



# 2019 Statewide Amish Travel Study

## *March 2020*



Prepared by:



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## Purpose

The purpose of this study is to identify state routes Amish and Non-Motorized users (i.e. bike and pedestrian) frequent and formulate recommendations to improve safety and pavement preservation along those state roadways. Based on review of Amish and Non-Motorized volumes, crash rates, and known safety concerns, recommendations were categorized (e.g. improved signage, widened shoulder, off-road path) to aid ODOT in making decisions on future capital improvements to state roadways.

The study also examined current Amish community populations and projected future Amish community populations. This study serves as an update to the *Amish Buggy Safety on Ohio's State Roadway System Analysis and Action Plan, 2000*.

## Background

Since the Amish Buggy Safety Action Plan was completed in 2000, Amish populations have migrated to areas not included within the previous study limits. This study investigated the limits of where the Amish population has migrated and collected travel data, along with input from local Amish communities regarding travel patterns, to assist in ODOT's decision making to address future roadway improvements.

The study included the counties in Ohio that have known Amish vehicle traffic on the state system. Amish vehicle traffic is currently present in all of ODOT's 12 districts. Counties included within the study area are highlighted in green on the following page.

Though included within this study, Geauga County was not a focal point of public involvement for this study as ODOT recently completed a detailed Amish Travel Study in 2016 defining improvements on all state routes within the county.

As part of the travel data collection effort for this study both Amish buggy and bike/pedestrian crashes within known Amish traveled areas were analyzed. To aid in verifying the limits of current Amish travel throughout the State, population studies along with input from ODOT district staff and County Administrators were utilized. In addition, 417 buggy counts were conducted to aid in verifying travel limits and buggy volumes.

Public involvement was also a critical component of this study. A public survey was distributed across the State and through ODOT staff, Amish Liaisons and distributed through The Budget newspaper. The survey yielded 1,275 responses from 27 counties and provided feedback on travel patterns and safety concerns.

A total of 18 community meetings were conducted within high density Amish population areas across the State. The meetings attracted 505 participants and provided information on local travel patterns, mode choices, safety concerns and improvement desires.

All travel data and public involvement feedback collected were utilized to create a prioritization matrix to determine which state routes were most in need of Amish-related improvements. The matrix was based on ten criteria, each with varying weights corresponding to them based on their level of importance towards Amish safety.

From the results of the matrix, typical countermeasures were recommended for each type of prioritized route. Routes with a low prioritization were assigned more basic countermeasures including improved signage and pavement markings, while high priority routes were assigned more drastic countermeasures including widened shoulders or buggy lane construction.



# Previous Studies Summary

## Ongoing – Evaluation of Partial Depth Pavement Repairs on Routes Heavily Traveled by Amish Horse and Buggies

This project was initiated by ODOT and the Ohio Research Initiative for Locals (ORIL) to improve the performance and service life of partial depth repairs performed on Amish buggy routes in Ohio and reduce their life cycle costs. ODOT and local public agencies perform routine repairs on roadways in Ohio to maintain comfortable and safe travel of the public. Roadways in Ohio with heavy Amish buggy traffic see more frequent partial depth repairs as they encounter more damage.

Calks on the horseshoes of Amish buggies are the main cause of pavement damage. The annual cost of repairs on Amish routes exceeds repair costs on Non-Amish routes by four times.

The proposed solution to this problem is two fold: establish stronger asphalt mixes, and design alternative calks on the horseshoes. New asphalt mixes have been designed and are currently being evaluated in the field. Results of these evaluations are still ongoing. Different horseshoes were also evaluated. The study team worked with Amish farriers to develop multiple new horseshoe designs. Lab tests of the new designs indicated that these new horseshoe designs could significantly reduce pavement damage.

Evaluation of Partial Depth Pavement Repairs on Routes Heavily Traveled by Amish Horse and Buggies



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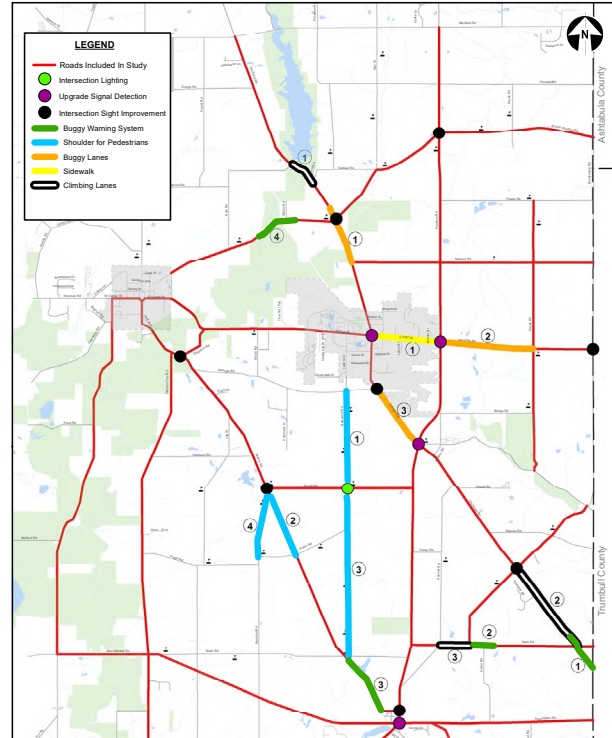
*Final Report*



## 2016 Amish Safety Strategic Plan – Geauga County

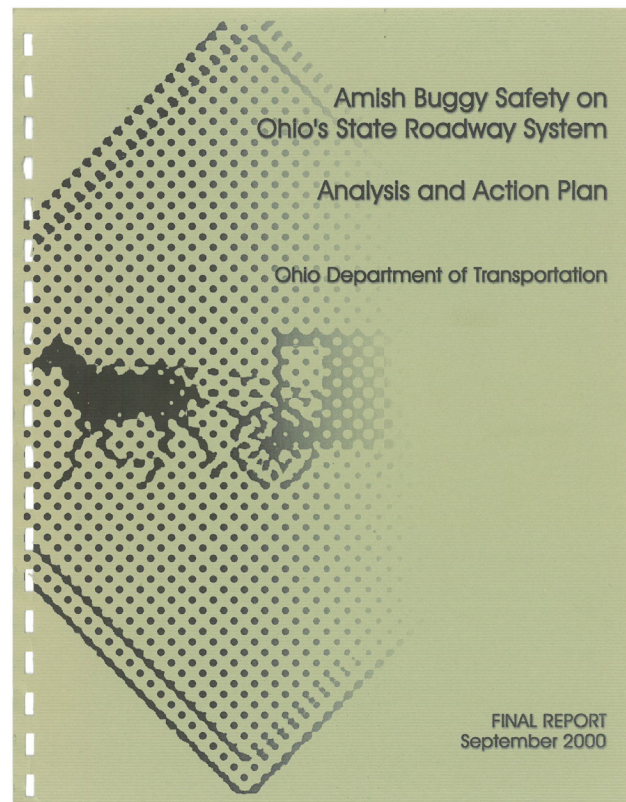
ODOT led a multi-agency strategic plan to improve the safety of Amish road users, including pedestrians in Geauga County. The study developed prioritization criteria based on existing roadway/intersection conditions, vehicle traffic volume, Amish buggy and pedestrian volumes, and Amish population density. The criteria were used to recommend countermeasures on all roadways within the study area ranging from additional signage and lighting to shoulder widenings and buggy lanes. An implementation strategy was created that detailed time frames and preliminary cost estimates for each recommendation on each state route. The summary of prioritizations and recommended improvements are shown on the map to the right. Since the study was completed recently and is more focused than this statewide study, Geauga County was excluded from the scope of this study.

**Amish Safety Strategic Plan**  
Recommended Improvements Map



## 2000 Statewide Amish Study

ODOT and the Ohio Department of Public Safety (ODPS) have previously completed statewide studies in 2000 to analyze the potential safety issues with Amish buggies and pedestrians sharing roadways with motor vehicles. The ODOT study evaluated the overall safety concerns, and the study recommendations were focused on roadway design and maintenance of roadway facilities. The ODPS study focused on driver education and enforcement initiatives. A public involvement/public opinion survey was also completed as part of the ODOT study.



## Literature Review

### The Amish Population: County Estimates and Settlement Patterns (2013)

The article presents the findings of a county-based estimate of the Amish population. The results are from work commissioned by the Association of Statisticians of American Religious Bodies for the recently released 2010 U.S. Religion Census, plus research and updates associated with tracking the growth and geographic spread of Amish settlements in North America. County estimates are restricted to Amish church groups who rely on horse-and-buggy for travel.

The findings of the article show a large population increase is occurring within the Amish community across the United States due to growing family sizes and more young adults choosing to stay in Amish society. The overall U.S. Amish population is projected to grow to 346,827 (463 settlements) by 2020, and 917,524 (927 settlements) by 2050. The largest Amish populations are currently found in Ohio, Pennsylvania, and Indiana. Ohio has seen substantial growth over the past 30 years as 34 of Ohio's 54 Amish settlements were founded since 1990.

In the future, the availability of farmable land may influence where populations migrate and expand to. These lands must be located close to a town with services (shopping, hospitals, etc.) so the Amish can complete day-to-day activities.

With the expanding use of technology within certain Amish communities, there will be less of a need for farm workers. This may drive men to occupations such as sawmill workers, furniture makers, and home construction workers and may further disrupt Amish development patterns.

### Online Mapping Tools for Geolocating Amish Settlements (2015)

This technical document outlines the use of online mapping to estimate population density of Amish populations in Ohio and Pennsylvania. Aerial imagery and approximate address locations on Google/Bing were used to determine Amish residences within Ohio and Pennsylvania. In total, 1,362 Amish houses (~10% of Amish households) in Ohio and 1,203 in Pennsylvania (~11% of Amish households) were mapped.

Mapping from this technical document was used to define the locations of 18 community meetings for this study.

### Transport Practices in Amish Communities (2014)

This study seeks to define and characterize transport practices in Amish communities which have eschewed the car for religious reasons. Specifically, the paper draws on a comprehensive literature and archival review, supplemented with expert interviews, to briefly outline Amish beliefs and traditions, and then relate how these influence people's mobility by mode, journey purpose, community, and stage of life. The study considers mobility by utilizing twelve different mobilities as motivations, along with examples applied across six suggested stages of life. The twelve motivations considered are: migration; business / profession; discovery; medical related; military related; post-employment; trailing travel; travel across modes; travel for service work; tourist travel; visiting friends / relatives; and work / commuting. The six life stages are infancy, preschool, scholars, young people, adults, and old folks. The impacts of Amish transport are then considered with respect to society more broadly but also for each of the life stages.

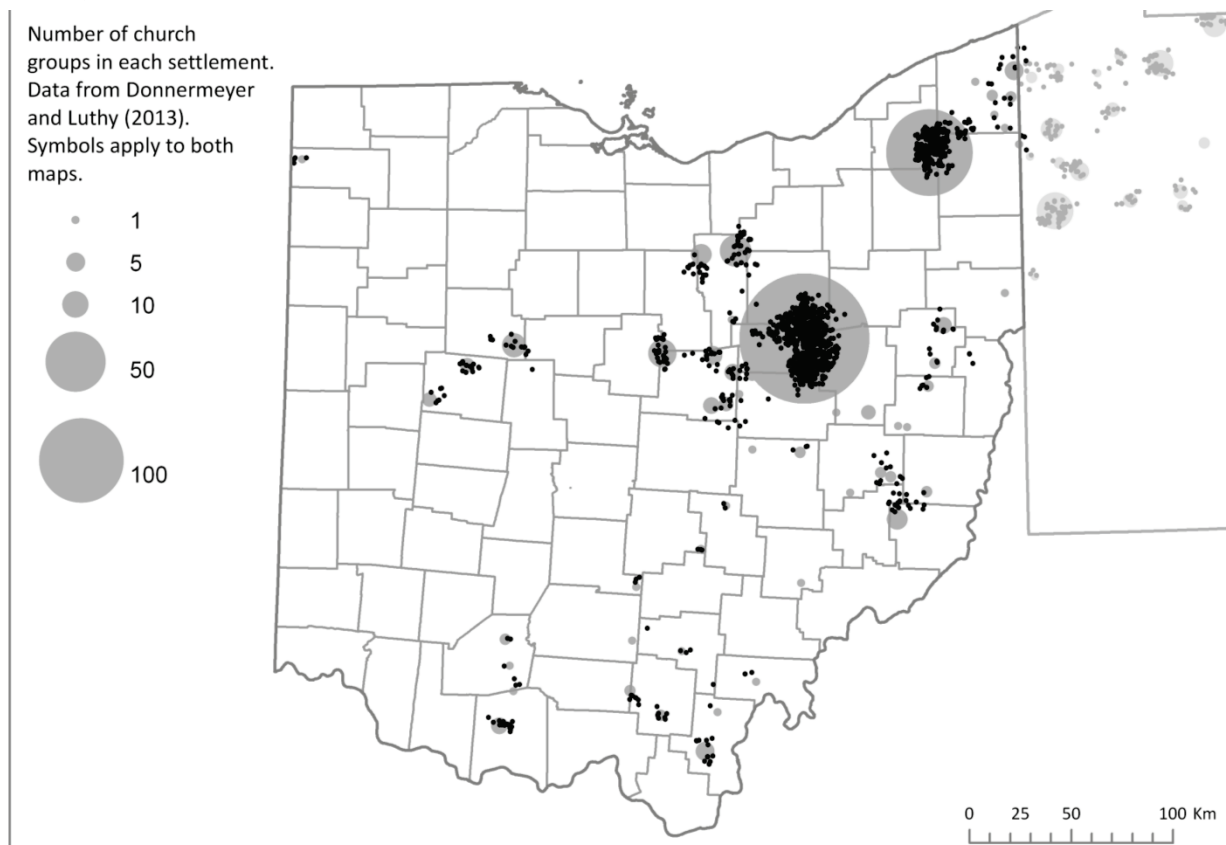
# Amish Population Trends

From previous studies and information provided by the Young Center for Anabaptist and Pietist Studies, Elizabethtown College, locations, densities and past growth rates of the Amish population across the State were established. As of 2019, the total Amish population within Ohio is approximately 76,200 people. Ohio is currently the most populous state for Amish populations, recently passing Pennsylvania, and contains the largest settlement of Amish population in Holmes County with over 36,000 residents (the Young Center for Anabaptist and Pietist Studies, Elizabethtown College). Amish populations are present in 57 of Ohio's 88 counties. Most counties contain small settlements of Amish but all evidence suggests that the Amish population both across Ohio and the U.S. is expected to grow rapidly.

## Population by Settlement

To gain a sense of where the Amish reside today, a map of known Amish bishop locations and population centers from 2013 are shown in the map below. Though the map is nearly seven years old, the locations and densities of Amish populations shown on this map were verified by both population statistics and community meeting attendance.

Amish populations in general are increasing rapidly and projected to double approximately every 21 years (2013 study). From information provided by Elizabethtown College, 2019 population distribution by settlement is detailed below. The majority of settlements are experiencing at least a gradual increase in population. From this data and information gathered from public meetings with local Amish communities across the State, potential future growth areas were established to aid the Department in anticipating increases in Amish buggy volumes and/or an expansion of



Black dots: Amish ministers – Grey circles: Amish settlements

the Amish travel footprint along state routes in the coming years.

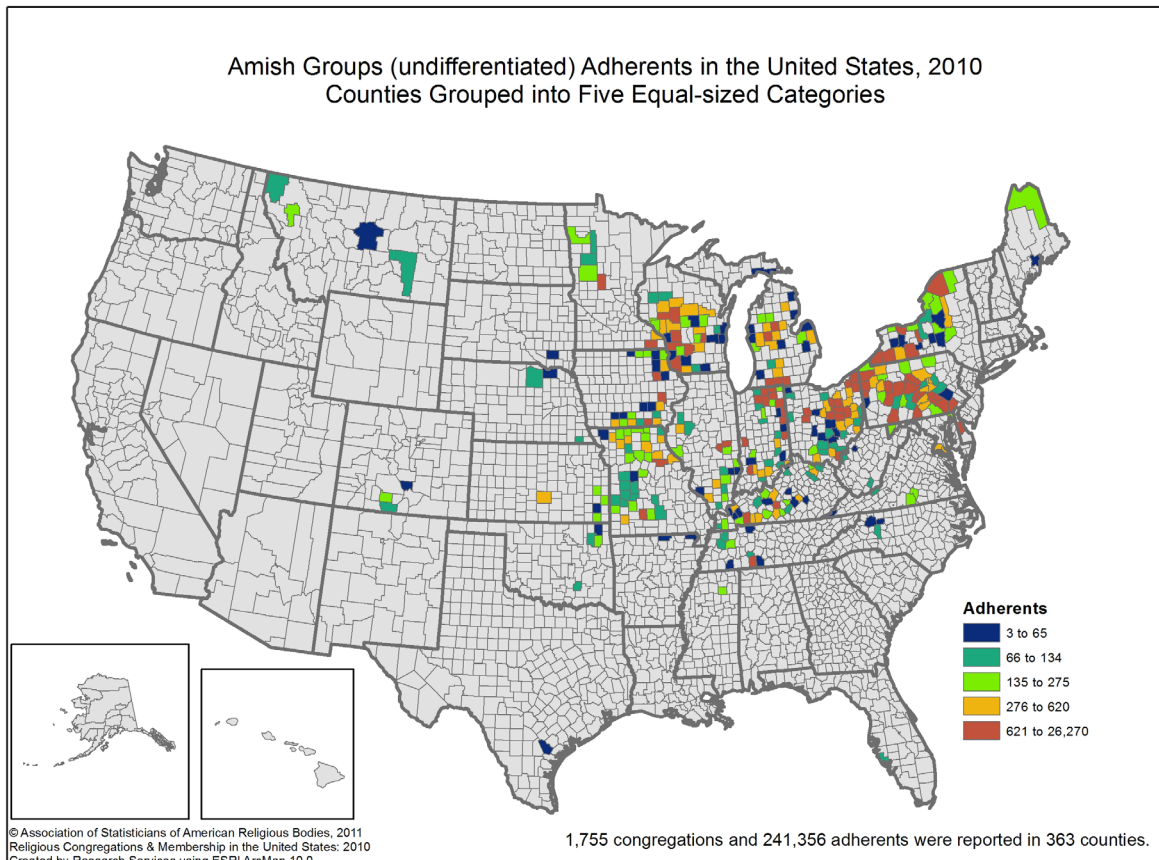
## Population by County

Amish populations were also analyzed at the county level using Religious Census data created by the Association of Statisticians of American Religious Bodies (ASARB) from 2000 and 2010. Though this data is older than the data provided by Elizabethtown College, the information is still helpful in identifying areas of past Amish population growth. As shown in the statewide maps, almost all counties within the State experienced some growth in their Amish populations between 2000 and 2010. Many counties saw accelerated growth or new Amish populations. This information reinforces other anecdotal evidence that Amish populations across the State are growing rapidly.

The challenge in estimating population growth is determining where exactly the

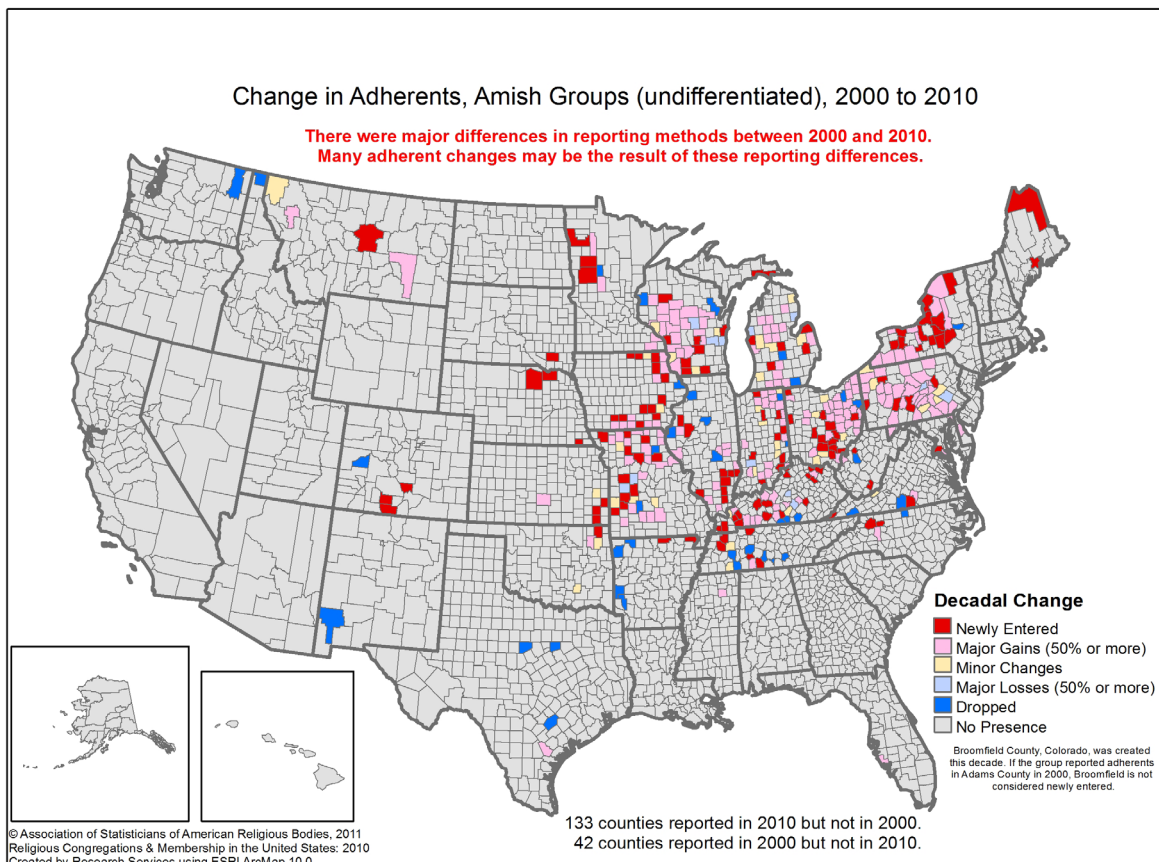
Amish population will expand to. Established Amish population centers, like eastern Holmes County, will continue to expand around the core population and growth to neighboring townships and counties can be anticipated. But as those highly populated areas continue to expand, some Amish families choose to leave the area and start communities of their own. Determining where these new communities will emerge is challenging to predict. In general, the Amish are seeking affordable farm land that is relatively convenient to a small town where they can buy and sell goods (2013 Study).

