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Subject:
Logan Union Champaign County
Regional Planning Commission Freight Study

1. Introduction

The Logan Union Champaign County Regional Planning Commission (LUC RPC) has been the Regional Transportation Planning Organization (RTPO) responsible for administering planning and zoning regulations for Logan, Union, and Champaign counties for the past 50 years. The mission of the LUC RPC is to promote planned growth, encourage sustainable development, preserve land resources, and improve the quality of life by providing guidance, support, information, planning, and education services to citizens and government member agencies. As part of its mission, in April 2017 the LUC RPC retained Arcadis U.S., Inc. (Arcadis) to conduct a local freight study for the benefit of the western Ohio region. The local freight study is known as the *LUC RPC Freight Study.*

2. Previous Studies

The *LUC RPC Freight Study* is a product of two previous studies. The first is Ohio's *Access Ohio 2040* long-range transportation plan. The second is a regional freight study (the *U.S. 68 & S.R. 31 2-Lane Study*), which resulted from *Access Ohio 2040* and is currently being performed by the Ohio Department of Transportation (ODOT).

Access Ohio 2040 included a statewide freight study and an economic analysis of freight origins, destinations, and movement through Ohio. It identified Ohio's production, distribution, and population centers and a network of interstate highways and two-lane roads connecting these centers. The network is referred to as the Strategic Transportation System (STS). The STS includes all interstate highways as the backbone of the freight network and strategic two-lane regional roadways that reach the major production, distribution, and population centers in Ohio. The STS provides a broadly balanced and robust network serving roadway freight.

Access Ohio 2040 directed that the two-lane roads included in the STS be studied beyond statewide freight trends. Therefore, as *Access Ohio 2040* is implemented, ODOT is performing regional operational freight studies to analyze portions of the two-lane STS network that are critical to freight movement. The *U.S. 68 & S.R. 31 2-Lane Study* is the second of the regional freight studies. It is an in-depth needs assessment and operational analysis of U.S. 68 and S.R. 31 to identify and prioritize incremental system improvements to promote the efficient and safe flow of freight. The STS routes and the *U.S. 68 & S.R. 31 2-Lane Study* are illustrated at the top of Figure 1 in Attachment 1.

3. Project Background

The *LUC RPC Freight Study,* being conducted concurrently with the *U.S. 68 & S.R. 31 2-Lane Study*, is a local operational freight study. The *U.S. 68 & S.R. 31 2-Lane Study* identifies U.S. 68 and S.R. 31 as regional connections moving freight from Champaign, Logan, Hardin, Hancock, and Union counties in western Ohio to I-75 to continue north into Canada or south to the Gulf of Mexico. As part of the stakeholder outreach process for the *U.S. 68 & S.R. 31 2-Lane Study,* ODOT invited a cross section of representative freight users (e.g., manufacturers, logistics operators/distributors, freight shippers), public agencies, and law enforcement officers to engage in a series of in-person interviews in an effort to obtain additional information regarding the movement of freight along U.S. 68 and S.R. 31, congested locations, and safety hot spots. Through these stakeholder interviews, ODOT learned that several large Marysville-based freight generators use local state and county roads to travel east-west between U.S. 33 in Marysville and East Liberty and U.S. 68 in West Liberty, and then to Interstate 75.

4. Study Purpose and Study Area

The LUC RPC has identified seven state and county roads, totaling 50 miles within its jurisdiction, that may be likely route choices for trucks traveling east-west between U.S. 33 and U.S. 68. The goal of the *LUC RPC Freight Study* is to examine the existing conditions along each state route, identify improvements to make the state routes safer and more efficient, and identify methods to redirect trucks from county routes to state routes. As part of the *LUC RPC Freight Study,* Arcadis has determined truck volumes,

assessed the existing conditions, and analyzed crash data for the seven state and county roads in the study area. This memo presents the findings of the *LUC RPC Freight Study* and potential solutions to route freight traffic to state routes. Table 1 identifies each road and the beginning and end for the portion included in this study. The *LUC RPC Freight Study* is illustrated on Figure 1 in Attachment 1.

Table 1 Study Area Roads

Road	Length (miles)	Begin Point	End Point
S.R. 287	15.4	U.S. 68 (in West Liberty)	U.S. 33 (Northwest of Marysville)
S.R. 245	12.4	U.S. 68 (in West Liberty)	S.R. 559 (in North Lewisburg)
S.R. 559	4.7	S.R. 245 (in North Lewisburg)	S.R. 287
Logan C.R. 44	5.3	U.S. 33 (Northwest of Marysville)	U.S. 68
Champaign C.R. 111	4.8	S.R. 559 (in North Lewisburg)	S.R. 245 (in Mingo)
Logan C.R. 28/ Champaign C.R. 11	4.0	S.R. 245 (in Mingo)	S.R. 287
Logan C.R. 153	3.4	S.R. 287	U.S. 33 (Northwest of Marysville)

Overall, these seven roads serve as vital local connections between U.S. 33 in Marysville and East Liberty and U.S. 68 in West Liberty.

5. Stakeholder Interviews

To obtain information regarding operations on the seven state and county routes in the study area, the movement of freight on each route, and locations of safety concerns or bottlenecks, the *LUC RPC Freight Study* included a stakeholder outreach component similar to that of the *U.S. 68 & S.R. 31 2-Lane Study*. Three stakeholder interviews were conducted.

The first interview was part of the *U.S. 68 & S.R. 31 2-Lane Study* interview conducted with the City of Urbana and the Clark County Metropolitan Planning Association on June 1, 2017. The second interview occurred during the project kickoff meeting on July 10, 2017 and included the Logan County engineer and the Champaign County engineer. The third interview was part of the *U.S. 68 & S.R. 31 2-Lane Study* interview with One World Logistics conducted on July 12, 2017. Questions specific to the roads in the study area were included in each interview.

Overall, stakeholders were in consensus that traffic moves freely along the seven state and county routes included in the study area. The Logan and Champaign County engineers each cited recurring maintenance issues. They indicated that the alignment, roadway cross section, and pavement composition on county roads are not designed to

accommodate freight traffic and both agencies spend a portion of their annual maintenance budget repairing damage. The Logan and Champaign County engineers and One World Logistics cited safety concerns at locations of substandard horizontal and vertical curves. Specific examples cited include the reverse curves on S.R. 245 west of the Union Chapel Community Church, the intersection geometry at S.R. 287/C.R. 44, and the intersection geometry at C.R. 44/Township Route 15 (T.R. 15).

6. Traffic Volumes

For the *LUC RPC Freight Study,* Arcadis collected traffic volume data at 11 intersections on September 19, 2017. The data included 24 hours of video at each intersection. The 12 daytime hours of the video, from 6 a.m. to 6 p.m., were processed to obtain traffic volumes. The traffic volume data were analyzed to determine existing 12-hour traffic volumes and truck percentages on each road. See Figure 2 in Attachment 1 for a study area map. Traffic volumes are presented in Table 2 and illustrated on traffic volume diagrams included in Attachment 2.

State Route 287

On the portion of S.R. 287 running parallel to U.S. 33, approximately 940 trucks were observed between 6 a.m. and 6 p.m. Between West Liberty and Middleburg, approximately 100 trucks were observed during that same time period.

State Route 245

Between West Liberty and the S.R. 287 intersection, approximately 100 trucks were observed on S.R. 245 between 6 a.m. and 6 p.m. Between the intersection of S.R. 287 and North Lewisburg, approximately 30 to 50 trucks were observed on S.R. 245 during that same time period. Therefore, approximately 50 trucks pass through North Lewisburg between 6 a.m. and 6 p.m. each day.

State Route 559

Approximately 40 trucks were observed on S.R. 559 between 6 a.m. and 6 p.m. These trucks pass through North Lewisburg as they travel north-south on S.R. 559.

Logan County Route 44

Approximately 10 to 25 trucks were observed on C.R. 44 between 6 a.m. and 6 p.m.

Champaign County Route 111

Approximately 15 trucks were observed on C.R. 111 between 6 a.m. and 6 p.m. These trucks pass through North Lewisburg to access County Route 111.

Logan County Route 28/Champaign County Route 11

Approximately 10 to 15 trucks were observed on C.R. 28/C.R. 11 between 6 a.m. and 6 p.m.

Logan County Route 153

Near C.R. 287 in Middleburg, approximately 35 trucks were observed on C.R. 153 between 6 a.m. and 6 p.m. Near U.S. 23, approximately 550 trucks were observed on S.R. 287 between 6 a.m. and 6 p.m.

Overall approximately 35 trucks used C.R. 153 in lieu of the portion of S.R. 287 that runs parallel to U.S. 33. Approximately 10 to 25 trucks used C.R. 44 in lieu of the portion of S.R. 287 that passes through Middleburg. Approximately 10 to 15 trucks used C.R. 28/C.R. 11 to travel between S.R. 245 and S.R. 287. Approximately 15 trucks used C.R. 111 to travel between North Lewisburg and Mingo. A map illustrating the 12-hour truck volumes and 12-hour truck percentages at each intersection for which data were collected is included as Figure 3 in Attachment 1.

Table 2 12-Hour Traffic Volumes, Truck Percentages, and Truck Volumes

Route	Segment	12-Hour Traffic Volume (Total No. of Vehicles)	Truck (%)	12-Hour Truck Volume (Total No. of Trucks)
S.R. 287	Near U.S. 33	1,800	29%	940
	East of S.R. 559	1,400 to 1,750	7%	110
	West of S.R. 559	700 to 800	11%	90
S.R. 245	West of Champaign C.R. 28/ Logan C.R. 11	430	6%	30
	East of Champaign C.R. 28/ Logan C.R. 11	600	8%	50
S.R. 559	-	400 to 600	7% to 9%	40
Logan C.R. 44	West of T.R. 15	300	6% to 8%	25
	East of T.R. 15	200	4%	10
	Near Logan C.R. 153	900	1%	10
Champaign C.R. 111	-	200 to 400	3% to 4%	15
Champaign C.R. 28/ Logan C.R. 11	Near S.R. 287	80	7%	10
	Near Champaign C.R. 111	350	2%	15
Logan C.R. 153	Near S.R. 287	700 to 1,000	4% to 5%	35
	Near U.S. 33	2,900	19%	550

7. Crash Analysis

Arcadis reviewed the crash data, provided by the ODOT TIMS website, from 2014 to 2016 for each route included in the study area. A total of 178 crashes were documented within the study area, approximately 10 percent of which involved freight.

