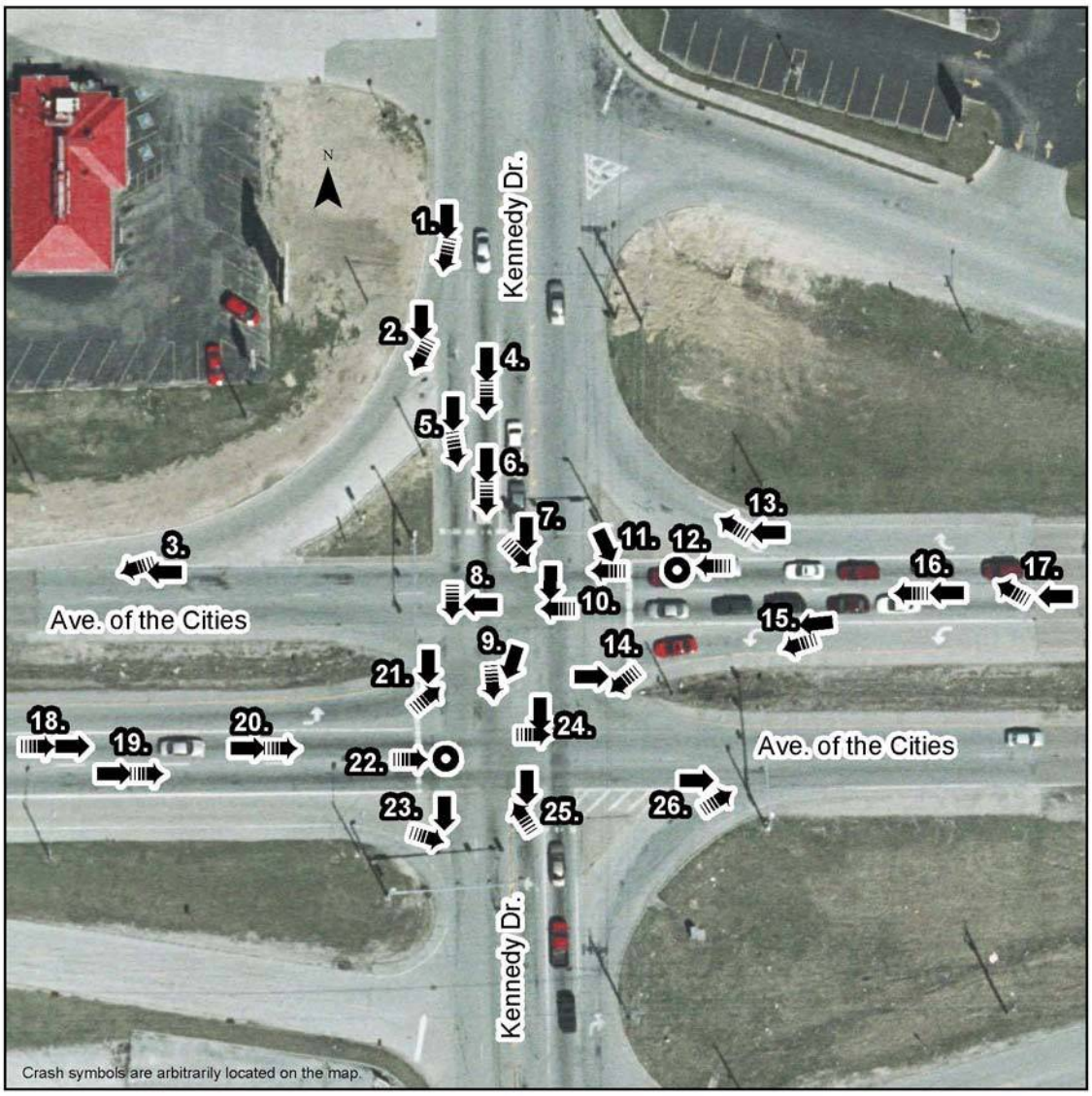
Avenue of the Cities is a four-lane divided arterial with a posted speed limit of 45 mph. There are left-turn only lanes at both east and west approaches. Kennedy Drive is a two-lane arterial with a speed limit of 45 mph. Kennedy Drive has left-turn only lanes on both the north and south approaches.

A wide intersection and high speed on all approaches is a probable cause for the high number of crashes.

Table 6.1
Kennedy Dr. & Avenue of the Cities (East Moline) 1993/2007 Comparison

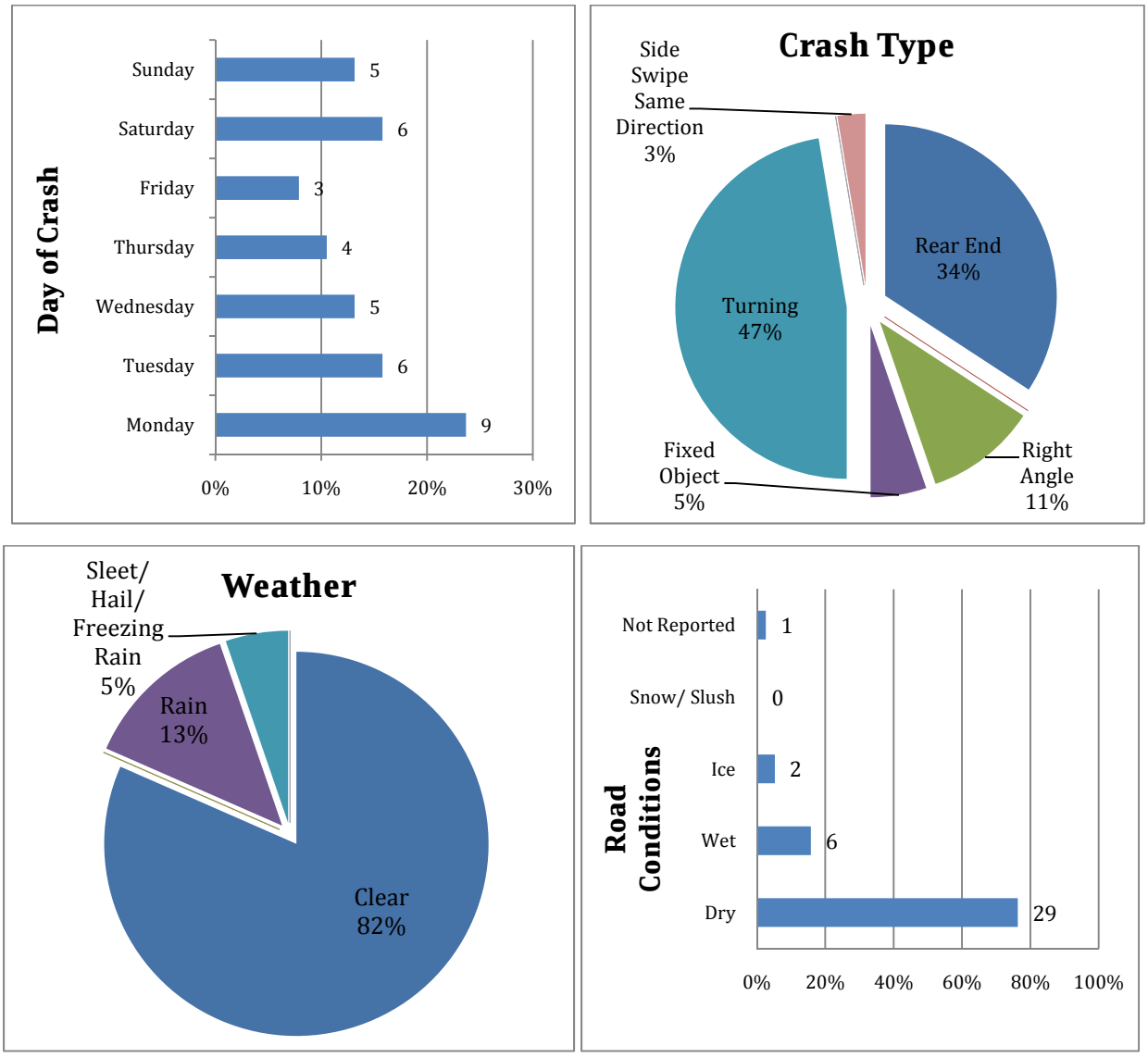
	1993	2007
Total Crashes	29	38
# of Fatalities	0	0
# of Injuries	11	28
Crash Rate	2.61	3.72
Predominant Crash Type	Turning (Left)	Turning

Figure 6.2
Illinois Location #1- Kennedy Dr. & Avenue of the Cities (Moline)



1. Southwest Bound, Slow/Stop Right Turn, Rear End (1)
2. Southwest Bound, Right Turn, Turning (3)
3. Southwest Bound, Left Turn, Turning (1)
4. South Bound, Straight, Rear End (1)
5. South Bound, Passing/Overtaking, Rear End (1)
6. South Bound, Slow/Stop in Traffic, Rear End (2)
7. South Bound, Left Turn, Turning (1)
8. South Bound, Straight, Angle (2)
9. South Bound, Straight, Turning (1)
10. West Bound, Straight, Angle (1)
11. West Bound, Straight, Turning (1)
12. West Bound, Skidding/Control Loss, Fixed Object (1)
13. West Bound, Slow/Stop Right Turn, Rear End (1)
14. West Bound, Left Turn, Turning (3)
15. West Bound, Slow/Stop Left Turn, Sideswipe Same Direction (1)
16. West Bound, Slow/Stop in Traffic, Rear End (1)
17. West Bound, Merge, Rear End (3)
18. East Bound, Skidding/Control Loss, Rear End (1)
19. East Bound, Slow/Stop in Traffic, Rear End (1)
20. East Bound, Straight, Rear End (1)
21. East Bound, Left Turn, Turning (3)
22. East Bound, Straight Collision with Fixed Object (1)
23. East Bound, Right Turn, Turning (1)
24. East Bound, Straight, Angle (1)
25. North Bound, Left Turn, Turning (3)
26. Northeast Bound, Slow/Stop Right Turn, Turning (1)

Figure 6.3
Illinois Location #1 - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #2- IL 5/JOHN DEERE EXPY & 38TH ST- MOLINE

Ranked second (with a score of 40), this location experienced forty-six (46) crashes in 2007, resulting in twelve (12) injuries. Taking into account traffic volume, the crash rate for this intersection was above average at 2.43 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Thursdays.

Figure 6.4
Photo- IL 5/John Deere Expy. & 38th St. (Moline)

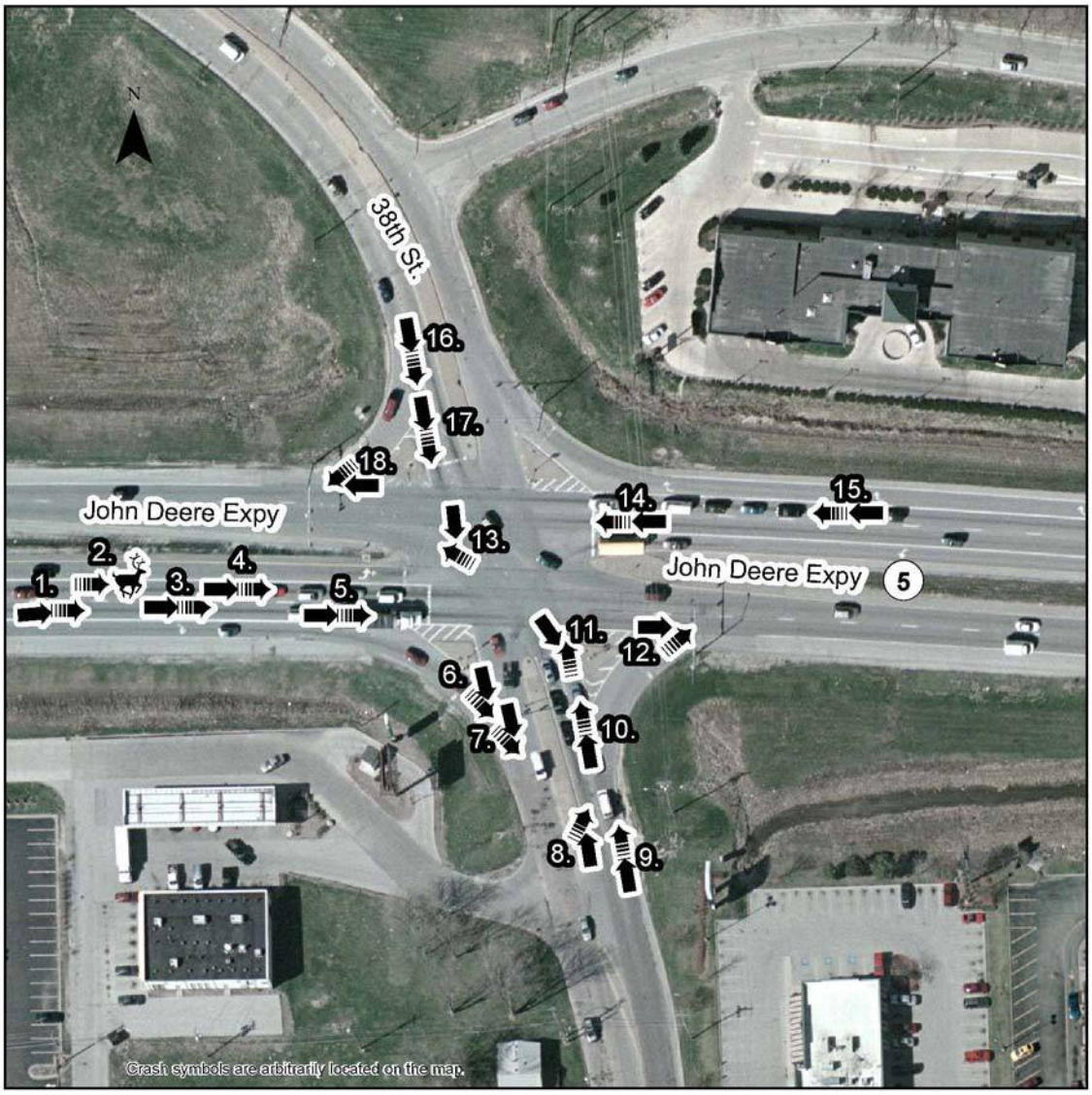
IL 5/ John Deere Expressway is a divided, four-lane highway with a posted speed limit of 55 mph. There are left-turn only lanes on both the east and west approaches. Thirty-Eighth Street is a two-lane arterial on the north approach (transitioning to a minor road on the south approach) with a posted speed limit of 30 mph. There are left and right turn only lanes on both the north and south approaches.