There have been 17 new Amish settlements established within Ohio since 2010. The majority of these new settlements have occurred in Ashtabula County as Amish populations expand from Geauga County and Pennsylvania, within the Knox and Morrow County area, around other established Amish communities, and along the Ohio River. The communities along the Ohio River



within Washington, Adams, Pike, Vinton, and Belmont Counties are transplanted settlements from more heavily populated Amish areas. It is difficult to predict if growth in these new communities will continue or if other settlements will develop around them in the future.

In an effort to help identify locations where Amish populations may expand to over the next 10 to 15 years, a growth area map was created and is shown on the next page. Growth areas identified were established from a combination of demographic research into the Amish culture, anecdotal information gathered at community meetings conducted as part of this study, data of previous Amish growth areas and from discussions with Elizabethtown College about Amish settlement patterns for this study.

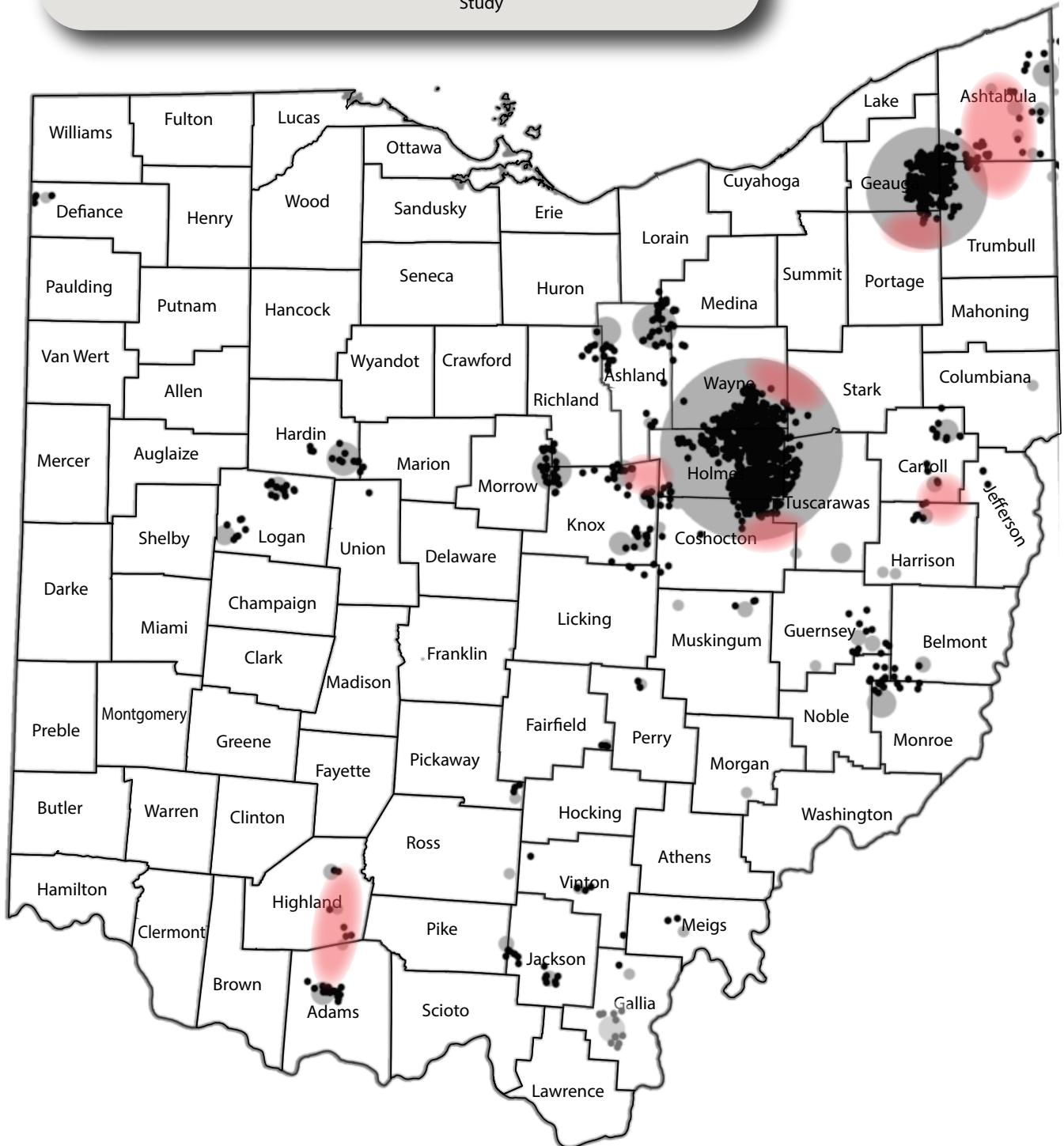


## Probable Future Amish Expansion Areas

### Legend

- Probable Expansion Areas
- Location of Bishop\*
- Amish Settlement Size\*

\*From 2013 Donnermeyer & Luthy Study



**2019 Estimated Amish Population by Settlement\***

| <b>Ohio County/ies</b>                          | <b>Local Settlement Name</b>  | <b>Year Started</b> | <b>Church Districts</b> | <b>Estimated Population</b> |
|---|-------------------------------|---------------------|-------------------------|-----------------------------|
| Holmes / Tuscarawas / Coshocton / Wayne / Stark | Holmes County                 | 1808                | 288                     | 36,755                      |
| Geauga / Trumbull / Ashtabula / Portage         | Geauga                        | 1886                | 131                     | 18,325                      |
| Medina / Ashland / Wayne                        | Lodi/Homerville               | 1952                | 17                      | 2,085                       |
| Morrow / Knox                                   | Fredericktown                 | 1973                | 14                      | 1,935                       |
| Hardin / Marion                                 | Kenton / Mt. Victory          | 1953                | 9                       | 1,260                       |
| Ashland   | Ashland / Shiloh              | 1954                | 6                       | 910                         |
| Knox / Licking                                  | Martinsburg / Utica           | 1987                | 5                       | 805                         |
| Carroll   | Carrollton                    | 1982                | 5                       | 780                         |
| Ashtabula                                       | Conneaut / Pierpoint          | 1994                | 6                       | 745                         |
| Logan   | DeGraff                       | 1994                | 4                       | 735                         |
| Gallia  | Gallipolis                    | 1993                | 5                       | 720                         |
| Knox  | Brinkhaven/Danville           | 1990                | 5                       | 675                         |
| Monroe / Noble                                  | Lewisville                    | 1987                | 4                       | 635                         |
| Jackson   | Oak Hill                      | 2001                | 4                       | 595                         |
| Guernsey  | Peoli                         | 1969                | 3                       | 555                         |
| Knox  | Danville/Butler               | 1964                | 4                       | 530                         |
| Knox  | Howard / Wahonding            | 2001                | 4                       | 500                         |
| Adams   | West Union                    | 1976                |                         | 495                         |
| Highland  | Hillsboro                     | 2006                | 4                       | 465                         |
| Guernsey  | Salesville / Quaker City      | 1991                | 3                       | 435                         |
| Muskingham                                      | Adamsville                    | 1997                | 4                       | 395                         |
| Jackson   | Beaver                        | 1994                | 3                       | 375                         |
| Belmont   | Barnesville                   | 1993                | 2                       | 370                         |
| Logan   | Belle Center                  | 1974                | 4                       | 360                         |
| Carroll   | Kilgore                       | 2005                | 3                       | 335                         |
| Harrison  | Scio                          | 2001                | 3                       | 325                         |
| Gallia  | Vinton                        | 2005                | 2                       | 200                         |
| Knox  | Glenmont                      | 1994                | 2                       | 200                         |
| Ashland   | Loudonville / McKay           | 1991                | 2                       | 200                         |
| Ashtabula                                       | Cherry Valley / Dorset        | 1991                | 2                       | 190                         |
| Highland  | Peebles                       | 2006                | 1                       | 180                         |
| Tuscarawas                                      | Newcomerstown / Mechanicstown | 2006                | 2                       | 175                         |
| Coshocton                                       | Walhonding / Martinsburg      | 2000                | 2                       | 175                         |
| Defiance  | Hicksville                    | 1914                | 1                       | 165                         |
| Fairfield                                       | Bremen                        | 1989                | 1                       | 160                         |
| Belmont   | Piedmont                      | 2011                | 1                       | 150                         |
| Coshocton                                       | Frazeysburg                   | 2007                | 2                       | 145                         |

|                       |                         |      |                             |                      |
|-----------------------|-------------------------|------|-----------------------------|----------------------|
| Harrison              | Freeport                | 2006 | 1                           | 145                  |
| Vinton                | McArthur                | 2004 | 1                           | 140                  |
| Ashtabula             | West Andover            | 2012 | 1                           | 130                  |
| Guernsey              | Middlebourne            | 1998 | 2                           | 130                  |
| Trumbull / Mercer, PA | Kinsman / Jamestown     | 1975 | 2                           | 130                  |
| Columbiana            | Unity Valley            | 2015 | 1                           | 125                  |
| Ashtabula             | Williamsfield           | 1998 | 1                           | 125                  |
| Vinton                | McArthur 2              | 2016 | 1                           | 110                  |
| Perry                 | Mt. Perry               | 2013 | 1                           | 110                  |
| Ashtabula             | Andover                 | 1992 | 2                           | 110                  |
| Vinton                | Londonderry             | 2007 | 1                           | 100                  |
| Morgan                | Chesterhill / Stockport | 1978 | 1                           | 100                  |
| Noble                 | Pleasant City           | 2007 | 1                           | 80                   |
| Pickaway              | Laurelville / Kingston  | 1988 | 1                           | 80                   |
| Knox                  | Danville                | 1964 | 1                           | 75                   |
| Knox                  | Mt Vernon               | 2017 | 1                           | 70                   |
| Columbiana            | Rogers                  | 2013 | 1                           | 55                   |
| Ashtabula             | Jefferson               | 2011 | 1                           | 55                   |
| Highland              | Hillsboro / Marshall    | 2010 | 1                           | 50                   |
| Perry                 | Bremen / Junction City  | 2016 | 1                           | 45                   |
| Pike                  | Pike County             | 2015 | 1                           | 35                   |
| Meigs                 | Pomeroy                 | 2006 | 1                           | 35                   |
| Adams                 | Decatur                 | 2016 | 1                           | 30                   |
| Ashtabula             | Windsor                 | 2017 | 1                           | 25                   |
| Washington            | Barlow                  | 2016 | 1                           | 20                   |
| Pike                  | Wayerly                 | 2019 | 1                           | 15                   |
| Preble                | Eaton                   | 2019 | 1                           | 15                   |
| Morrow                | Chesterville            | 2012 | 1                           | 15                   |
|                       |                         |      |                             |                      |
| <b>Total</b>          | <b>65 settlements</b>   |      | <b>588 church districts</b> | <b>76,200 people</b> |

\*Estimate completed by The Young Center for Anabaptist and Pietist Studies, Elizabethtown College

# Historic Crash Data

Buggy, bicycle and pedestrian crash data was obtained throughout the State for a ten-year period (2009 through 2018) using ODOT’s TIMS CAM tool. Crashes for buggy, bicycle and pedestrian uses were mapped and refined to include only crashes within known Amish travel areas. For the ten-year period ending in 2019, there was a total of 723 buggy crashes, 101 bicycle crashes, and 126 pedestrian crashes.

## Buggy Crashes

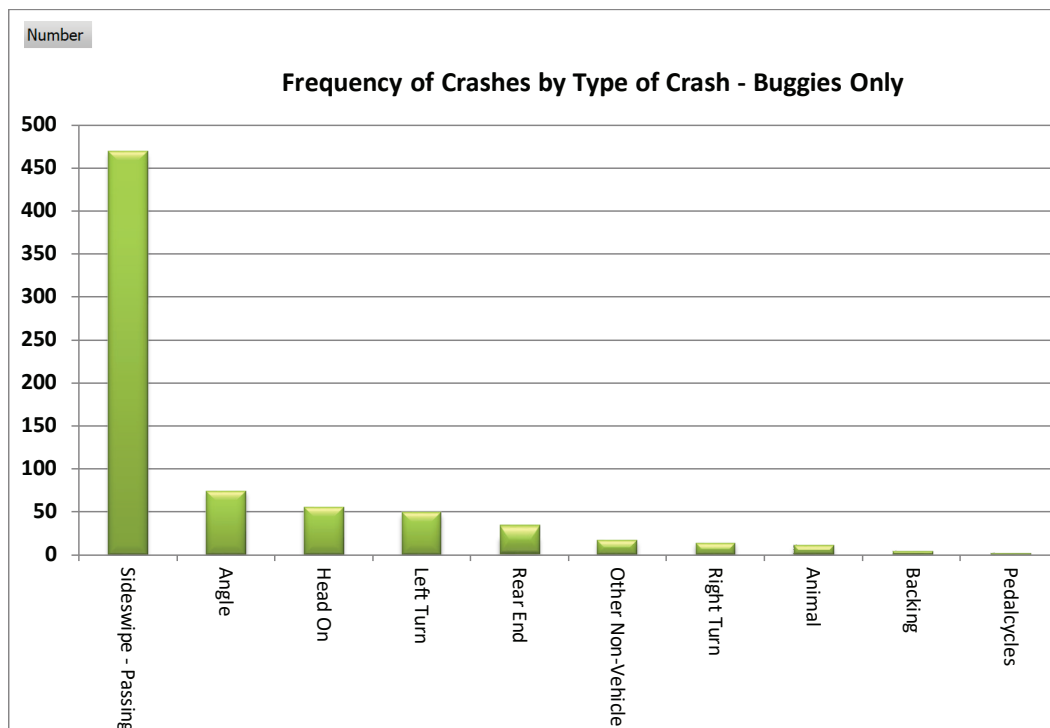
The majority of buggy crashes occur during daylight (59.3%) on clear (60.6%), dry (80.4%) days. The primary type of crash involving a buggy occurs while passing (sideswipe – 64.9%) as shown in the chart below. This data suggests motor vehicles are either misjudging the length needed to pass a buggy, are approaching buggies unexpectedly along roadways due to sight obstructions, or are distracted while driving.

The majority of buggy crashes (over 58%) occur along “straight level grades”. The locations of these buggy crashes are consistent with the high volume of sideswipe

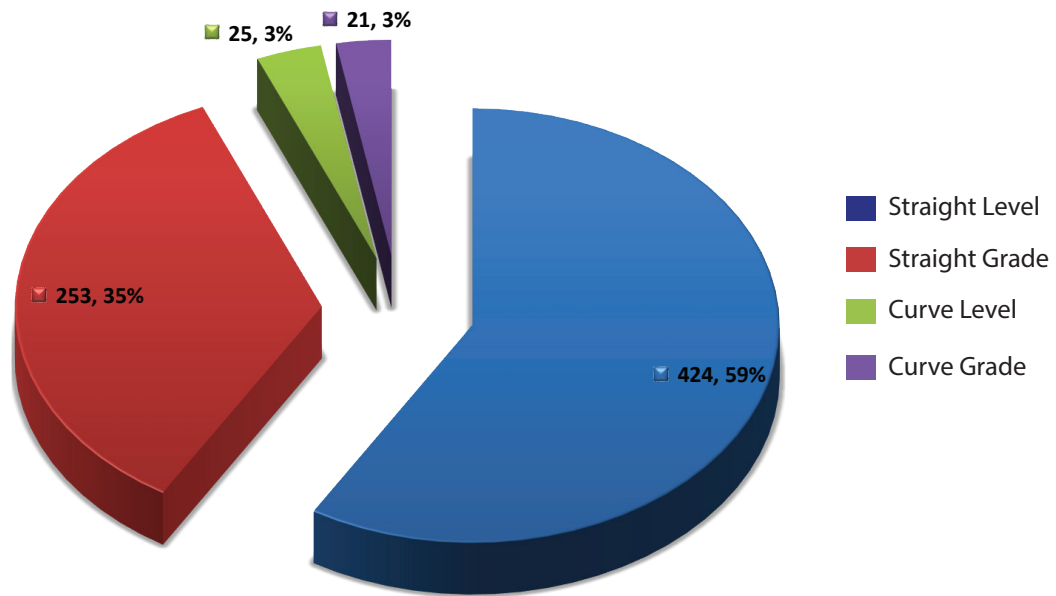
crashes throughout the State. Feedback from community meetings and the public survey also mimicked these findings as respondents cited “aggressive motor vehicle drivers” as the top reason for feeling unsafe along state routes.

Buggy crashes have remained relatively consistent year to year ranging from 60 to 84 crashes annually. One item of concern is the relative increase in fatal crashes since 2016. From 2009 through 2015, only 6 fatal buggy crashes occurred throughout the State, while 9 fatal buggy crashes have occurred since 2016.

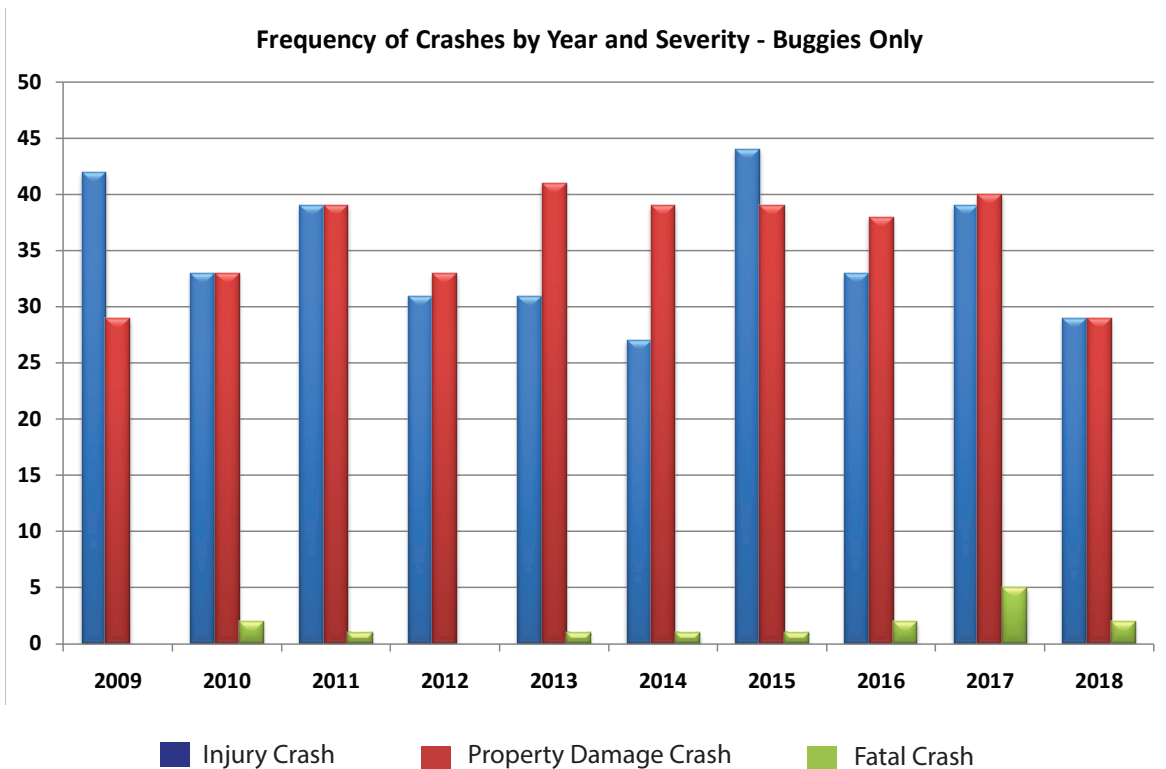
There have been 17 fatalities and 132 incapacitating injuries from buggy crashes over the past ten-year period across the State. Due to the high speed differential and minimal safety protection for the buggy occupants, incapacitating injury and fatal crashes are more common with buggy crashes than typical motor vehicle crashes. From information gathered at public meetings with local Amish communities and confirmed by historic crash data, a few state routes stood out as high crash routes across the State. For a listing of these locations see page 18.



Frequency of Crashes by Road Contour - Buggies Only



Frequency of Crashes by Year and Severity - Buggies Only



## Bicycle and Pedestrian Crashes

The majority of bicycle and pedestrian crashes occurred along roadway segments (81.5% not at intersection) during clear (58.6%) and dry (83.3%) conditions. Contrary to buggy crashes, a large volume of bicycle and pedestrian crashes occurred at night (47.2%). This data, along with information gathered from public meetings with Amish communities across the State, suggests that cyclists and pedestrians are not wearing reflective gear while traveling at night.