Forty-eight crashes (25 percent) resulted in an injury. Sixty-eight (40 percent) occurred in the dark or in low-light conditions. Forty-seven (29 percent) occurred on wet, icy, or snowy pavement. Twenty (10 percent) involved freight. Fixed-object crashes, animal strikes, rear-end crashes, and angle crashes are the four most common crash types, accounting for 28 percent, 21 percent, 14 percent, and 12 percent of the crashes, respectively. The crash analysis results for each route are summarized below:

State Route 287

A total of 60 crashes occurred on S.R. 287. Fourteen (23 percent) resulted in an injury. Twenty-eight (47 percent) occurred in the dark. Twelve occurred during inclement weather; seven of these occurred on icy pavement and five occurred on wet pavement. Ten (17 percent) crashes involved freight.

Twenty (33 percent) of the crashes were fixed-object crashes. Seventeen (28 percent) were animal strikes, five were angle crashes, and five were rear-end crashes. Four crashes, including one head-on collision, occurred at the intersection with CR 144.

Overall, 62 percent of the crashes on S.R. 287 were fixed-object crashes and animal strikes.

State Route 245

A total of 66 crashes occurred on S.R. 245. Nineteen (29 percent) resulted in an injury. Twelve (18 percent) occurred in the dark. Nineteen occurred during inclement weather; nine of these occurred on icy/snowy pavement and 10 occurred on wet pavement. Five (7 percent) crashes involved freight.

Sixteen (24 percent) of the crashes were fixed-object crashes. Thirteen (20 percent) were angle crashes and nine were animal strikes. Half of the crashes occurred between 10 a.m. and 3 p.m. Eight of the fixed-object crashes occurred in the curves between C.R. 47 and C.R. 1.

State Route 559

A total of 14 crashes occurred on S.R. 559. Four (29 percent) resulted in an injury. None involved freight.

Four (29 percent) of the crashes were fixed-object crashes, four (28 percent) were angle crashes, and one was an animal strike. Six crashes, half of which were angle crashes, occurred in North Lewisburg.

Logan County Route 44

A total of 12 crashes occurred on C.R. 44. Four (33 percent) resulted in an injury. Five (42 percent) occurred in the dark. None involved freight.

Seven (58 percent) of the crashes were animal strikes, two (17 percent) were angle crashes, and two were fixed-object crashes. Four of the animal strikes occurred in the dark between S.R. 559 and C.R. 277.

Champaign County Route 111

A total of three crashes occurred on C.R. 111, none of which resulted in an injury or involved freight. One crash occurred in the dark, although on an illuminated segment of

C.R. 111. One crash was an angle crash, one was a sideswipe crash, and one was a fixed-object crash. One crash occurred on icy pavement.

Champaign County Route 28/Logan County Route 11

A total of seven crashes occurred on C.R. 28/C.R. 11. Two (29 percent) resulted in an injury. Four (57 percent) occurred in the dark. Two occurred during inclement weather; one occurred on icy pavement and one occurred on wet pavement. Two (29 percent) involved freight.

Five (71 percent) of the crashes were fixed-object crashes, four of which occurred between S.R. 245 and Bump Road. One was an animal strike. Four of the seven crashes occurred from 8 p.m. to 5 a.m., and three occurred at the intersection with S.R. 287.

Logan County Route 153

A total of 16 crashes occurred on C.R. 153. Five (31 percent) resulted in an injury. Six (38 percent) occurred at dusk or in the dark. Six occurred during inclement weather; two of these occurred on icy pavement and four occurred on wet pavement. Three (18 percent) involved freight.

Five (31 percent) of the crashes were rear-end crashes, five (31 percent) were animal strikes, and three were fixed-object crashes. Four crashes occurred during the a.m. peak hour and four occurred during the p.m. peak hour. Four of the five rear-end crashes occurred between S.R. 287 and C.R. 153. Three crashes occurred east of the Valeo Station, one of which involved freight. Three of the five animal strikes occurred within 3,000 feet of Middleburg.

A diagram illustrating the crash analysis for each route is included in Attachment 3.

8. Existing Conditions

Arcadis visited the study area on July 10, 2017 and used a dashboard camera to document the existing conditions of each of the seven roads in the study area. Existing conditions documented include roadway geometry, number of lanes, left- and right-turn lanes, and truck restrictions. The existing conditions for each road are summarized below. The study area map included in Attachment 1 illustrates these locations.

State Route 287

S.R. 287 is an east-west minor collector road that connects U.S. 33 to S.R. 245 and then to U.S. 68 (via 2.2 miles of S.R. 245) in West Liberty. The 2.3-mile-long segment that runs parallel to U.S. 33 has a 55-mile-per-hour (mph) posted speed limit, one lane in each direction, and 2- to 4-foot-wide shoulders. There are southbound right-turn lanes to NEX Transport and NK Parts Industries. There are a southbound right-turn lane and a

northbound left-turn lane to Honda. This portion of S.R. 287 provides access to Nissin Brake, Midwest Express, Inc., Honda, Clark Trucking, NEX Transport, and NK Parts Industries.

The 13.2-mile-long segment that runs east to west connects U.S. 33 to U.S. 68 in West Liberty. This portion is one lane in each direction with a 1-foot-wide shoulder. The posted speed limit is 55 mph for the majority of this segment, with a short section in Middleburg posted at 25 mph and a short section in West Liberty posted at 35 mph.

Most of the intersections along S.R. 287 are free flowing with the minor streets controlled by stop signs. During the site visit, Arcadis noted the following unique characteristics moving west to east along S.R. 287 within the study area:

- The four-leg intersection where S.R. 287 ends and becomes S.R. 245 is stop controlled on the north and south approaches. The movement transitioning from S.R. 287 to S.R. 245 is free flowing; therefore, motorists may not realize the route number changed. Four crashes occurred at this intersection. Two crashes were angle crashes, one crash was a head-on collision, and one was a backing crash.
- West of C.R. 28/C.R. 11 is a series of reverse curves with 25 mph advisory speed placards on the horizontal curve warning signs. These reverse curves were cited as examples of substandard curves during stakeholder interviews. Three crashes occurred in the location of these curves. Two of the crashes were fixed-object crashes that occurred when the vehicle exited the roadway, and the third was an overturning vehicle.
- The four-leg intersection at C.R. 28/C.R. 11, at Union Chapel Community Church, is stop controlled on the minor street approaches. The east and west approaches from S.R. 287 are free flowing. Two crashes occurred at this intersection, one of which was a fixed-object crash and the other an animal strike.
- The four-leg intersection at C.R. 44/C.R. 41, at Union Chapel Community Church, is stop controlled on three of the four legs. The north approach from S.R. 287 eastbound is free flowing; however, traffic must turn left to continue on S.R. 287. The east approach from S.R. 287 westbound must stop at this intersection and turn right to continue on S.R. 287. This intersection was cited during stakeholder interviews. Trucks must travel into the oncoming lanes while trying to negotiate the turn required to navigate this intersection. One crash, an angle crash, occurred at this intersection.
- The three-leg intersection at C.R. 347 is stop controlled on the west approach from S.R. 287 eastbound. Traffic must stop and turn right to continue on S.R. 287. Four crashes occurred at this intersection; two were left-turn crashes, one was a head-on crash, and one was an angle crash.

- The three-leg intersection at C.R. 153 is stop controlled at all approaches. However, a slip ramp allows for a free-flowing movement for S.R. 287 westbound traffic. Traffic at the north approach from S.R. 287 eastbound must stop and turn left to continue on S.R. 287. One crash, an angle crash, occurred at this intersection.

State Route 245

S.R. 245 is an east-west major collector road that connects S.R. 559 in North Lewisburg to U.S. 68 in West Liberty. The road is one lane in each direction with 1- to 2-foot-wide shoulders. The posted speed limit is 55 mph for most of the segment, with a short section in West Liberty and North Lewisburg posted at 35 mph.

Most of the intersections along S.R. 245 are free flowing with the minor streets controlled by stop signs. During the site visit, Arcadis noted the following unique characteristics moving west to east along S.R. 245 within the study area:

- The four-leg intersection of S.R. 245 and U.S. 68 is controlled by a traffic signal. Three crashes occurred at this intersection, two of which were angle crashes and one a backing crash.
- East of West Liberty is a series of reverse curves with 30 mph advisory speed placards on the horizontal curve warning signs. Eleven crashes occurred in the vicinity of these reverse curves. Seven of these 11 crashes were fixed-object crashes that occurred when the vehicles exited the roadway, two were animal strikes, one was an angle crash, and one was an overturning vehicle.
- The four-leg intersection where S.R. 287 ends and becomes S.R. 245 is stop controlled on the north and south approaches. Traffic at the south approach from S.R. 245 westbound must stop and turn left to continue on S.R. 245. Traffic at the west approach from S.R. 245 eastbound must turn right to continue on S.R. 245, although the movement is free flowing. Four crashes occurred at this intersection. Two of the four crashes were angle crashes, one was a head-on collision, and one was a backing crash.
- The three-leg intersection at C.R. 223 is stop controlled on the south and east approaches. Traffic at the east approach from S.R. 245 westbound must stop and turn right to continue on S.R. 245. Traffic at the north approach from S.R. 245 eastbound must turn left to continue on S.R. 245, although the movement is free-flowing. A rear-end and an angle crash occurred at this intersection.
- The three-leg intersection at C.R. 171 is stop controlled on the south and east approaches. Traffic at the south approach from S.R. 245 westbound must stop and turn left to continue on S.R. 245. Traffic at the west approach from S.R. 245 eastbound

must turn right to continue on S.R. 245, although the movement is free-flowing. No crashes occurred at this intersection.

- The four-leg intersection at C.R. 507 is stop controlled at all four approaches. No crashes occurred at this intersection.
- West of the intersection with C.R. 28/C.R. 11 is a series of horizontal curves with 15 mph advisory speed placards on the horizontal curve warning signs. One overturning vehicle crash occurred at this intersection.
- The three-leg intersection at C.R. 28/C.R. 11 is stop controlled on the north approach. Traffic at the east approach from S.R. 245 eastbound must turn right to continue on S.R. 245, although the movement is free flowing. Similarly, traffic at the south approach from S.R. 245 westbound must turn left to continue on S.R. 245, although the movement is free flowing. No crashes occurred at this intersection.
- The four-leg intersection of S.R. 245 and C.R. 296 is stop controlled on three of the four approaches. Traffic at the north approach from S.R. 245 eastbound must stop and turn left to continue on S.R. 245. Traffic at the east approach from S.R. 245 westbound must turn right to continue on S.R. 245, although the movement is free-flowing. A left-turn crash, and an angle crash occurred at this intersection.
- The four-leg intersection of S.R. 245 and Sycamore Street, in North Lewisburg, is controlled by a traffic signal. Three crashes occurred at this intersection. One crashed involved a pedestrian, one crash was a sideswipe crash where both vehicles were traveling in the same direction, and one was a rear-end crash.
- The four-leg intersection of S.R. 245 and S.R. 559, in North Lewisburg, is stop controlled on the north and south approaches. Three crashes occurred at this intersection. One crash was a right-turn crash, one was a backing crash, and one was an angle crash.

