Metropolitan Planning Organization of Johnson County

Date: June 28, 2018

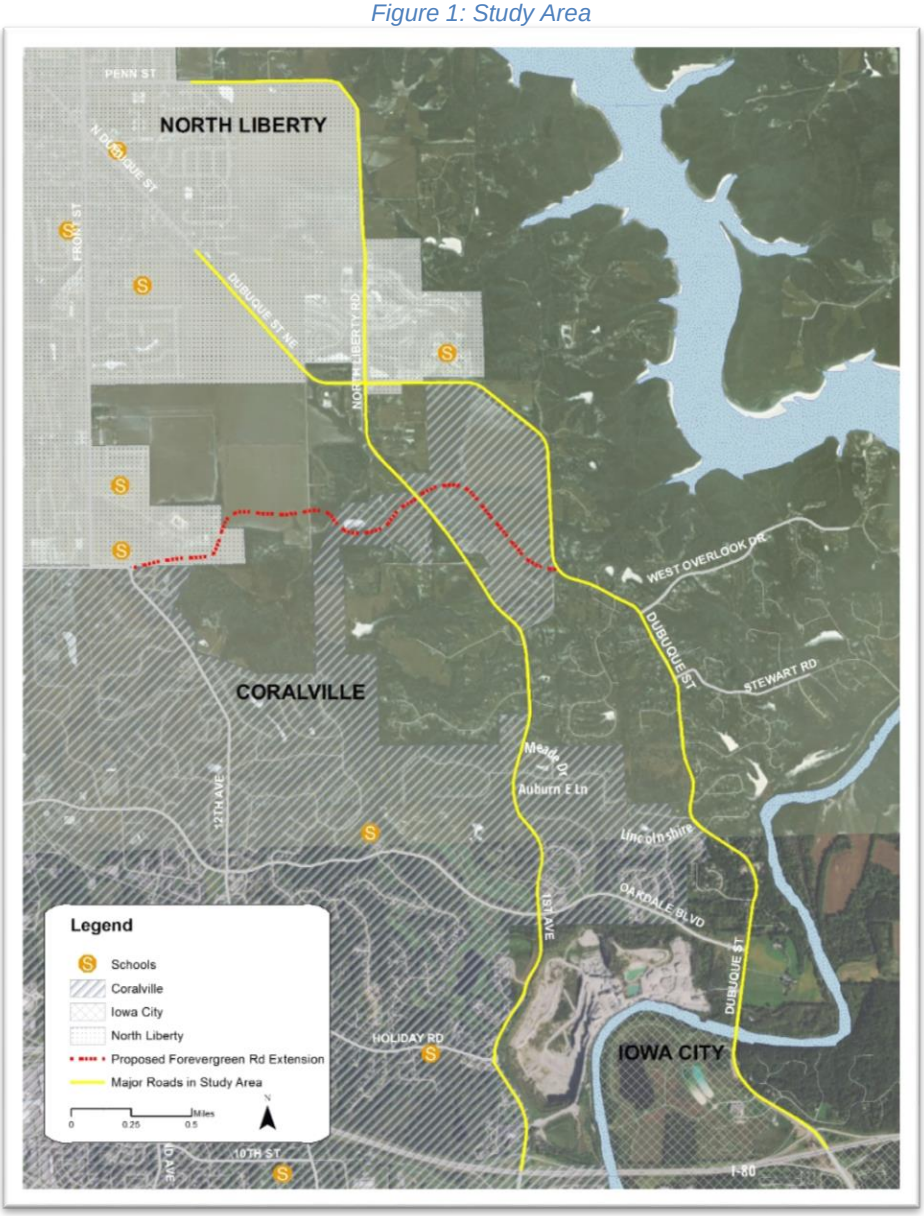
To: Greg Parker; Johnson County Engineer

From: Emily Bothell; Senior Transportation Engineering Planner

Re: 2018 Update - Dubuque Street NE/ 1st Avenue/ North Liberty Road Traffic Study

To follow is an update of the Dubuque Street NE, 1st Avenue, and North Liberty Road area traffic study completed in 2012. This study was initiated to identify and evaluate a range of factors in the corridor (traffic volumes, vehicle speeds, collisions, future road alignments, and land uses) and their impact on Dubuque Street NE, 1st Avenue and North Liberty Road.

Figure 1: Study Area



*The Forevergreen Road extension should not be interpreted as the exact road alignment.

Study Area

The study area is located mostly within unincorporated Johnson County north of Interstate 80 and west of the Coralville Reservoir/ Iowa River (**Figure 1**). The study focuses on Dubuque Street NE and 1st Avenue / North Liberty Road from I-80 to North Liberty's City limits. Dubuque Street NE and North Liberty Road have rural cross-sections while 1st Avenue is a mix of both rural and urban street design.

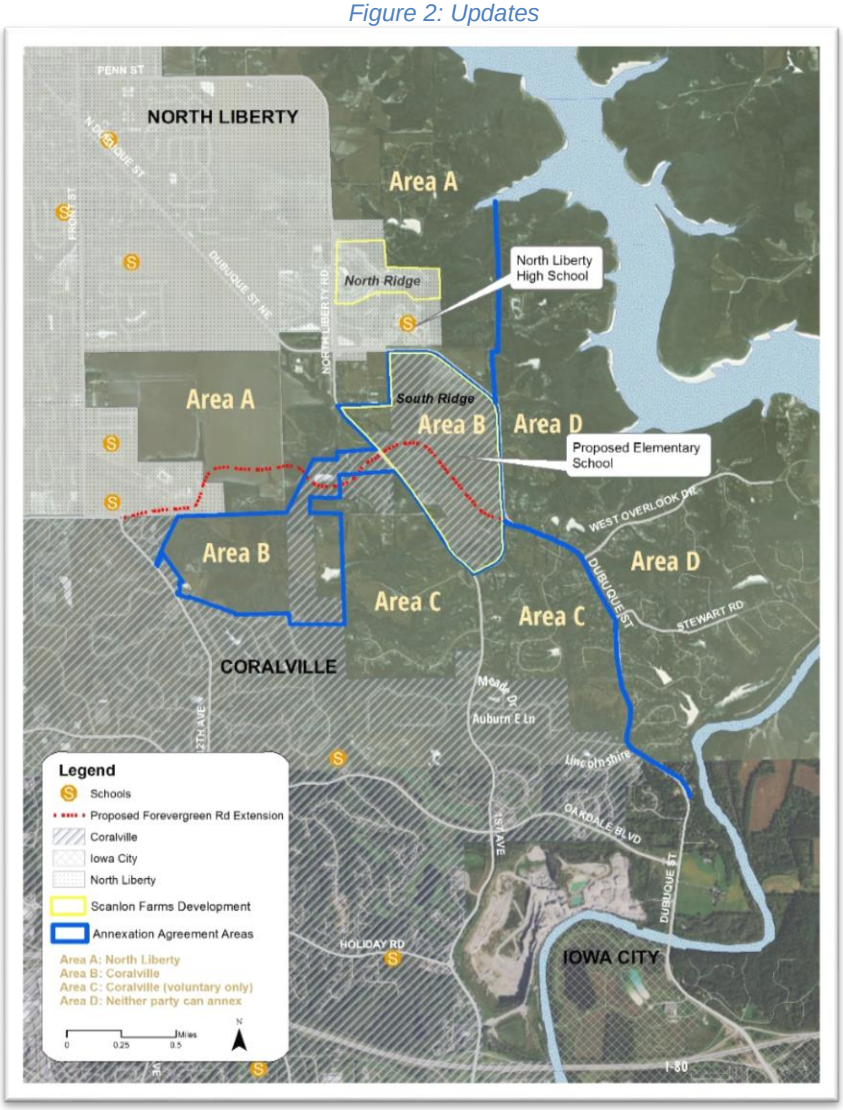
The anticipated Forevergreen Road extension from 12th Avenue to Dubuque Street NE is shown in **Figure 1***. The extension is planned to include a roundabout at North Liberty Road and at Dubuque Street NE/ Rustic Ridge Road NE.