The high rate of speed and high traffic volume (average daily traffic of 36,400 on IL 5/ John Deere Expressway) contributes to the large number of rear-end crashes at this location. While signs warning of upcoming signaled intersections are present at most intersections along IL 5/ John Deere Expressway, the sheer number of vehicles and close proximity of intersections cause abrupt stops, which are difficult to complete at high speeds.

Table 6.2
IL 5/ John Deere Expry. & 38th St (Moline) 1993/2007 Comparison

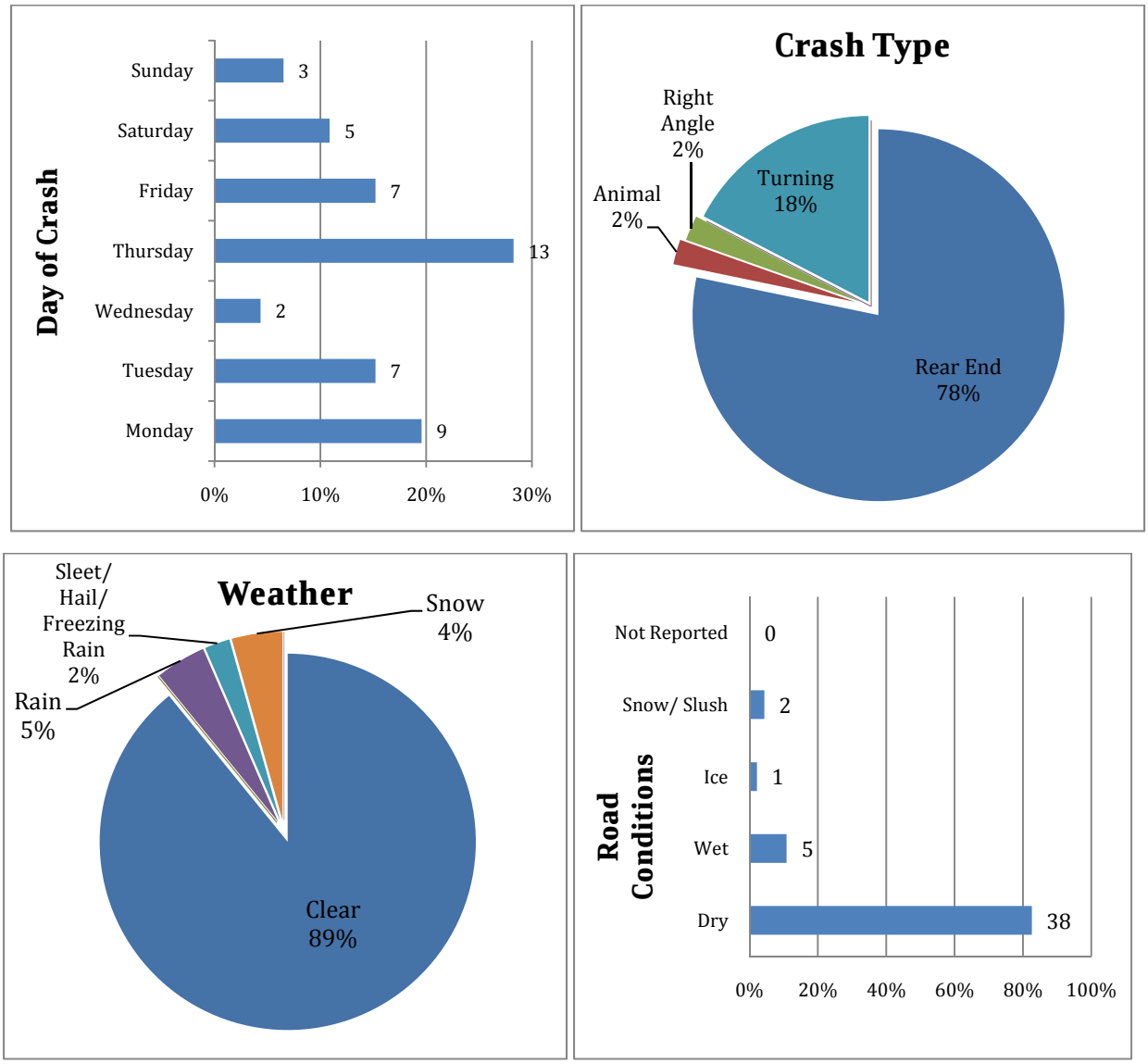
	1993	2007
Total Crashes	Not Ranked	46
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	12
Crash Rate	Not Ranked	2.43
Predominant Crash Type	Not Ranked	Rear-end

Figure 6.5
Illinois Location #2- IL 5/John Deere Expy. & 38th St. (Moline)



1. East Bound, Avoiding Vehicle/Object, Rear-end (2)
2. East Bound, Straight, Animal (Deer) (1)
3. East Bound, Slow/Stop in Traffic, Rear-end (3)
4. East Bound, Straight, Rear-end (7)
5. East Bound, Starting in Traffic, Rear-end (1)
6. East Bound, Right Turn, Turning (1)
7. Southeast Bound, Right Turn, Turning (2)
8. North Bound, Enter from Drive/Alley, Angle (1)
9. North Bound, Slow/Stop in Traffic, Rear-end (1)
10. North Bound, Straight, Rear-end (1)
11. North Bound, Straight, Turning (2)
12. Northeast Bound, Right Turn, Turning (1)
13. Northwest Bound, Left Turn, Turning (1)
14. West Bound, Straight, Rear-end (11)
15. West Bound, Slow/Stop in Traffic, Rear-end (8)
16. South Bound, Straight, Rear-end (1)
17. South Bound, Slow/Stop in Traffic, Rear-end (1)
18. Southwest Bound, Right Turn, Turning (1)

Figure 6.6
Illinois Location #2 - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #3- 16TH ST & IL 5/JOHN DEERE EXPY- MOLINE

Ranked third (with a score of 38), this location experienced thirty-three (33) crashes in 2007, resulting in nineteen (19) injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.97 crashes per MEV. Like the second-ranked Illinois location, rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays.

Figure 6.7
Photo- 16th St. & IL 5/John Deere Expy. (Moline)

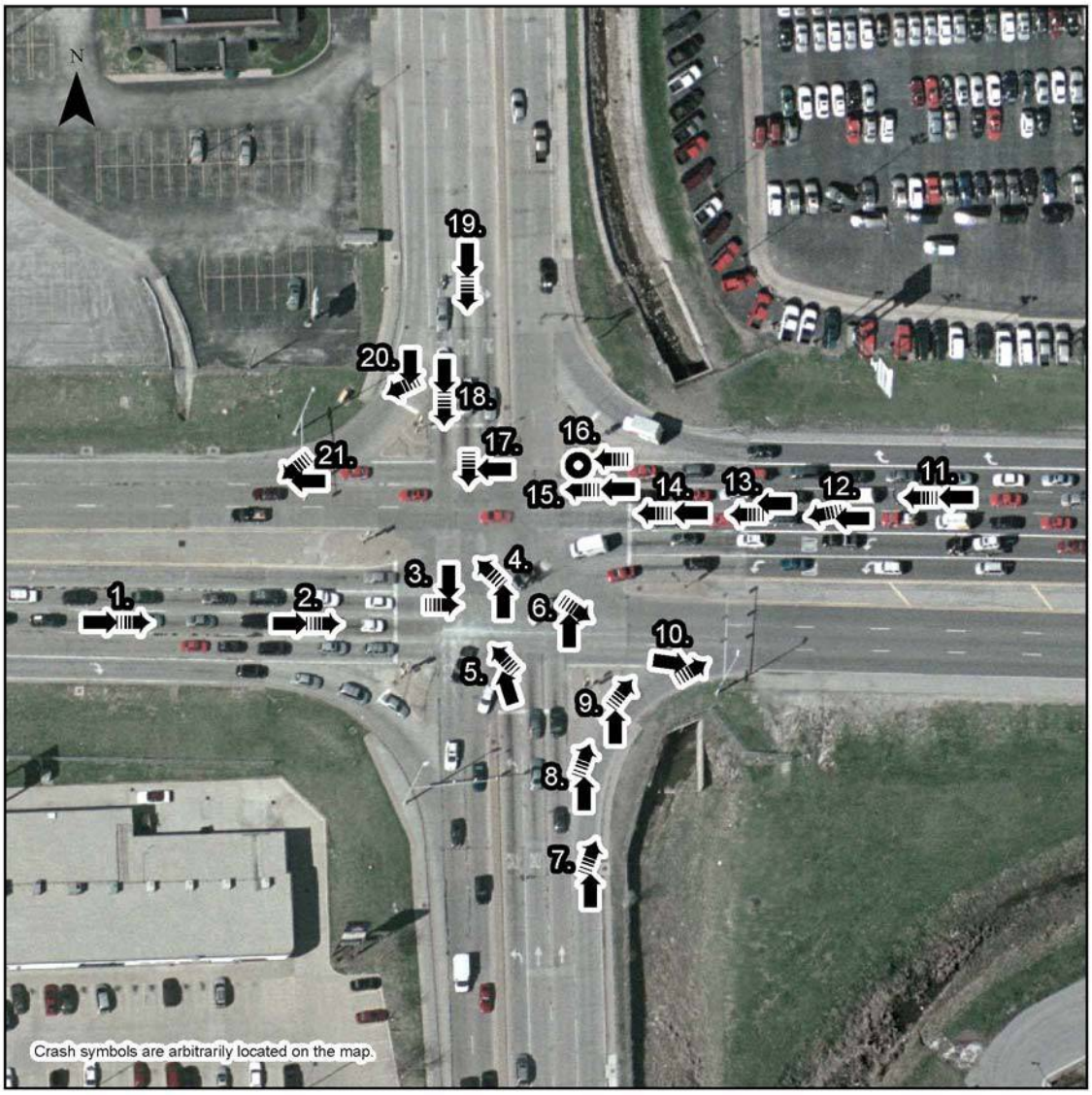
As with the previous location, IL 5/John Deere Expressway is a divided highway. The west approach has one left-turn lane, three through lanes and one right-turn only lane for the east-bound traffic. The speed limit is 45 mph. The east approach of John Deere Expressway has dual left-turn only lanes, one right-turn lane and two through lanes for the west-bound traffic. The speed limit is 55 mph. Sixteenth Street is an arterial road with two through lanes, one left-turn and one right-turn only lanes for both south and north approaches entering the intersection.

Again, the high rate of speed and high traffic volume (average daily traffic of 28,600 on IL 5/ John Deere Expressway)contributes to the large number of rear-end crashes at this location. While signs warning of upcoming signaled intersections are present at most intersections along IL 5/ John Deere Expressway, the sheer number of vehicles and close proximity of intersections cause abrupt stops, which are difficult to complete at high speeds.

Table 6.3
16th St. & IL 5/ John Deere Expry. (Moline) 1993/2007 Comparison

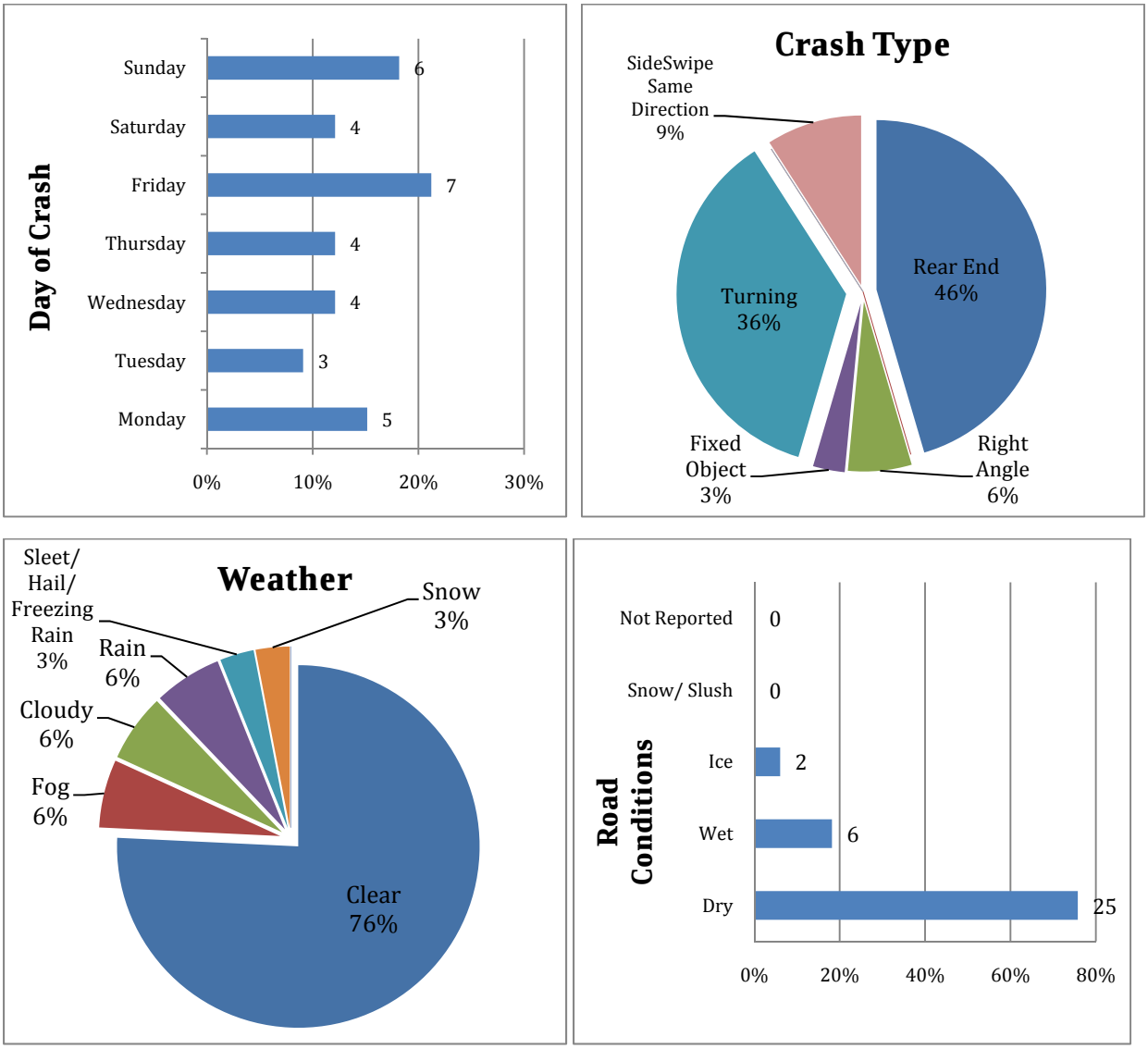
	1993	2007
Total Crashes	28	33
# of Fatalities	0	0
# of Injuries	16	19
Crash Rate	2.01	1.97
Predominant Crash Type	Rear-end	Rear-end