<u>State Route 559</u>

S.R. 559 is a north-south minor collector that connects S.R. 287 west of Middleburg to S.R. 245 in North Lewisburg. The road is one lane in each direction with 1- to 2-foot wide shoulders. The posted speed limit is 55 mph for the majority of the segment, with a short section in North Lewisburg posted at 35 mph.

Most of the intersections along S.R. 559 are free flowing with the minor streets controlled by stop signs. During the site visit, Arcadis noted the following unique characteristics moving north to south along S.R. 559 within the study area:

- The three-leg intersection at S.R. 287, in North Lewisburg, is stop controlled on the south approach from S.R. 559 northbound. No crashes occurred at this intersection.
- The four-leg intersection at C.R. 44 is stop controlled on the east and west approaches. The north and south approaches from S.R. 559 are free flowing. One angle crash occurred at this intersection.
- At the southern end of S.R. 559, there are three horizontal curves with 15 mph advisory speed placards on the horizontal curve warning signs. No crashes occurred in these curves.
- The four-leg intersection of S.R. 559 and C.R. 111 is stop controlled on the east and west approaches. The north and south approaches from S.R. 559 are free flowing. One sideswipe crash involving two vehicles traveling in the same direction occurred at this intersection.
- The four-leg intersection of S.R. 559 and S.R. 245 is stop controlled on the north and south approaches from S.R. 559. Three crashes occurred at this intersection. One crash involved a pedestrian, one was a sideswipe crash where both vehicles were traveling in the same direction, and one was a rear-end crash.

Logan County Route 44

C.R. 44 is an east-west local road that connects U.S. 33 northwest of Marysville to U.S. 68 (via 1.1 miles of C.R. 153 and via 7.8 miles of S.R. 287) in West Liberty. The road is one lane in each direction, with no shoulder and no edge line. The posted speed limit is 55 mph. C.R. 44 is signed to prohibit trucks.

Most of the intersections along C.R. 44 are free flowing with the minor streets controlled by stop signs. During the site visit, Arcadis noted the following unique characteristics moving west to east along C.R. 44 within the study area:

- The four-leg intersection at S.R. 287/C.R. 41, at Union Chapel Community Church, is stop controlled on three of the four approaches. Traffic at the south approach from C.R. 44 must stop.
- The three-leg intersection at T.R. 15 is stop controlled on the south approach. Traffic at this approach from T.R. 15 must stop. The intersection is located in a horizontal curve with 15 mph advisory speed placards on the horizontal curve warning signs. A substandard grade break was observed at this intersection. This grade break causes freight traffic to bottom out as while turning from T.R. 15 to C.R. 44.

- East of the intersection at T.R. 15, there is a horizontal curve with a 25-mph advisory speed placard on the horizontal curve warning sign. One fixed object crash occurred in this curve.
- The four-leg intersection at S.R. 559 is stop controlled on the east and west approaches. Traffic at these approaches from C.R. 44 must stop.
- The three-leg intersection at S.R. 277 is stop controlled on the west approach. Traffic at this approach from C.R. 44 eastbound must stop and turn left to continue on C.R. 44. Traffic at the north approach from C.R. 44 westbound must turn right to continue on C.R. 44, although the movement is free flowing.
- The three-leg intersection where C.R. 44 ends and becomes C.R. 153 is stop controlled on the east approach. The south approach from C.R. 44 is a free-flowing movement onto C.R. 153. The movement transitioning from C.R. 44 to C.R. 153 is free flowing; therefore, motorists may not realize the route number changed.

Champaign County Route 111

C.R. 111 is an east-west local road that connects S.R. 559 in North Lewisburg to C.R. 28/C.R. 11 in Mingo. The road is one lane in each direction with no shoulder. There are no pavement markings. The posted speed limit is 55 mph.

Most of the intersections along C.R. 111 are free flowing with the minor streets controlled by stop signs. During the site visit, Arcadis noted the following unique characteristics moving west to east along C.R. 111 within the study area:

- The three-leg intersection at C.R. 28/C.R. 11 is stop controlled on the east approach from C.R. 111.
- Along C.R. 111, there are 10 horizontal curves with advisory speed placards on the horizontal curve warning signs. The speeds posted on the placards range from 20 mph to 35 mph.
- The four-leg intersection of S.R. 559 and C.R. 111, in North Lewisburg, is stop controlled on the east and west approaches. Traffic at the east approach from C.R. 111 must stop.

Champaign County Route 28/Logan County Route 11

C.R. 28/C.R. 11 is a north-south local road that connects S.R. 287 to S.R. 245 and to C.R. 111 in Mingo. The road is one lane in each direction with no shoulder. There are no edge lines north of C.R. 507. The posted speed limit is 55 mph.

Most of the intersections along C.R. 28/C.R. 11 are free flowing with the minor streets controlled by stop signs. During the site visit, Arcadis noted the following unique characteristics moving south to north along C.R. 28/C.R. 11 within the study area:

- The three-leg intersection at S.R. 245 is stop controlled on the south approach from C.R. 28/C.R. 11.
- The three-leg intersection at C.R. 111 is stop controlled on the east approach. The north and south approaches from C.R. 28/C.R. 11 are free flowing.
- There are two horizontal curves at the north end and two horizontal curves at the south end of C.R. 28/C.R. 11 with 15 mph advisory speed placards on the horizontal curve warning signs.
- The three-leg intersection at S.R. 287 is stop controlled on the north approach from C.R. 44/C.R. 11.

Logan County Route 153

C.R. 153 is an east-west local road that connects U.S. 33 to S.R. 287 in Middleburg. The road is one lane in each direction with no shoulder. The posted speed limit is 55 mph.

Most of the intersections along C.R. 153 are free flowing with the minor streets controlled by stop signs. During the site visit, Arcadis noted the following unique characteristics moving west to east along C.R. 153 within the study area:

- The four-leg intersection at S.R. 287 is stop controlled at two of the four approaches. Traffic at the north and south approaches from C.R. 153 must stop.
- The three-leg intersection at C.R. 44 is stop controlled on the east approach. Traffic at this approach from C.R. 153 westbound must stop and turn right to continue on C.R. 153. Traffic at the north approach from C.R. 44 eastbound must turn left to continue on C.R. 153, although the movement is free flowing.
- East of the intersection at C.R. 44, there is one horizontal curve with a 25-mph advisory speed placard and two horizontal curves with 35 mph advisory speed placards on the horizontal curve warning signs.
- The three-leg intersection at S.R. 287 is stop controlled at all approaches.

9. Recommendations for Further Study

Based on the *LUC RPC Freight Study* area, existing conditions, 12-hour traffic volumes, and crash data documented herein, this section presents actions to route freight traffic on state routes versus county routes within the study and also identifies locations where further study is recommended.

State Routes

The 12-hour truck traffic volumes indicate that most truck drivers choose S.R. 287, S.R. 245, and S.R. 559 to travel east-west between U.S. 33 and U.S. 68. Given that these three roads are also the routes preferred by the LUC RPC and the Logan and Champaign County engineers prefer freight to use, Arcadis has identified 12 locations for further study to potentially improve safety, improve traffic operation and make the state routes the most desirable choice for freight traffic. Each location is classified as intersection or non-intersection related. Intersection related sites are typically locations where traffic traveling along the state route must stop or significantly reduce their speed to navigate along the state route. Non-intersection related sites are typically related to horizontal and vertical curves. Table 3 summarizes the 12 sites recommended for further study. Figure 4 in Attachment 1 illustrates each site.

Site 1: On S.R. 245, east of West Liberty, is a series of reverse curves. The curves have horizontal curve warning signs but only one of the signs has an advisory speed placard. There are small chevron signs in each curve. Eleven crashes occurred near these curves. Seven crashes were fixed-object crashes that occurred when the vehicles exited the roadway, two crashes were animal strikes, one crash was an angle crash, and one was an overturning vehicle. None of these crashes involved freight. An engineering study is recommended to identify improvements that may reduce crashes. Potential improvements that could be considered include enhanced signing (i.e., larger chevrons and advisory speed placards), surface treatments to increase skid resistance, superelevation adjustments, curve flattening and/or roadway realignment.

Site 2: The three-leg intersection of S.R. 245 and S.R. 287 is stop controlled at the north approach, which is C.R. 1 and on the south approach, which is S.R. 245 westbound. Traffic on S.R. 245 westbound must stop and turn left to continue on S.R. 245. Traffic on S.R. 287 is not required to stop even though S.R. 287 ends at this intersection. No further study of this location is currently recommended.

Table 3 Recommendations for Further Study

Site Number	Recommendation Type	Location		State Route Traffic Must Stop	Sight Distance	Geometric Alignment	Signing
1	Non-Intersection Oriented	S.R. 245	-			X	X
2	Intersection Oriented	S.R. 245	S.R. 287	X			
3	Non-Intersection Oriented	S.R. 287	-			X	
4	Intersection Oriented	S.R. 287	Logan C.R. 44	X		X	
5	Intersection Oriented	S.R. 287	Logan C.R. 307	X			
6	Intersection Oriented	S.R. 287	Logan C.R. 153	X			X
7	Intersection Oriented	S.R. 245	Champaign C.R. 223	X			
8	Intersection Oriented	S.R. 245	Logan C.R. 171	X	X		
9	Intersection Oriented	S.R. 245	Champaign C.R. 108	X	X	X	
10	Non-Intersection Oriented	S.R. 245	-			X	
11	Intersection Oriented	S.R. 287	Logan C.R. 28/ Champaign C.R. 11	X			
12	Intersection Oriented	S.R. 287	S.R. 296	X			

Site 3: On S.R. 287, west of C.R. 28/C.R. 11, is a series of reverse curves with 25 mph advisory speed placards on the horizontal curve warning signs. These reverse curves were cited as safety concerns during the stakeholder interviews and they were noted as one of two reasons One World Logistics routes their freight on S.R. 245, and through North Lewisburg, versus S.R. 287. Three crashes occurred in these curves. Two of the crashes were fixed-object crashes that occurred when a passenger vehicle exited the roadway, and the third was a semi-truck that overturned. An engineering study is

recommended to identify improvements that may reduce crashes. Potential improvements that could be considered include enhanced signing (i.e., larger chevrons and advisory speed placards), surface treatments to increase skid resistance, superelevation adjustments, curve flattening and/or roadway realignment.