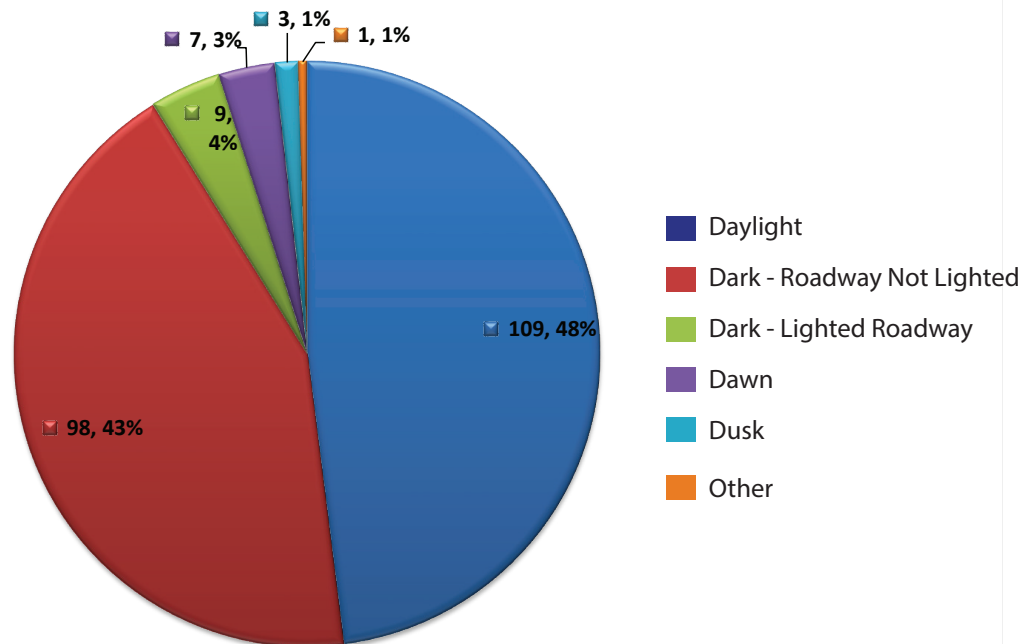
Roughly 90% of all bicycle and pedestrian accidents occur along straight grades or along straight, flat roadway segments. The locations of these crashes are consistent with the high volume of sideswipe crashes throughout the State. Feedback from community meetings and the public survey also mimicked these findings as respondents cited “aggressive motor vehicle drivers” as the top reason for

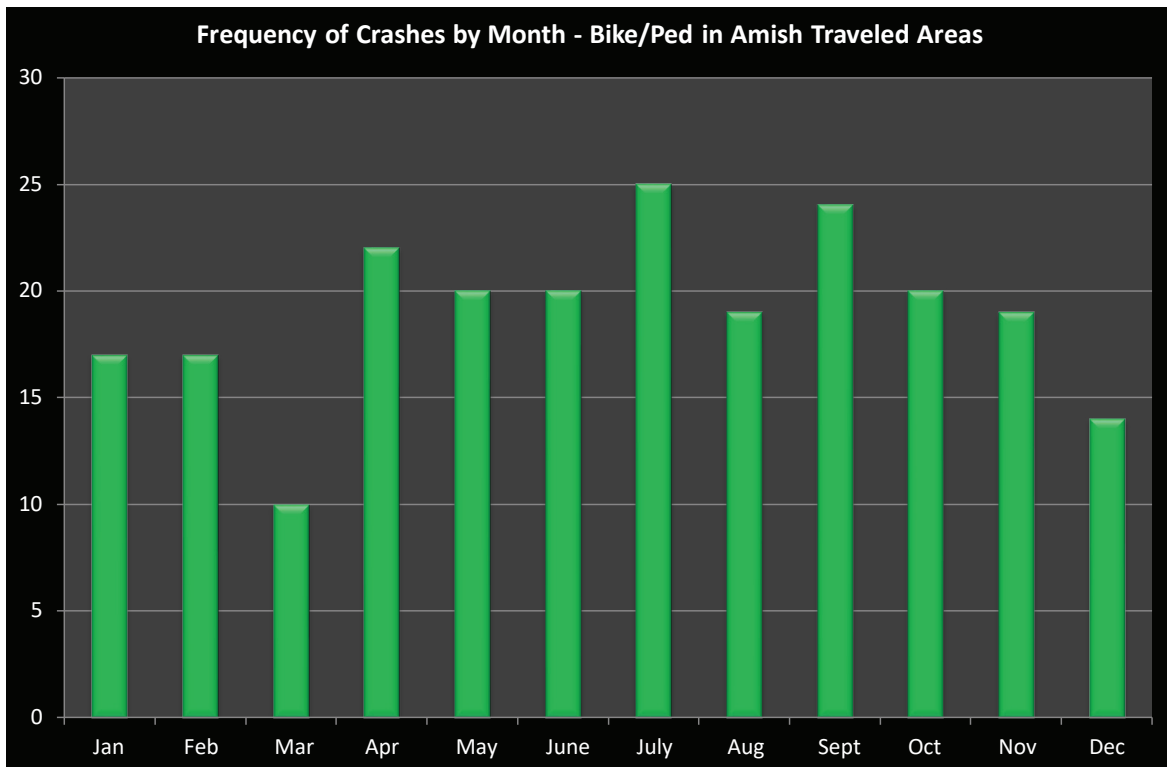
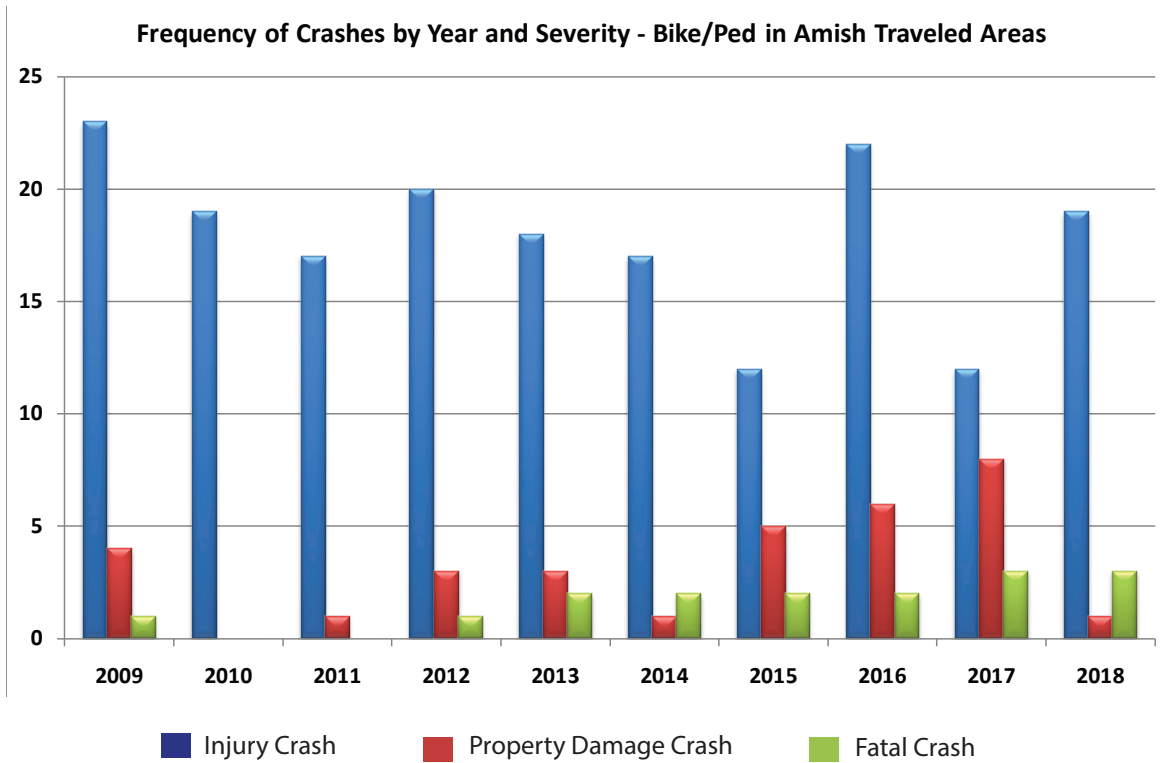
feeling unsafe along state routes.

Similar to buggy crashes, bicycle and pedestrian crashes have remained relatively consistent year to year in Amish traveled areas ranging from 18 to 30 crashes annually. Crashes have also remained fairly steady throughout the calendar year indicating that the Amish are traveling fairly consistently across the seasons by bike or foot for daily activities. March had the lowest amount of bike and pedestrian crashes with ten, while there was a slight increase in crashes within the warmer, summer months with July having the most at 25.

There have been 32 fatalities and 76 incapacitating injuries from crashes over the past ten-year period along known Amish traveled routes across the State. From information gathered at public meetings with local Amish communities and confirmed by historic crash data, a few state routes stood out as high crash routes across the State. See page 19 for a listing of these locations.

Frequency of Crashes by Light Condition - Bike/Ped in Amish Traveled Areas





### Top 10 Roadway Segments for Buggy Crashes/Mile/Year (2009 - 2018)

| District | County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Crash Rate/Mile/Year | # of Fatal Crashes |
|----------|--------|-------|-----------|-------------------|---------|-----------------|----------------------|--------------------|
| 11       | HOL    | 39    | 28.2      | SR 515            | 29      | CR 114          | 0.875                | 1                  |
| 11       | HOL    | 241   | 9.1       | CR 77             | 11.6    | CR 100          | 0.72                 | 1                  |
| 3        | WAY    | 301   | 2.6       | SR 604            | 3.9     | IR 71           | 0.538                | 0                  |
| 3        | WAY    | 250   | 22.1      | Mt. Hope Rd       | 24.3    | Kidron Rd       | 0.455                | 0                  |
| 4        | TRU    | 87    | 0         | County Line       | 2.5     | SR 534          | 0.44                 | 0                  |
| 11       | HOL    | 241   | 5.3       | CR 507            | 6.7     | CR 201          | 0.357                | 0                  |
| 11       | HOL    | 241   | 6.7       | CR 201            | 9.1     | CR 77           | 0.333                | 0                  |
| 3        | WAY    | 241   | 2.8       | US 250            | 7.13    | County Line     | 0.323                | 0                  |
| 4        | STA    | 241   | 0         | County Line       | 3.5     | SR 93           | 0.314                | 1                  |
| 11       | HOL    | 62    | 24.79     | SR 557            | 26.4    | SR 39           | 0.311                | 0                  |

### Top Roadway Segments for Buggy Fatal Crashes (2009 - 2018)

| District | County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Crash Rate/Mile/Year | # of Fatal Crashes |
|----------|--------|-------|-----------|-------------------|---------|-----------------|----------------------|--------------------|
| 3        | ASD    | 42    | 14.9      | SR 604            | 19.3    | County Line     | 0.25                 | 2                  |
| 11       | HOL    | 39    | 28.2      | SR 515            | 29      | CR 114          | 0.875                | 1                  |
| 11       | HOL    | 241   | 9.1       | CR 77             | 11.6    | CR 100          | 0.72                 | 1                  |
| 3        | WAY    | 301   | 3.9       | IR 71             | 6.4     | US 42           | 0.2                  | 1                  |
| 3        | WAY    | 250   | 24.3      | Kidron Rd         | 26.9    | SR 241          | 0.269                | 1                  |
| 4        | STA    | 241   | 0         | County Line       | 3.5     | SR 93           | 0.314                | 1                  |
| 3        | ASD    | 96    | 0         | County Line       | 5.5     | SR 60           | 0.127                | 1                  |
| 4        | ATB    | 322   | 22.5      | SR 7              | 25.18   | State Line      | 0.112                | 1                  |
| 7        | SHE    | 47    | 25.14     | Baker Rd          | 27.09   | County Line     | 0.103                | 1                  |
| 3        | LOR    | 58    | 2.5       | SR 162            | 7.2     | SR 18           | 0.043                | 1                  |

### ***Top 10 Roadway Segments for Bike/Ped Crashes/ Mile/Year within Amish Traveled Areas (2009 - 2018)***

| <b>District</b> | <b>County</b> | <b>Route</b> | <b>Begin SLM</b> | <b>Begin Cross Route</b>   | <b>End SLM</b> | <b>End Cross Route</b>            | <b>Crash Rate/<br/>Mile/<br/>Year</b> | <b># of Fatal Crashes</b> |
|-----------------|---------------|--------------|------------------|----------------------------|----------------|-----------------------------------|---------------------------------------|---------------------------|
| 11              | HOL           | 39           | 24.8             | US 62                      | 28.2           | SR 515                            | 0.265                                 | 1                         |
| 7               | MER           | 49           | 19.95            | Tama Rd                    | 21.4           | SR 707                            | 0.138                                 | 0                         |
| 11              | HOL           | 39           | 28.2             | SR 515                     | 29             | CR 114                            | 0.125                                 | 0                         |
| 11              | HOL           | 241          | 9.1              | CR 77                      | 11.6           | CR 100                            | 0.12                                  | 0                         |
| 11              | HOL           | 39           | 29               | CR 114                     | 32.49          | County Line                       | 0.115                                 | 0                         |
| 11              | HOL           | 93           | 2.2              | SR 643                     | 4.18           | County Line                       | 0.101                                 | 0                         |
| 9               | HIG           | 138          | 25.1             | SR 771                     | 26.1           | Bectal Rd                         | 0.1                                   | 0                         |
| 11              | HOL           | 241          | 6.7              | CR 201                     | 9.1            | CR 77                             | 0.083                                 | 0                         |
| 7               | DAR           | 571          | 20.8             | Gettysburg<br>Pittsburg Rd | 22.05          | Painter<br>Creek<br>Arcanum<br>Rd | 0.08                                  | 0                         |
| 3               | HUR           | 61           | 0                | County Line                | 2.64           | US 224                            | 0.076                                 | 1                         |

### ***Top Roadway Segments for Bike/Ped Fatal Crashes within Amish Traveled Areas (2009 - 2018)***

| <b>District</b> | <b>County</b> | <b>Route</b> | <b>Begin SLM</b> | <b>Begin Cross Route</b> | <b>End SLM</b> | <b>End Cross Route</b> | <b>Crash Rate/<br/>Mile/<br/>Year</b> | <b># of Fatal Crashes</b> |
|-----------------|---------------|--------------|------------------|--------------------------|----------------|------------------------|---------------------------------------|---------------------------|
| 5               | COS           | 643          | 5.4              | CR 190                   | 10.87          | County Line            | 0.037                                 | 2                         |
| 11              | HOL           | 39           | 24.8             | US 62                    | 28.2           | SR 515                 | 0.265                                 | 1                         |
| 3               | HUR           | 61           | 0                | County Line              | 2.64           | US 224                 | 0.076                                 | 1                         |
| 7               | LOG           | 638          | 0                | US 68                    | 3.99           | SR 273                 | 0.050                                 | 1                         |
| 3               | LOR           | 18           | 1.7              | SR 511                   | 6.4            | SR 58                  | 0.043                                 | 1                         |
| 4               | TRU           | 45           | 18.59            | SR 88                    | 23.6           | SR 87                  | 0.040                                 | 1                         |
| 3               | HUR           | 224          | 18.7             | SR 13                    | 21.27          | County Line            | 0.039                                 | 1                         |
| 3               | WAY           | 3            | 4.9              | S Elyria Rd              | 10.8           | SR 226                 | 0.034                                 | 1                         |
| 11              | HOL           | 83           | 14.7             | CR 192                   | 17.78          | County Line            | 0.032                                 | 1                         |
| 10              | ATH           | 681          | 7.07             | US 50                    | 10.49          | County Line            | 0.029                                 | 1                         |

# Buggy Counts





To aid in determining where and how frequently Amish populations travel along state routes, 417 traffic counts were conducted across 11 ODOT Districts as part of this study. Counts were conducted at each location on a single weekday for 12 hours, from morning through evening between the months of November 2018 and August 2019. Counts collected Amish buggy, motor vehicle, and truck traffic at each location. Attached in Appendix D are traffic count location maps. Traffic count data supplemented anecdotal data collected through public surveys, community meetings with local Amish, and ODOT maintenance staff knowledge of Amish traveled routes.

## Results

As the counts were limited in their scope (one day for 12 hours), it is difficult to establish with certainty that routes with little or no Amish buggy traffic observed are routes that are not traveled with some frequency by Amish populations. Still, these counts do provide evidence of routes where travel is more frequent. The counts were used to verify information from ODOT officials, feedback from community meetings and the

public survey, as well as evidence of Amish populations in certain areas. The counts are one criterion used to determine roadway segment ranking within the prioritization matrix presented later in this study.

An example of a regional buggy count map is illustrated on the next page. Buggy count results were segmented into four categories to help score the buggy volume criteria within the prioritization matrix. The four categories are detailed below.

| Icon  | Category            | Frequency |
|---|---------------------|-----------|
|  | None Counted        | 0         |
|  | Lightly Traveled    | 1 - 5     |
|  | Moderately Traveled | 6 - 12    |
|  | Frequently Traveled | 13 & up   |

The majority of the locations counted across the state returned few or no buggy counts. If these locations were identified by ODOT as an “Amish Traveled Route” based on physical evidence or knowledge of local Amish travel patterns, the route was still considered to have some buggy travel and evaluated within the prioritization matrix. Some counts were placed outside of ODOT identified Amish travel limits to determine if buggy traffic did



exist beyond known limits. If buggy traffic was witnessed, that route segment was added to the prioritization matrix for evaluation. Locations that returned no Amish buggy traffic were not included.

The top ten highest volume locations are detailed below. Most of the “frequently traveled” roadway segments were confined to eastern Holmes and southeastern Wayne Counties. SR 241 is among the busiest Amish traveled route in the State with three segments within Holmes and Wayne Counties within the top ten in buggy volume. Other highly traveled routes in the area included, SR 643, SR 39, SR 557, and US 250.

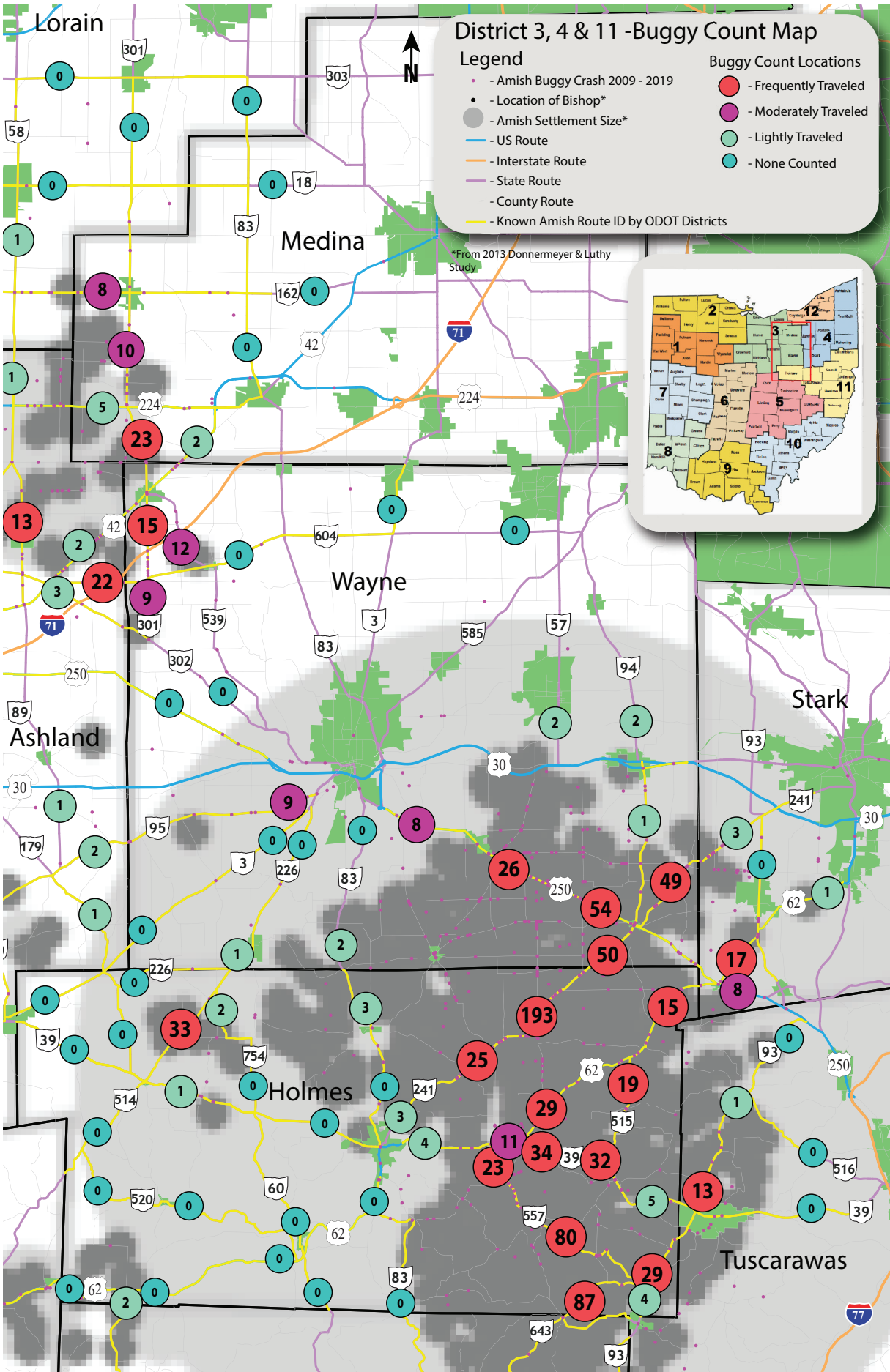
Outside of the eastern Holmes and southeastern Wayne County areas there were a few notable “frequently traveled” roadway segments as well. Those segments included: SR 301 in Medina County, SR 604 in Ashland County, SR 87 in Trumbull County, SR 377 in Morgan County, SR 229 in Knox County, and SR 87, SR 528, and SR 608 in Geauga County. Please note that buggy count volumes were not taken within Geauga County as part of this study and are not included in the buggy count volume chart below.

Buggy count maps and results for the entire State are included within Appendix D.



### **Top 10 Buggy Count Volumes Across the State**

| <b>District</b> | <b>Count #</b> | <b>County</b> | <b>Route</b> | <b>SLM</b> | <b>Buggy Volume per Count</b> |
|-----------------|----------------|---------------|--------------|------------|-------------------------------|
| 11              | 116            | HOL           | 241          | 10         | 193                           |
| 11              | 145            | HOL           | 643          | 1          | 87                            |
| 11              | 137            | HOL           | 557          | 5          | 80                            |
| 3               | 101            | WAY           | 250          | 25         | 54                            |
| 3               | 103            | WAY           | 241          | 1          | 50                            |
| 3               | 102            | WAY           | 241          | 6          | 49                            |
| 11              | 130            | HOL           | 39           | 25         | 34                            |
| 11              | 113            | HOL           | 514          | 8          | 33                            |
| 11              | 131            | HOL           | 39           | 28         | 32                            |
| 11              | 122            | HOL           | 62           | 28         | 29                            |



## Public Survey

A public survey was developed and distributed across the Amish Community for approximately one year from August 2018 to August 2019. The purpose of the survey was to gather information about how Amish travel (modal choice), where they travel (specific routes), and why they travel (trip purpose) on public roadways. Surveys were distributed to the Amish Community through various methods including the 2018 Thanksgiving issue of The Budget newspaper, ODOT District staff, known Amish community members, and at ODOT-held community meetings.