Updates

The following actions have taken place subsequent to the 2012 traffic study (**Figure 2**):

1. Liberty High School was constructed at the northeast corner of North Liberty Road and Dubuque Street NE and opened in the fall of 2017.
2. The Iowa City Community School District is planning to construct an elementary school south of the new high school.
3. North Liberty Road (north of Dubuque Street NE) has been reconstructed to urban design standards and the Forevergreen Road extension is planned for construction between 12th Avenue and Dubuque Street NE.
4. In the fall of 2013 the Oakdale Boulevard extension from Pembrokeshire Drive to Dubuque Street NE was completed. This major east-west arterial street provides a direct link between 1st Avenue in Coralville to Dubuque Street NE.
5. The *MPOJC Travel Demand Model* was updated in 2017 for the entire metropolitan area (including an updated 2045 socio-economic forecast) and recalibrated to the year 2045.

Figure 2: Updates

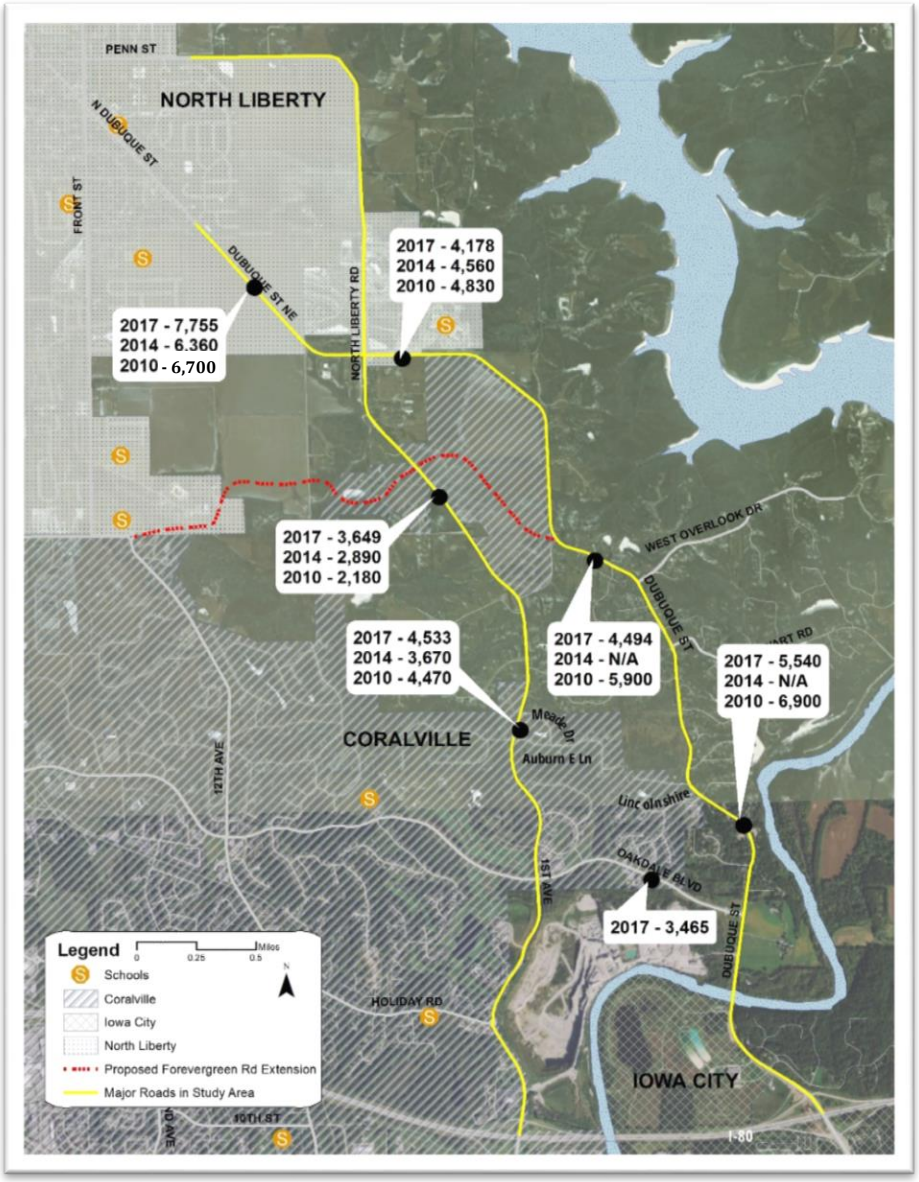


Traffic Counts

The Iowa DOT collects traffic counts throughout Johnson County every four years. The counts are usually taken over a 48-hour period using portable traffic counters. Due to the short duration of the count and the fact that the data represents an average of traffic during a specific period, the 48-hour traffic averages are annualized after they are collected. This is done by multiplying the 48-hour average by an "expansion factor" that has been generated with data provided by several permanent Automatic Traffic Recorded (ATR) sites in the metropolitan area. The ATR sites collect traffic volume data daily throughout the year and provide insight relating to the seasonal change in local travel patterns. Traffic counts used in this report from 2010 and 2014 were collected by the Iowa DOT, whereas the counts reported for 2017 were collected by the Metropolitan Planning Organization of Johnson County (MPOJC).