Site 4: The four-leg intersection of S.R. 287 and C.R. 44/C.R. 41, at Union Chapel Community Church, is stop controlled at three of the four approaches. Traffic on S.R. 287 eastbound must stop and turn left to continue on S.R. 287. Traffic on S.R. 287 westbound must reduce speed and turn right to continue on S.R. 287. In addition, One World Logistics cited the geometry at this intersection as the second reason they route their freight on S.R. 245, and through North Lewisburg, versus S.R. 287. Freight traveling westbound on S.R. 287 must travel into the oncoming lane while turning right to continue on S.R. 287. An engineering study is recommended to identify improvements that may reduce crashes and improve freight operations. Potential improvements that could be considering include increased turning radii and/or a free-flow right turn.

Site 5: The three-leg intersection of S.R. 287 and C.R. 347 is stop controlled at the west approach forcing S.R. 287 eastbound traffic to stop and turn right to continue on S.R. 287. No further study of this location is currently recommended.

Site 6: The three-leg intersection at C.R. 153 is stop controlled at all approaches. However, a slip ramp allows for a free-flowing movement for S.R. 287 westbound traffic. Potential improvements that could be considered include enhanced signing.

Site 7: The three-leg intersection of S.R. 245 and C.R. 223 is stop controlled at the south and east approaches. Westbound traffic on S.R. 245 must stop and turn right to continue on S.R. 245. An engineering study is recommended to identify improvements that may improve freight operations. Potential improvements that could be consider include a free-flow right turn.

Site 8: The three-leg intersection of S.R. 245 and C.R. 171 is stop controlled at the south and east approaches. Westbound traffic on S.R. 245 westbound must stop and turn left to continue on S.R. 247. The skew at which C.R. 171 intersects with S.R. 245 limits sight distance at this intersection. An engineering study is recommended to identify improvements that may improve freight operations. Potential improvements that could be consider include a free-flow left turn.

Site 9: The four-leg intersection of S.R. 245 and C.R. 507 is stop controlled at all four approaches. Traffic on S.R. 245 in both directions must stop. The crest vertical curve and the terrain in the southeast quadrant of the intersection limit sight distance. An engineering study is recommended to identify improvements that may improve freight operations. Potential improvements that could be considered include regarding to

increase intersection sight distance which could allow S.R. 245 traffic to cross C.R. 507 without stopping.

Site 10: On S.R. 245, west of the intersection with C.R. 28/C.R. 11, is a series of horizontal curves with 15 mph advisory speed placards on the horizontal curve warning signs. One overturning vehicle crash occurred at this intersection, but it was not freight related. An engineering study is recommended to identify improvements that may reduce crashes. Potential improvements could be considered include enhanced signing, surface treatments to increase skid resistance, superelevation adjustments, curve flattening and/or roadway realignment.

Site 11: The three-leg intersection of S.R. 245 and C.R. 28/C.R. 11 requires traffic on S.R. 245 to reduce speed and turn left or right through this intersection to continue on the state route. An engineering study is recommended to identify geometric intersection improvements that would improve freight operations.

Site 12: The four-leg intersection of S.R. 245 and S.R. 296 is stop controlled on the north, east, and south approaches. Eastbound traffic on S.R. 245 must stop and turn left to continue on the state route. Traffic on S.R. 245 westbound must reduce speed and turn right to continue on S.R. 245. An engineering study is recommended to identify improvements that may improve freight operations. Potential improvements that could be consider include a free-flow right turn.

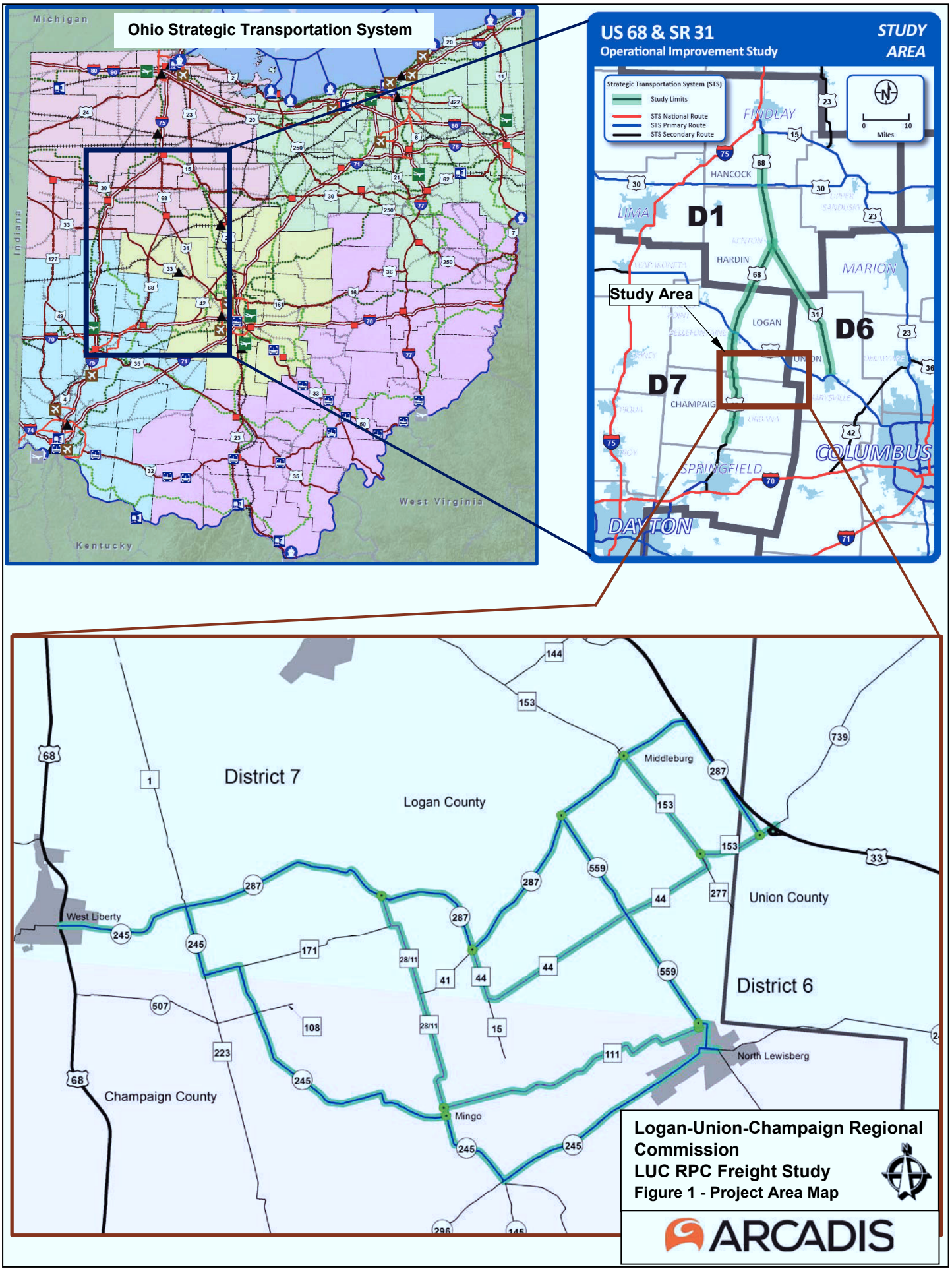
County Routes

The 12-hour truck traffic volumes indicate that some truck drivers (typically 50 trucks or less) choose C.R. 44, C.R. 111, C.R. 28/C.R. 11, and C.R. 153 to travel east-west between U.S. 33 and U.S. 68. Given the maintenance issues, roadway cross section, pavement composition, and safety concerns noted during stakeholder interviews, it is recommended that trucks be redirected from these county routes onto state routes.

A signing, education, and enforcement campaign may facilitate the effort to redirect truck traffic onto S.R. 287, S.R. 245, or S.R. 559. It is recommended that local and state governments work cooperatively to install signs prohibiting trucks on each of the county routes. It is also recommended that the LUC RPC and Marysville-based freight generators cooperate to educate drivers regarding the appropriate route choices, and that state and local police cooperate to enforce the truck restrictions.