The survey was distributed in two forms: as a location specific survey with an area map attached, and as a Statewide survey without a area specific map. Area maps were

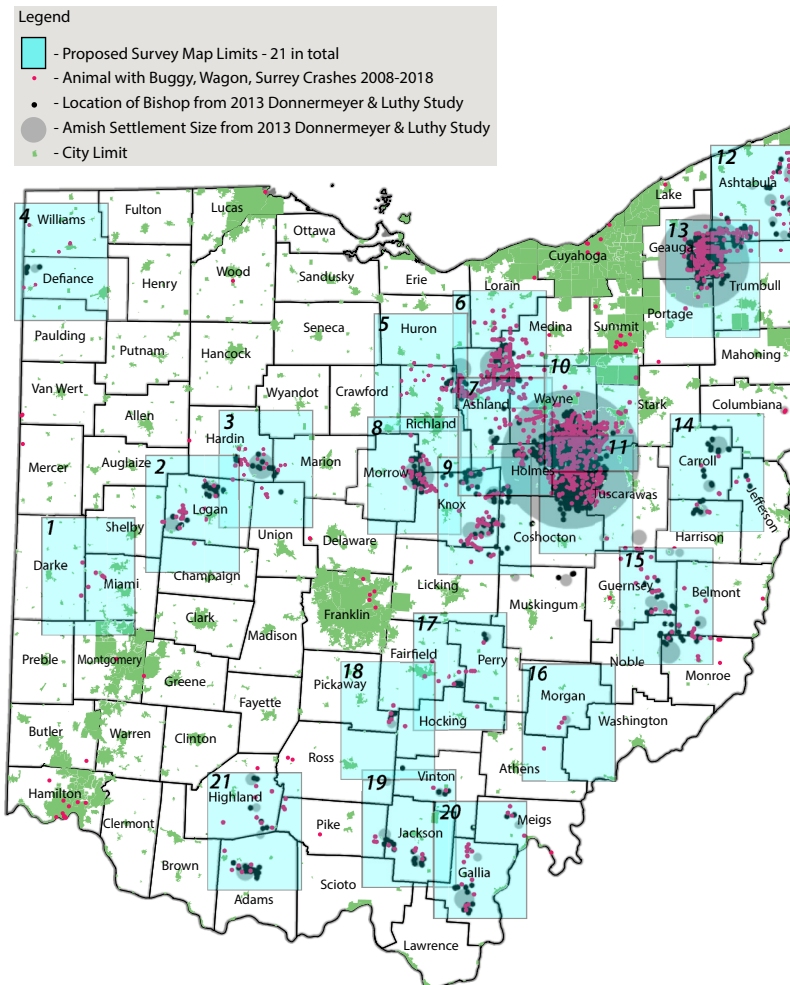
used to gather input on where the local Amish travel most frequently by buggy. The Statewide survey asked that the respondent to list their most frequently traveled buggy routes without the aid of a map. Though both survey forms asked the same questions, different survey forms were used for different distribution methods. The Statewide survey was used when distributed through The Budget Newspaper, while ODOT district staff distributed location specific surveys to the local Amish population. The image below summarizes the 21 areas where location specific survey maps were created.

## Results

A total of 1,275 public surveys were completed across 27 counties within the State. The response rate varied across the State with roughly three

quarters of responses coming from Holmes, Wayne, Ashland, Knox and Morrow County communities. To gain a better understanding of the response distribution across the State, the map on page 24 illustrates the public survey response rate by county.

Non-Motorized Study Survey Map Locations



## Mode of Travel

The Amish use various modes of transportation to complete their daily trips. Some communities allow more modal choices than others including the use of E-Bikes, scooters and golf carts. Even within communities allowing one or more of those additional modes of travel, buggy travel was still the most frequently used mode as 95% of respondents traveled by buggy at least once a week. Walking was also a heavily utilized mode choice as 75%



walked at least once a week along public roadways. Bicycle use was less frequent across the State yet 60% of respondents travel by bicycle at least once a week. Bicycling usage varies wildly by Amish settlement as some communities do not allow the Amish to ride bicycles. Roughly 30% of respondents do not travel by bicycle.

least once a day. Travel to/from school mimics travel for work with 43% of respondents stating they travel to school at least once a day. Travel to shop or sell goods is more of a weekly travel mode with 60% of respondents stating they travel once a week and an additional 27% said they travel to shop at least once a month.

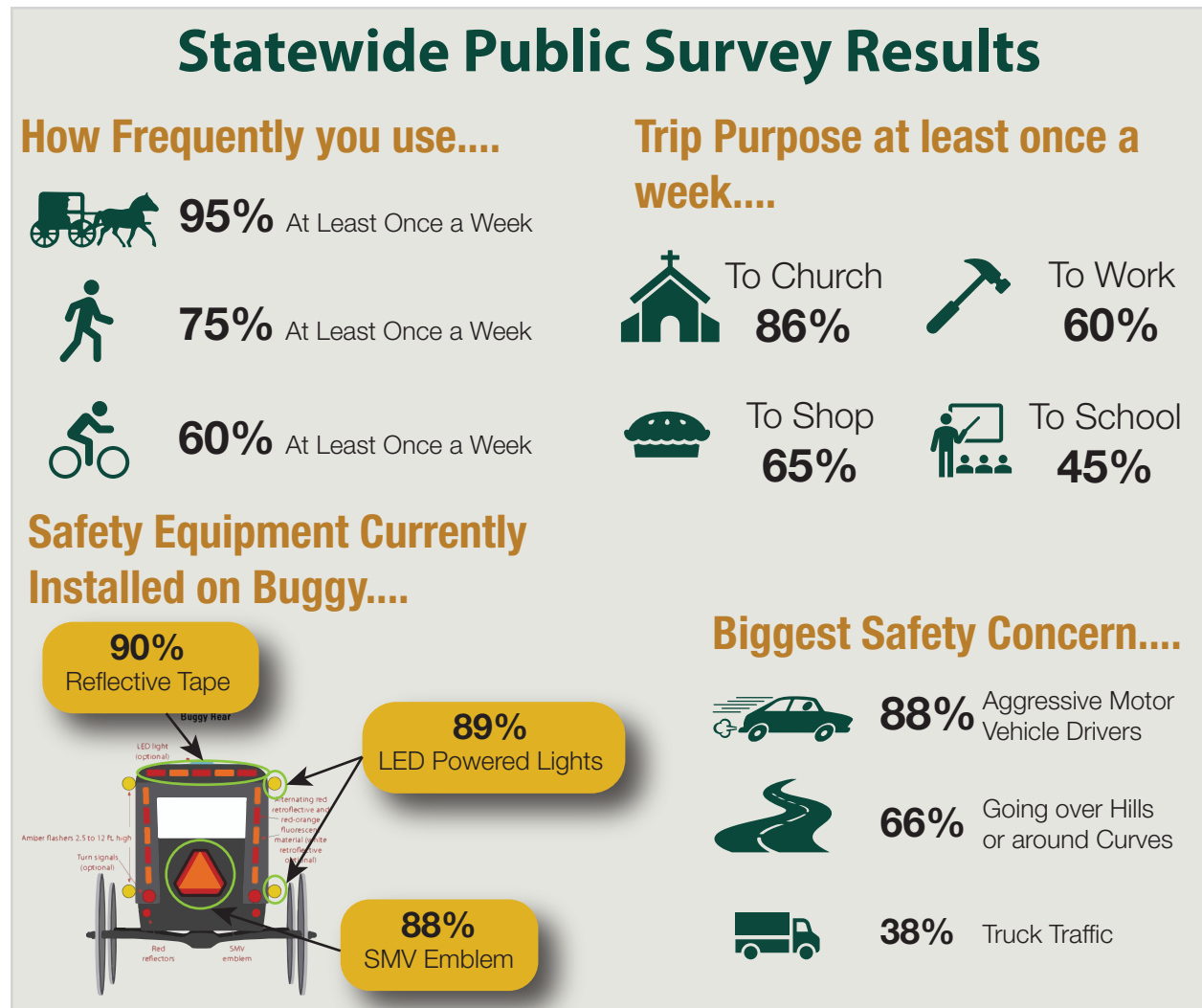
### Frequency & Trip Purpose

The reason and frequency the Amish are traveling on public roadways varies depending on the trips purpose. When analyzing travel frequency by week most respondents stated that they travel for church the most at 86%. This result makes sense as church is a weekly trip generator. Travel for work is more frequent with roughly 50% of respondents stating they travel for work at

### Night Travel & Safety Equipment

Nearly all respondents (94%) travel by buggy, bicycle or foot at night. This reinforces the importance of installing or wearing proper safety equipment to increase visibility while traveling at night.

Though there is some consistency in the survey results regarding buggy safety



equipment currently installed, discussions with Amish communities across the State revealed buggy safety equipment varied widely by community. One explanation for this discrepancy could be that roughly three quarters of the survey respondents live within the Holmes, Wayne, Ashland, Knox and Morrow Counties area where some Amish communities are more open to using various forms of buggy safety equipment. Smaller Amish communities along the Ohio River or within Hardin and Logan Counties were much more conservative with regards to buggy safety equipment. For area specific survey results refer to the Area Profiles section of this report beginning on page "Area Profiles" on page 31.

The survey results showed that roughly 90% of all respondents stated that they have installed reflective tape (rear of buggy), LED-powered lights/lanterns, and/or Slow Moving Vehicle (SMV) emblem on their buggies. In addition, two thirds of respondents use battery powered turn signals. The color of the LED lights used on the buggies varies throughout the State ranging from white, red, yellow, orange or blue. These survey results were consistent with the results from the 2016 Amish Safety Strategic Plan for Geauga County regarding buggy safety equipment. In that survey, over 85% of respondents installed rear reflective warning tape, a SMV emblem, LED-powered lights and turn signals. These survey results indicate many Amish communities are taking a proactive approach to buggy safety.

The Amish expressed that their biggest safety concern while driving was aggressive motor vehicle drivers (88% of responses). This concern was expressed at community meetings across the State in both heavily traveled and newer, smaller, Amish communities. Nearly two-thirds of all respondents stated that going over hill or around corners was their biggest safety concern. The rest of the results were evenly distributed with roughly one-third of

respondents stating that truck traffic, being hit while turning left or being seen after dark are their biggest safety concerns.

Respondents were also asked to provide additional feedback on any other safety concerns while traveling by buggy, bicycle or foot as part of an open-ended question. Examples of the most common responses are summarized below.



***"What scares me is people texting and on phone"***



***"Rough roads where horses could step in potholes and bicycles could hit holes or grooves and cause an accident"***



***"In a buggy you cannot depend on turning signals. I have been stopped, waiting to turn left out in the right lane, turning signals on, and just ready to turn someone comes out around"***



***"Locals drive too fast on roads, don't turn out far enough when passing, pass at hill where you can't see"***



***"Wider roads with shoulders would be nice, and would make it safer for buggy traffic"***

## Community Meetings

An Amish community's size, method of transportation, preferred safety equipment, and transportation challenges can vary wildly by community. Even separate Amish communities that reside within the same County can be different from one another. There is little consistency with regard to these transportation issues across the State. To gather a perspective on the various Amish communities across the State as well as assess their unique transportation challenges, a total of 18 public meetings were held between March and August 2019. Meeting locations were selected around known Amish population centers while also attempting to represent the cultural diversity of varying Amish communities across the State. Meetings were held after work hours between 5 PM and 8 PM on a Monday, Tuesday, Wednesday or Thursday night and each lasted for one to two hours. The team worked with local Amish liaisons within each community to organize each meeting. Meetings were held at locations where the local Amish felt most comfortable and included produce auctions, Amish Health & Safety Days, township halls, resident's barns or local Amish businesses.

Meetings were promoted within the local Amish community one month ahead of each meeting date. The team produced and printed flyers that the local Amish liaisons distributed throughout the community. The approach was fairly successful as most meetings had 20 to 35 attendees. The average meeting size was 32 attendees. In total, excluding Amish Health & Safety Day participation, 505 attendees participated in the community meetings. A summary and map of each meeting is provided on the following pages.

### Meeting Format

Each meeting began with a short presentation from the consultant team that gave an

overview of the goals, timeline and purpose of the study and explained the information ODOT was seeking to gather from the local Amish community to help inform the study. After the presentation, the meeting transitioned into an open house format where participants interacted one-on-one with the consultant team, ODOT representatives and at times local safety, county or township officials, to ask questions and gather information about local Amish travel patterns.

Participants were asked to provide feedback on four exercises specific to the local area. The exercises focused on buggy travel, bike/pedestrian travel, locations of roadway safety concerns, and future roadway improvement desires. Participants were presented with maps of the local area and asked to highlight locations on the map where they traveled frequently by buggy, bike or foot, as well as locations where they felt unsafe while traveling. Participants were also presented with six ideas for future improvements to remedy areas of safety concern and asked to circle improvements they felt would be most



beneficial. In addition, participants had the ability to share any additional safety concerns via comments sheets.

Feedback from each community meeting is illustrated within the Area Profiles section of the study, as well as within Appendix C. Data collected at each community meeting was paramount in informing the prioritization matrix detailed later in this document. Buggy travel, bike/pedestrian travel and locations of safety concern are each criterion that directly contributed to a roadway segment's priority level.

## Thematic Concerns

Though Amish communities differ from one area of the State to another, there were some common concerns that arose from discussions at community meetings across the State. Below is a summary of some of the most common concerns.

### *Roadway Maintenance*

Two major concerns were raised regarding roadway maintenance: filling potholes and maintaining shoulders. Potholes can cause serious damage to a buggy as it travels and some of the less traveled motor vehicle routes tend to have more potholes making it difficult for the Amish to use those routes. Many Amish complained about shoulder "drop offs" from the edge of the paved shoulder to the gravel alongside the treated shoulder. In many areas there is a large drop off due to erosion during storms or steep grades into roadside ditches which forces the Amish driver to ride closer to the traveled lane. Improved maintenance of the treated shoulder would allow the Amish to ride within the available shoulder width and out of the traveled lane.

### *Edge Line/Shoulder Rumble Strips*

Many Amish, particularly in the southern portion of the State, complained about shoulder rumble strips. The rumble strips "spook" the horses when the buggy wheels

run along them and the horse itself cannot run on the rumble strips as the horse could trip and fall. To remedy this issue the buggy driver has to span the rumble strip between the buggy wheels or run in the traveled lane. Many of the shoulders with rumble strips don't have enough width to allow the buggy to travel outside of the rumble strips, away from the traveled lane. The Amish would like to see rumble strips removed on state routes they frequently travel.

### *Intersection Sight Distance*

Many Amish across the State identified restricted sight distance as a major issue while turning onto state routes. Amish drivers are set back from the front of the horse a large distance (approximately 12 feet) as compared with a typical motor vehicle driver. As a result, at intersections where the typical motor vehicle driver may have no sight distance issues, an Amish buggy driver may not be able to see around tall grass or brush. Where possible within the right of way, additional grass and shrub cutting should be considered to improve sight distance for Amish drivers.

### *Snow Plowing*

Amish expressed the need for the shoulders along state routes to be plowed in the winter as they still use the roadways regardless of the weather. They also expressed concern about snow plows approaching the buggies suddenly and plowing around them, which startles the horse and driver. They would like plow drivers to be more courteous while passing.



## Community Meetings Summary

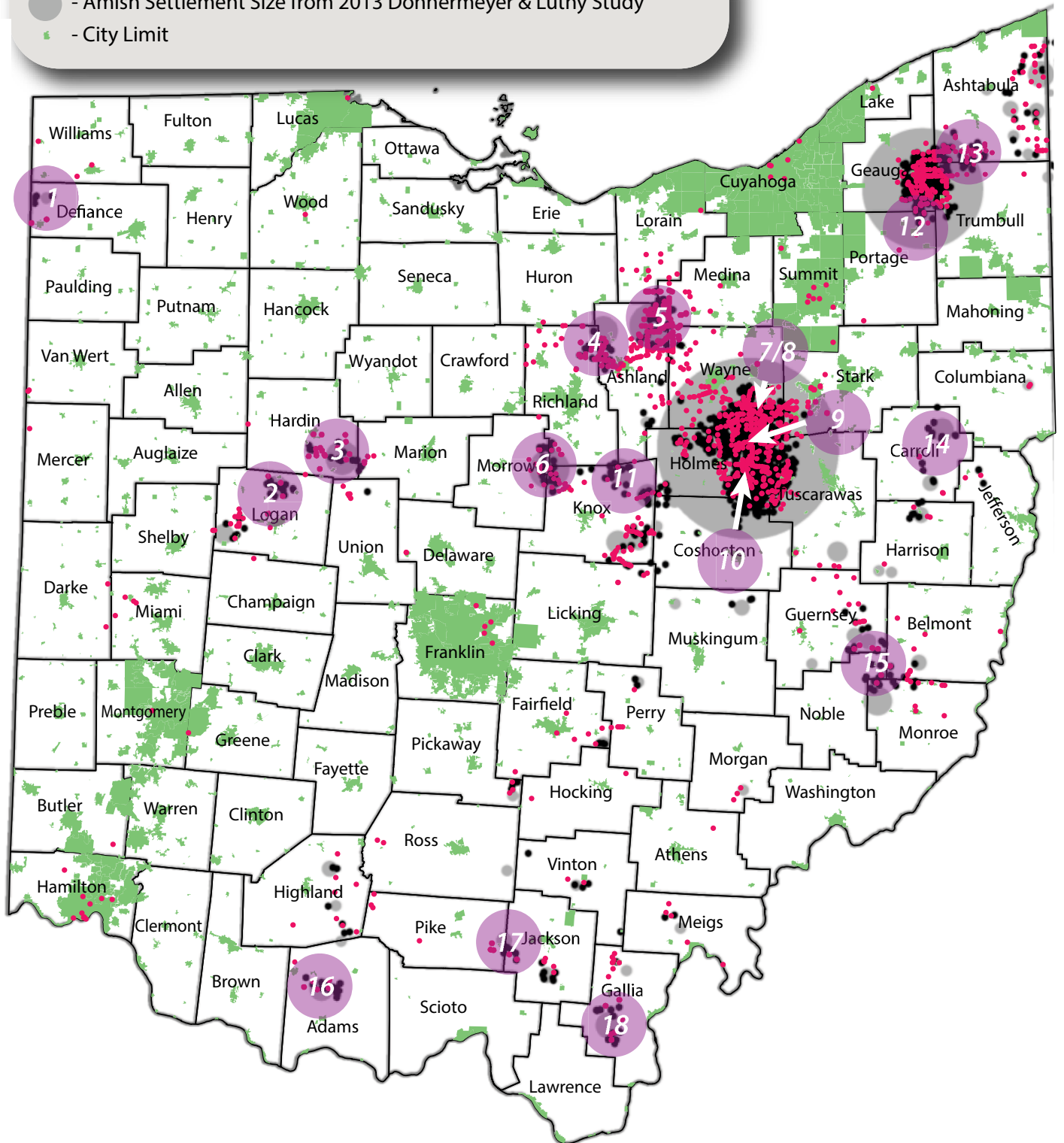
| Map ID | Location                                       | Address   | County       | Date of Meeting           | Total Attendees |
|--------|--|---|--------------|---------------------------|-----------------|
| 17     | Scioto Township Fire Department Building       | 4701 State Route 776, Jackson Ohio 45640              | Jackson      | 3/26/2019                 | 30              |
| 7      | Kidron Community Park Building                 | 4434 Kidron Road, Kidron, Ohio 44636                  | Wayne        | 3/27/2019                 | 16              |
| 16     | Wheat Ridge Community Building                 | 3735 Wheat Ridge Road, West Union, Ohio 45693         | Adams        | 4/9/2019                  | 34              |
| 1      | Amish Schoolhouse Community Room               | 07327 Hicksville-Edgerton Road, Hicksville Ohio 43526 | Defiance     | 4/10/2019                 | 39              |
| 18     | Patriot Metals Building                        | 1588 Gage Road, Patriot, Ohio 45658                   | Gallia       | 4/11/2019                 | 33              |
| 15     | Village of Batesville's Community Park Shelter | 56705 Seneca Lake Road, Quaker City, Ohio 43773       | Noble        | 5/28/2019                 | 7               |
| 6      | Owl Creek Auction                              | 7835 County Rd 22, Fredericktown, Ohio 43019          | Morrow       | 6/5/2019                  | 18              |
| 3      | Dudley Township Hall                           | 21593 County Road 190, Mt. Victory, Ohio 43340        | Hardin       | 6/6/2019                  | 34              |
| 14     | Kilgore Fire Hall                              | 7177 Germano Road, Carrollton Ohio 44615              | Carroll      | 6/11/2019                 | 31              |
| 5      | County Line Produce Auction                    | 11701 Jeffery Road, West Salem, Ohio 44287            | Wayne/Medina | 7/3/2019                  | 55              |
| 9      | Mount Hope Event Center - Dean Beachy Arena    | 8076 State Route 241, Millersburg, Ohio 44654         | Holmes       | 7/9/2019                  | 85              |
| 11     | Nunda Ridge Schoolhouse                        | 20330 Nunda Road, Butler, Ohio 44822                  | Knox         | 7/10/2019                 | 34              |
| 13     | Levi Miller's Shop/Barn                        | 2669 Rice Road, Orwell, Ohio 44076                    | Ashtabula    | 7/22/2019                 | 27              |
| 2      | Daniel Miller's Barn                           | 8148 County Route 49, Belle Center, Ohio 43310        | Logan        | 8/8/2019                  | 21              |
| 12     | Nelson Township Community House                | 11642 Windham Parkman Rd Garrettsville, Ohio 44231    | Portage      | 8/12/2019                 | 16              |
| 10     | Oasis Center                                   | 3460 Township Road 159 Baltic, Ohio 43804             | Holmes       | 8/13/2019                 | 1,200*          |
| 8      | Kidron Community Park Building                 | 4434 Kidron Road, Kidron, Ohio 44636                  | Wayne        | 8/14/2019                 | 25              |
| 4      | Keim Bulk Food                                 | 1411 Twp Rd 1106, Ashland, Ohio 44805                 | Ashland      | 8/15/2019                 | 600*            |
|        |  |   |              | <b>Total</b>              | <b>505</b>      |
|        |  |   |              | <b>Average Attendance</b> | <b>32</b>       |

\* Health and Safety Day Events - Attendance Totals are Estimated. Estimated Totals not Included in Total or Average Attendance Numbers

# Community Meeting Locations

## Legend

- Community Meeting Locations - 18 in total
- Animal with Buggy, Wagon, Surrey Crashes 2008-2018
- Location of Bishop from 2013 Donnermeyer & Luthy Study
- Amish Settlement Size from 2013 Donnermeyer & Luthy Study
- City Limit



## Area Profiles

Large Amish settlements, like Holmes and Geauga, are known by locals and tourist alike. These settlements tend to dominate popular thinking of acceptable Amish cultural from both a roadway/buggy safety and modal choice perspective. But the State of Ohio has over 76,000 Amish residents, in 65 Amish settlements, stretching into 57 counties. Due to Amish settlements being spread across the State, settlements can differ wildly in terms of geography and topography, impacting roadway safety concerns differently. Settlements can also vary wildly in terms of their accepted cultural beliefs. Each settlement's policies on acceptable modes of transportation and roadway safety equipment is governed by local bishops. These policies can vary greatly by settlement even within the same county.