In the spring of 2017, MPO Staff recorded average daily traffic (ADT) counts on Dubuque Street NE, 1st Avenue, North Liberty Road, and Oakdale Boulevard. The MPO's traffic counts, like the DOT's counts, represent average daily traffic and therefore were annualized by the same method noted above.

Figure 3: Annual Average Daily Traffic Counts



Annual average daily traffic (AADT) count locations on the major roads within the study area between 2010 and 2017 are shown in **Figure 3**. When comparing traffic counts during this time frame, the recorded AADT on Dubuque Street NE has declined except for the location south of Juniper Street. The AADT on North Liberty Road and 1st Avenue has increased at both count locations (**Table 1**).

Collisions 2006-2010

Between 2006 and 2010, there were approximately 236 collisions on the major roads in the study area, which include Dubuque Street NE, 1st Avenue, and North Liberty Road. Most of the collisions were attributed to animal collisions, driving too fast for conditions, swerving / evasive actions, and following too close as shown in **Table 2**.

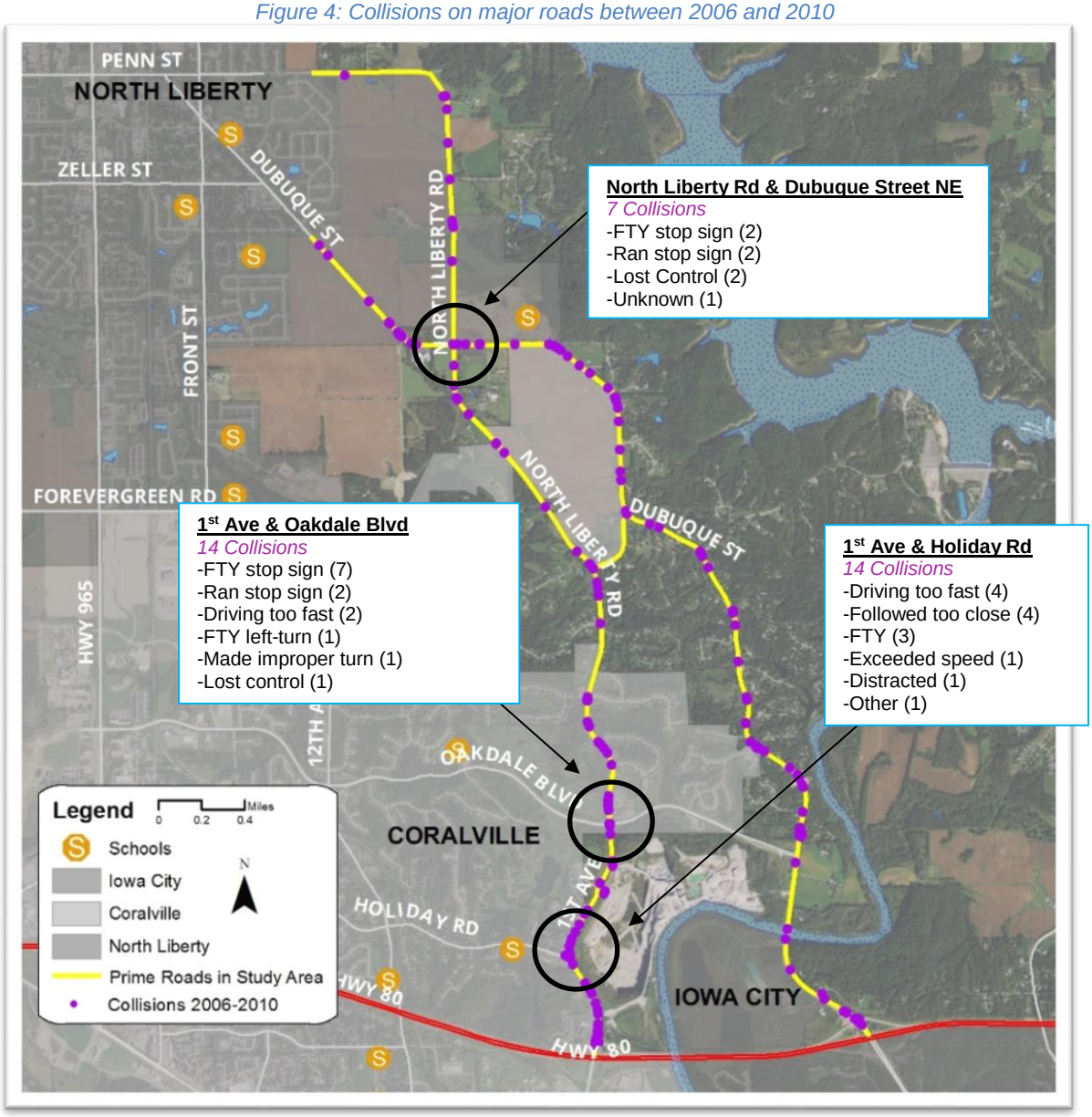
Table 1: Trend in Traffic Counts from 2010-2017

		2010 (Iowa DOT)	2014 (Iowa DOT)	2017 (MPOJC)	Trend 2010-2017
Dubuque Street NE					
1	South of Juniper Street in North Liberty	6,700	6,360	7,755	↑
2	East of North Liberty Road	4,830	4,560	4,178	↓
3	South of Rustic Ridge Road NE	5,900	n/a	4,494	↓
4	South of Lincolnshire Place	6,900	n/a	5,540	↓
North Liberty Road / 1st Avenue					
5	North of Rustic Ridge Road NE	2,180	2,890	3,649	↑
6	North of Oakdale Boulevard	4,470	3,670	4,533	↑

The intersections with a significant number of collisions between 2006 and 2010 are North Liberty Road and Dubuque Street NE, 1st Avenue and Oakdale Boulevard, and 1st Avenue and Holiday Road (**Figure 4**). The intersection of North Liberty Road and Dubuque Street NE was stop-controlled for north- and southbound vehicles during this time and of the seven collisions that occurred at this intersection, four collisions were caused by a motorist failing to yield at the stop sign and motorists running the stop sign. At the intersection of 1st Avenue and Oakdale Boulevard, a majority of collisions were caused by motorists failing to yield at the stop sign. During this time, the intersection was also stop-controlled for east- and westbound vehicles and

is currently controlled by a temporary traffic signal. Lastly, at the 1st Avenue and Holiday Road roundabout, four collisions were caused by motorists driving too fast and four were caused by motorists following too close.