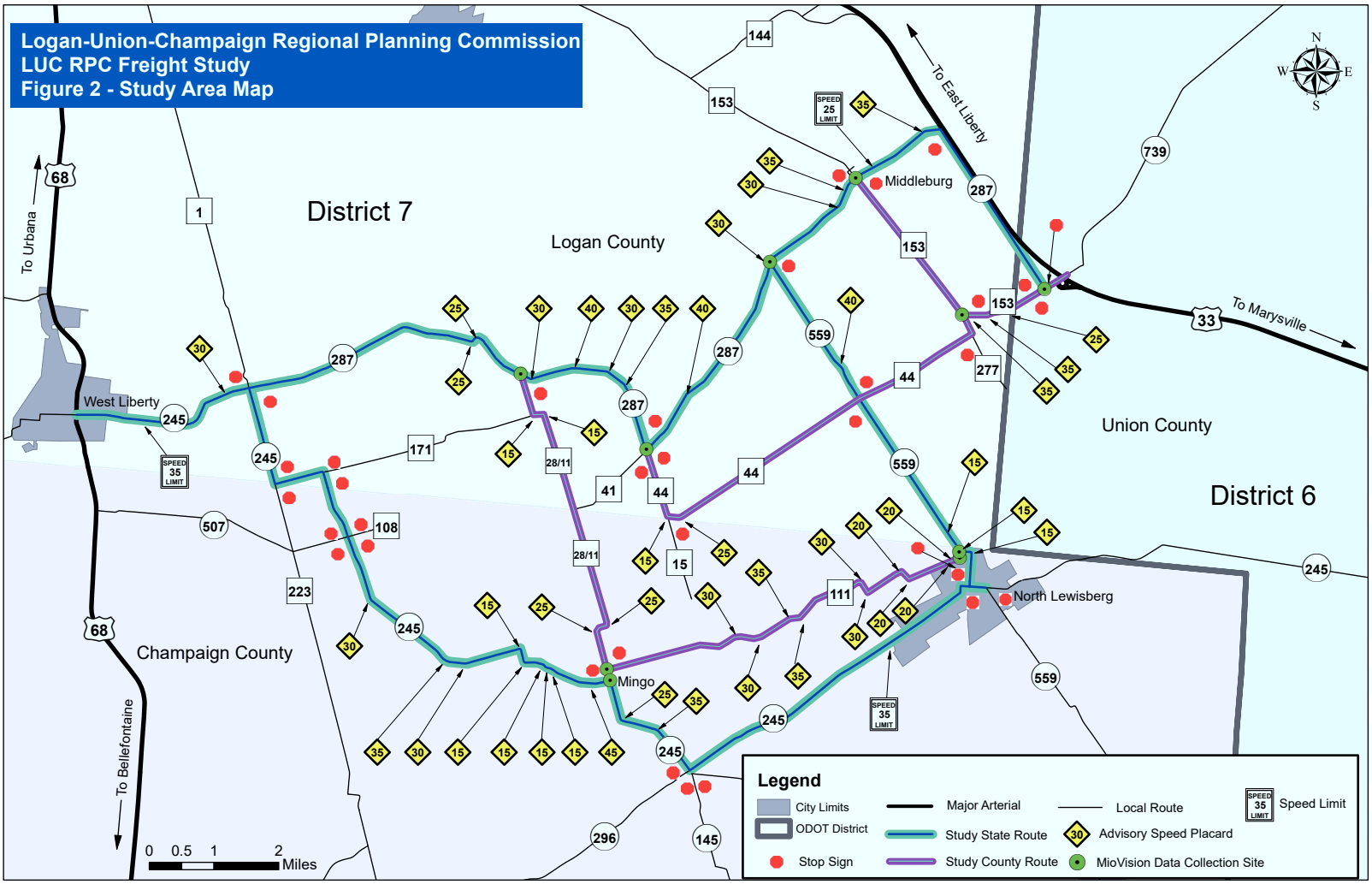
ATTACHMENT 1

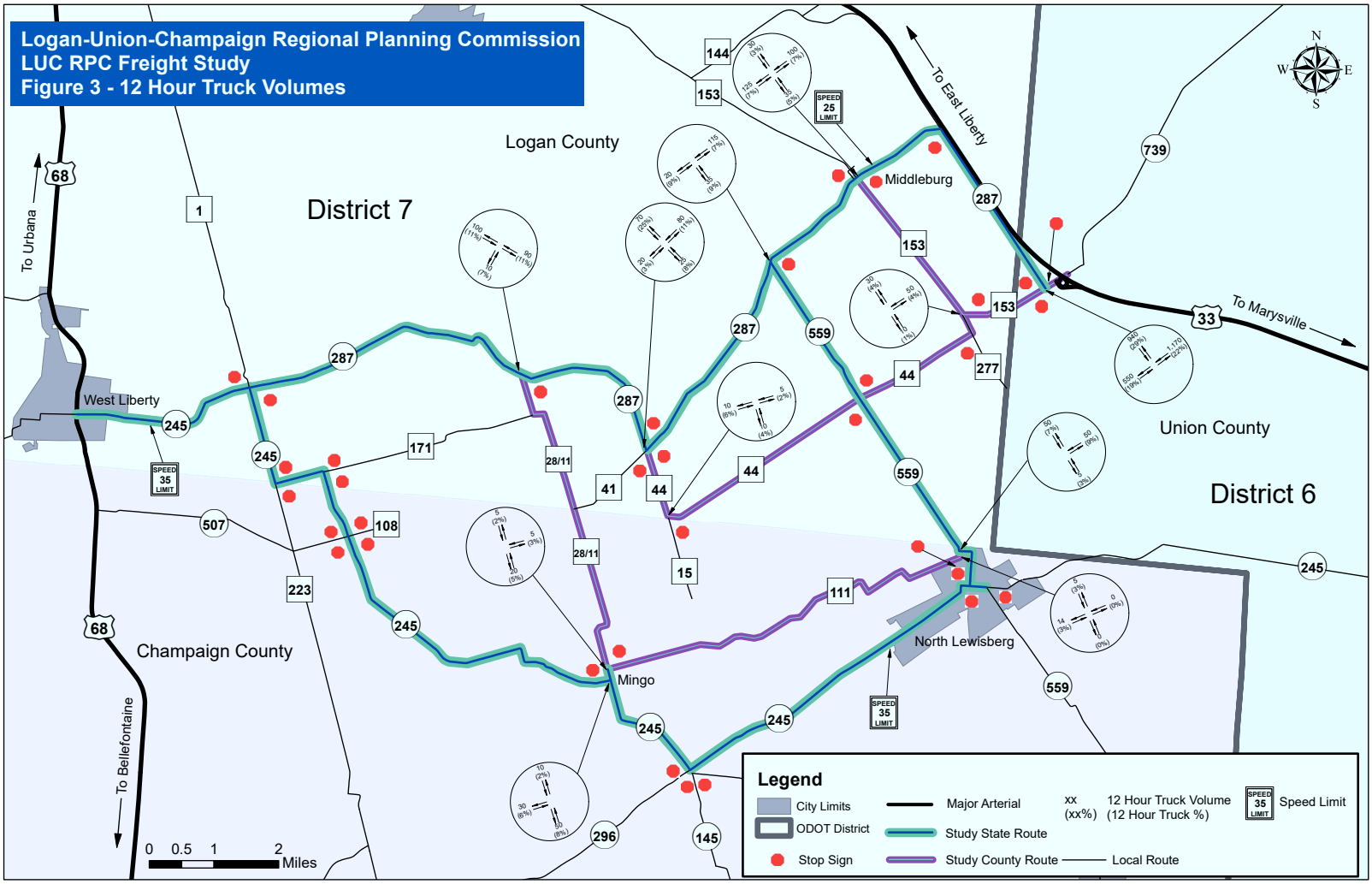
Figures

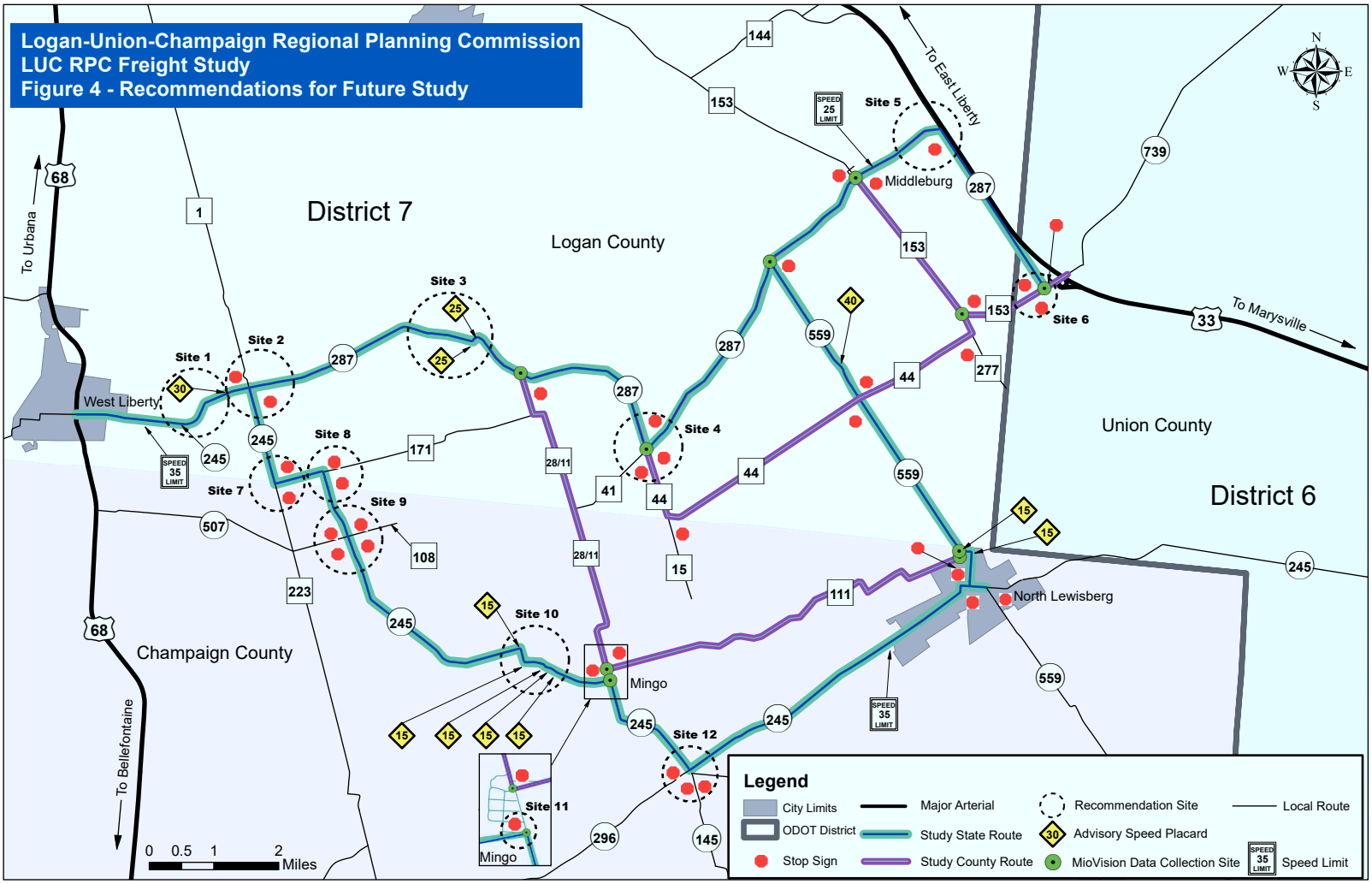


Logan-Union-Champaign Regional Commission
LUC RPC Freight Study
Figure 1 - Project Area Map