The goal of the area profiles detailed on the following pages is to provide ODOT with specific feedback on roadway safety concerns, Amish travel patterns, and local Amish policies regarding roadway travel and safety for a localized area. The profiles can help inform ODOT of specific needs of an area when determining future improvements. The area profiles are centered around locations where community meetings were conducted. Localized public survey results, community meeting feedback, population data, historic crash data, and buggy count information is summarized within each area profile.

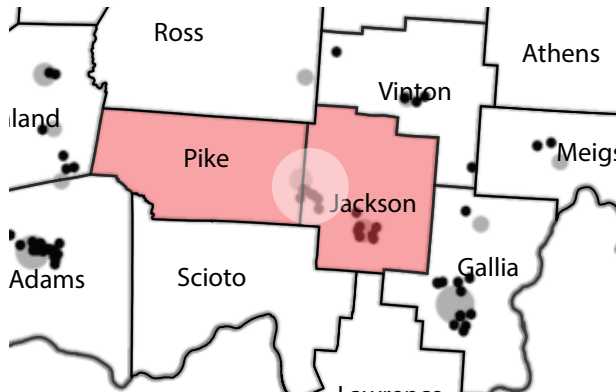
There were 18 community meetings conducted in total as part of this study, which resulted in 16 area profile summaries. Two community meetings were conducted in Kidron and the results of those two meetings were combined into a single area profile. The community meeting conducted in Barnsville, within Noble County had the lowest attendance of any meeting, with only seven Amish community members in attendance. The low turnout, along with limited public

survey responses from the area, limited the accuracy of the data. As a result, no area profile was summarized for this location. The chart below summarizes the area profiles detailed on the following pages.

| Area Name         | County                        |
|-------------------|-------------------------------|
| Beaver            | Jackson/Pike                  |
| Kidron            | Wayne                         |
| West Union        | Adams                         |
| Hicksville        | Defiance/Williams             |
| Patriot           | Gallia                        |
| Fredericktown     | Morrow/Knox                   |
| Mt. Victory       | Hardin                        |
| Kilgore           | Carroll                       |
| Tri-County        | Ashland/Medina/Wayne          |
| Mt. Hope          | Northern Holmes               |
| Jelloway/Danville | Knox                          |
| Orwell            | Ashtabula/Trumbull            |
| Belle Center      | Logan                         |
| Garrettsville     | Portage                       |
| Charm             | Southern Holmes/<br>Coshocton |
| Shiloh            | Ashland/Richland              |

# Beaver Area

## Jackson/Pike County




### Public Survey Summary

The settlements within this area are conservative and do not allow bicycle or scooter use. Buggy travel is the primary mode of transportation within this community with walking as a distant second option. All survey respondents said they use buggy transportation at least once a week, with the majority stating they use it daily.


LED lights or any battery-powered lights are rarely used within the community. Roughly 80% of survey respondents said they do travel with a lantern at night. The use of other buggy safety equipment is sparse as only the slow-moving vehicle emblem had a response rate of over 45%. Most other response options had few to no responses.




*“SR 32 rumble strips - can’t ride on them”*




**375 - 2019 Population (Beaver Settlement)**



**25 - Survey Responses**

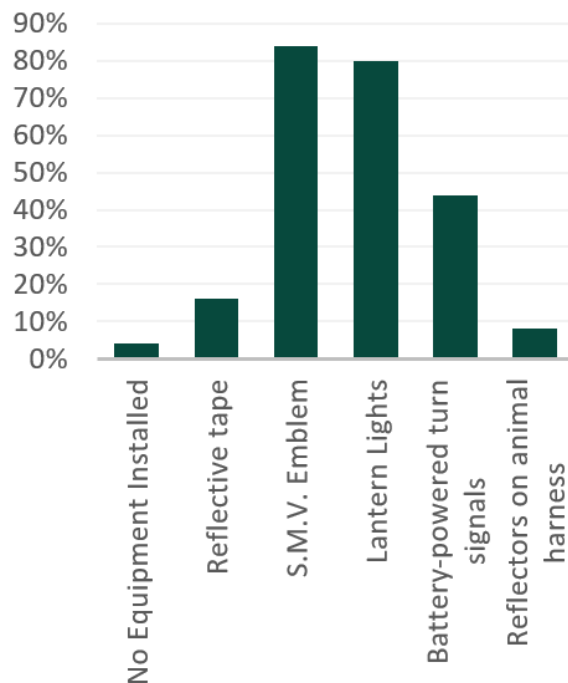


**30 - Community Meeting Attendees**



**Bicycles/Scooters Allowed?**

### Buggy Safety Equipment Installed

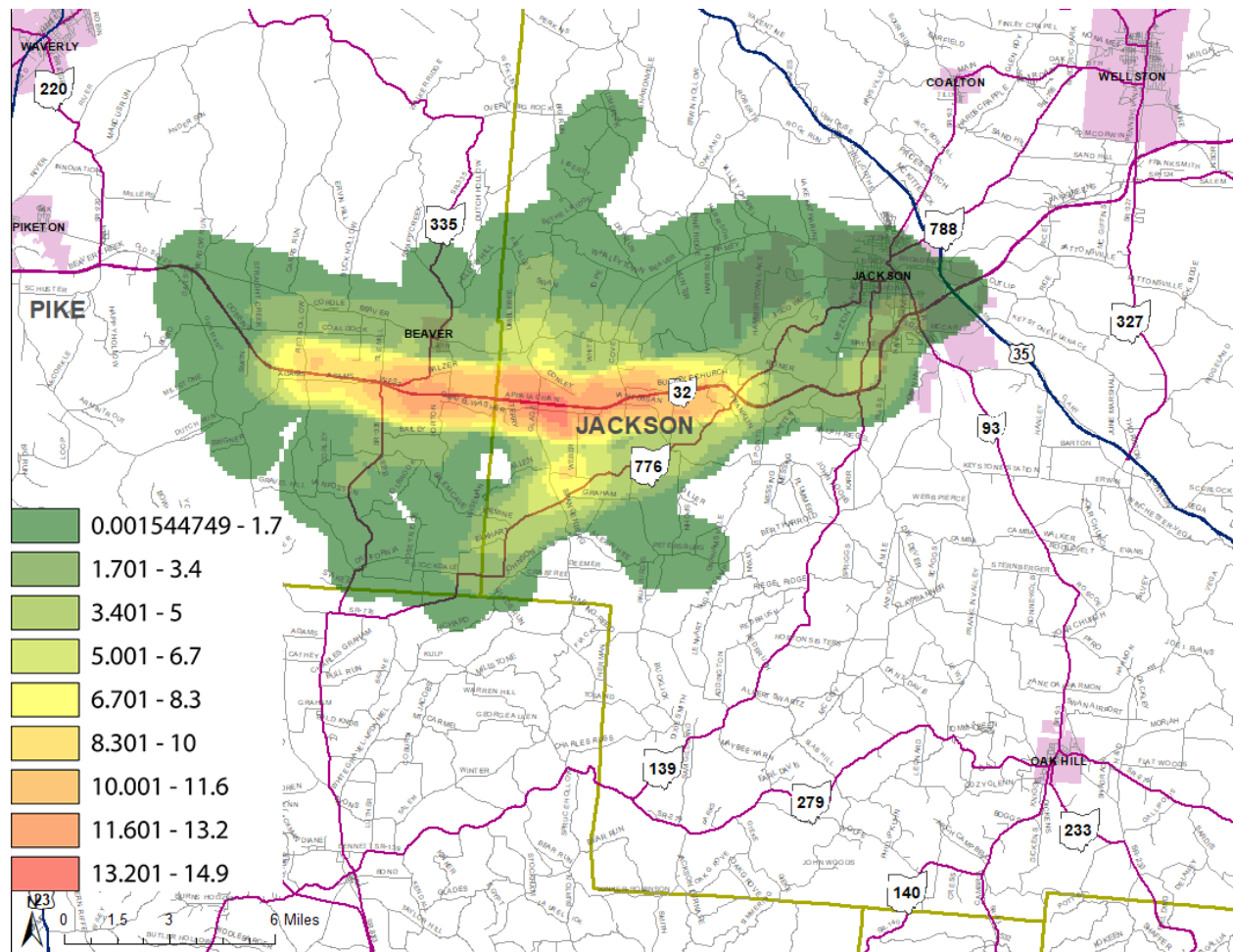


## Community Meeting Summary

The local Amish population indicated they try to avoid most state routes in the area, but must frequently travel along SR 32 as there are limited options to travel east/west. They noted that the speed and volume of the trucks along the route combined with the recent installment of shoulder rumble strips make SR 32 difficult to navigate. Many stated that they run their buggy partially within the traveled lane to avoid the rumble strips.

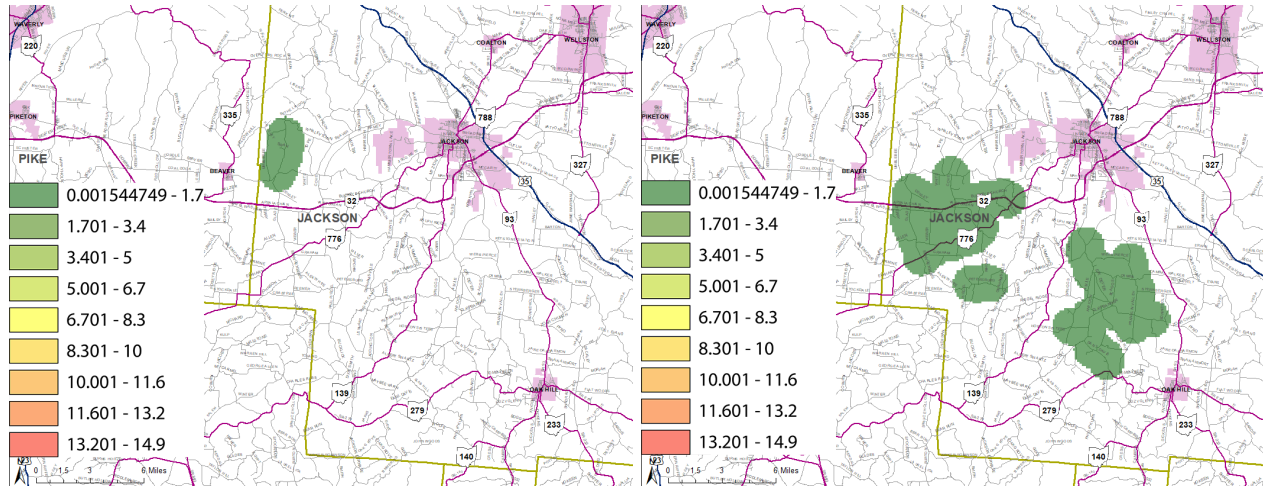
### Buggy Travel Exercise

Local Amish noted that they travel most frequently on SR 32, (between the town of Beaver in Pike County and SR 776 just west of the City of Jackson) and SR 776 (from roughly the Pike County line, east to SR 32). This information is consistent with known population data in the area, as many of the Amish in this settlement reside south of SR 32 within the southwestern corner of Jackson County and southeastern corner of Pike County.



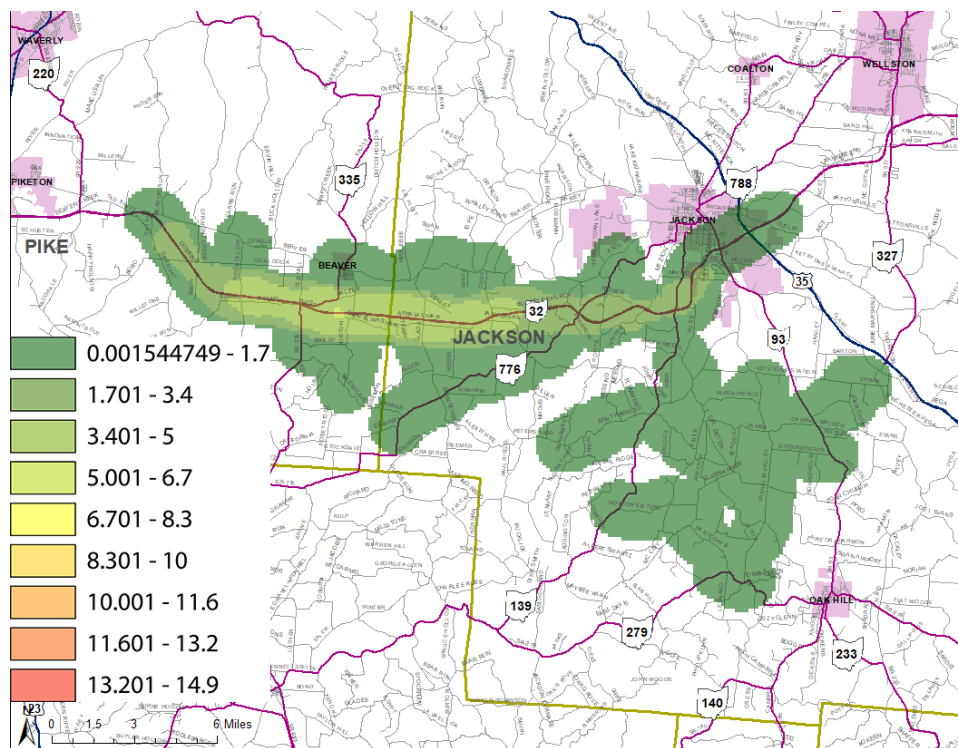
### Bike/Ped Exercise

There was a limited response to this exercise as the local Amish in the area are not allowed to ride bikes or scooters for transportation. In addition, the area is very rural with a general rolling terrain, and narrow shoulders so walking to destinations is generally difficult. Only SR 32 and portions of SR 776 were identified as locations people seldom walk (only one response).



### Safety Location Exercise

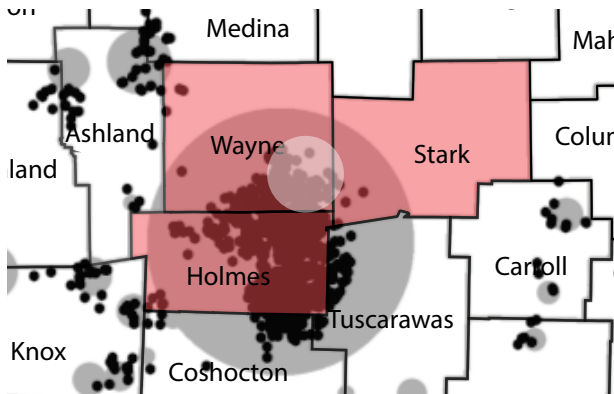
Consistent with other data gathered from the local area, SR 32 roughly between the town of Beaver and SR 776 was cited as the location with the highest safety concern locally. Portions of SR 776 around the Pike/Jackson County line were also cited as areas of concern. Safety concerns expressed ranged from lack a visibility around corners and over hills on SR 776, and vehicle speed and limited shoulder width due to rumble strips along SR 32.





# Kidron Area

## Wayne County



### Public Survey Summary

This community is open to using various modes of transportation to travel locally. Though buggy travel is still the primary means of travel, other modes including bikes, e-bikes, golf carts, scooters and walking are also very prevalent within the community.

Personal safety is taken seriously within this community. The use of battery-powered lights (76% of respondents) and turn signals are prevalent throughout the community. Walkers and bikers were observed wearing fluorescent safety vests at the community meetings and the local Amish expressed that the use of vests were encouraged by community elders.

Typical concerns expressed by the local Amish mimic statewide results regarding aggressive motor vehicle drivers. They also noted that existing buggy lanes and/or widened shoulders in the area could be wider to facilitate safer travel along state routes.

**36,755 - 2019 Population (Part of Holmes Settlement)**

**110 - Survey Responses**

**41 - Community Meeting Attendees**

**Bicycles/Scooters Allowed?**

Below are a couple of written survey responses from local Amish.



***"55 mph drivers do not slow down or turn out far enough for bicycles and buggies"***



***"The buggy lane on SR 241 is a tad skinny. If it were 12" wider I would feel a whole lot safer."***

| Local Safety Concerns     |                           |                      |                     |                     |                         |
|---------------------------|---------------------------|----------------------|---------------------|---------------------|-------------------------|
|                           |                           |                      |                     |                     |                         |
| <b>Aggressive Drivers</b> | <b>Over Hills /Curves</b> | <b>Truck Traffic</b> | <b>Turning Left</b> | <b>Seen at Dusk</b> | <b>Entering Roadway</b> |
| <b>90%</b>                | <b>66%</b>                | <b>32%</b>           | <b>32%</b>          | <b>29%</b>          | <b>8%</b>               |

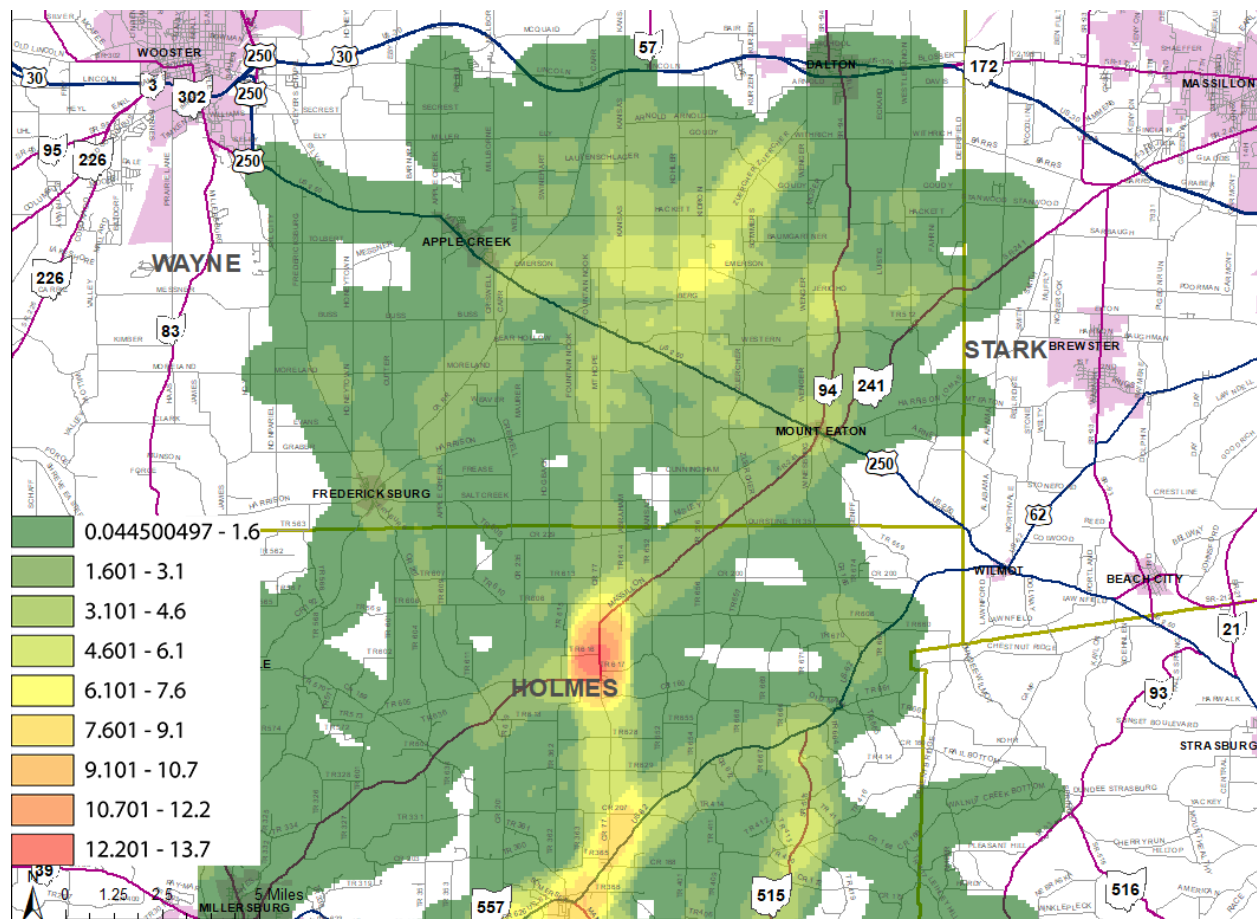
## Community Meeting Summary

This location hosted two community meetings at the Kidron Community Center. The first was held on March 27th and the second held on August 14th. Amish attendance at the first meeting was low and local Amish requested a second meeting be held to gather additional feedback as the area is one of the more populated Amish areas in the State. Though there were two community meetings held at this location, neither had a high turnout of Amish. So results for the exercises from this location are limited.

Locals expressed safety concerns regarding bikes, scooters and e-bikes traveling on state routes. Many motor vehicle drivers pass very close and in many cases have trouble judging the speed of e-bikes on the roadway. This has led to many near misses and some bicycle and pedestrian accidents in the area. The area is a local tourist destination and, as such, has a higher number of motor vehicles are on the roadways than other Amish areas of the State. Due to the availability of numerous county and township roads in the area, Amish expressed that they try to avoid state routes when possible. Local Amish have seen the benefits of buggy lanes with some recent installations in the area and expressed the desire to have those facilities constructed in the future, particularly along SR 241.