Figure 6.8
Illinois Location #3- 16th St. & IL 5/John Deere Expy. (Moline)



1. East Bound, Straight, Rear-end (2)
2. East Bound, Slow/Stop in Traffic, Rear-end (3)
3. East Bound, Skidding/Control Loss, Angle (1)
4. Northwest Bound, Skidding, Rear-end (1)
5. Northwest Bound, Skidding/Control Loss, Sideswipe/Same Direction (1)
6. Southeast Bound, Right Turn, Turning (1)
7. Northeast Bound, Slow/Stop Right Turn, Turning (1)
8. Northeast Bound, Slow/Stop Right Turn, Rear-end (1)
9. North Bound, Slow/Stop Right Turn, Rear-end (1)
10. Northeast Bound, Right Turn, Turning (8)
11. West Bound, Starting in Traffic, Rear-end (1)
12. West Bound, Changing Lanes, Sideswipe/Same Direction (1)
13. West Bound, Slow/Stop in Traffic, Sideswipe/Same Direction (1)
14. West Bound, Slow/Stop in Traffic, Rear-end (2)
15. West Bound, Straight, Rear-end (2)

Figure 6.9
Illinois Location #3 (16th St. & IL 5/John Deere Expy.) - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #3- IL 5/JOHN DEERE EXPY & 41ST ST- MOLINE

Tied for third (with a score of 38), this location experienced thirty-four (34) crashes in 2007, resulting in fifteen (15) injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.98 crashes per MEV. Similar to the previous two IL 5/John Deere Expressway intersections, rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays.

Figure 6.10
Photo- IL 5/John Deere Expy. & 41st St. (Moline)

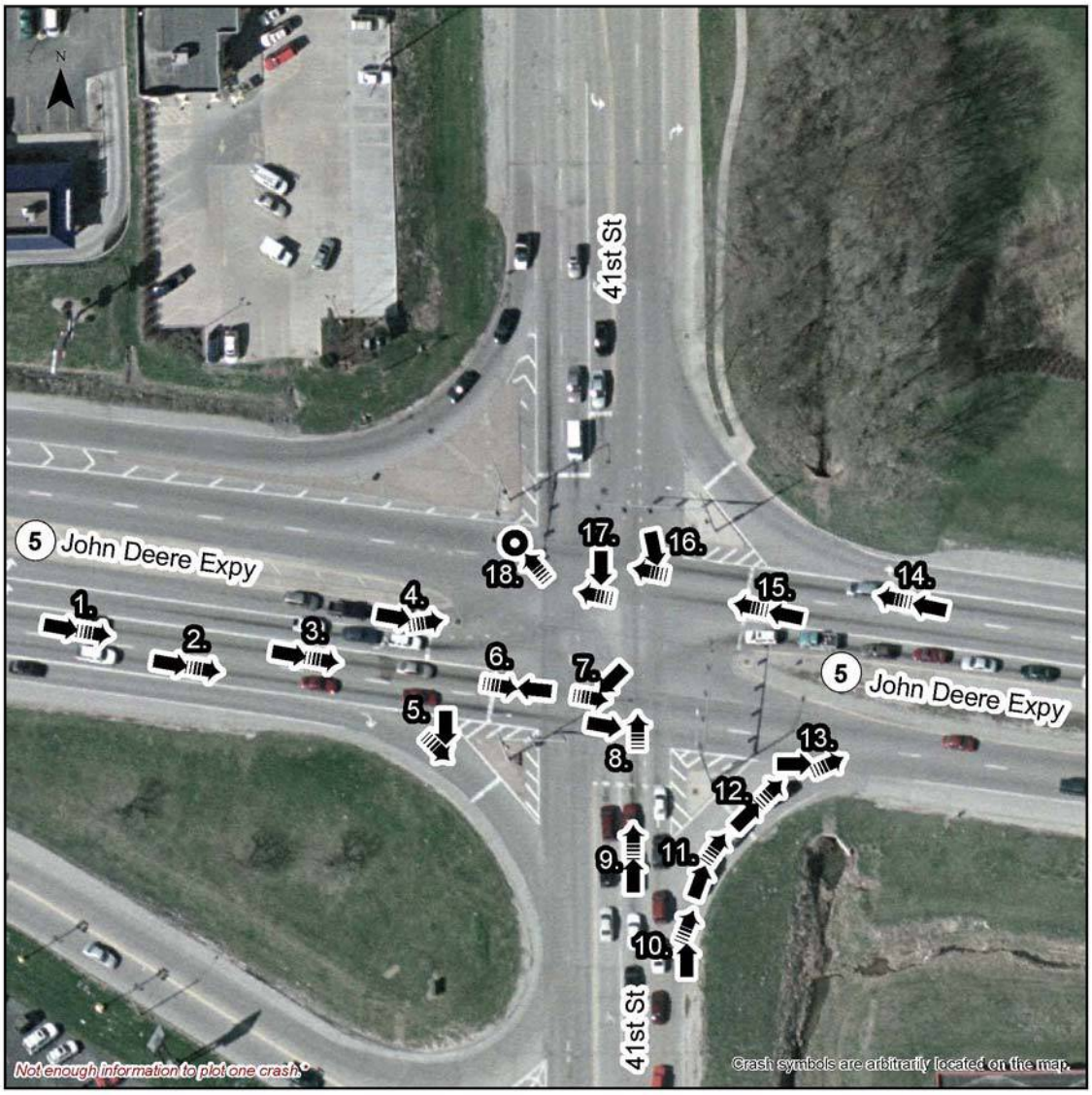
IL 5/John Deere Expressway is, again, a four-lane divided highway at this location, with a speed limit of 55 mph. Forty-First Street is a four-lane arterial. Left turn lanes are provided for all approaches at this intersection. Right-turn lanes are provided and channelized at each corner.

Like the previous two intersections, the high rate of speed and high traffic volume (average daily traffic here of 39,200 on IL 5/ John Deere Expressway) contributes to the large number of rear-end crashes at this location. While signs warning of upcoming signaled intersections are present at most intersections along IL 5/ John Deere Expressway, the sheer number of vehicles and close proximity of intersections cause abrupt stops, which are difficult to complete at high speeds.

Table 6.4
IL 5/ John Deere Expry. & 41st St. (Moline) 1993/2007 Comparison

	1993	2007
Total Crashes	28	34
# of Fatalities	0	0
# of Injuries	30	15
Crash Rate	1.73	1.98
Predominant Crash Type	Rear-end	Rear-end

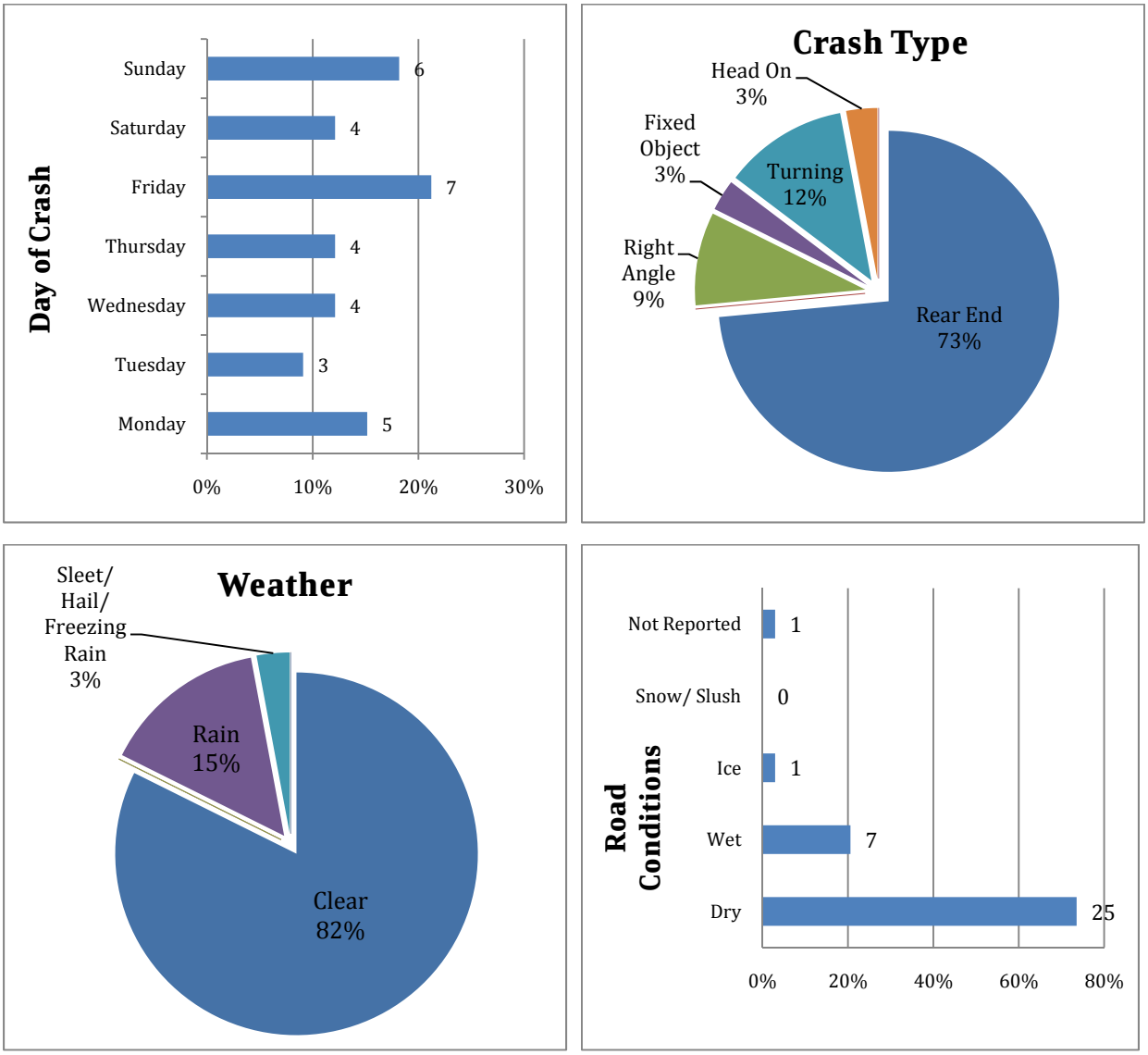
Figure 6.11
Illinois Location #3- IL 5/John Deere Expy. & 41st St. (Moline)



1. East Bound, Changing Lanes, Rear-end (1)
2. East Bound, Slow/Stop in Traffic, Rear-end
3. East Bound, Straight, Rear-end (8)
4. East Bound, Slow/Stop Left Turn, Rear-end (1)
5. East Bound, Right Turn, Turning (1)
6. East Bound, Skidding/Control Loss, Head-on (1)
7. East Bound, Straight, Turning (1)
8. North Bound, Straight, Angle (1)
9. North Bound, Straight, Rear-end (1)
10. Northeast Bound, Starting in Traffic, Rear-end (1)
11. Northeast Bound, Slow/Stop Right Turn, Rear-end (2)
12. Northeast Bound, Straight, Rear-end (4)
13. Northeast Bound, Right Turn, Turning (1)
14. West Bound, Straight, Rear-end (4)
15. West Bound, Slow/Stop in Traffic, Rear-end (1)
16. West Bound, Straight, Turning (1)
17. West Bound, Straight, Angle (2)
18. Northwest Bound, Left Turn, Fixed Object (1)

*One North Bound, Rear-end Crash was not plotted due to the 'unknown' data input in the field 'Vehicle Action'.

Figure 6.12
Illinois Location #3 (IL 5/John Deere Expy. & 41st St.) - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #5- 7TH ST & AVENUE OF THE CITIES- EAST MOLINE

Ranked fifth (with a score of 37), this location experienced twenty-four (24) crashes in 2007, resulting in fifteen (15) injuries. Taking into account traffic volume, the crash rate for this intersection was above average at 2.37 crashes per MEV. Crashes involving turning vehicles were the predominant crash type, accounting for 87% of all crashes. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Thursdays.