ARCADIS

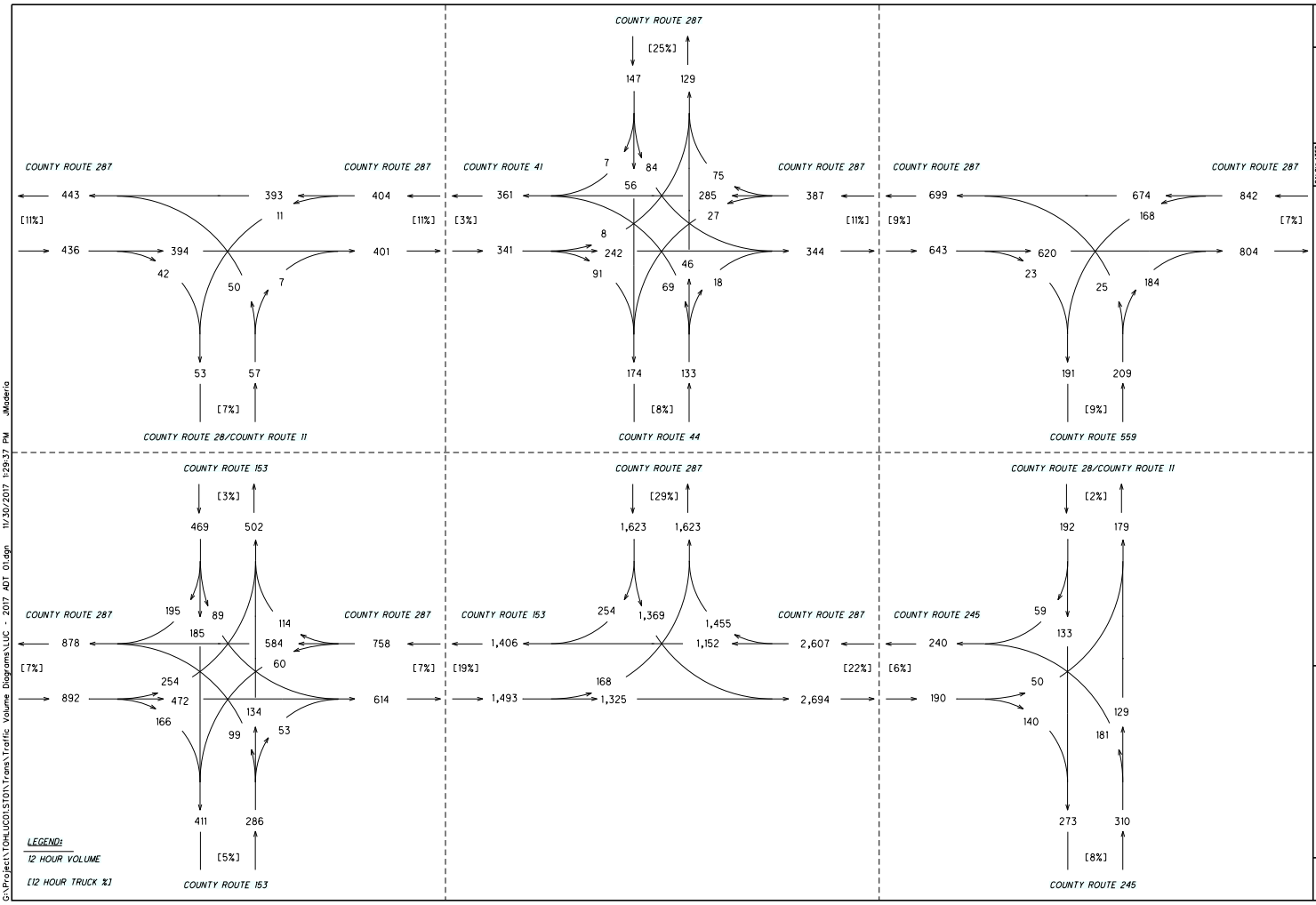

Logan-Union-Champaign Regional Planning Commission
LUC RPC Freight Study
Figure 2 - Study Area Map
District 7
Logan County
Union County
District 6
Champaign County
West Liberty
Middleburg
North Lewisberg
Mingo
To Urbana
To Bellefontaine
To East Liberty
To Marysville
Legend
City Limits
ODOT District
Stop Sign
Major Arterial
Study State Route
Study County Route
Local Route
Advisory Speed Placard
MioVision Data Collection Site
Speed Limit
0 0.5 1 2 Miles


Logan-Union-Champaign Regional Planning Commission
LUC RPC Freight Study
Figure 3 - 12 Hour Truck Volumes
Logan County
District 7
Union County
District 6
Champaign County
West Liberty
Middleburg
North Lewisberg
Mingo
To Urbana
To Bellefontaine
To East Liberty
To Marysville
Legend
City Limits
ODOT District
Stop Sign
Major Arterial
Study State Route
Study County Route
Local Route
xx (xx%)
12 Hour Truck Volume (12 Hour Truck %)
Speed Limit
0 0.5 1 2 Miles


Logan-Union-Champaign Regional Planning Commission
LUC RPC Freight Study
Figure 4 - Recommendations for Future Study
District 7
Logan County
Union County
District 6
Champaign County
West Liberty
Middleburg
North Lewisberg
Mingo
To Urbana
To Bellefontaine
To East Liberty
To Marysville
Site 1
Site 2
Site 3
Site 4
Site 5
Site 6
Site 7
Site 8
Site 9
Site 10
Site 11
Site 12
SPEED 35 LIMIT
SPEED 25 LIMIT
0 0.5 1 2 Miles
Legend
City Limits
ODOT District
Stop Sign
Major Arterial
Study State Route
Study County Route
Recommendation Site
Advisory Speed Placard
MioVision Data Collection Site
Local Route
Speed Limit

ATTACHMENT 2

Traffic Volume Diagrams



NOT TO SCALE

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CHECKED JM

FREIGHT STUDY
OPEN YEAR (2017) 12 HOUR VOLUME

LUC-RPC

1/2

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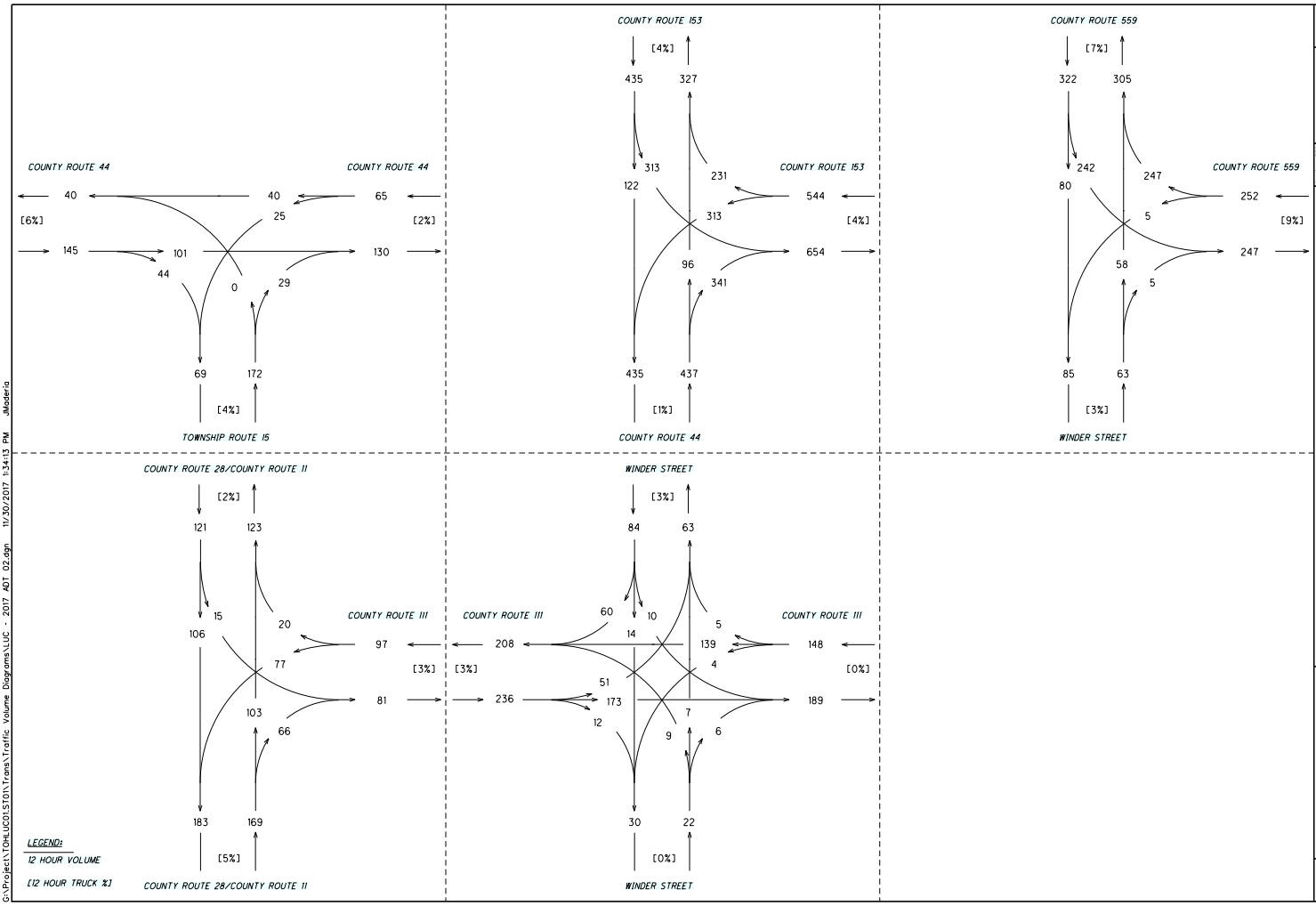

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FREIGHT STUDY
OPEN YEAR (2017) 12 HOUR VOLUME

LUC-RPC

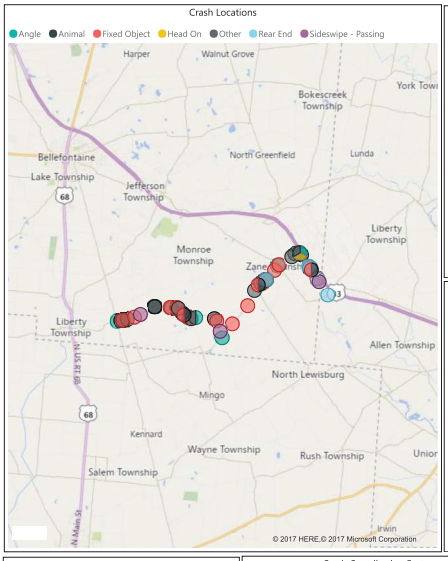
2/2

ATTACHMENT 3

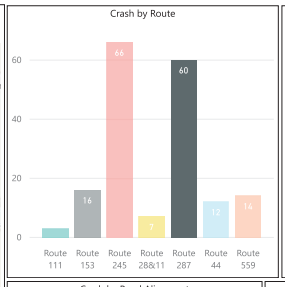
Crash Analysis

Logan-Union-Champaign Regional Planning Commission - LUC RPC Freight Study - Crash Analysis - Route 287