Figure 4: Collisions on major roads between 2006 and 2010



Collisions 2011-2015

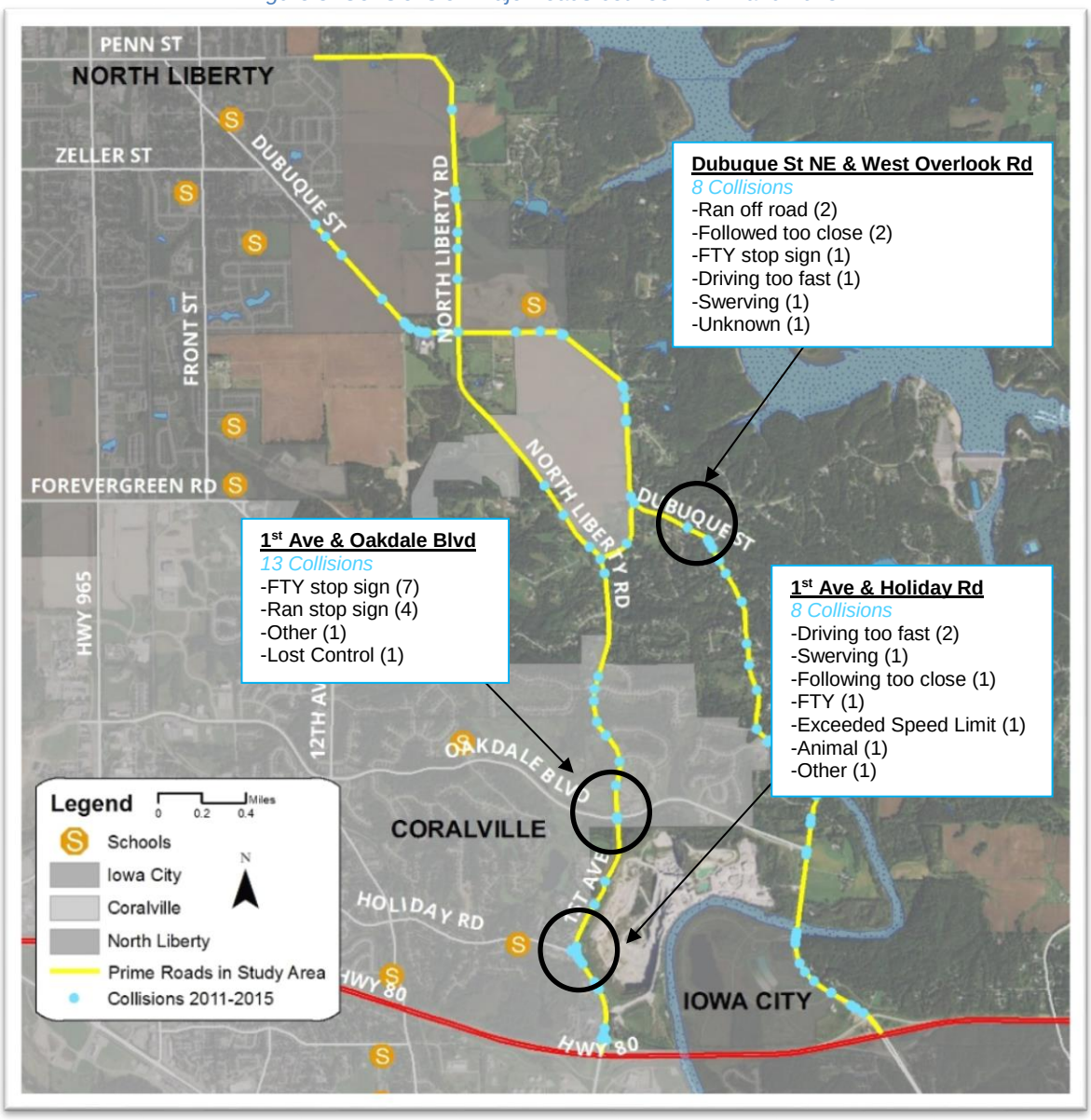
Between 2011 and 2015, there were approximately 152 collisions on the major roads in the study area (**Figure 5**). Most of the collisions were attributed to animal collisions, following too close, driving too fast for conditions, and swerving / evasive actions (comparable to the major cause of collisions occurring between 2006 and 2010 as shown in **Table 2**). That said, the number of collisions occurring in the study area have decreased by 35% in the last five-years. Similar to collisions occurring between 2006 and 2010, over half of all collisions occurred on Dubuque Street NE. This may be due to the fact that Dubuque Street NE has more inherent visibility issues due to the curvature of the road.

Table 2: Major Cause of Collisions

Major Cause	*2006-2010*	*2011-2015*
Animal	21%	18%
Driving too fast	14%	12%
Swerving/evasive action	9%	9%
Followed too close	9%	14%

The intersections with a significant number of collisions between 2011 and 2015 are Dubuque Street NE and West Overlook Road, 1st Avenue and Oakdale Boulevard, and 1st Avenue and Holiday Road (**Figure 5**). The intersection of Dubuque Street NE and West Overlook Road had eight collisions, two of which were caused by a motorist running off the road and two where motorists followed too close. At the intersection of 1st Avenue and Oakdale Boulevard, a majority of collisions were caused by motorists failing to yield at the stop sign (similar to the previous 5 years). During this time, the intersection was stop-controlled for east- and westbound vehicles and is currently controlled by a temporary traffic signal. Lastly, at the 1st Avenue and Holiday Road roundabout two collisions were caused by motorists driving too fast.

Figure 5: Collisions on major roads between 2011 and 2015



Countermeasures

Between 2006 and 2015 the intersections of 1st Avenue and Oakdale Boulevard and 1st Avenue and Holiday Road had the highest concentration of collisions. **Table 3** shows the major causes of collisions and potential countermeasures. If there were less than 2 collisions for a major cause, it was not included in **Table 3**.