Figure 6.13
Photo-7th St. & Avenue of the Cities (East Moline)

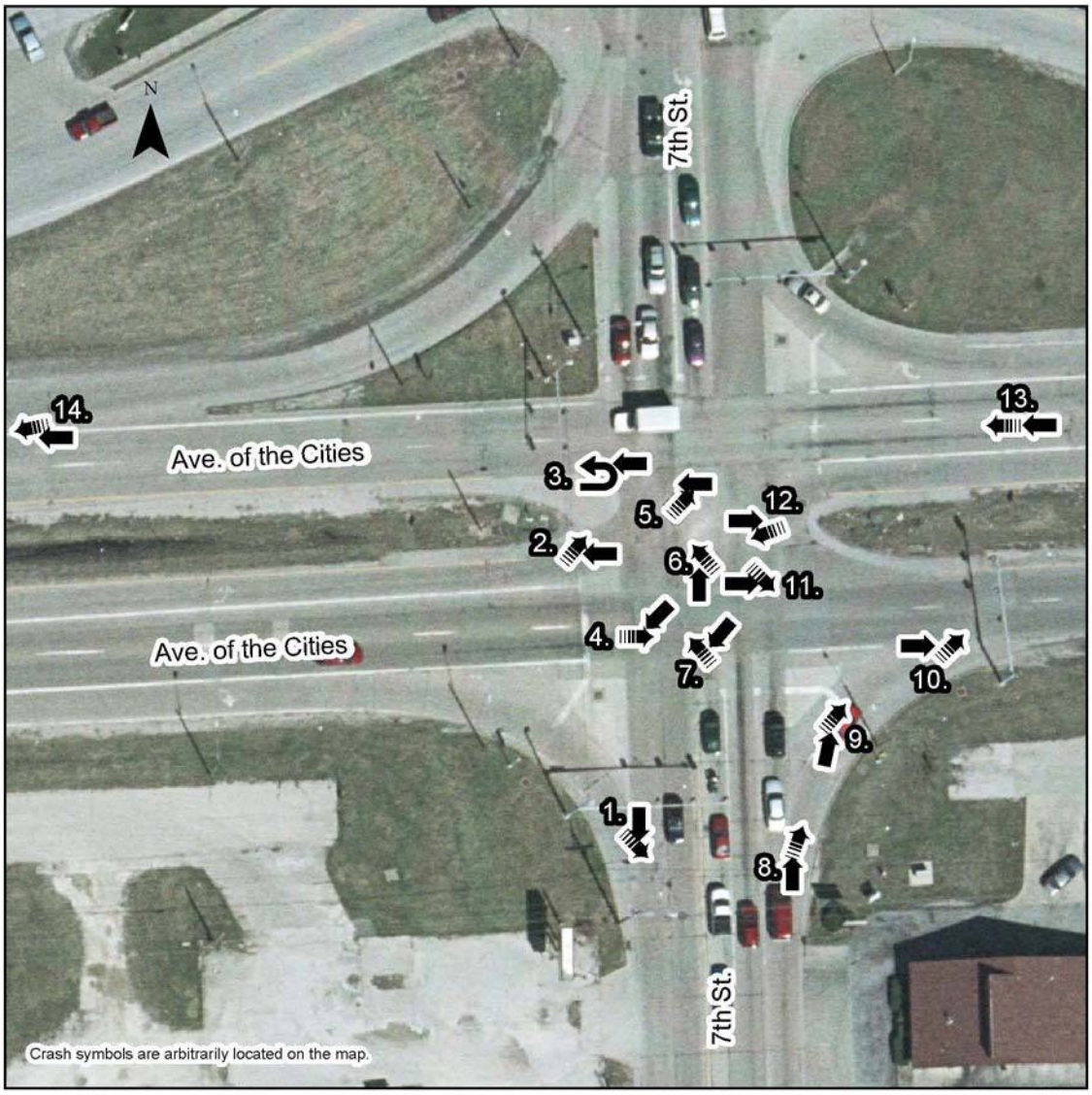
Avenue of the Cities is a four-lane divided arterial at this location, with a speed limit of 45 mph. Left-turn and right-turn only lanes are provided for both east and west approaches. Seventh Street is a four-lane arterial road with a posted speed limit of 30 mph. Left-turn only lanes are present for both north and south approaches, and a channelized right-turn only lane is present for the north approach.

The high number of crashes involving turning vehicles is most likely due to the wide intersection and high speeds on Avenue of the Cities.

Table 6.5
7th St. & Avenue of the Cities (East Moline) 1993/2007 Comparison

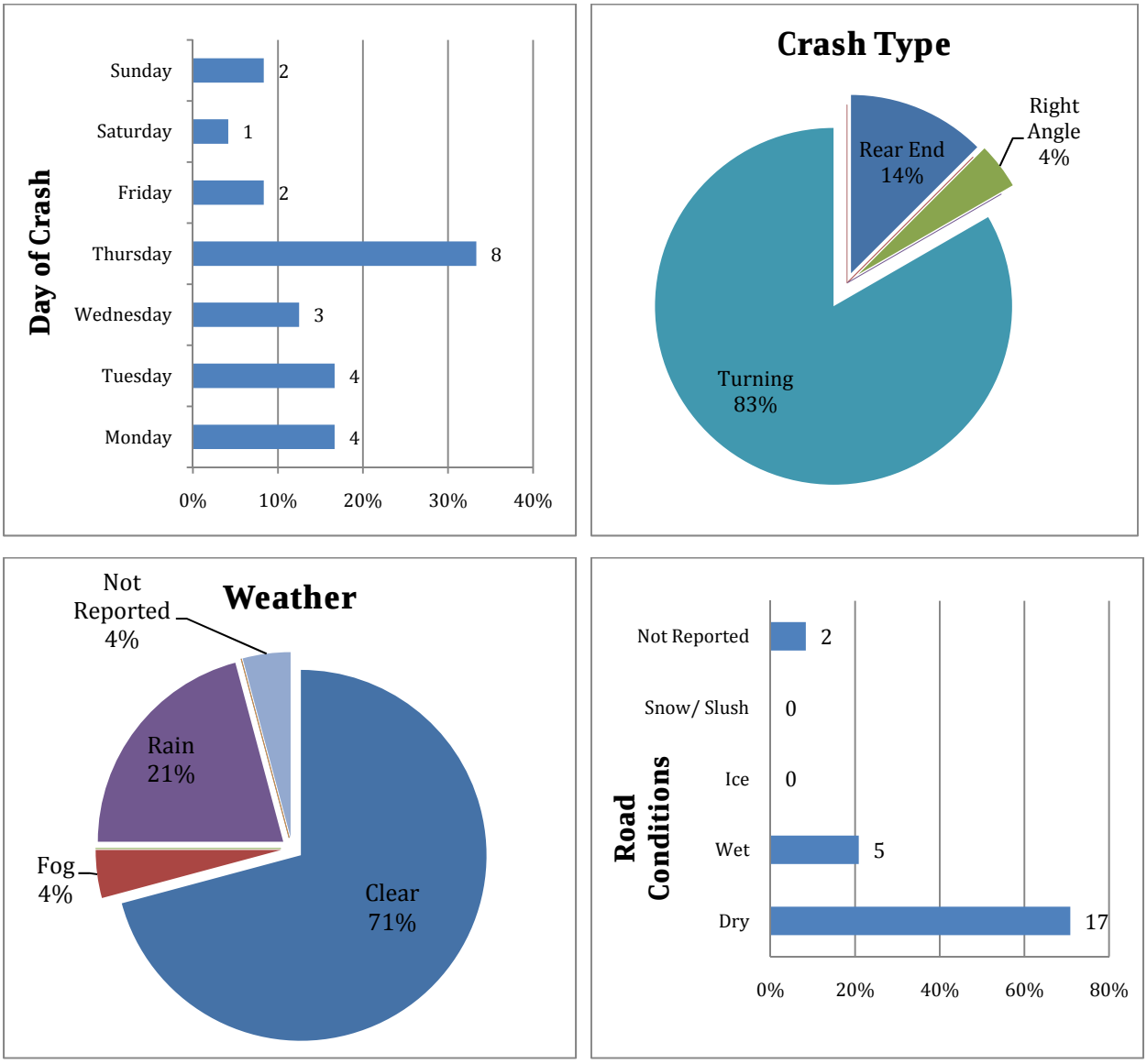
	1993	2007
Total Crashes	23	24
# of Fatalities	0	0
# of Injuries	18	15
Crash Rate	2.05	2.37
Predominant Crash Type	Turning	Turning

Figure 6.14
Illinois Location #5- 7th St. & Avenue of the Cities (East Moline)



1. East Bound, Right Turn, Turning (1)
2. East Bound, Left Turn, Turning (3)
3. East Bound, U-turn, Turning (1)
4. East Bound, Straight, Turning (1)
5. East Bound, Turn on Red, Turning (1)
6. North Bound, Left Turn, Turning (1)
7. North Bound, Left Turn, Angle (1)
8. North Bound, Slow/Stop Right Turn, Rear-end (1)
9. Northeast Bound, Right Turn, Turning (1)
10. Northeast Bound, Left Turn, Turning (2)
11. South Bound, Left Turn, Turning (5)
12. West Bound, Left Turn, Turning (1)
13. West Bound, Skidding/Control Loss, Rear-end (2)
14. Southwest Bound, Left Turn, Turning (3)

Figure 6.15
Illinois Location #5 - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #6- 19TH ST (EAST OF I-74) & AVENUE OF THE CITIES-MOLINE

Ranked sixth (with a score of 31), this location experienced twenty-four (24) crashes in 2007, resulting in five (5) injuries. Taking into account traffic volume, the crash rate for this intersection was above average at 2.37 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Wednesday.

Figure 6.16
Photo- 19th St. (East of I74) & Avenue of the Cities (Moline)

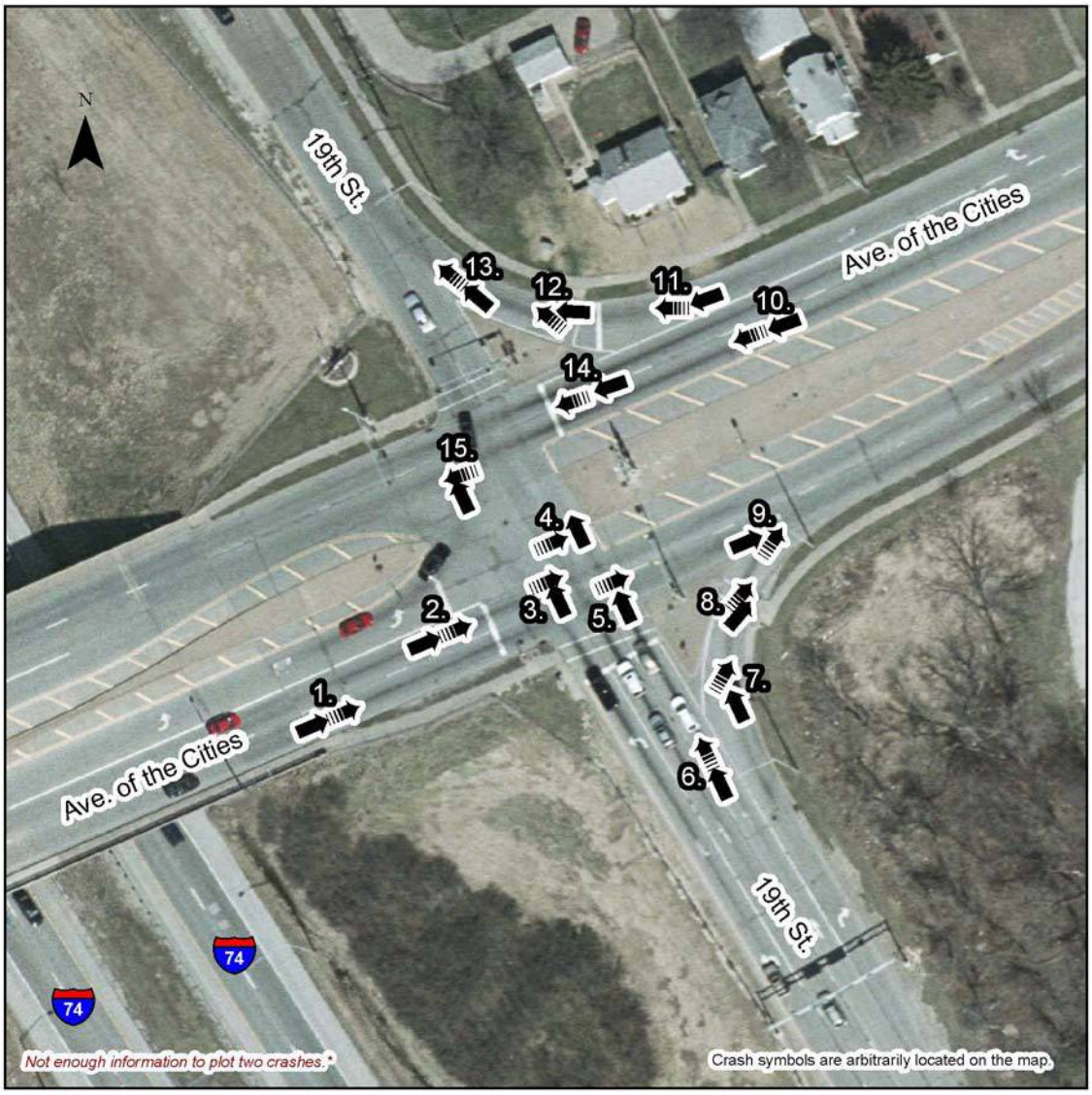
Avenue of the Cities is an undivided arterial with a posted speed limit of 35 mph at this location. Nineteenth Street is an arterial road divided by I-74 and the east portion is two lanes for southbound traffic with one left- and one right-turn only lanes (both with markings). Because 19th Street at this location is one-way, there is no left-turn from Avenue of the Cities on the west approach (which does have a right-turn only lane) and no right-turn from the east approach (which has a left-turn only lane).

Observations indicate that the high number of rear-end crashes may be due to the rate of speed on both Nineteenth Avenue and the eastbound approach of Avenue of the Cities, poor visibility of traffic signals on Avenue of the Cities, and the location's close proximity to the intersection of Avenue of the Cities and the northbound section of 19th Street.