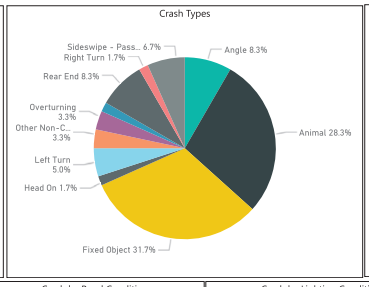
Crash Locations



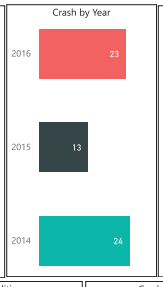
Crash by Route



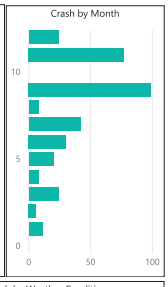
Crash Types



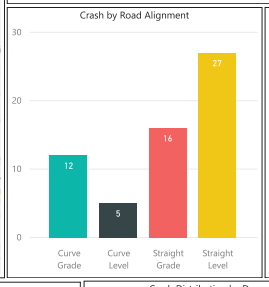
Crash by Year



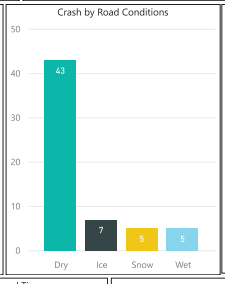
Crash by Month



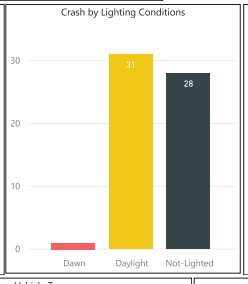
Crash by Road Alignment



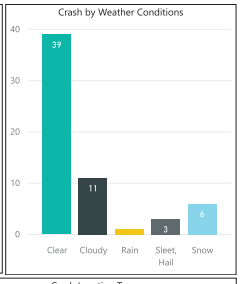
Crash by Road Conditions



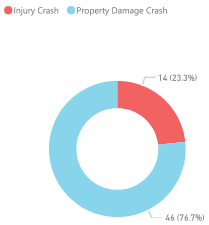
Crash by Lighting Conditions



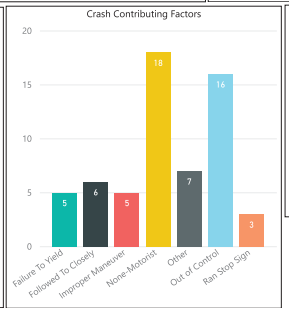
Crash by Weather Conditions



Crash Severity



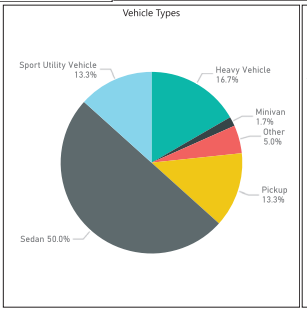
Crash Contributing Factors



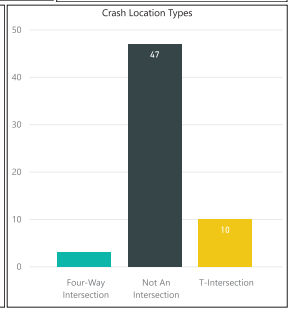
Crash Distribution by Day and Time

Time Period	FR	MO	SA	SU	TH	TU	WE	Total
10AM-3PM	5	3	4	1	2	3		**18**
4PM-7PM	2	1	3	1	3	1	1	**12**
6AM-9AM	3	2		1		2	2	**10**
8PM-5AM	4	4	4		4	2	2	**20**
Total	**14**	**10**	**11**	**3**	**9**	**8**	**5**	**60**

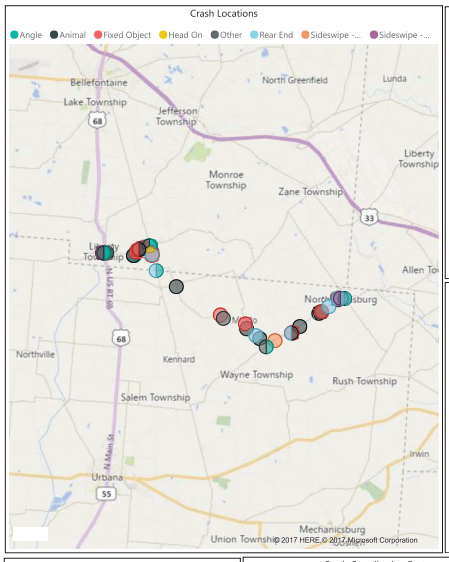
Vehicle Types

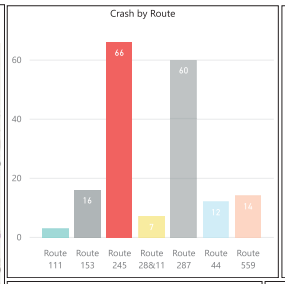


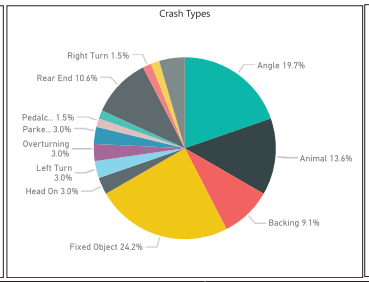
Crash Location Types

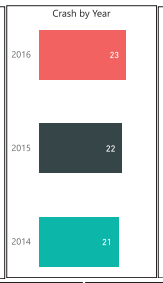


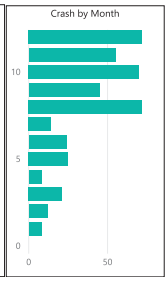
Logan-Union-Champaign Regional Planning Commission - LUC RPC Freight Study - Crash Analysis - Route 245

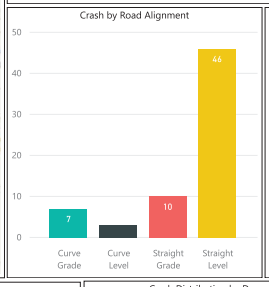


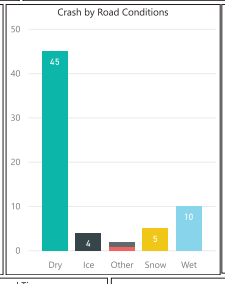


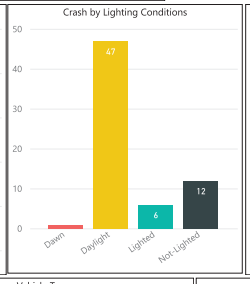


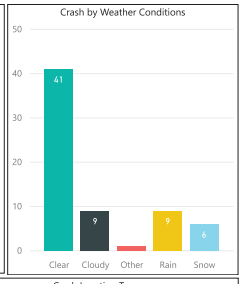


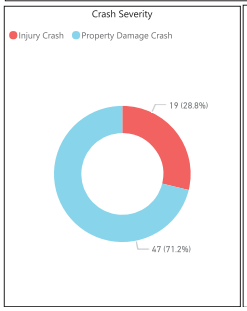


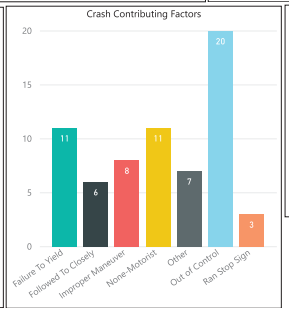






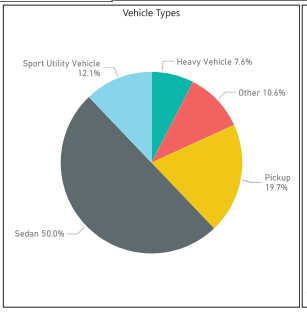


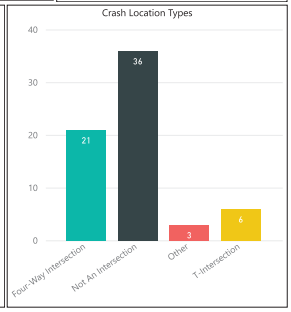




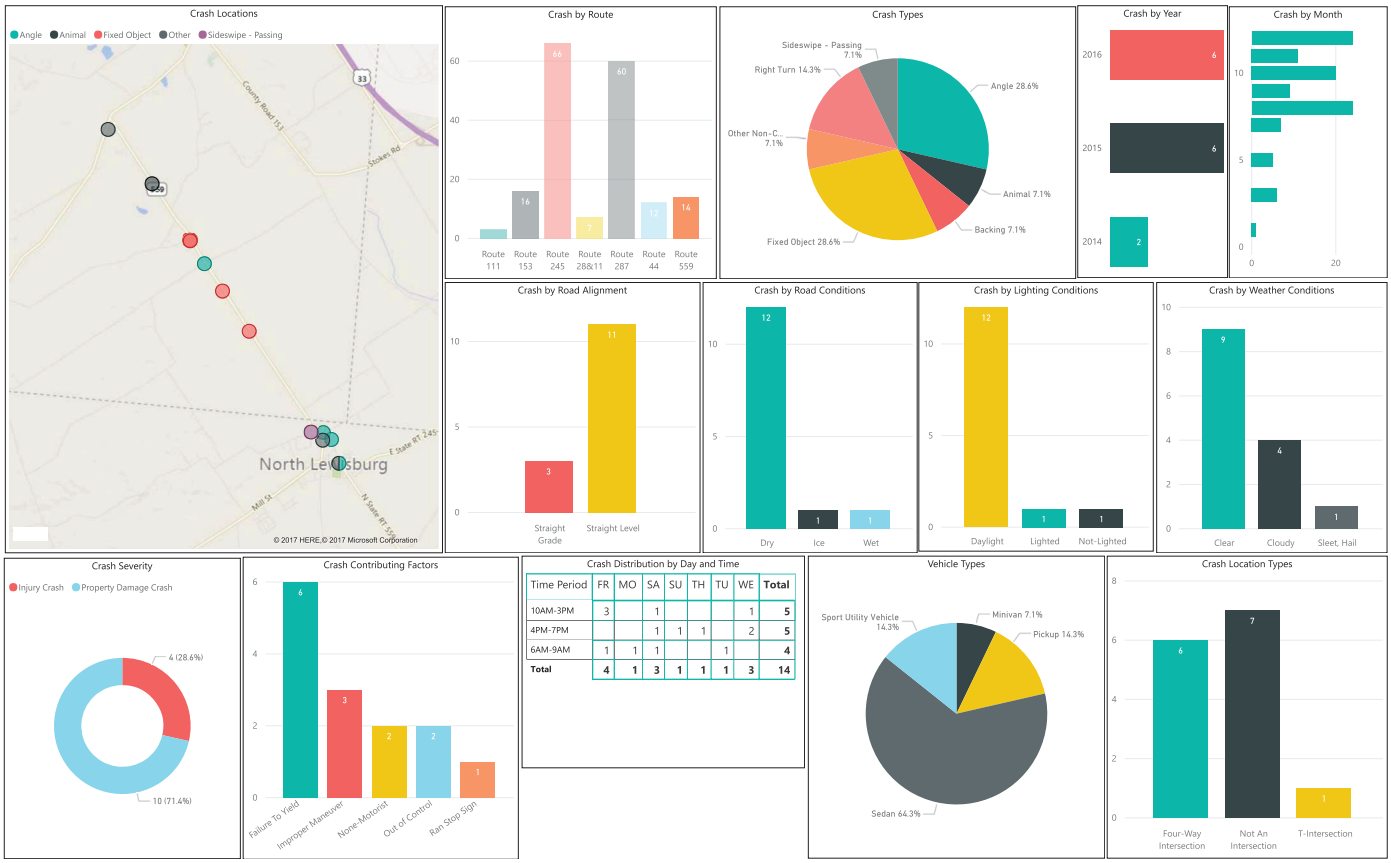
Crash Distribution by Day and Time

Time Period	FR	MO	SA	SU	TH	TU	WE	Total
10AM-3PM	5	4	3	2	5	7	3	**29**
4PM-7PM	2	1	1	2	3	2	1	**12**
6AM-9AM		1	3		3	4	2	**13**
8PM-5AM	3	2	1	1	1	3	1	**12**
Total	**10**	**8**	**8**	**5**	**12**	**16**	**7**	**66**