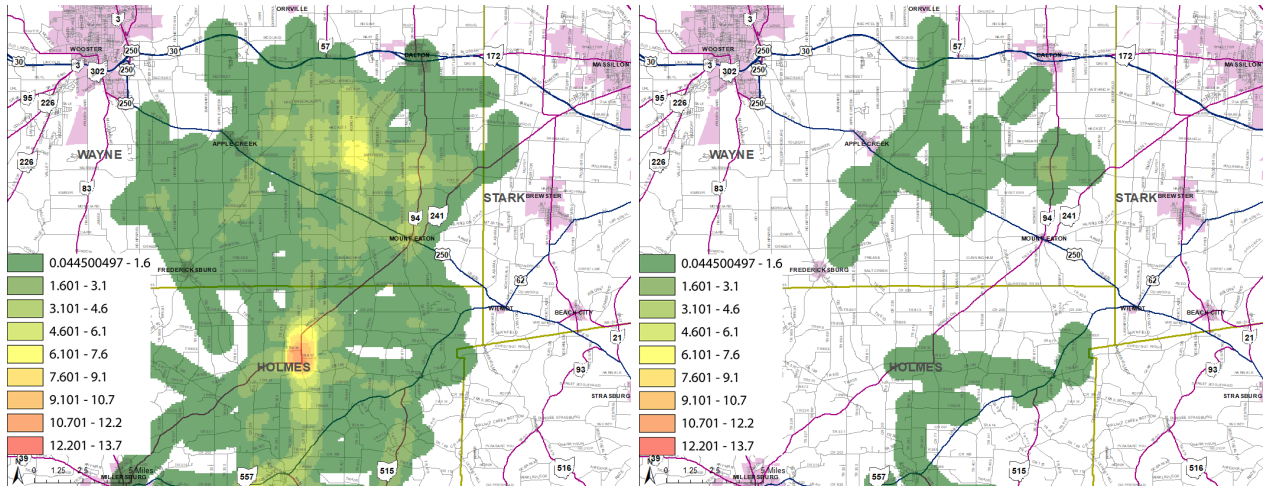
### Buggy Travel Exercise

The most frequently traveled locations (four instances each) were along SR 94 (from US 250 to Hackett Road), and along SR 241 (from the Holmes County line, east to SR 93 in Stark County). US 250 east of Wooster through Stark County was also identified by the local population as a frequently traveled buggy route.



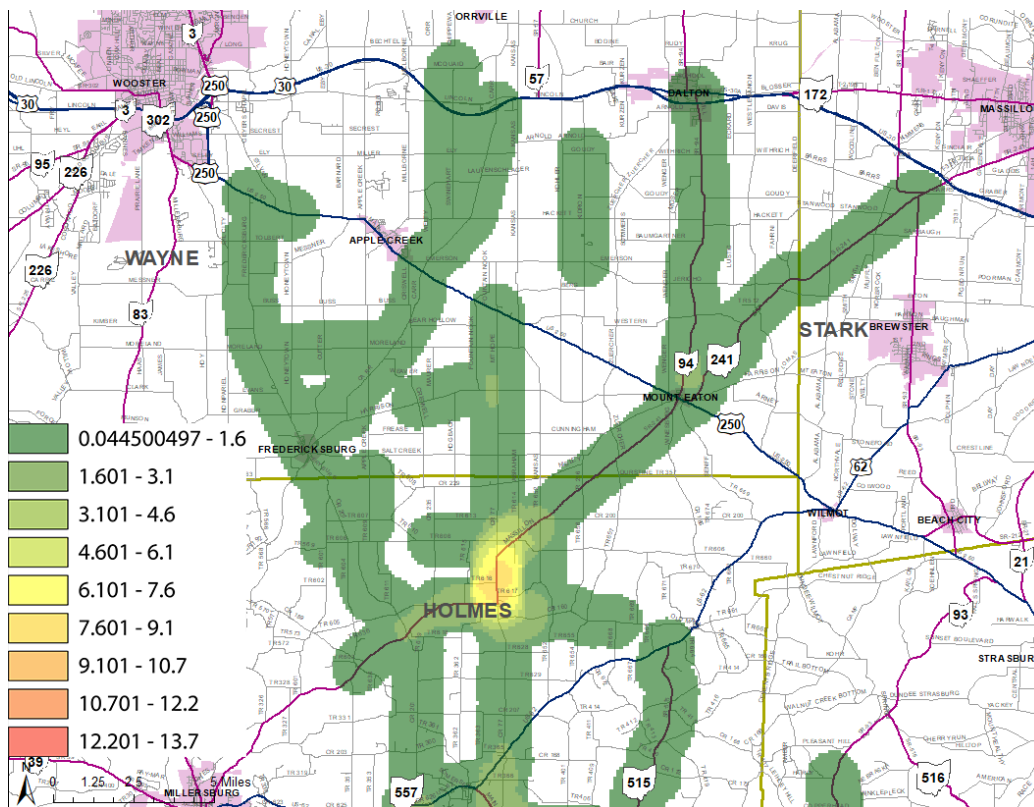
### Bike/Ped Exercise

SR 94 from US 250 to roughly Hackett Road was also the most identified state route in the area for bicycle and pedestrian activity. Other state routes in the area saw little or no feedback regarding bicycle and pedestrian usage.



### Safety Location Exercise

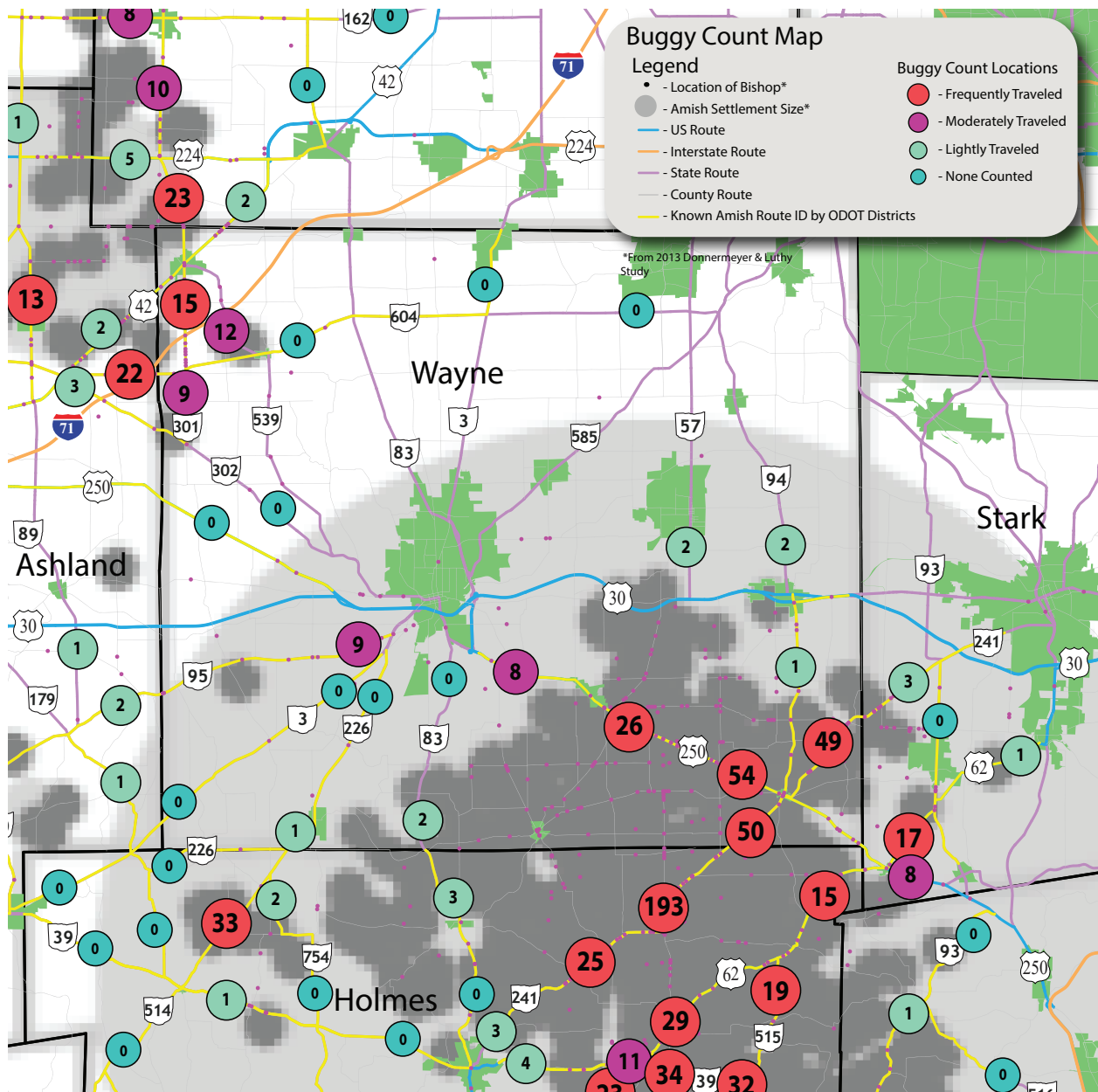
SR 94 from US 250 to roughly Hackett Road was the most identified route for safety concerns in the area (3 instances). This does not correlate with recent crash data in the area which cited both US 250 and SR 241 as the highest crash locations in the area. This might be due to the low response rate from the community meetings. Survey comments also seem to corroborate recent crash data as many expressed concerns about traveling along SR 241.



## Crash Data/Buggy Counts

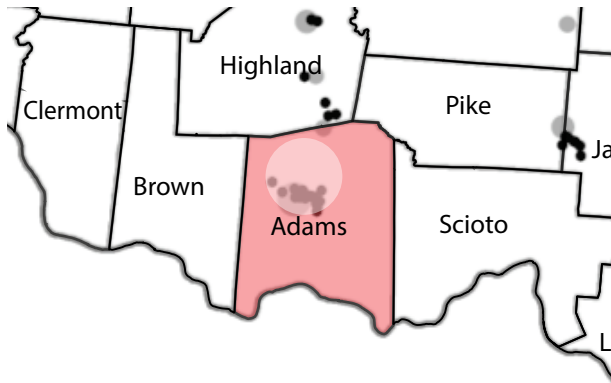
Three roadway segments within this community rank in the top ten for buggy crashes/mile/year within the State from 2009-2019. Roadway segments along US 250 (Mt Hope Road to Kidron Road) and SR 241 (US 250 to SR 93), which spans the Wayne and Stark County border, have crash rates/mile/year that exceed 0.3. These routes have also produced two fatal buggy crashes over the last ten years. US 62 within Stark County is another notable buggy crash location, with a crash rate/mile/year that exceeds 0.25.

The Kidron area returned some of the highest buggy count volumes in the State. SR 241 and US 250 were the most heavily traveled routes from buggy count results with over 50 buggies recorded over a 12-hour period. High volume counts were recorded as far east as Stark County. While the majority of buggy travel seems to be bound by US 30 to the north and SR 83 to the west, a few buggy counts noted small volumes of buggy traffic north of US 30 just south of Orrville and along SR 83 suggesting that local populations could be expanding in those directions.



# West Union Area

## Adams County



### Public Survey Summary

The West Union Amish community is very progressive when it comes to buggy/bicycle safety equipment. All survey respondents use reflective tape and a SMV emblem, while nearly all respondents use LED-powered lights and two-thirds have battery-powered turn signals. The community does allow cycling and many children bicycle to/from school. Aggressive motor vehicle driving was the most frequent safety concern in the community. Other safety concerns included being seen after dusk/dark and while going over hills and around curves. These concerns regarding visibility may correlate with a general lack of signage and intersection lighting in the area.



***“Have nieces and nephews going to school - cycling. Lots of big-rig trucks on the same roadways.”***

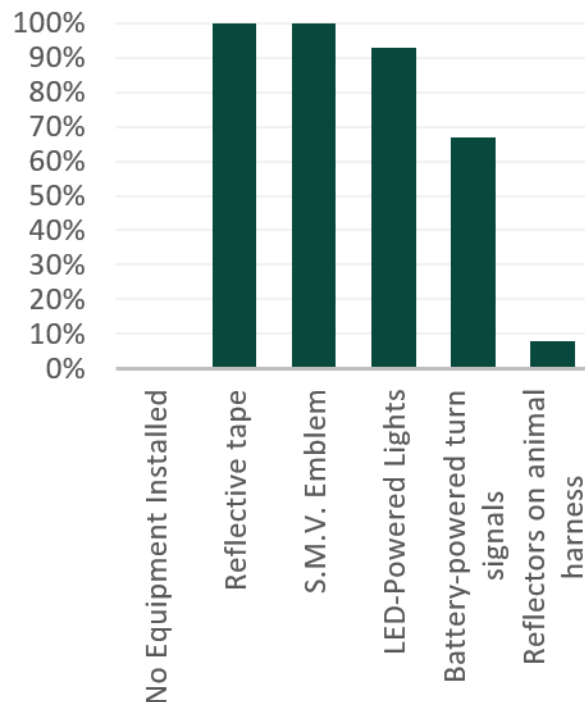
**495 - 2019 Population (West Union Settlement)**

**15 - Survey Responses**

**34 - Community Meeting Attendees**

**Bicycles/Scooters Allowed?**

### Buggy Safety Equipment Installed

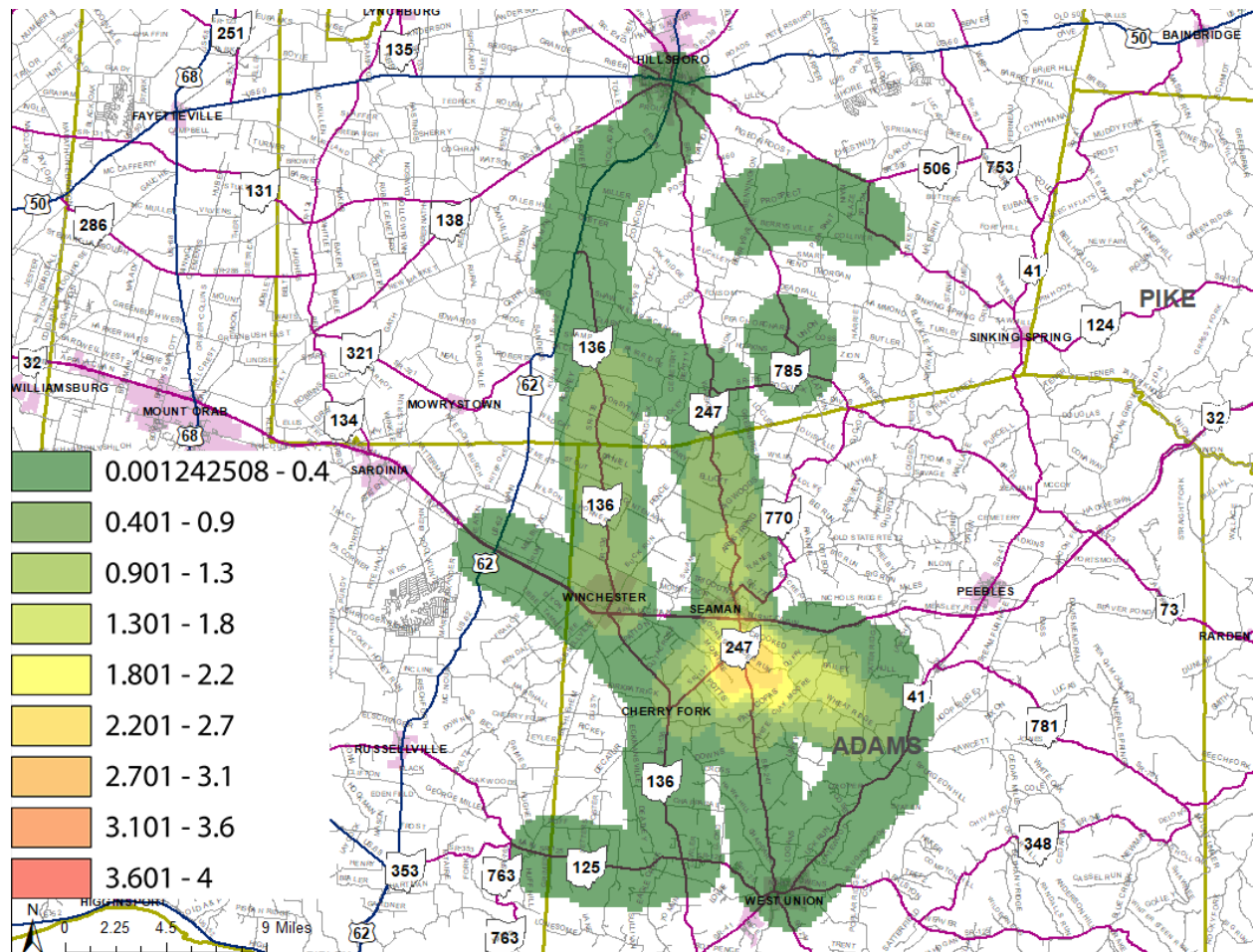


## Community Meeting Summary

Local Amish expressed concern with the increased number of tourists in the area. Many are not aware that Amish live within Adams County and are not expecting to encounter a SMV on state routes in the area. A need for additional signage within Amish frequented areas was discussed to better inform tourist of slow moving vehicles. Many roadways in the area have limited shoulder width, many curves and hills with high speed limits. These issues enhance the need for additional signage.

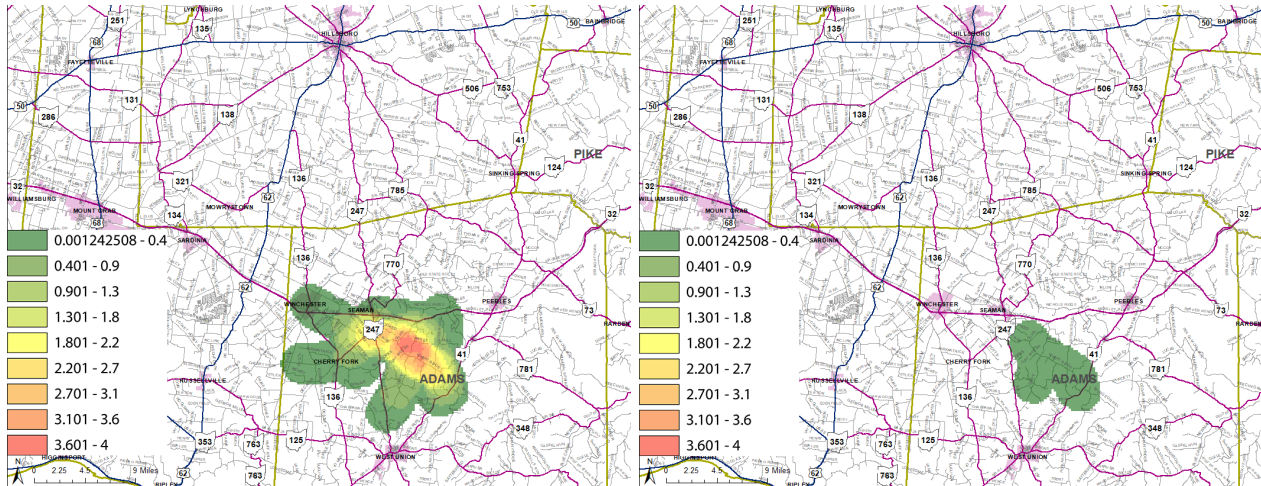
### Buggy Travel Exercise

The most frequented routes identified were limited to the northwestern portion of Adams County, north of West Union. SR 247 from just south of the SR 137 intersection, northward through the town of Seaman to the Adams/Highland County line, was the most frequented route. Other frequented Amish buggy routes in the area were SR 137 (between SR 136 and SR 247) and SR 136 (north of SR 137, through Winchester and northward towards Highland County).



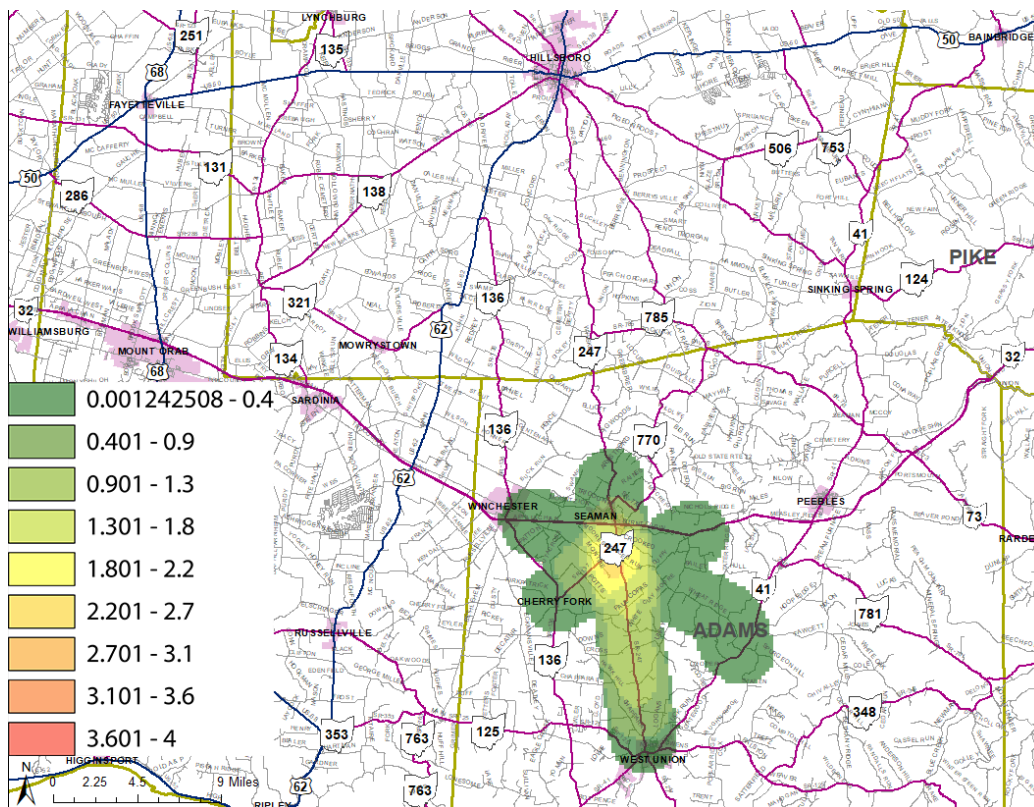
### Bike/Ped Exercise

This community does allow bicycle use and identified SR 137 (from SR 136 to SR 247) as the most frequently used route. It was expressed at the community meeting that many school children use this route to travel to/from school.



### Safety Location Exercise

SR 247 from north of West Union to the SR 32 intersection was the state route with the highest safety concern in the area. Many locals at the community meeting expressed a difficulty crossing this route due to high truck and traffic volumes along SR 247. SR 137 was also identified by many locals as a safety concern location.