Table 6.6
19th St. (East of I74) &Avenue of the Cities (Moline) 1993/2007 Comparison

	1993	2007
Total Crashes	Not Ranked	24
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	5
Crash Rate	Not Ranked	2.37
Predominant Crash Type	Not Ranked	Rear-end

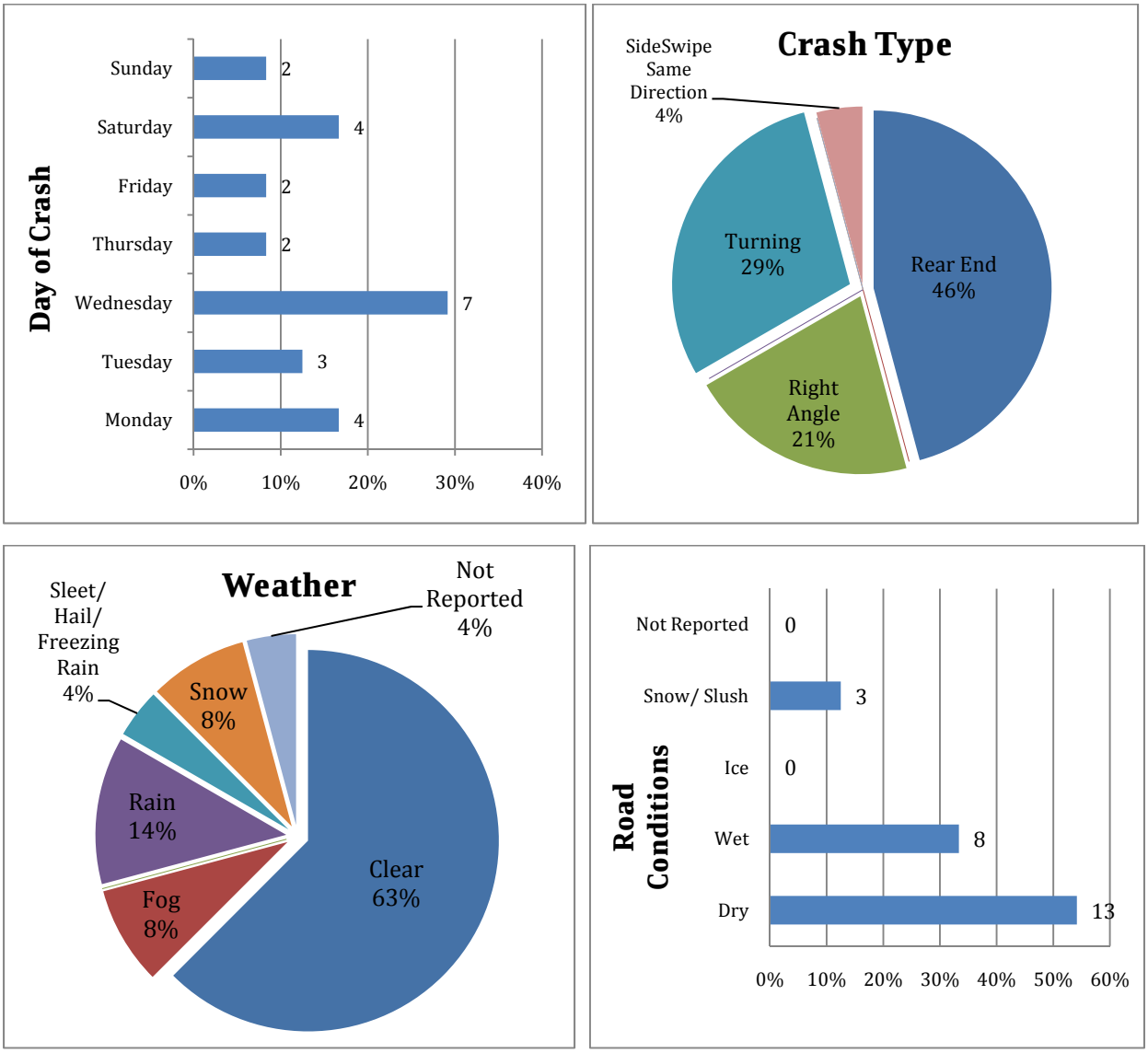
Figure 6.17
Illinois Location #6- 19th St. (East of I74) & Avenue of the Cities (Moline)



1. East Bound, Straight, Rear-end
2. East Bound, Slow/Stop in Traffic, Rear-end
3. East Bound, Skidding/Control Loss, Angle
4. North Bound, Straight, Angle
5. East Bound, Straight, Angle
6. North Bound, Straight, Rear-end
7. Northeast Bound, Right Turn, Turning
8. Northeast Bound, Slow/Stop Right Turn, Sideswipe, Same Direction
9. North Bound, Right Turn, Turning
10. West Bound, Slow/Stop in Traffic, Rear-end
11. West Bound, Slow/Stop Right Turn, Rear-end
12. Northwest Bound, Right Turn, Turning
13. Northwest Bound, Straight, Rear-end
14. West Bound, Straight, Rear-end
15. West Bound, Straight, Angle

*Two crashes not plotted on map: Southeast Bound, Right Turn, Turning; Southwest Bound, Right Turn, Turning

Figure 6.18
Illinois Location #6 - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #7- 6TH AVE & 23RD ST- MOLINE

Ranked seventh (with a score of 30), this location experienced eighteen (18) crashes, resulting in three (3) injuries. Taking into account traffic volume, the crash rate for this intersection was well above average at 5.51 crashes per MEV. Rear-end crashes were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Friday.

Figure 6.19
Photo- 6th Ave & 23rd St. (Moline)

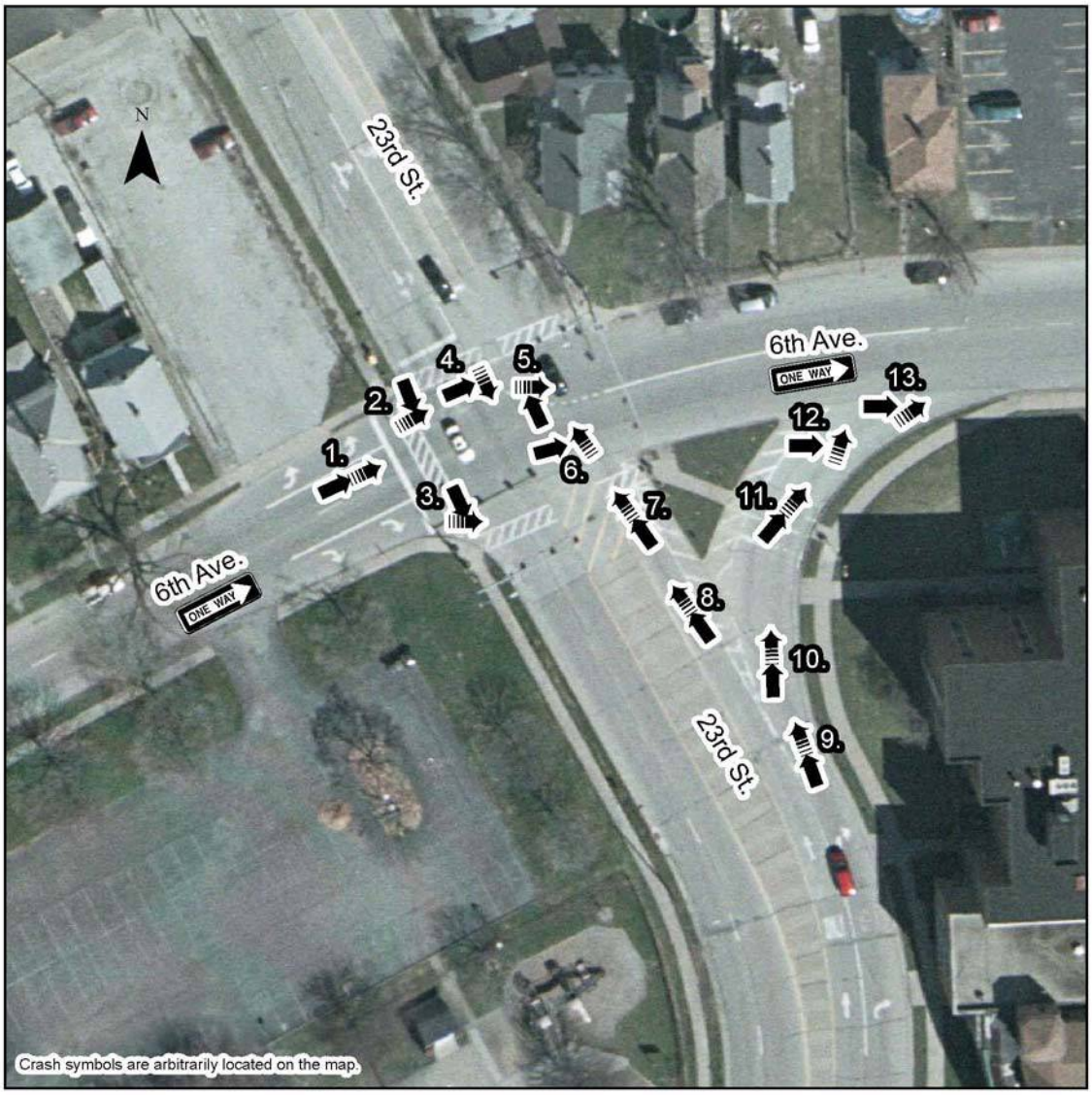
Sixth Avenue is a one-way (eastbound), two lane undivided highway with a posted speed limit of 30 mph. Twenty-Third Street is a four lane minor road also with a speed limit of 30 mph. Both left- and right-only lanes are provided at all approaches.

Observation noted that the visibility of the traffic light approaching from the south on 23rd Ave may be difficult to see due to the curvature of the road. This obstruction may add to the number of rear-end crashes.

Table 6.7
6th Ave & 23rd St. (Moline) 1993/2007 Comparison

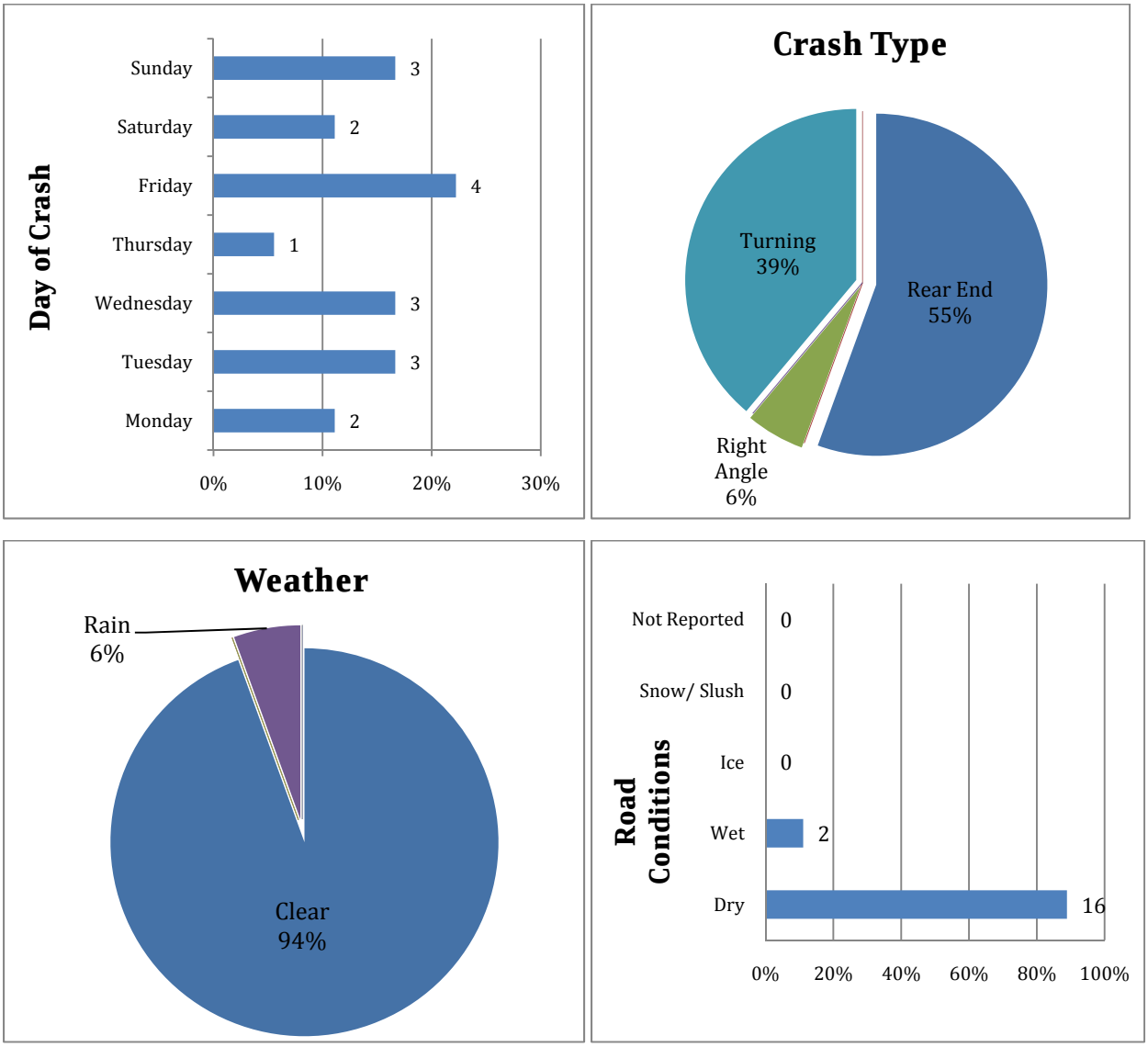
	1993	2007
Total Crashes	Not Ranked	18
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	3
Crash Rate	Not Ranked	5.51
Predominant Crash Type	Not Ranked	Rear-end

Figure 6.20
Illinois Location #7- 6th Ave & 23rd St. (Moline)



1. East Bound, Straight, Rear-end (1)
2. East Bound, Left Turn, Turning (1)
3. East Bound, Right Turn, Turning (1)
4. South Bound, Left Turn, Turning (1)
5. Southeast Bound, Left Turn, Turning (2)
6. North Bound, Straight, Angle (1)
7. North Bound, Straight, Rear-end (3)
8. North Bound, Starting in Traffic, Rear-end (1)
9. Northeast Bound, Straight, Rear-end (1)
10. 10. Northeast Bound, Starting in Traffic, Rear-end (1)
11. Northeast Bound, Slow/Stop Right Turn, Rear-end (3)
12. Northeast Bound, Right Turn, Turning (1)
13. Northeast Bound, Straight, Turning (1)

Figure 6.21
Illinois Location #7 - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #8- 19TH ST & 6TH AVE- MOLINE

Ranked eighth (with a score of 27), this location experienced sixteen (16) crashes in 2007, resulting in five (5) injuries. Taking into account traffic volume, the crash rate for this intersection was above average at 2.88 crashes per MEV. Crashes involving turning vehicles were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays.

Figure 6.22
Photo- 19th St. & 6th Ave (Moline)

As in the seventh-ranked location, Sixth Street is a one-way (eastbound), two lane undivided highway with a speed limit of 30 mph. There is one left-only lane and one right-only lane provided. Nineteenth Street is a four lane arterial with a posted speed limit of 30 mph. No left-only lanes are provided. A channelized right-only turn lane is provided for the south approach.