At the intersection of 1st Avenue and Oakdale Boulevard, the temporary signal is listed as the primary countermeasure as a majority of collisions were related to the two-way stop-control at

the intersection (motorists failing to yield at the stop sign and running the stop sign). At the intersection of 1st Avenue and Holiday Road, it is recommended that the advance warning signage and pavement markings be reviewed.

Table 3: Potential Countermeasures

		Number of Collisions between 2006 and 2015		Potential Countermeasures
Major Cause	**Manner of Collision**	**1st Ave & Oakdale Blvd**	**1st Ave & Holiday Rd**	
FTY Stop Sign	Broadside	14	0	A temporary signal has been installed and a roundabout is anticipated in the future.
Ran Stop Sign	Broadside	6	0	
Driving too fast	Sideswipe, Rear-end	2	6	Install/review location of current warning signs (speed limit, intersection ahead, etc.)
Following too close	Rear-End	0	5	Install/review location of advance warning signs
Failure to Yield Other	Broadside, Sideswipe	0	3	Refresh pavement markings and install/review location of warning/directional signs
TOTAL		22	14	

Traffic Speeds

In the spring of 2017, MPO Staff collected 85th-percentile speeds on Dubuque Street NE, 1st Avenue, North Liberty Road, and Oakdale Boulevard (**Figure 6**). The 85th-percentile speed is a term for the speed at which 85% of vehicles are traveling at or below.

The speed limit on Dubuque Street NE is 35-mph from the Iowa City, city limits to north of West Overlook Road where it increases to 50-mph for approximately a mile before dropping back down to 35-mph near the high school. At the time the speeds were collected, the speed limit on Dubuque Street NE increased to 50-mph just west of North Liberty Road before transitioning to 25-mph at North Liberty's City limits. Since that time, the speed limit on Dubuque Street NE (west of North Liberty Road) has been adjusted to 35-mph, with a 25-mph transition zone at North Liberty City limits (**see Appendix A**).

The speed limit on 1st Avenue is 45-mph north of Oakdale Boulevard and increases to 55-mph where 1st Avenue becomes North Liberty Road at the Coralville municipal border. At the time speeds were collected, the speed limit on North Liberty Road decreased to 35-mph just north of the intersection with Dubuque Street NE before transitioning to 25-mph near N Juniper Street. Since that time, the speed limit on North Liberty Road has also been adjusted to 45-mph north of the intersection with Dubuque Street NE (**see Appendix A**) before transitioning to 35-mph just east of N Juniper Street.

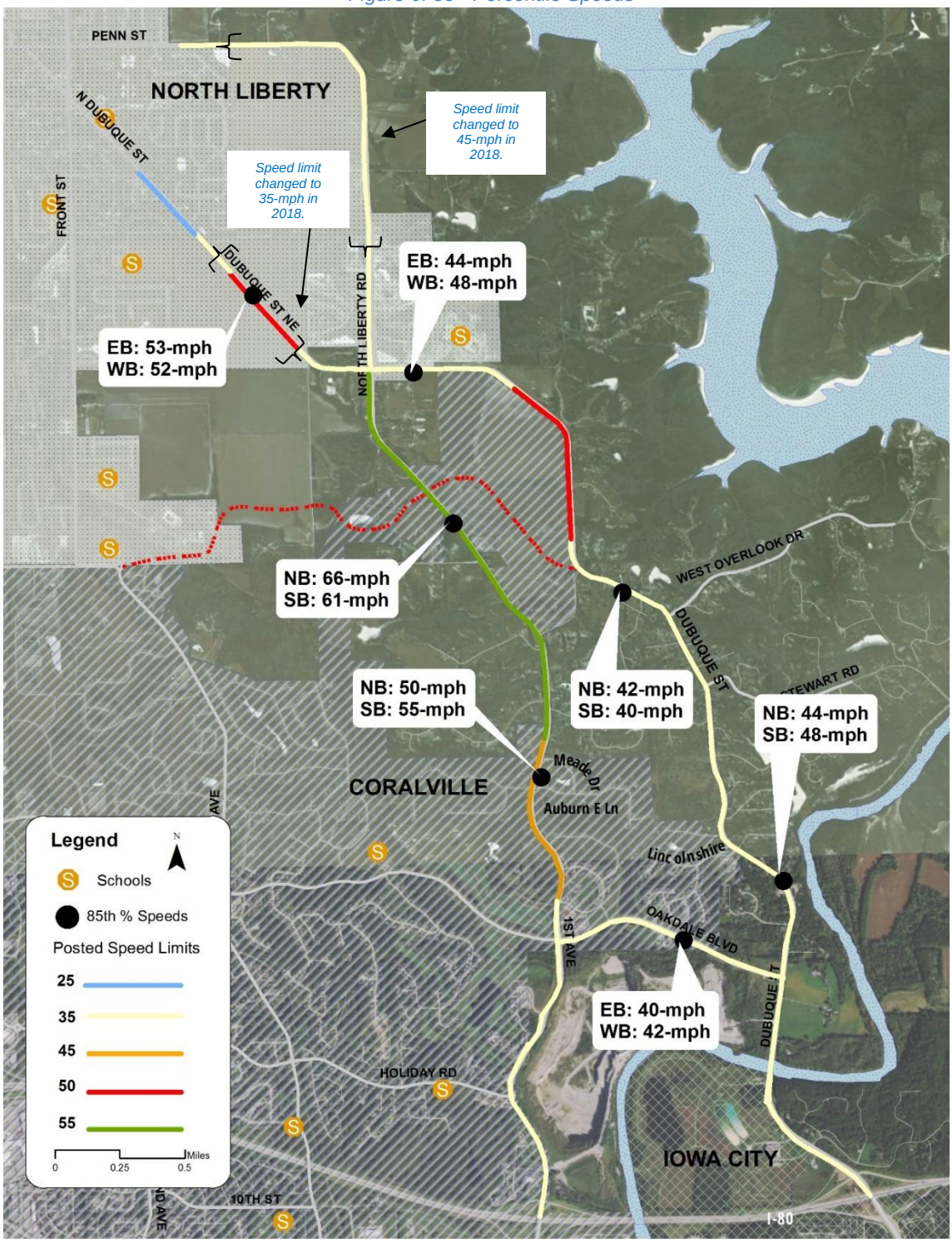
As shown in **Figure 6**, the 85th-percentile speeds on Dubuque Street were 5-13 mph higher than the posted speed limit of 35-mph and 2-3 mph higher than the posted speed limit in the 50-mph zone (west of North Liberty Road). On 1st Avenue, between Meade Drive and Auburn Lane, 85th-percentile speeds were 5-10 mph higher than the posted speed limit of 45-mph. On North Liberty Road, between Rustic Ridge Road and N Dubuque Street, speeds were 6-11 mph higher than the posted speed limit of 55-mph. On Oakdale Boulevard, between N Dubuque Street NE and 1st Avenue, 85th-percentile speeds were 5-7 mph higher than the posted speed limit of 35-mph.