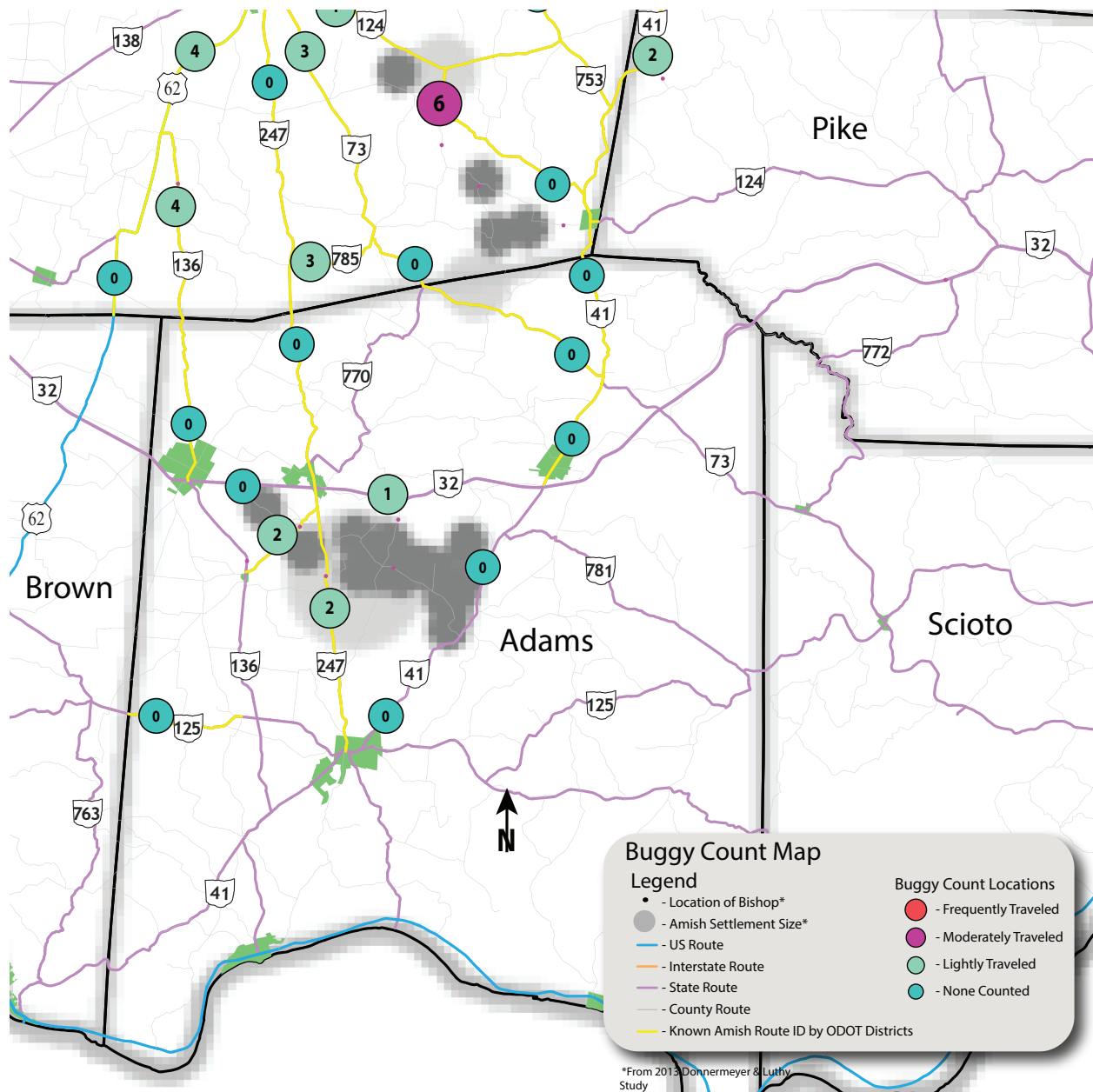


## Crash Data/Buggy Counts

Over the last ten years only a few buggy or bike/pedestrian crashes have occurred on state routes in the local area with none significant enough to present a trend. However, to the north in Highland County along SR 138, bicycle and pedestrian crashes ranked seventh highest in the State (0.1 crashes/mile/year) between SR 771 and Bectal Road. This community did not have a community meeting to determine the cause of the relatively high crash rate.

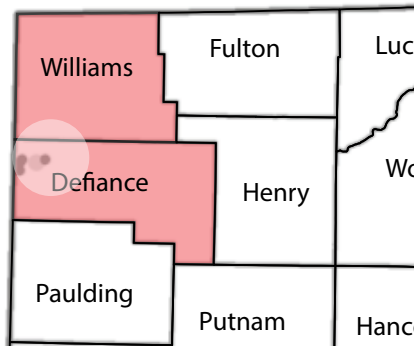
Buggy counts in the area were low, with only two recorded buggies along SR 137 and SR 247 within the West Union community. This is consistent with feedback from the community meeting where local Amish expressed they seek to avoid state routes in the area whenever possible.

Again, to the north within Highland County, moderate buggy travel was noted on both SR 138 and SR 124 (six recorded buggies at each) signaling separate Amish communities in that region.



# Hicksville Area

## Defiance/Williams County



### Public Survey Summary

We received no survey responses from this area.

**165 - 2019 Population (Hicksville Settlement)**

**0 - Survey Responses**

**39 - Community Meeting Attendees**

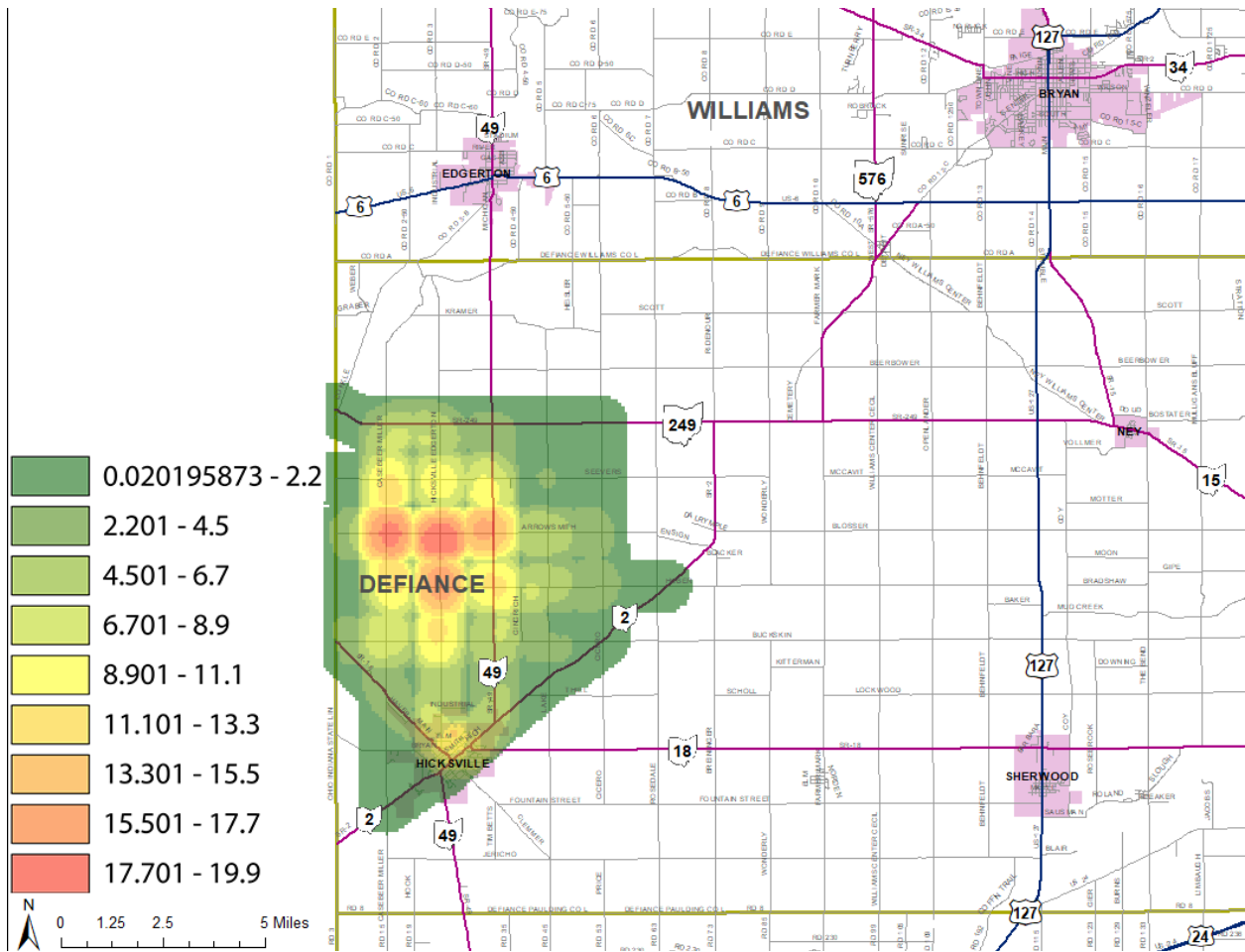
**Bicycles/Scooters Allowed?**

### Community Meeting Summary

Locals expressed concerns with school children walking along and crossing both state and county roadways in that area. They requested additional crosswalk and school speed limit signage be installed as motor-vehicles travel very fast on the straight, flat roadways within the area.

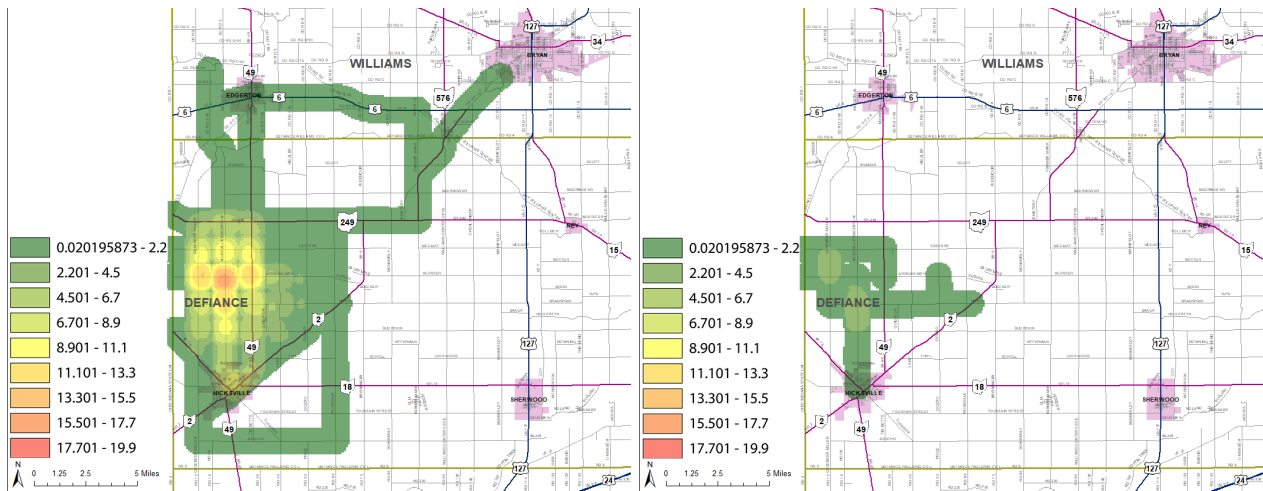
### Buggy Travel Exercise

Buggy travel is concentrated north of Hicksville. SR 49 was identified as a highly traveled buggy route from SR 2 to SR 249 with travel frequency peaking just south of SR 249. SR 249 (State Line, east to SR 49) was also identified as a highly traveled route. This settlement is an extension of larger settlements within Northeastern Indiana and thus Amish frequently travel across state lines.



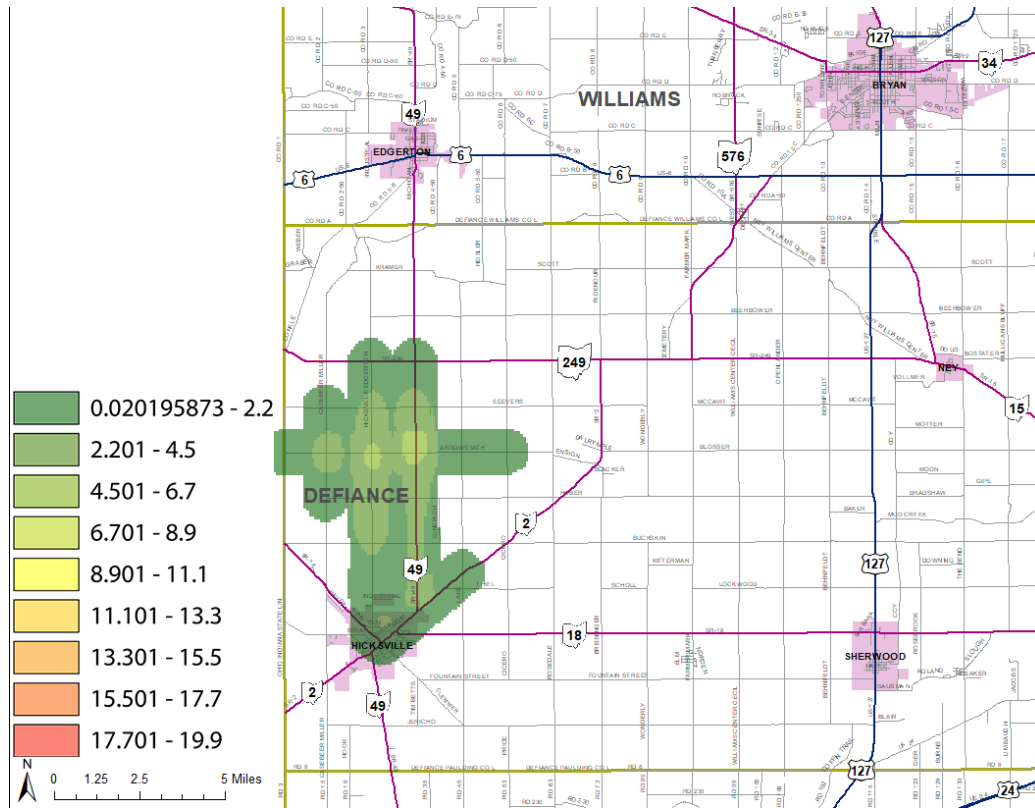
### Bike/Ped Exercise

Bicycle and scooter use is allowed within the community. Few Amish walk outside of school children, but many use bicycles as an alternative to buggy travel. SR 49 (SR 2 to SR 249) was identified as the most frequented bicycling route in the area. SR 249 (State Line, east to SR 49) was also identified as a high bicycle location.



## Safety Location Exercise

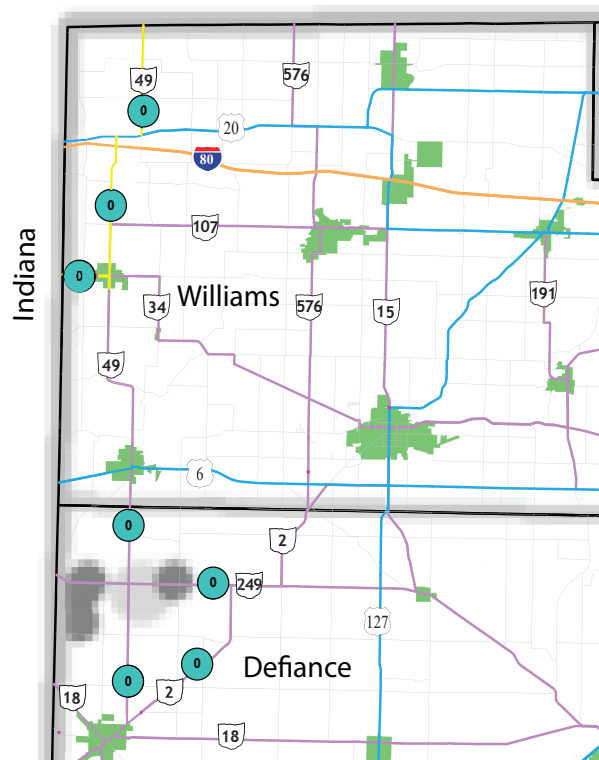
Consistent with other feedback, SR 49 (SR 2 to SR 249) was the only state route in the area identified as a high safety concern location. Locals cited narrow shoulders and high motor-vehicle speeds as the main concerns along this route.



## Crash Data/Buggy Counts

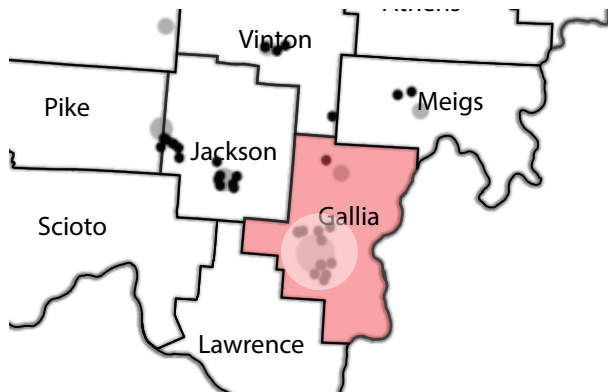
The only buggy or bike/pedestrian related crashes within the last ten years in the area have occurred along SR 2 northeast of Hicksville. There have only been a couple of crashes recorded, thus not enough to warrant further investigation.

Seven buggy counts were conducted in Williams and Defiance County. No counts showed evidence of buggy travel along state routes in the area. Due to the limited scope of the buggy counts (one day, 12-hours), no evidence of buggy travel does not mean the Amish do not use these routes, but they may suggest that these routes are not utilized on a daily basis.



## Patriot Area

### Gallia County



### Public Survey Summary

Local Amish travel primarily by buggy or on foot throughout this community as 95% of respondents travel by buggy at least once a week and nearly 85% walk at least once a week. Bicycle and scooters are not used in the area. Almost 100% of respondents use reflective tape, SMV emblem and LED-Powered lights on their buggies. However, buggy turn signals, were not utilized within this community. While aggressive motor vehicle driving was ranked as the area’s top safety concern (77%), going over hills or around curves was the second highest safety concern (74%). This concern was echoed at the community meeting as the area’s topography is rolling, with few alternative travel routes outside of state routes.

**720 - 2019 Population (Gallipolis Settlement)**

**33 - Survey Responses**

**33 - Community Meeting Attendees**

**Bicycles/Scooters Allowed?**



*“Lots of our roads are plenty narrow”*

### Local Safety Concerns

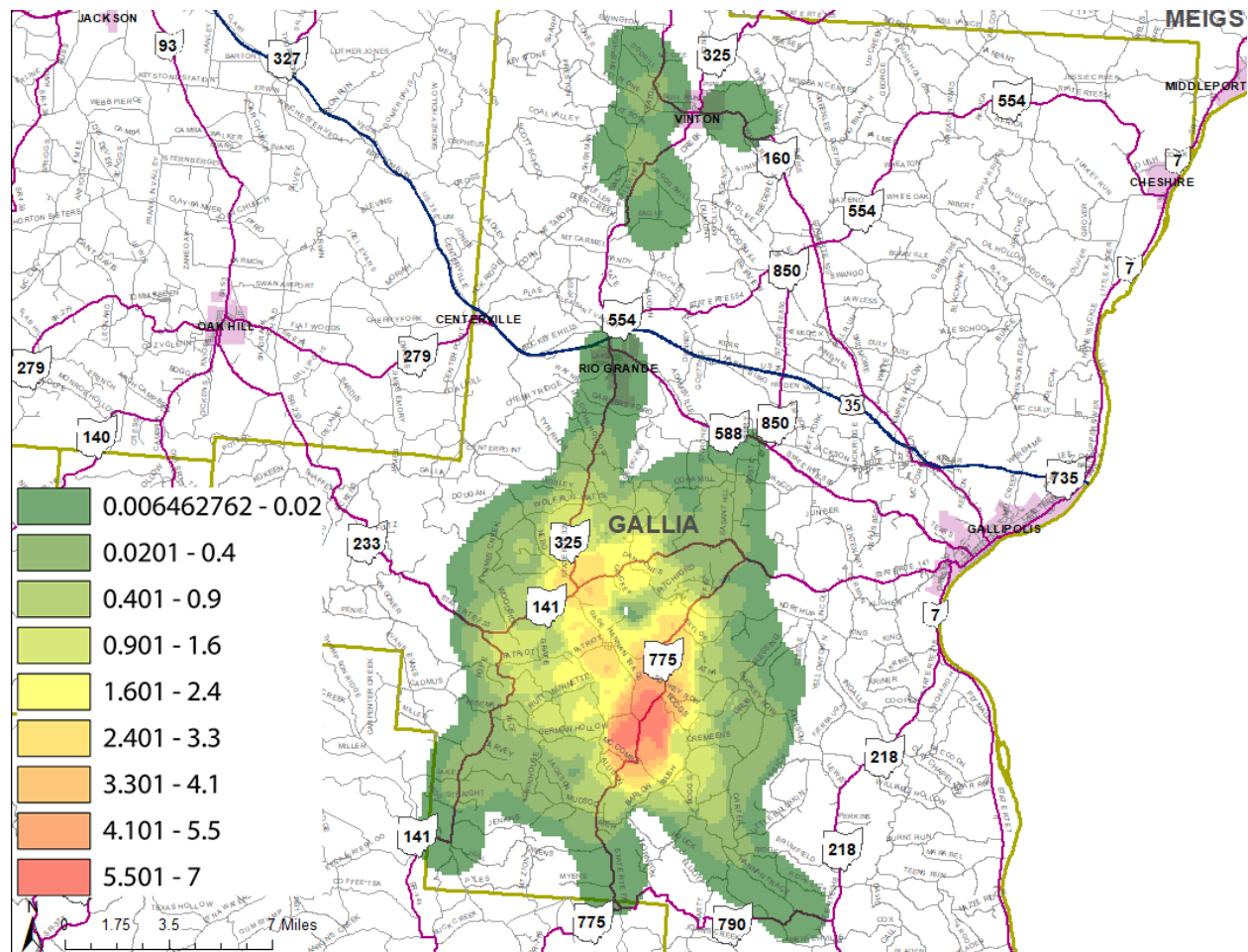
|                           |                           |                      |                     |                     |                         |
|---------------------------|---------------------------|----------------------|---------------------|---------------------|-------------------------|
|                           |                           |                      |                     |                     |                         |
| <b>Aggressive Drivers</b> | <b>Over Hills /Curves</b> | <b>Truck Traffic</b> | <b>Seen at Dusk</b> | <b>Turning Left</b> | <b>Entering Roadway</b> |
| <b>77%</b>                | <b>74%</b>                | <b>42%</b>           | <b>26%</b>          | <b>26%</b>          | <b>19%</b>              |

## Community Meeting Summary

The community expressed concern over narrow shoulders, lack of signage in some areas, and the interaction between snow plows and buggies during the winter months. Many cited snow plow drivers passing extremely close to the buggy, spraying it with snow and scaring the horse.