Table 6.8
19th St. & 6th Ave (Moline) 1993/2007 Comparison

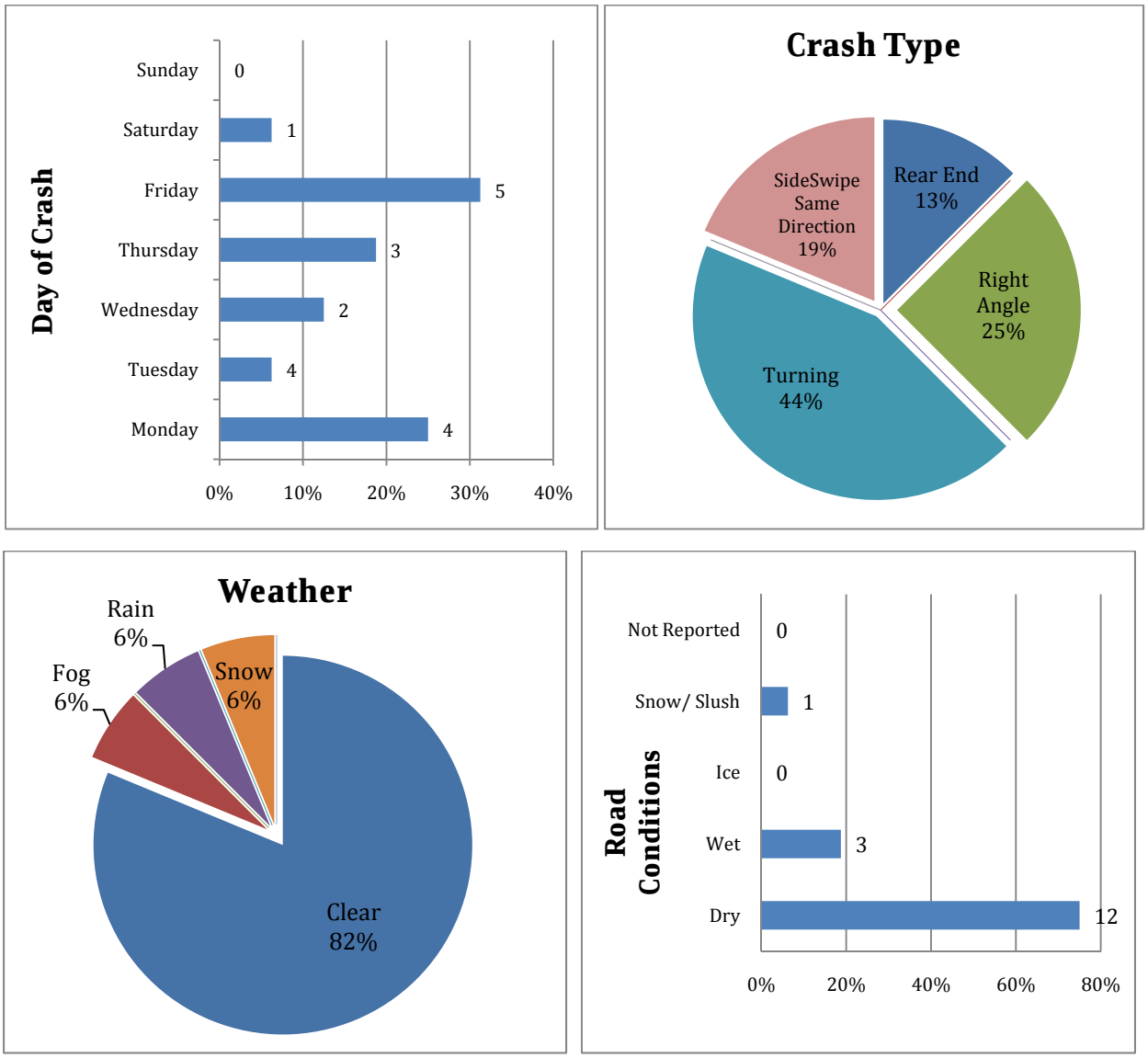
	1993	2007
Total Crashes	Not Ranked	16
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	5
Crash Rate	Not Ranked	2.88
Predominant Crash Type	Not Ranked	Turning

Figure 6.23
Illinois Location #8- 19th St. & 6th Ave (Moline)

1. East Bound, Changing Lanes, Sideswipe, Same Direction (2)
2. South Bound, Straight, Angle (3)
3. South Bound, Slow/Stop in Traffic, Rear-end (2)
4. East Bound, Left Turn, Turning (4)
5. East Bound, Straight, Turning (1)
6. North Bound, Straight, Angle (1)

* Three crashes not plotted on map: Northeast Bound, Left Turn, Turning; Northeast Bound, Slow/Stop, Left Turn, Sideswipe, Same Direction; Southeast Bound, Left Turn, Turning

Figure 6.24
Illinois Location #8 (19th St. & 6th Ave) - Crash Frequency by Crash Type and Under Various Conditions



ILLINOIS LOCATION #8- 12TH AVE & 41ST ST- MOLINE

Tied for eighth (with a score of 27), this location experienced thirteen (13) crashes in 2007 resulting in thirteen (13) injuries. Taking into account traffic volume, the crash rate for this intersection was below average at 1.99 crashes per MEV. Crashes involving turning vehicles were the predominant crash type. Most crashes occurred during daylight hours in clear, dry conditions. The highest number of crashes occurred on Fridays.

Figure 6.25
Photo- 12th Ave & 41st St. (Moline)

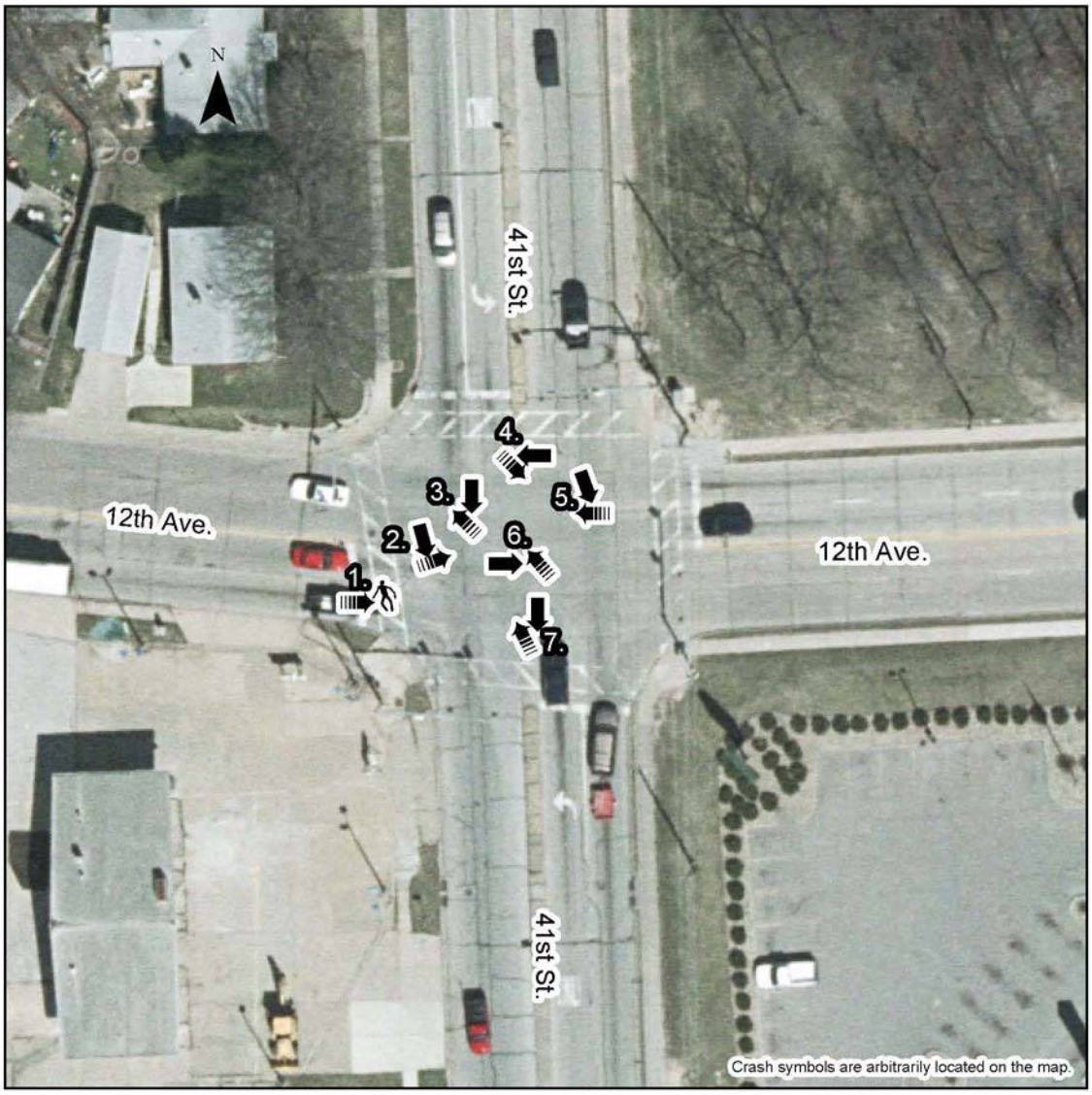
Twelfth Avenue is a four lane arterial road with a speed limit of 30 mph. No left-only or right-only turn lanes are provided. Forty-First Street is a two-lane arterial with a speed limit of 30 mph and left-turn only lanes on both the north and south approaches.

Crashes involving turning vehicles may be due to the curvature of the road on both the western approach of 12th Ave and the southern approach of 41st Street, which reduces visibility of oncoming traffic.

Table 6.9
12th Ave & 41st St. (Moline) 1993/2007 Comparison

	1993	2007
Total Crashes	Not Ranked	13
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	13
Crash Rate	Not Ranked	1.99
Predominant Crash Type	Not Ranked	Turning

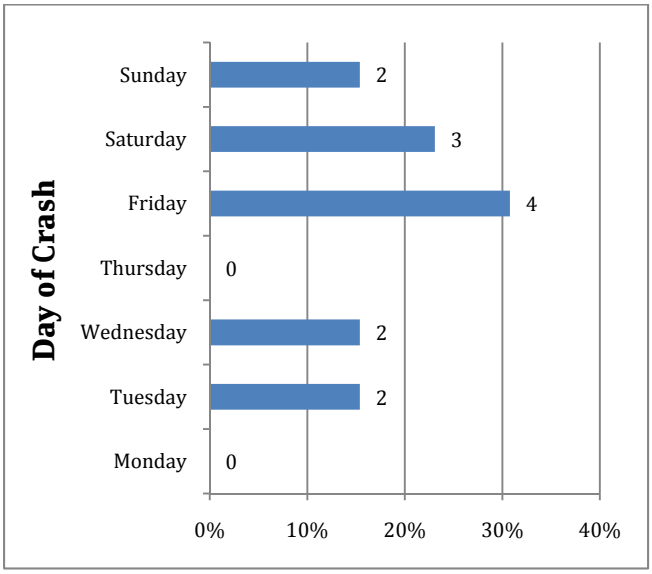
Figure 6.26
Illinois Location #8-12th Ave & 41st St. (Moline)

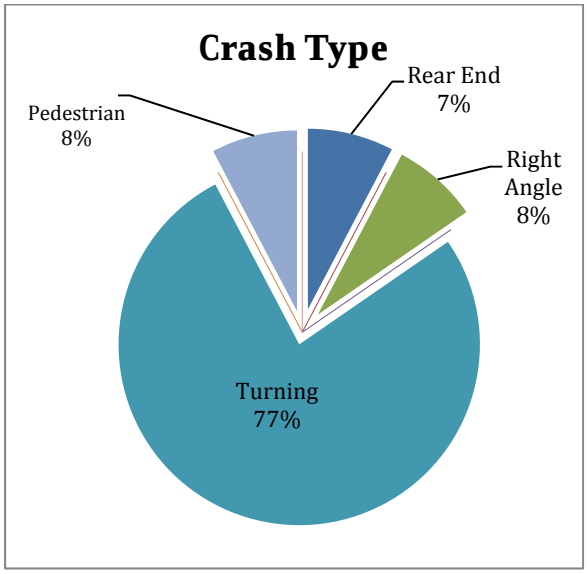


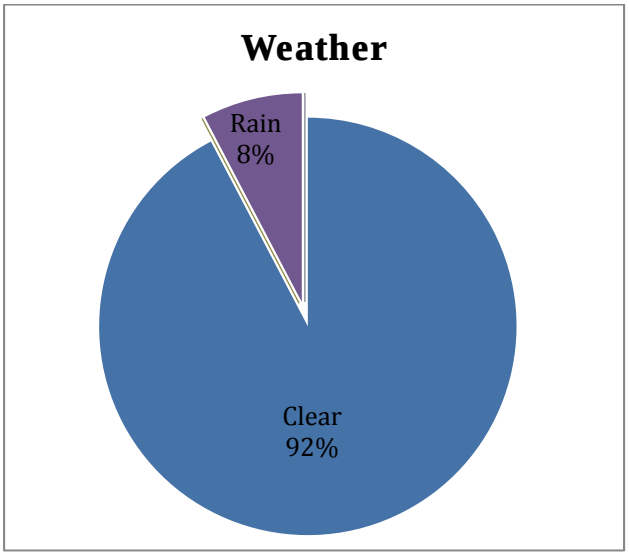
1. East Bound, Straight, Pedestrian (1)
2. East Bound, Left Turn, Turning (1)
3. Northwest Bound, Straight, Angle (1)
4. South Bound, Left Turn, Turning (1)
5. West Bound, Straight, Turning (1)
6. Northwest Bound, Left Turn, Turning (4)
7. North Bound, Left Turn, Turning (1)

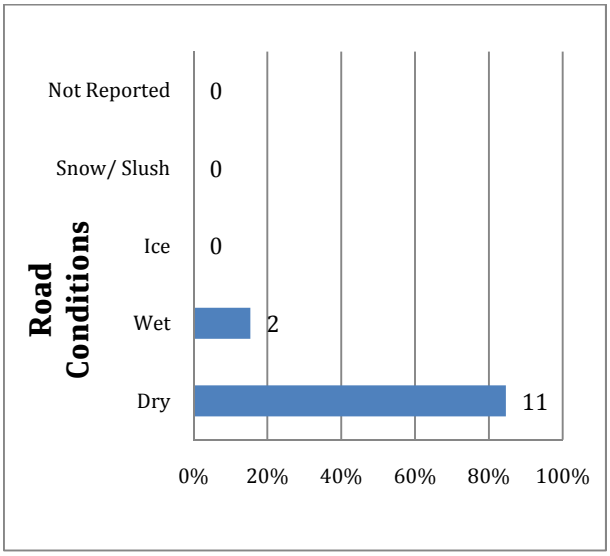
*Three crashes not plotted on map: Southwest Bound, Left Turn, Turning; West Bound, Unknown initial direction, Rear-end; Northeast Bound, Left Turn, Turning

Figure 6.27
Ilinois Location #8 (12th Ave & 41st St.) - Crash Frequency by Crash Type and Under Various Conditions









ILLINOIS LOCATION #10- 16TH AVE & 7TH ST- EAST MOLINE

Ranked tenth (with a score of 26), this location experienced twelve (12) crashes in 2007, resulting in four (4) injuries. Taking into account traffic volume, the crash rate for this intersection was above average at 3.27 crashes per MEV. Right-angle crashes were the predominant crash type. Most crashes occurred during daylight hours in dry conditions. The highest number of crashes occurred on Mondays.