The 85th-percentile speeds on the major roads in the study area were all well above the posted speed limit. Motorists may be selecting higher speeds because this area is largely suburban/ rural with a substantial amount of undeveloped land. The speed limit, design of the road, and surrounding environment must work in concert if desired operating speeds are to be achieved. Once much of the undeveloped land in the study area is developed, it is expected that lower traffic speeds would naturally follow.

Increasing the speed limits on the major roads in the study area is not recommended due to the number of conflict points (driveways, intersections) and the high occurrence of speed related

collisions as recorded between 2006 and 2015. Additionally, as the area further develops the number of conflict points will also increase.

Figure 6: 85th-Percentile Speeds



Land Use

The study area is located in one of the fastest growing areas of the metropolitan region. Since 2012, much of the land in the study area has been rezoned from primarily agriculture zones to residential or interim-development zones. Noteworthy developments include Scanlon Farms (North and South Ridge), Dahnovan Estates, and the new high school (Liberty High) in North Liberty (**Figure 7**).

Figure 7: Future Land Uses

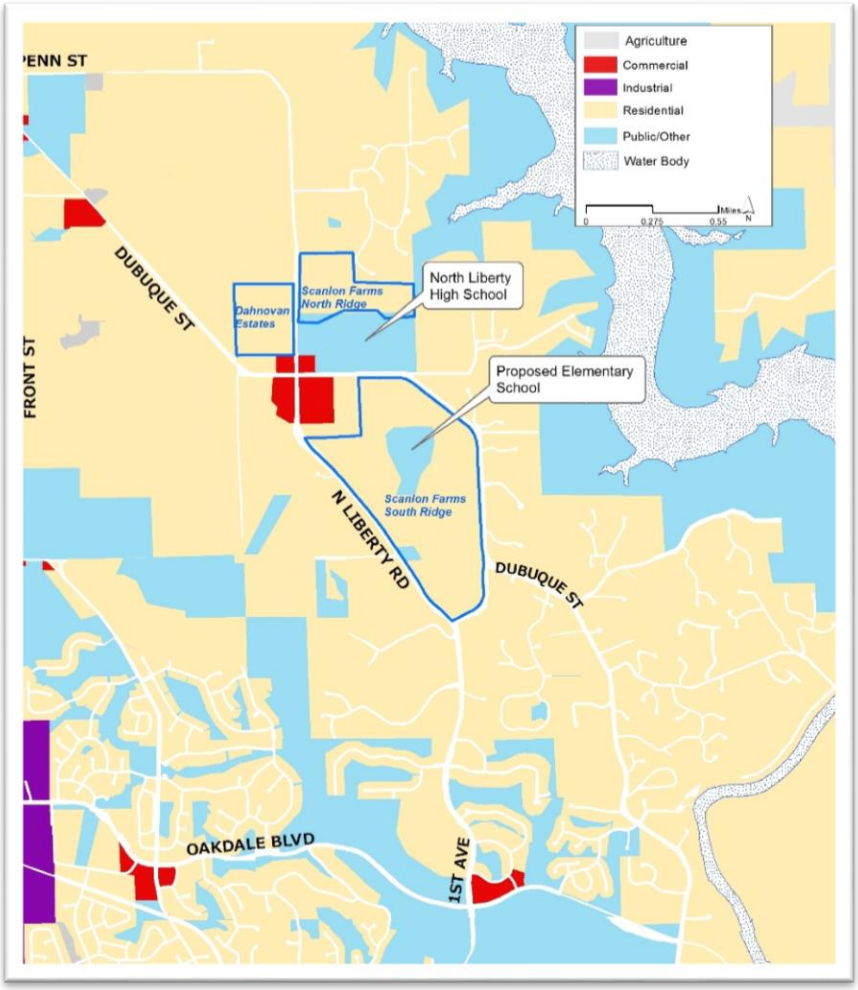


Figure 7 displays the projected future land uses in the study area. Future land use designations were derived from future land use plans and documents of each community. Land use categories represented on the map are simplified in order to make broad comparisons between the municipalities and the County. The northernmost portion of the study area is in the unincorporated area of Johnson County and in the future, will likely change from primarily agriculture to residential.

2045 Forecasted Traffic Volumes

Methodology

The MPOJC 2045 Travel Demand Model was used to analyze the transportation system and provide traffic forecasts on Dubuque Street NE, 1st Avenue, North Liberty Road, and the Forevergreen Road extension. The model includes the most up to date and best available socio-economic and land use data to calculate the expected demand for roadways. Future growth assumptions are based on growth trends, zoning and land use plans, availability of open space, and an evaluation of current land uses and densities. Traffic analysis models are best used for general indications of traffic patterns in the area, but not for prediction of exact volumes. Future traffic volume data is generated with the best knowledge we have at one particular point in time, but there is no model software that can predict specific land use decisions as well as the political, cultural, and economic decisions that influence future traffic. As such, these estimates and traffic forecasts will change as the socio-economic outlook changes over time.

Growth Trends

Table 4: 2045 Population Projections

Entity	*2014 Census Estimate*	*2045 Projection*	*Percent Increase*
North Liberty	18,299	38,500	110%
Coralville	20,349	32,000	57%
Iowa City	73,415	95,700	30%
Tiffin	2,444	8,800	260%
University Heights	1,125	1,400	24%
Total Metro Population	115,632	176,400	53%
Johnson County (in MPO Boundary)	9,906	15,219	54%

The Iowa City Metropolitan Area is one of the fastest growing regions in the state. Between 2010 and 2014, the Census Bureau estimates the region grew by nearly 12,500 residents or a 12% increase in four years. Based on linear growth trends from 2000 to 2014, its estimated that the population residing in North Liberty will increase to 38,500 by 2045 (a 110% increase), while Coralville's population is expected to increase to 32,000 people (a 57% increase) as shown in **Table 4**. By the year 2045, growth trends indicate that the metro area will grow by 53%, or 60,768 people, to approximately 176,400 persons. Based on