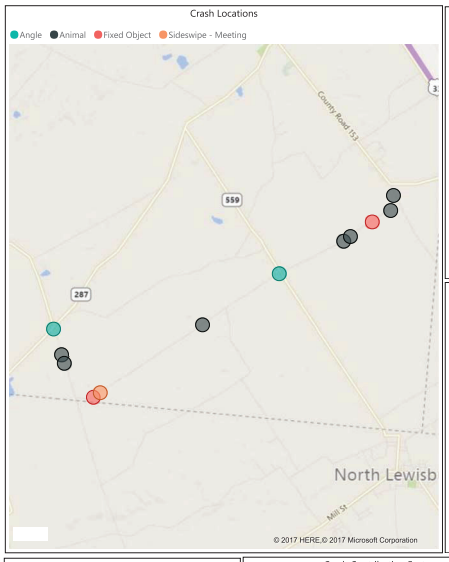


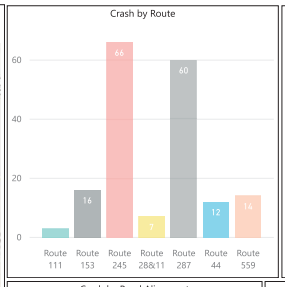
Logan-Union-Champaign Regional Planning Commission - LUC RPC Freight Study - Crash Analysis - Route 559

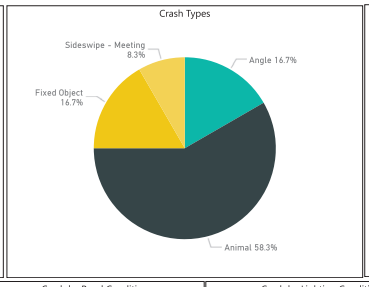


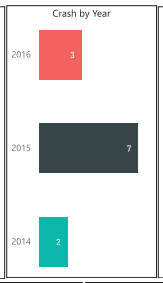
Time Period	FR	MO	SA	SU	TH	TU	WE	**Total**
10AM-3PM	3		1				1	**5**
4PM-7PM			1	1	1		2	**5**
6AM-9AM	1	1	1			1		**4**
Total	**4**	**1**	**3**	**1**	**1**	**1**	**3**	**14**

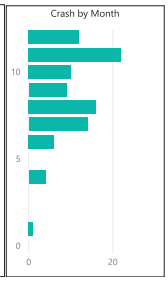
Logan-Union-Champaign Regional Planning Commission - LUC RPC Freight Study - Crash Analysis - Route 44

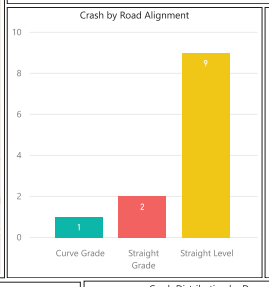


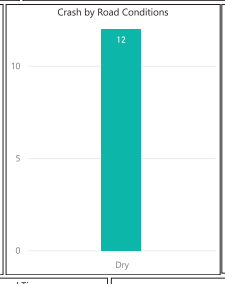


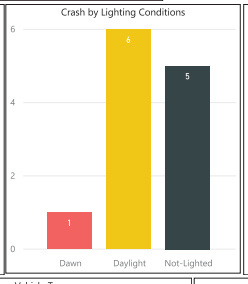


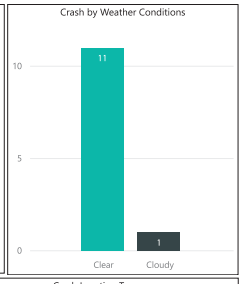


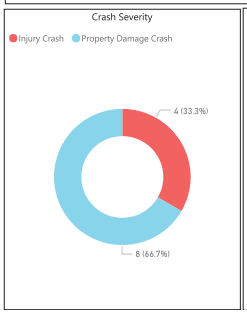


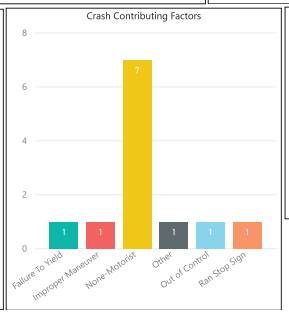






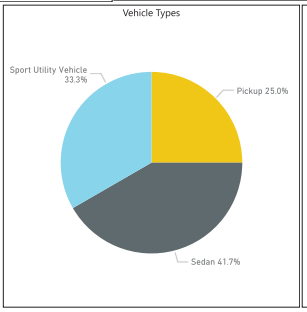


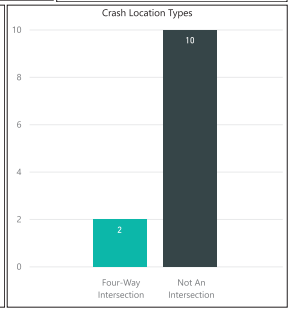




Crash Distribution by Day and Time

Time Period	FR	MO	SA	TH	TU	WE	**Total**
10AM-3PM			1		1		**2**
4PM-7PM			2				**2**
6AM-9AM	1			1	1		**3**
8PM-5AM	1	1		1	1	1	**5**
Total	**2**	**1**	**3**	**2**	**3**	**1**	**12**

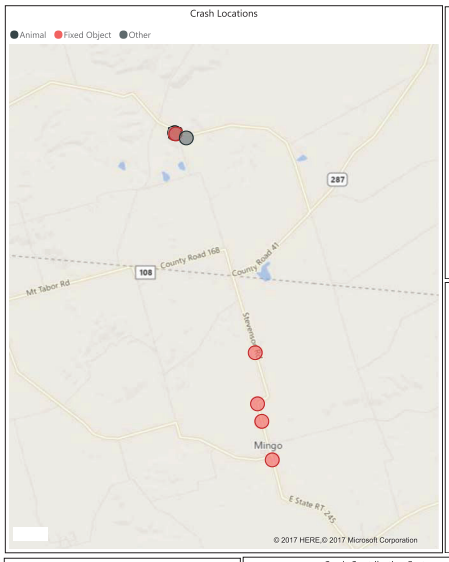


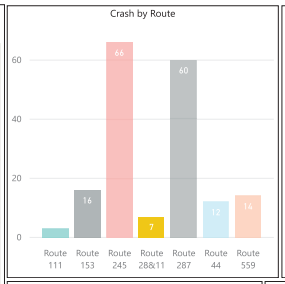


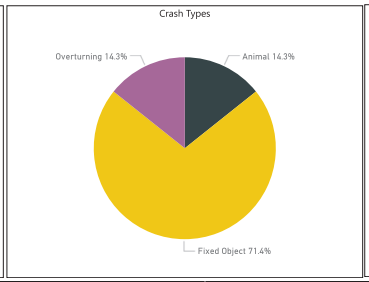
Logan-Union-Champaign Regional Planning Commission - LUC RPC Freight Study - Crash Analysis - Route 111

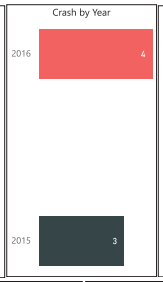
Time Period	TU	WE	Total
10AM-3PM	1	1	2
4PM-7PM		1	1
Total	**1**	**2**	**3**

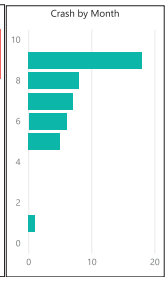
Logan-Union-Champaign Regional Planning Commission - LUC RPC Freight Study - Crash Analysis - Route 28& Route 11

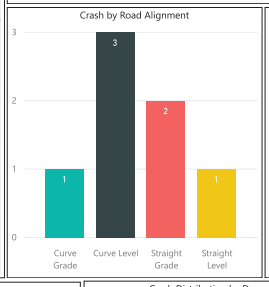


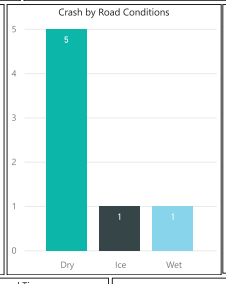


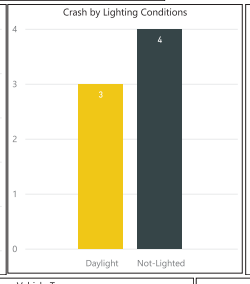


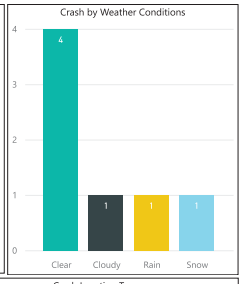


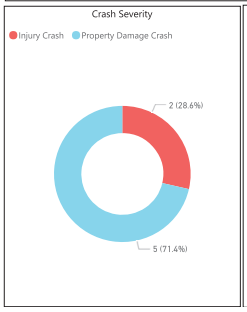


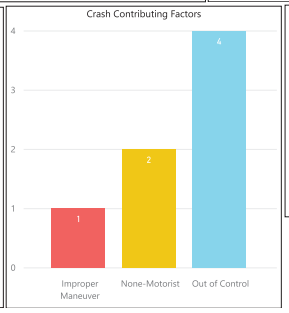






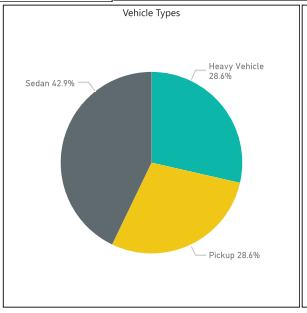


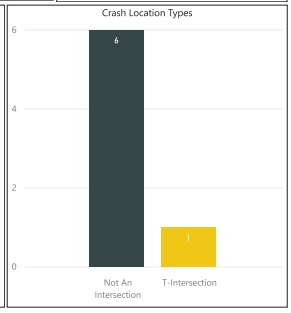




Crash Distribution by Day and Time

Time Period	FR	MO	TH	TU	WE	**Total**
10AM-3PM				1		**1**
4PM-7PM	1				1	**2**
8PM-5AM	1	1	1		1	**4**
Total	**2**	**1**	**1**	**1**	**2**	**7**





Logan-Union-Champaign Regional Planning Commission - LUC RPC Freight Study - Crash Analysis - Route 153

Time Period	FR	MO	SA	TH	TU	**Total**
10AM-3PM		2				**2**
4PM-7PM		1		2	2	**5**
6AM-9AM	2	1	1		2	**6**
8PM-5AM		1		1	1	**3**
Total	**2**	**5**	**1**	**3**	**5**	**16**