Figure 6.28
Photo- 16th Ave & 7th St. (East Moline)

Sixteenth Avenue is a one-way (westbound), two lane, undivided highway with a posted speed limit of 30 mph. There is one right-turn only lane provided. Seventh Street is a four lane arterial with a speed limit of 30 mph. There is a left-turn only lane provided at the south approach onto Sixteenth Avenue.

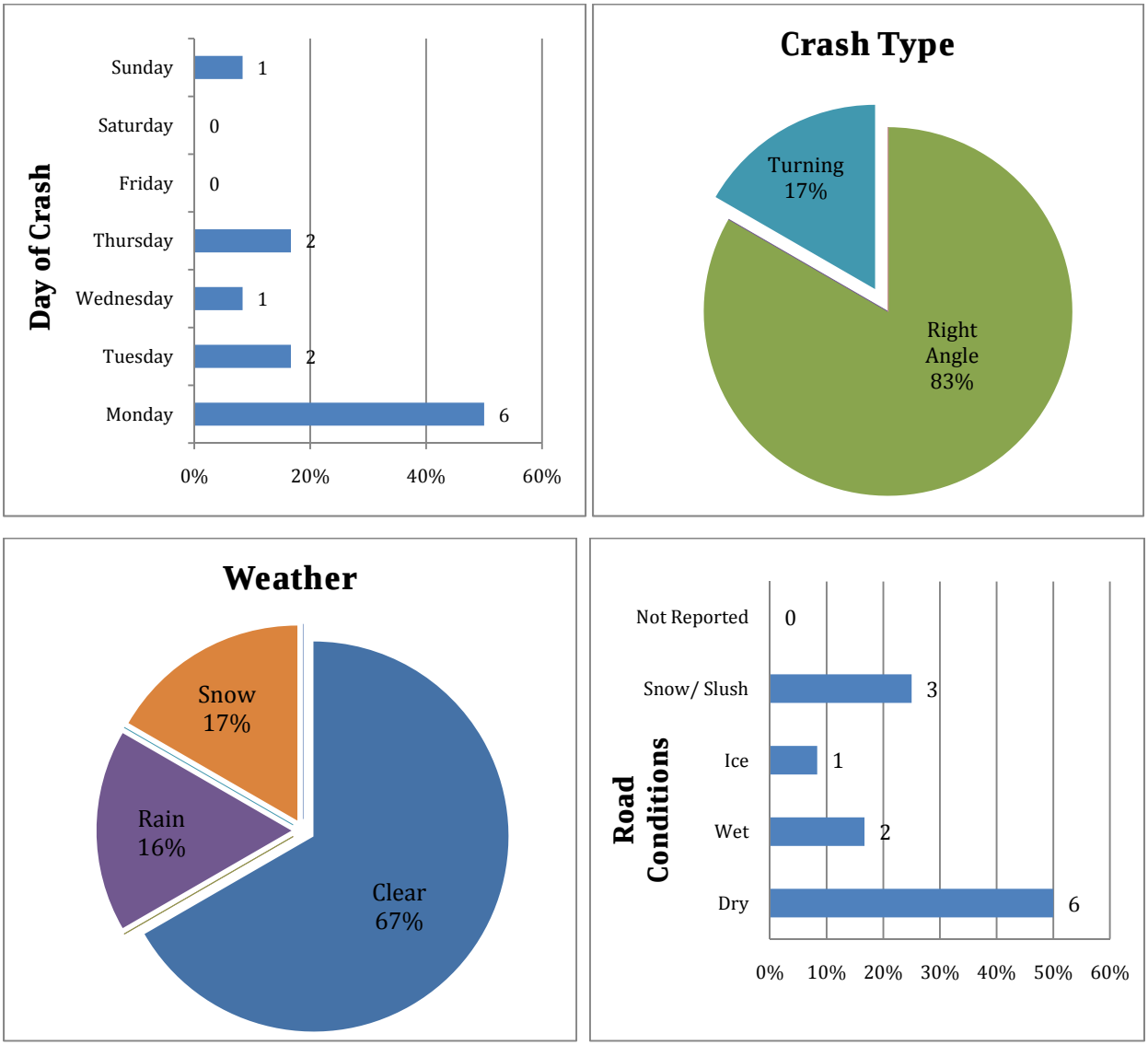
Table 6.10
16th Ave & 7th St. (East Moline) 1993/2007 Comparison

	1993	2007
Total Crashes	Not Ranked	12
# of Fatalities	Not Ranked	0
# of Injuries	Not Ranked	4
Crash Rate	Not Ranked	3.27
Predominant Crash Type	Not Ranked	Angle

Figure 6.29
Illinois Location #10- 16th Ave & 7th St. (East Moline)

1. South Bound, Turning on Red, Turning (1)
2. South Bound, Right Turn, Turning (1)
3. West Bound, Straight, Angle (3)
4. South Bound, Straight, Angle (6)
5. North Bound, Straight, Angle (1)

Figure 6.30
Illinois Location #10- Crash Frequency by Crash Type and Under Various Conditions



Status of Previously Ranked Intersections

This Chapter evaluates the 2007 status of top-ranked locations in the previous report studying 1993 data. Tables 7.1 and 7.2 give a comparison of the number of crashes and overall ranking of 1993 top-ranked intersections in Iowa and Illinois, respectively.

Table 7.1
Status of 1993 Top Ranked Intersections (Iowa)

Location	Total # of Crashes		Overall Rank	
	1993	2007	1993	2007
Eastern Ave. & US 6/Kimberly Rd., Davenport	31	15	1	7
US 61 SB/ Welcome Way & Kimberly Rd., Davenport	31	13	2	Not Ranked
3rd St. & Main St., Davenport	21	1	3	Not Ranked
US 67/ State St. & Devil's Glen Rd., Bettendorf	24	5	3	Not Ranked
Locust St., Division St., & Hickory Grove Rd., Davenport	23	5	5	Not Ranked
Marquette St. & Kimberly Rd., Davenport	23	8	6	Not Ranked
35th St. & Marquette St., Davenport	17	7	7	Not Ranked
53rd St. & US 61 NB/Brady St., Davenport	21	11	7	Not Ranked
Elmore Ave. & US 6/ Kimberly Rd., Davenport	22	16	9	10
Spring St. & US 6/Kimberly Rd., Davenport	22	10	9	Not Ranked
Locust St. & Iowa St., Davenport	18	15	9	3

Table 7.2
Status of 1993 Top Ranked Intersections (Illinois)

Location	Total # of Crashes		Overall Rank	
	1993	2007	1993	2007
16th St. & 44th Ave. Dr., Moline	27	4	1	Not Ranked
Kennedy Dr. & 42nd Ave., E. Moline	29	38	2	1
41st St. & IL 5/John Deere Expy, Moline	28	34	3	3
16th St. & IL 5/John Deere Expy, Moline	28	33	4	3
16th St. & 23rd Ave., Moline	27	10	4	Not Ranked
41st St. & 38th Ave./Coaltown Rd., Moline	19	9	6	Not Ranked
7th St. & 42nd Ave., E. Moline	23	24	7	5
12th St. & 12th Ave., Moline	13	5	8	Not Ranked
19th St. (NB) & 23rd Ave., Moline	18	24	9	6
11th St. & 42nd Ave, E. Moline	17	5	9	Not Ranked

Intersection Improvements

PAST IMPROVEMENTS

Tables 8.1 and 8.2 provide information on improvements completed between 1993 and 2007 for the 1993 top-ranked intersections. This information may prove valuable in understanding changes in rank and number of crashes for problem intersections. While improvements are initiated to mitigate safety issues, it is important to note that some can have secondary effects that may actually increase the number of crashes. For example, while red light-running photo enforcement dramatically decreases right-angle crashes, rear-end incidents may increase as drivers are more cautious about proceeding through the intersection during the amber phase.

Table 8.1
Intersection Improvements (1993-2007) at 1993 Top Ranked Intersections (Iowa)

Location	Improvements (1993-2007)
Eastern Ave. & US 6/Kimberly Rd., Davenport	Left turn lanes lengthened, right turn lanes added on Kimberly Rd; New signals with improved phasing; Control devices on Eastern Ave accesses
US 61 SB/ Welcome Way & Kimberly Rd., Davenport	Pavement marking updates; Red-light cameras installed on US 61 SB/Welcome Way; Repositioning of eastbound “stop bar”
3rd St. & Main St., Davenport	No Improvements Known
US 67/ State St. & Devil's Glen Rd., Bettendorf	Widening of State Street; Continuous left-turn lane
Locust St., Division St., & Hickory Grove Rd., Davenport	No Improvements Known
Marquette St. & Kimberly Rd., Davenport	Turn lanes lengthened; Widening; New signals with improved phasing
35th St. & Marquette St., Davenport	No Improvements Known
53rd St. & US 61 NB/Brady St., Davenport	Dual left turn lanes; Added raised median on 53rd to reduce traffic conflicts
Elmore Ave. & US 6/ Kimberly Rd., Davenport	Turn lanes added and lengthened; Improved signal phasing; Red-light cameras installed
Spring St. & US 6/Kimberly Rd., Davenport	No Improvements Known
Locust St. & Iowa St., Davenport	No Improvements Known

Table 8.2
Intersection Improvements (1993-2007) at 1993 Top Ranked Intersections (Illinois)

Location	Improvements (1993-2007)
16th St. & 44th Ave. Dr., Moline	No Improvements Known
Kennedy Dr. & 42nd Ave., E. Moline	Construction of right and left turn lanes at frontage road intercepts; Resurfacing; Pavement patching; Traffic signal post for southbound Kennedy Drive right turn lane; Pavement markings; Turn lane modifications-southbound Kennedy Drive to westbound Avenue of the Cities
41st St. & IL 5/John Deere Expy, Moline	Patching and concrete resurfacing
16th St. & IL 5/John Deere Expy, Moline	Full depth concrete pavement patching; Drainage improvements; Resurfacing
16th St. & 23rd Ave., Moline	No Improvements Known
41st St. & 38th Ave./Coaltown Rd., Moline	No Improvements Known
7th St. & 42nd Ave., E. Moline	Construction of right and left turn lanes at frontage road intercepts; Resurfacing; Pavement markings; Traffic signal retrofit
12th St. & 12th Ave., Moline	No Improvements Known
19th St. (NB) & 23rd Ave., Moline	Modernization of traffic signals and geometric improvements
11th St. & 42nd Ave, E. Moline	Retrofitting two 5-section existing left turn traffic signals

TOOLS FOR FUTURE IMPROVEMENTS

Like the top ranked intersections in 1993, improvements to those ranked in 2007 can significantly decrease the number and severity of crashes. To aid agencies in the decision as to what improvements will be the most effective at a certain intersection, several tools have been developed. One of these is the concept of a crash reduction factor (CRF).

A CRF is "the percentage crash reduction that might be expected after implementing a given countermeasure at a specific site". CFRs are especially helpful in fulfilling data requirements of SAFETEA-LU by providing quantitative measures of improvement effectiveness. There are several resources allowing agencies access to a wide variety of CFRs and decision making tools, including[8]:

- The Federal Highway Administration's (FHWA) *Desktop Reference for Crash Reduction Factors* (FHWA-SA-08-011)
- FHWA's *Traffic Signals, Toolbox of Countermeasures and Their Potential Effectiveness for Intersection Crashes, Toolbox for Countermeasures and Their*

[8] Using CRFs To Improve Highway Safety; *Public Roads*; May/June 2009

Potential Effectiveness for Pedestrian Crashes, and *Toolbox of Countermeasures and Their Potential Effectiveness for Roadway Departure*[9]

- *SafetyAnalyst* software[10]
- *Interactive Highway Safety Design Model (IHSDM)*[11]
- Training courses through the National Highway Institute (NHI)[12]

LINKING IMPROVEMENTS TO FUNDING

The Quad City Crash Report identifies intersections with poor performance based on number of crashes, severity and frequency of crash exposure. In some cases, geometric or physical improvements at these locations may help the situation. In other cases, non-engineering modifications may be needed, such as driver education and awareness or law enforcement. In either case, there are state and federal funding sources available to improve traffic safety.

Both the Illinois and Iowa Quad Cities receive an annual allocation of Surface Transportation Program (STP) funds. Bi-State Regional Commission facilitates a competitive selection process to prioritize and program these funds. STP funds may be used on either National Highway System (NHS) or federal-aid eligible routes. Bridges, safety projects, carpooling and bicycle/pedestrian oriented projects may be located on any public road. Candidate projects are submitted on an as needed. Typically, funding rounds occur every two or three years. Projects are ranked using criteria for level of service, safety and physical condition. Safety consideration is equally weighted with the other two factors. Intersections highlighted in this report would score well, if they are on a federally eligible route.