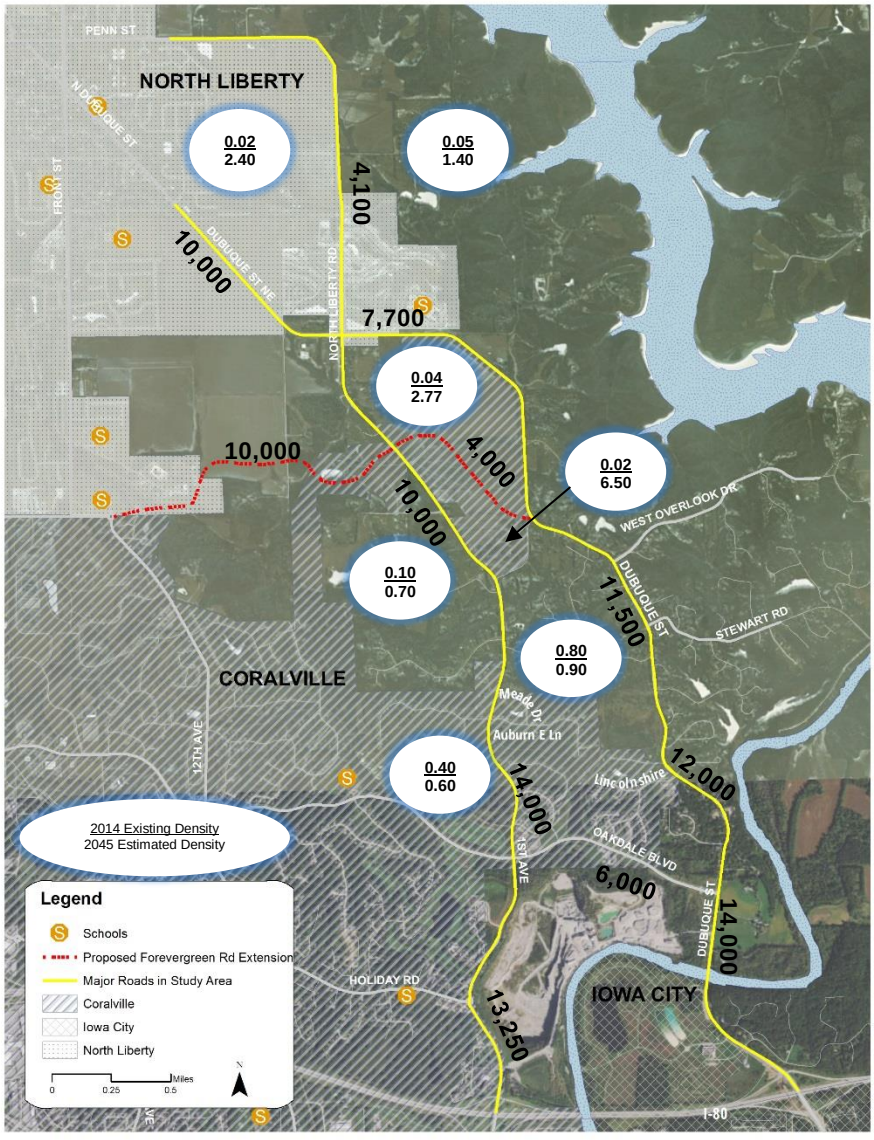
these trends, the study area alone is expected to grow by approximately 9,000 people with an increase of approximately 3,700 households.

Density (households/acre) was estimated using growth trends, land use plans and feedback from municipalities expecting to annex parcels in the undeveloped study area. Densities are all 'net' after taking into account infrastructure, open space, waterways, etc. Current density in the study area is well below 1 household per acre north of Rustic Ridge Road NE on account of the large percentage of undeveloped parcels in this area as shown in **Figure 8**. South of Rustic Ridge Road NE, current density rises to approximately 0.80 households/acre. In 2045, density is expected to increase to approximately 2.8 households/acre north of the Forevergreen Road extension, 2.4 households/acre in the northernmost portion of the study area (north of Dubuque Street NE), 6.5 households/acre just south of the Forevergreen Road extension and north of Rustic Ridge NE, and between 0.60 and 0.90 households/acre further south. Residential development in the unincorporated area tends to be lower density while residential development in the incorporated areas tends to be more moderate.

Commuting within the Metro Area

Within the metro area, many residents live in one community but travel daily to another community for work. The greatest number of inter-city-commuters travel from Coralville to Iowa City (4,611), followed by Iowa City residents who commute to Coralville (3,038), and North Liberty residents who travel to Iowa City on a daily basis (1,325). That being said, many residents within the metro area utilize the Dubuque Street NE, 1st Avenue, and North Liberty Road corridors as they are the primary arterials linking North Liberty and Iowa City.

Figure 8: Existing and Estimated Densities (Households / Acre) & 2045 Forecasted Volumes



Traffic Volumes

In the year 2045, the MPO Traffic Model forecasts that a Forevergreen Road extension between 12th Avenue and North Liberty Road would attract approximately 10,000 vehicles per day (vpd) and 4,000 vpd between North Liberty Road and Dubuque Street NE (**Figure 8**). The majority of traffic on Forevergreen Road is generated by residents in the study area, traveling to and from their homes. Forevergreen Road is expected to serve as the main east-west route to this area.

Forecasted traffic volumes on Dubuque Street NE are expected to increase by roughly 2,000 vpd south of Juniper Street, approximately 3,300 vpd east of North Liberty Road, approximately 5,600 vpd southeast of Rustic Ridge NE, and roughly 5,000 vpd south of Lincolnshire.

The model also predicts traffic volumes on North Liberty Road/1st Avenue to range from 10,000 vpd north of Rustic Ridge Road NE to 14,000 vpd just north of Oakdale Boulevard. On 1st Avenue between I-80 and Holiday Road the model forecasts approximately 13,000 vpd.