In Iowa, there are a number of traffic engineering and funding programs offered through the Iowa Department of Transportation (IADOT) to assist with cost-effective traffic safety and operational improvements. For cities, there is the Traffic Engineering Assistance Program (TEAP) for communities with less than a 35,000 population and the Urban-State Traffic Engineering Program (U-STEP). There is also the Traffic Safety Improvement Program (TSIP), a statewide competitive program to construct or improve traffic safety or operations, purchase traffic safety equipment or conduct research, such as sign inventory, work zone safety or review accident data. Iowa Clean Air Attainment Program (ICAAP) funds can be used to improve traffic safety as it relates to emission reductions. IADOT outlines these programs on-line in a funding guide at http://www.iowadot.gov/pol_leg_services/funding_guide.htm .

In Illinois, there are also traffic safety funds available to communities through the Illinois Department of Transportation (ILDOT). There are several traffic safety enforcement programs offered by the ILDOT. The Illinois Highway Safety Program (HSP)

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[9] Available at http://safety.fhwa.dot.gov/tools/crf/

[10] www.safetyanalyst.org

[11] www.tfhrc.gov/safety/ihsdm/ihsdm.htm

[12] http://www.nhi.fhwa.dot.gov/Training/train.aspx

reimburses communities for safety improvements. Information on these programs is available at: http://www.dot.state.il.us/grants.html .

Both states of Illinois and Iowa administer the federal Safe Routes to School Program. These funds provide for improvements that result in more students walking or bicycling to school. Each state offers a competitive program with a prerequisite for Safe Routes to School Plan related to the facility being proposed.

Appendix A

Crash Patterns,

Probable Causes

and General Countermeasures

Excerpted from:
Technology Improvement Group (TIG)
Crash, Cause Countermeasures, 2007

American Association of State Highway
and Transportation Officials

Crash Pattern	Probable Cause	General Countermeasure
Right-angle collisions at unsignalized intersections	Restricted sight distance	Remove sight obstructions Restrict parking near corners Install stop signs (see MUTCD) Install warning signs (see MUTCD) Install/improve street lighting Reduce speed limit on approaches* Install signals (see MUTCD) Channelize intersection
	Large total intersection volume	Install signals (see MUTCD)
	High approach speed	Reduce speed limit on approaches* Install rumble strips
Right-angle collisions at signalized intersections	Poor visibility of signals	Install advanced warning devices (see MUTCD Install 12-in. signal lenses (see MUTCD) Install overhead signals Install visors Install back plates Improve location of signal heads Add additional signal heads Reduce speed limit on approaches*
	Inadequate signal timing	Adjust Change interval Provide all-red clearance interval Install signal actuation Retime signals Provide progression through a set of signalized intersections
Rear-end collisions at unsignalized intersections	Pedestrian crossing	Install/improve signing or marking of pedestrian crosswalks Relocate crosswalk
	Driver not aware of intersection	Install/improve warning signs
	Slippery surface	Overlay pavement Provide adequate drainage Groove pavement Reduce speed limit on approaches* Provide “SLIPPERY WHEN WET” signs
	Large numbers of turning vehicles	Create left-or right-turn lanes Prohibit turns Increase curb radii

Crash Pattern	Probable Cause	General Countermeasure
Rear-end collisions at signalized intersections	Poor visibility of signals	Install/improve advance warning devices Install overhead signals Install 12 in. signal lenses (see MUTCD) Install visors Install back plates Relocate signals Add additional signal heads Remove obstacles Reduce speed limits on approaches*
	Inadequate signal timing	Adjust change interval Provide progression through a set of signalized intersections
	Pedestrian crossings	Install/improve signing or marking of pedestrian crosswalks Provide pedestrian “WALK” signal indication
	Slippery surface	Overlay pavement Provide adequate drainage Groove pavement Reduce speed limit on approaches* Provide “SLIPPERY WHEN WET” signs
	Unwarranted signals	Remove signals (see MUTCD)
	Large turning volumes	Create left or right-turn lanes Prohibit turns Increase curb radii
Pedestrian accidents at intersections	Restricted sight distance	Remove sight obstructions Install pedestrian crossings Improve/install pedestrian crossing signs Reroute pedestrian paths
	Inadequate protection for pedestrians	Add pedestrian refuge islands
	Inadequate signals	Install pedestrian signals (see MUTCD)
	Inadequate signal phasing	Add pedestrian “WALK” signal indication Change timing of pedestrian phase
	School crossing area	Use school crossing guards
Pedestrian accidents between intersections	Driver has inadequate warning of frequent mid-block crossings	Prohibit parking Install warning signs Lower speed limit* Install pedestrian barriers
	Pedestrians walking on roadway	Install sidewalks

Crash Pattern	Probable Cause	General Countermeasure
	Long distance to nearest crosswalk	Install pedestrian crosswalk Install pedestrian actuated signals (see MUTCD)
Pedestrian accidents at driveway crossings	Sidewalk too close to traveled way	Move sidewalk laterally away from highway
Left-turn collisions at intersections	Large volume of left turns	Provide left-turn signal phases Prohibit left turns Reroute left-turn traffic Channelize intersection Install STOP signs (see MUTCD) Create one-way streets
	Restricted sight distance	Remove obstacles Install warning signs Reduce speed limit on approaches*
Right-turn collisions at intersections	Short turning radii	Increase curb radii
Fixed-object collisions	Objects near traveled way	Remove obstacles near roadway Install barrier curbing Install breakaway feature to light poles, signposts, etc. Protect objects with guardrail
Fixed-object collisions and/or vehicles running off roadway	Slippery pavement	Overlay existing pavement Provide adequate drainage Groove existing pavement Reduce speed limit* Provide “SLIPPERY WHEN WET” signs
	Roadway design inadequate for traffic conditions	Widen lanes Relocate islands Close curb lane
	Poor delineation	Improve/install pavement markings Install roadside delineators Install advance warning signs (e.g., curves)
Sideswipe collisions between vehicles traveling in opposite directions or head-on collisions	Roadway design inadequate for traffic conditions	Install/improve pavement markings Channelize intersections Create one-way streets Install median divider Widen lanes
Collisions between vehicles traveling in same direction such as sideswipe, turning or lane changing	Roadway design inadequate for traffic conditions	Widen lanes Channelize intersections Provide turning bays Install advance route or street signs Install/improve pavement lane lines Remove parking Reduce speed limit*

Crash Pattern	Probable Cause	General Countermeasure
	Roadway design inadequate for present conditions	Widen lanes Change from angle to parallel parking Prohibit parking Reroute through traffic
Collisions at driveways	Left-turning vehicles	Install median divider Install two-way left-turn lanes
	Improperly located driveway	Regulate minimum spacing of driveways Regulate minimum corner clearance Move driveway to side street Install curbing to define driveway location Consolidate adjacent driveways
	Right-turning vehicles	Provide right-turn lanes Restrict parking near driveways Increase the width of the driveway Widen through lanes Increase curb radii
	Large volume of through traffic	Move driveway to side street Construct a local service road Reroute through traffic
	Large volume of driveway traffic	Signalize driveway Provide acceleration and deceleration lanes Channelize driveway
	Restricted sight distance	Remove sight obstructions Restrict parking near driveway Install/improve street lighting Reduce speed limit*
Night accidents	Poor visibility	Install/improve street lighting Install/improve delineation markings Install/improve warning signs
Wet pavement accidents	Slippery pavement	Overlay existing pavement Provide adequate drainage Groove existing pavement Reduce speed limit* Provide “SLIPPERY WHEN WET” signs
Collisions at railroad crossings	Restricted sight distance	Remove sight obstructions Reduce grades Install train actuated signals (see MUTCD) Install stop signs (see MUTCD) Install gates (see MUTCD) Install advance warning signs (see MUTCD)

*Speed study should be conducted to justify speed limit change.

Appendix B

Costs of Typical Intersection Improvements

Illinois Department of Transportation

Appendix B

Improvements	Cost
Install Street Lighting	$10,000- $15,000 per pole
Install Traffic Signals at Unsignalized Intersections	$100,000- $160,000
Rumble Strips	$3500 per leg of intersection
Install Advance Warning Devices	$7000 each for flashing light
Install 12” Signal Lenses	$130 per section; backplate $70 each
Install Overhead Signals	$25,000 per mast arm; $10,000 per signal post
Adjust Signal Phasing	$1000- $4000
Install Signal Actuation (for Both Intersections and Left Turn Lanes)	$20,000- $30,000
Re-Time Signals	$10,000
Provide Signal Progression	$4,000- $10,000 per intersection
Channelize Intersection	$200,000- $1,000,000
Install Stop Signs	$800 each
Improve/ Install Pavement Markings	$4000- $6000 for thermoplastic; $2000- $4000 for paint
Provide Turning Bays/Lanes	$50,000- $125,000 per bay/lane
Improving Turning Radii	$40,000 - $100,000
Install Controller	$20,000
Grade Separation at Intersection	$1,000,000 and up

Appendix C

Crash Countermeasures
and
Corresponding Crash Reduction Factors

Excerpted from:
Illinois Highway Safety Improvement Program
Benefit-Cost Tool Users Manual, 2008

Illinois Department of Transportation

COUNTERMEASURES	Unit	Service Life	CRF	Crash Type Affected
1.1 General				
1.1.1 Improvement/Realignment/Reconstruction URBAN	Unit Qnty	15	50%	All
1.1.2 Improvement/Realignment/Reconstruction RURAL	Unit Qnty	15	30%	All
1.2 Pavement				
1.2.1 Widening and Resurfacing or Widening alone	Miles	15	25%	All
1.2.2 Resurfacing alone	Miles	10	-	
1.2.3 De-Slick (formerly known as skidproofing)	Miles	5	45%	WP
1.2.4 Rumble Strips (Shoulder)	Miles	3	30%	FO,OVT-off the road
1.2.5 Rumble Strips (Centerline)	Miles	3	-	
1.2.6 Rumble Strips (Transverse)	Miles	3	25%	All
1.2.7 Channelization	Miles	15	50%	RE,HO,SSD,SOD,LT,FO,OVT,T,RT
1.2.8 Raised Reflective Marker Median	Miles	15	50%	HO,SOD,LT,T,RT
1.2.9 Rumble Strip Median	Miles	10	50%	HO,SOD,LT,T,RT
1.2.10 Thermoplastic or Preformed Tape Median	Miles	3	50%	RE,HO,SSD,SOD,LT,RT,T
1.2.11 Painted Median	Miles	2	50%	RE,HO,SSD,SOD,LT,RT,T
1.2.12 Lane Addition	Unit Qnty	15	50%	RE,SSD, LT,RT,T
1.2.13 Left Turn Lane	Unit Qnty	15	25%	Each leg w/added Left turn, RE,SSD,SOD,LT
1.2.14 Right Turn Lane	Unit Qnty	15	25%	Each leg w/added Right turn, RE,SSD,RT
1.2.15 Bidirectional Left Turn Lane	Unit Qnty	15	50%	RE,HO,SSD,SOD,LT
1.2.16 Left Turn Acceleration Lane	Unit Qnty	15	50%	RE,SOD,SSD,AG,LT
1.2.17 Right Turn Acceleration Lane	Unit Qnty	15	50%	RE,SSD,RT
1.2.18 Deceleration Lane	Unit Qnty	15	50%	RE,SSD,RT
1.2.19 One-Way Couple	Unit Qnty	15	50%	All
1.2.20 Install Roundabout	Unit Qnty	15	60%	All
1.2.21 Install Passing Lane	Unit Qnty	15	25%	All
1.2.22 Increase Width of Paved Shoulder	Miles	10	10%	All
1.2.23 Increase Lane Width	Miles	15	10%	All

COUNTERMEASURES	Unit	Service Life	CRF	Crash Type Affected
1.3 Signing				
1.3.1 Modernization	Unit Qnty	6	25%	All
1.3.2 Installation	Unit Qnty	6	40%	All
1.3.3 Speed Signing	Unit Qnty	6	40%	All
1.3.4 Advance Warning Signs	Unit Qnty	6	25%	All
1.3.5 Street Name Signs	Unit Qnty	6	25%	All
1.3.6 Four Way Stop	Unit Qnty	5	50%	All
1.3.7 Minor Leg Stop	Unit Qnty	5	40%	AG,LT,RT,T
1.3.8 Yield Sign	Unit Qnty	5	40%	AG,LT,RT,T
1.3.9 Changeable Message Signs	Unit Qnty	6	10%	All
1.3.10 Delineators	Unit Qnty	4	40%	All
1.3.11 Overhead Sign Truss	Unit Qnty	15	40%	RE,SOD
1.4 Signalization				
1.4.1 Modernization	Unit Qnty	10	25%	PD,FO,RE,SSD,SOD,AG,LT,RT,T
1.4.2 Install Traffic Signals	Unit Qnty	15	23%,-38%	23% All Other. -38% RE. 67% RAG
1.4.3 Relocation of Signal Supports	Unit Qnty	15	25%	FO
1.4.4 Advance Warning with Flasher	Unit Qnty	10	15%	OVT,FO,RE,SSD,SOD,AG,LT,RT,T
1.4.5 Red/Yellow Flashing Beacon	Unit Qnty	10	NR	Not recommended.
1.4.6 Red Flashing Beacon	Unit Qnty	10	45%	AG
1.4.7 Add Left Turn Phase with Left Turn Lane	Unit Qnty	10	35%	All
1.4.8 Add Left Turn Phase without Left Turn Lane	Unit Qnty	10	25%	All
1.4.9 Phase Adjustment	Unit Qnty	10	25%	All
1.4.10 Increase to 12 Inch Lens	Unit Qnty	10	25%	All
1.4.11 Add Traffic Actuation	Unit Qnty	10	25%	RE,AG,LT,RT,T
1.4.12 Time Lane Control	Unit Qnty	10	25%	HO,SOD
1.4.13 Optical Programmed	Unit Qnty	10	25%	RE,AG,LT,RT,T
1.4.14 Add Pedestrian Controls	Unit Qnty	10	25%	PD,PDC
1.4.15 Add Mast Arms and Signal Head per Lane	Unit Qnty	15	25%	RE,AG,LT,RT,T
1.4.16 Safety Lighting	Unit Qnty	15	50%	50% NGT

COUNTERMEASURES	Unit	Service Life	CRF	Crash Type Affected
1.4.17 Install Automated Enforcement of Red Light Violations	Unit Qnty	10	25%	AG, -15% RE