Table 5: 2045 Forecasted Volumes

		2010 (Iowa DOT)	2014 (Iowa DOT)	2017 (MPOJC)	2045 Forecasted Volumes
Dubuque Street NE					
1	South of Juniper St in North Liberty	6,700	6,360	7,755	10,000
2	East of North Liberty Rd	4,830	4,560	4,178	7,700
3	South of Rustic Ridge Rd NE	5,900	n/a	4,494	11,500
4	South of Lincolnshire Pl	6,900	n/a	5,540	12,000
North Liberty Road / 1st Avenue					
5	North of Rustic Ridge Rd NE	2,180	2,890	3,649	10,000
6	North of Oakdale Blvd	4,470	3,670	4,533	14,000
Forevergreen Road					
7	Between 12th Ave & North Liberty Rd	-	-	-	10,000
8	Between North Liberty Rd & Dubuque St NE	-	-	-	4,000

In 2045, the forecasted traffic volumes on Dubuque Street NE, 1st Avenue, and North Liberty Road are well under the theoretical capacity of a suburban arterial (approximately 15,800 vehicles per day at Level of Service E). The highest projected volume in the study area is 14,000 vpd on 1st Avenue, north of Oakdale Boulevard, and Dubuque Street NE, south of Oakdale Boulevard. Based on this information, the two-lane arterial street design (on each roadway) will continue to be acceptable to the year 2045.

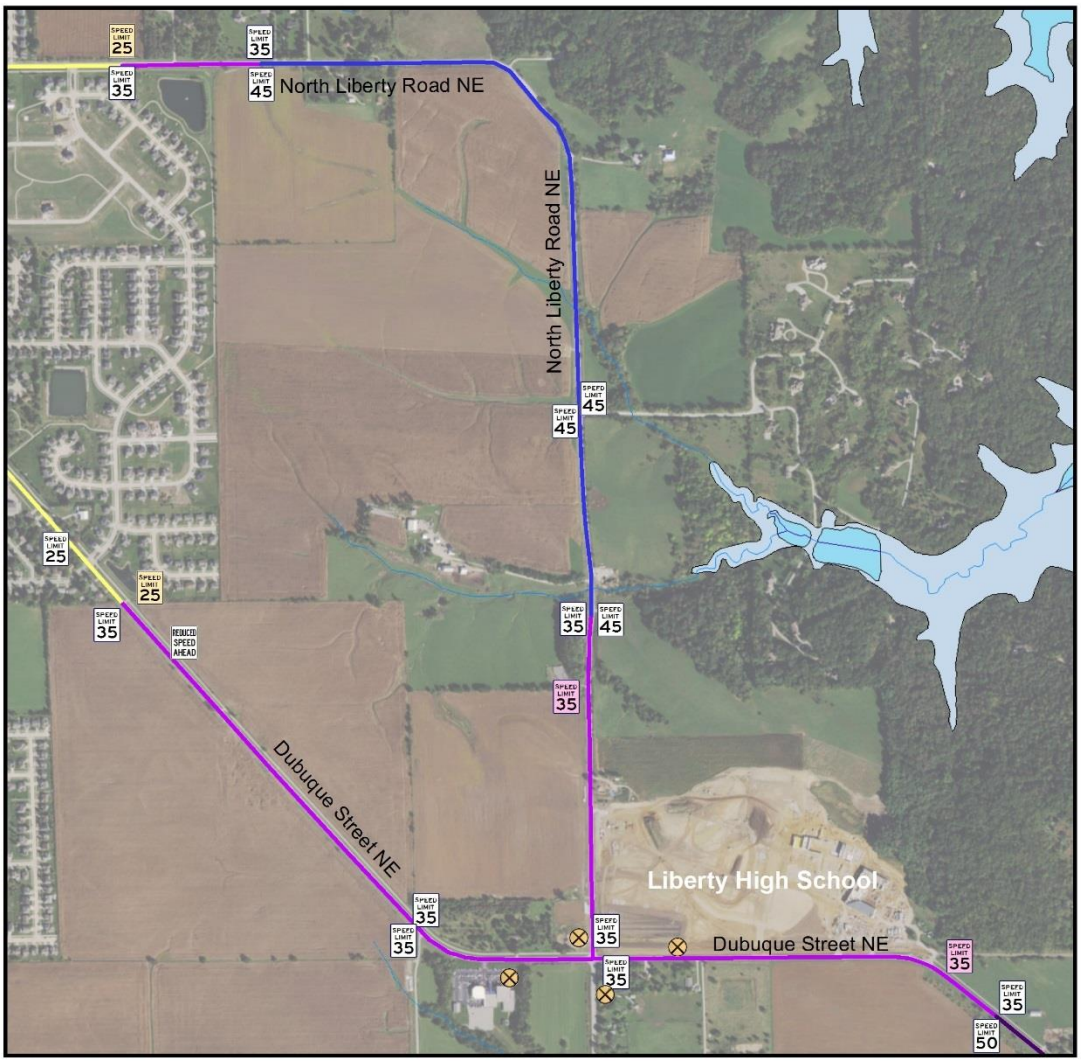
Conclusion

Dubuque Street NE, 1st Avenue, and North Liberty Road are currently well under daily capacity and experience relatively little delay (daily Level of Service at C or better). According to the recorded AADT, volumes on 1st Avenue/ North Liberty Road are trending upward (2010-2017) whereas Dubuque Street NE has seen a decrease in AADT except for the area south of Juniper Street. Between 2011 and 2015, collisions in the study area have decreased by 35% with over half of all collisions occurring on Dubuque Street NE.

In the year 2045, forecasted traffic volumes on roads in the study area are expected to be under the maximum daily capacity, but some portions of 1st Avenue will experience peak-hour congestion. The model forecasts traffic volumes on Dubuque Street NE to range from 7,700 vpd south of North Liberty City limits, to 14,000 vpd south of Oakdale Boulevard. Traffic estimates on 1st Avenue/ North Liberty Road range from 10,000 vpd north of Rustic Ridge Road NE to 14,000 vpd north of Oakdale Boulevard. Though traffic volumes are expected to increase on all roads in the study area, significant peak hour congestion is not projected with the Forevergreen Road and Oakdale Boulevard connections. It is recommended that left-turn lanes or other intersection improvements be reviewed at the major intersections with significant collisions (1st Avenue / Oakdale Boulevard and Dubuque Street NE / West Overlook Road) as traffic volumes increase or if notable increases in congestion occur as a result of the Forevergreen Road extension.

APPENDIX A: Speed Limit changes on Dubuque Street NE and North Liberty Road

Proposed Speed Limits on Dubuque Street NE & North Liberty Road



Legend

- 25 MPH
- 35 MPH
- 45 MPH
- 50 MPH
- Radar Feedback Sign
- Reduced Speed Ahead
- 25 MPH & Radar Feedback Sign
- Roundabout Warning

Posted Speed Limits

- 25
- 35
- 45
- 50

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Author: Emily Bothell
Projection: NAD 1983 State Plane Iowa South

MPOJC

N W E S

0 0.1 0.2 0.4 Miles