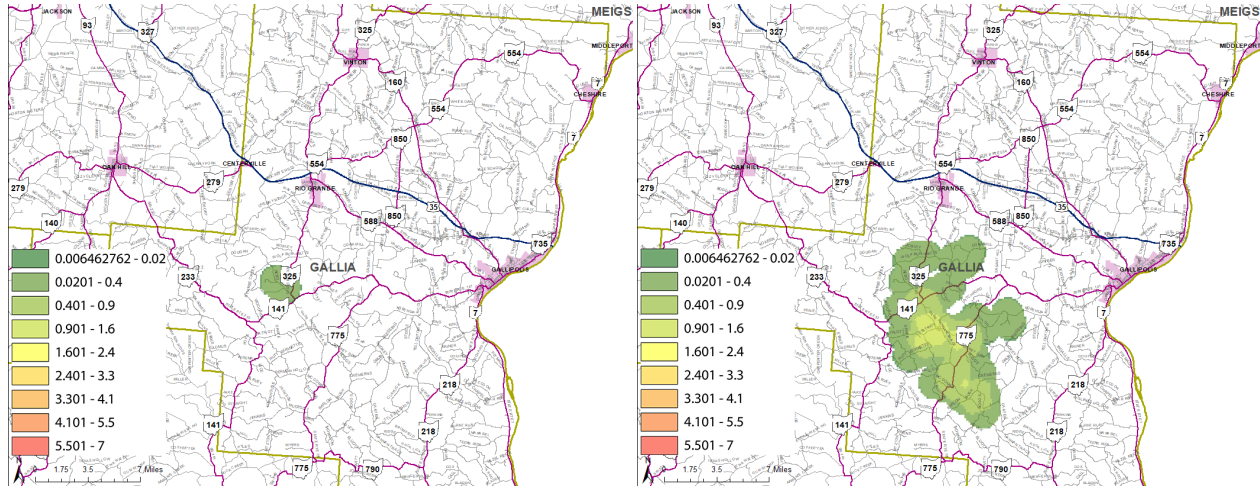
### Buggy Travel Exercise

Locals cited SR 775 south of Patriot (Hannan Trace Road and Patriot Road) as the most frequented state route in the area. Other frequently traveled state routes identified were north of the town of Patriot: SR 141 (near SR 325) and SR 325 (north of SR 141).



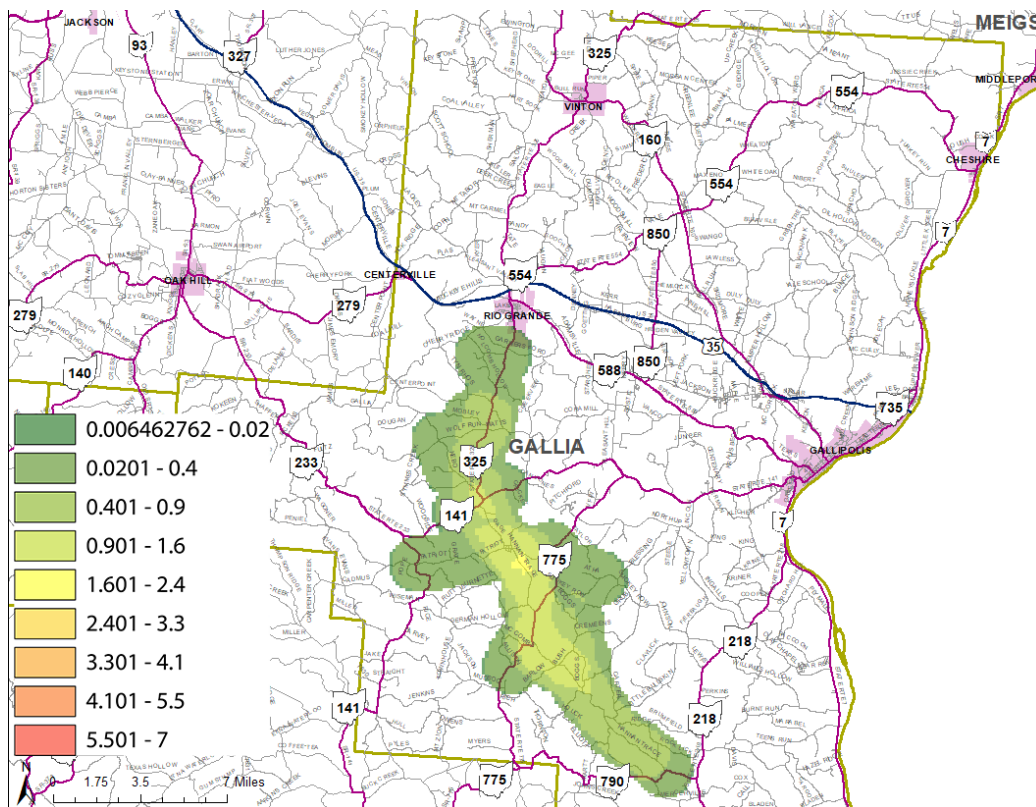
### Bike/Ped Exercise

Bicycling or the use of scooters is prohibited within this community. Though many in the survey responses said they walk to destinations regularly at least once a week, few meeting participants responded to this exercise. The most frequent response was along SR 775 just south of Patriot Road with only two responses.



### Safety Location Exercise

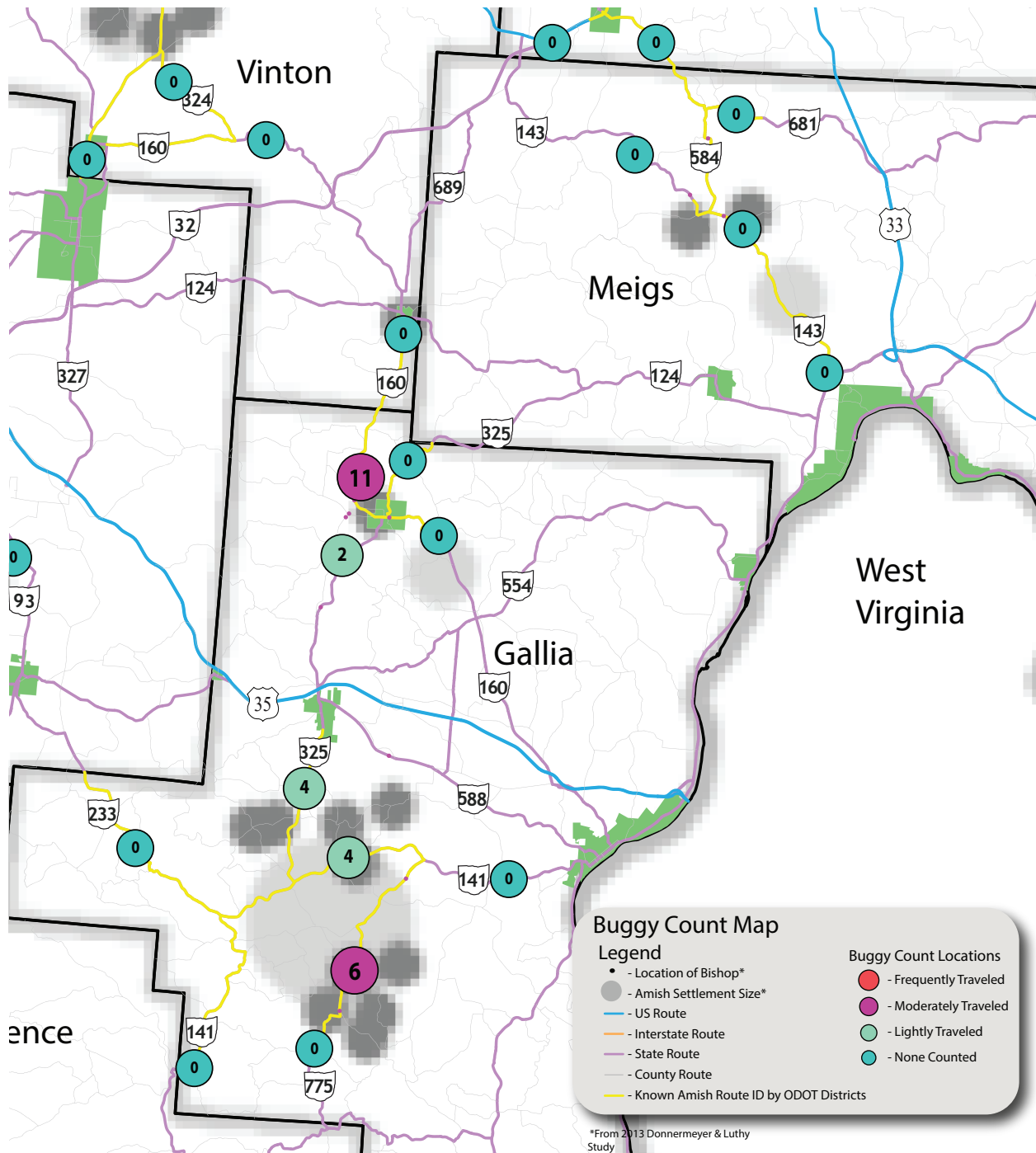
Only SR 325 north of Southwestern Elementary School (SLM 2.1) was cited as a location of safety concern. This area is prone to higher volumes of traffic during school arrival and dismissal. The roadway has both vertical and horizontal curves in this area, coupled with a speed limit reduction at the school. All of these elements make this location challenging for Amish travelers.



## Crash Data/Buggy Counts

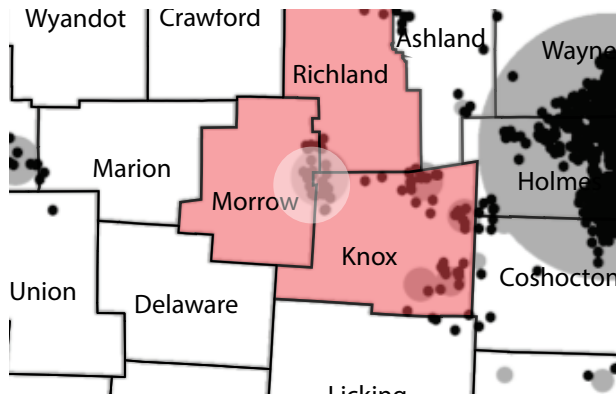
A few buggy crashes have been recorded in the Patriot area over the past ten years on SR 160 and SR 775. Neither route has a crash rate/mile/year over 0.05. No fatalities have occurred as a result of these crashes.

Light to moderate buggy counts were recorded around Patriot along SR 141, SR 325, and SR 775. Locations both east (along the Ohio River) and west (towards Jackson County) recorded no buggy traffic on state routes.



# Fredericktown Area

## Morrow/Knox County



### Public Survey Summary

Buggies are utilized heavily within the community as 100% of respondents use a buggy at least once a week. Local Amish also walk to destinations if not utilizing a buggy as 80% of respondents walk at least once a week. Riding a bike or scooter is not allowed within this community. Buggy safety was a central concern of this community as there have been some fatal accidents in the area on local roadways in the past. Almost all respondents (52 of 55 responses) use reflective tape, a SMV emblem, and LED-powered lights on their buggies. Many write-in comments echoed the need for all buggies to have LED-lights installed for safety. In line with those comments, nearly 60% of respondents stated their biggest safety concern in the area was being visible after dusk/dark.

**1,935 - 2019 Population**  
*(Fredericktown Settlement)*

**55 - Survey Responses**

**18 - Community Meeting Attendees**

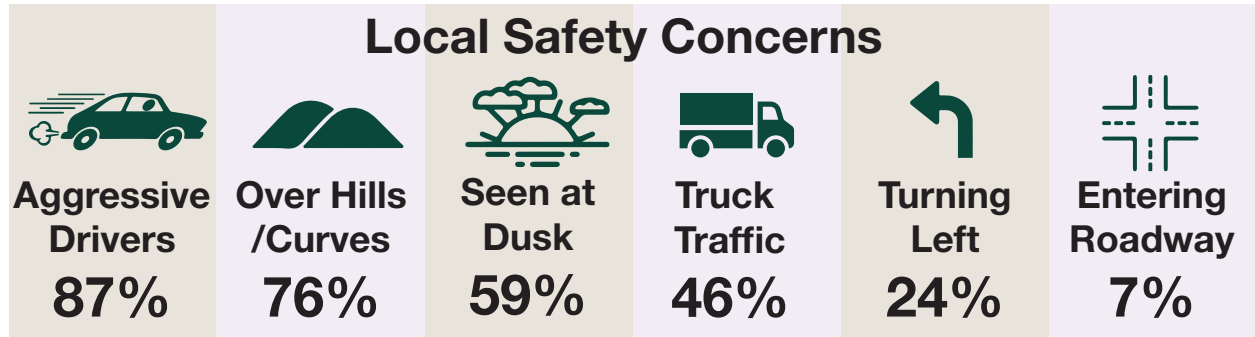
**Bicycles/Scooters Allowed?**



*“I think all buggies should have LED lights and flashers”*



*“There is a big concern going uphill when a lot of motor vehicle drivers pass around and they cannot see what’s coming ahead”*

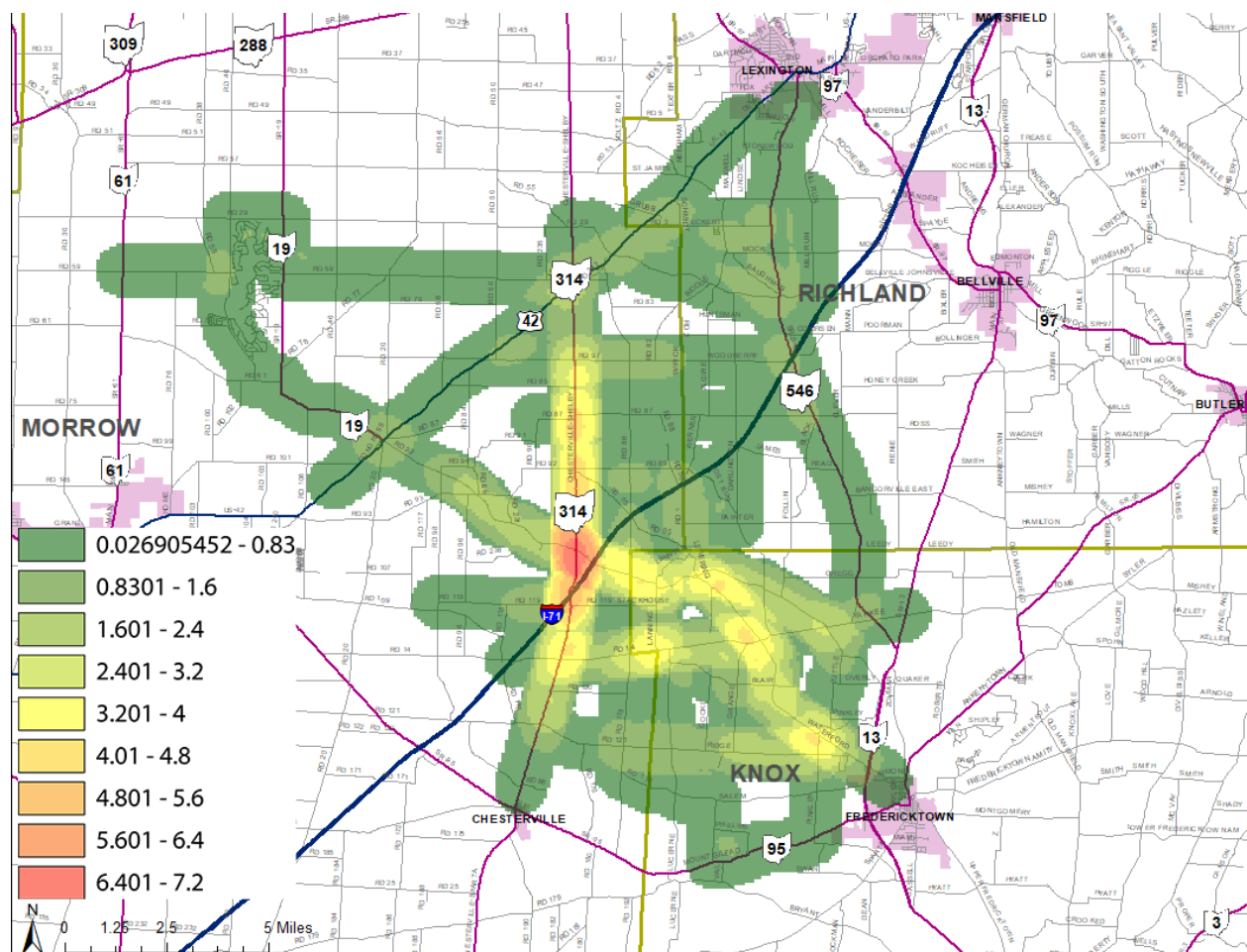


## Community Meeting Summary

Many locals at the community meeting were concerned with Amish traveling along SR 314 between US 42 and SR 95. They cited high volumes of truck traffic coming from Mansfield, high motor vehicle speeds, limited shoulder width, and lack of sight distance as major concerns. The Amish expressed that SR 314 is the only passable, direct north-south road in the area so they need to utilize the road frequently. From field observations of the area, many Amish were seen walking and riding buggy along SR 314 both prior to and after the community meeting.

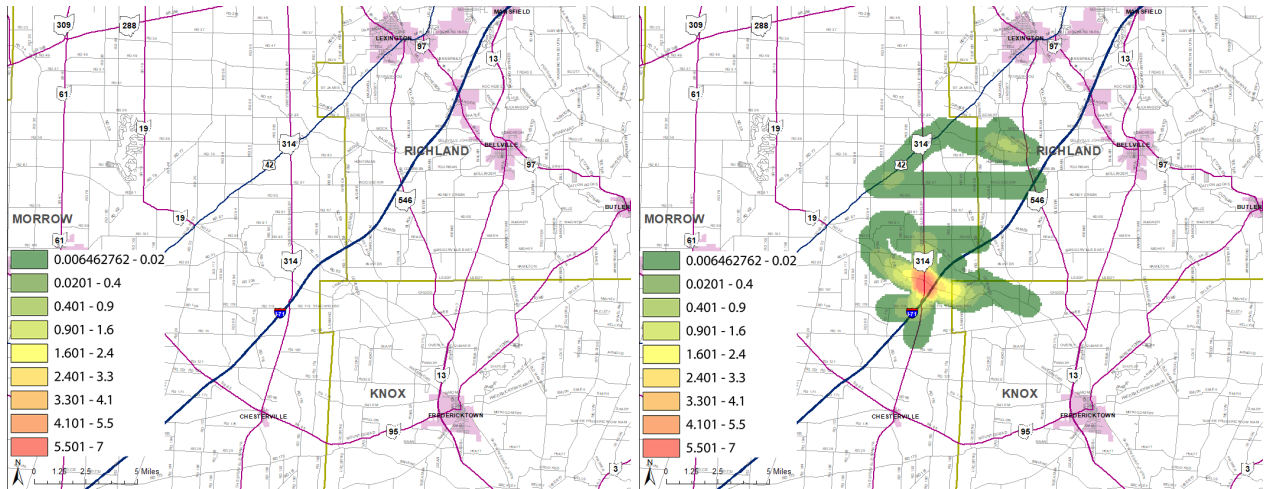
### Buggy Travel Exercise

SR 314 between US 42 and IR 71 was the only state route in the area frequently identified for buggy use by the community. The community is densely populated and is able to utilize local roads for all other frequent travel.



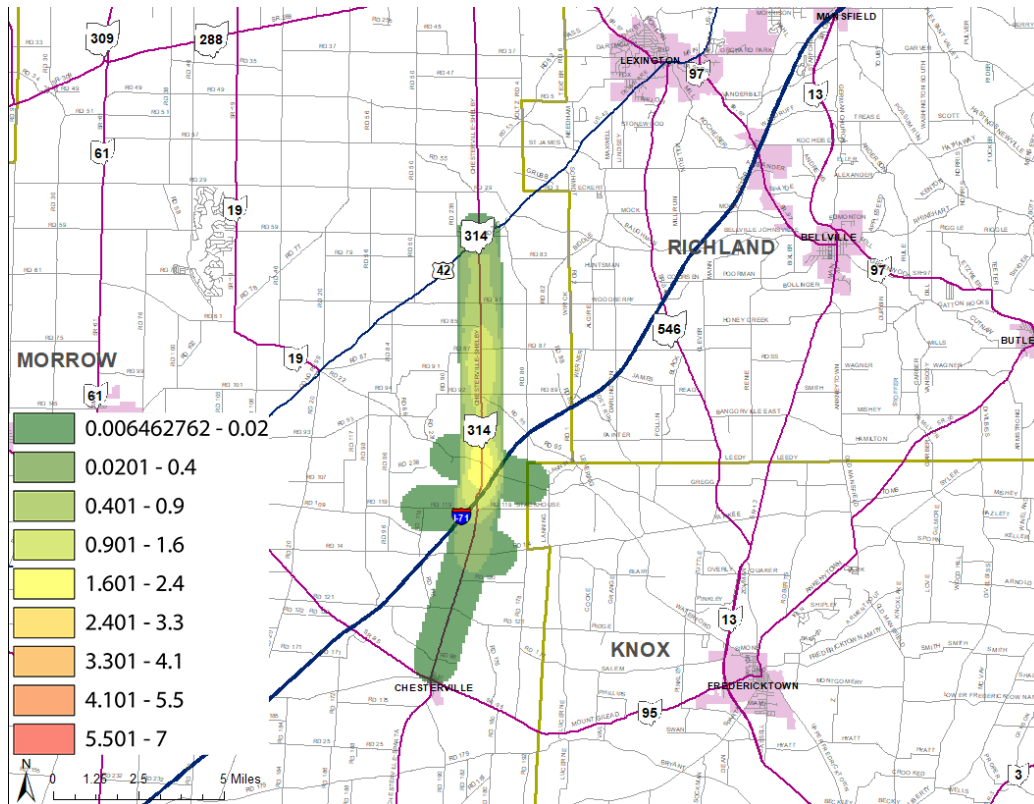
### Bike/Ped Exercise

SR 314 between US 42 and SR 71 was also identified as the most frequent walking route utilized by the community. US 42 (near SR 314) was also cited as a walking route by local Amish. Bicycling is not allowed within this community.



### Safety Location Exercise

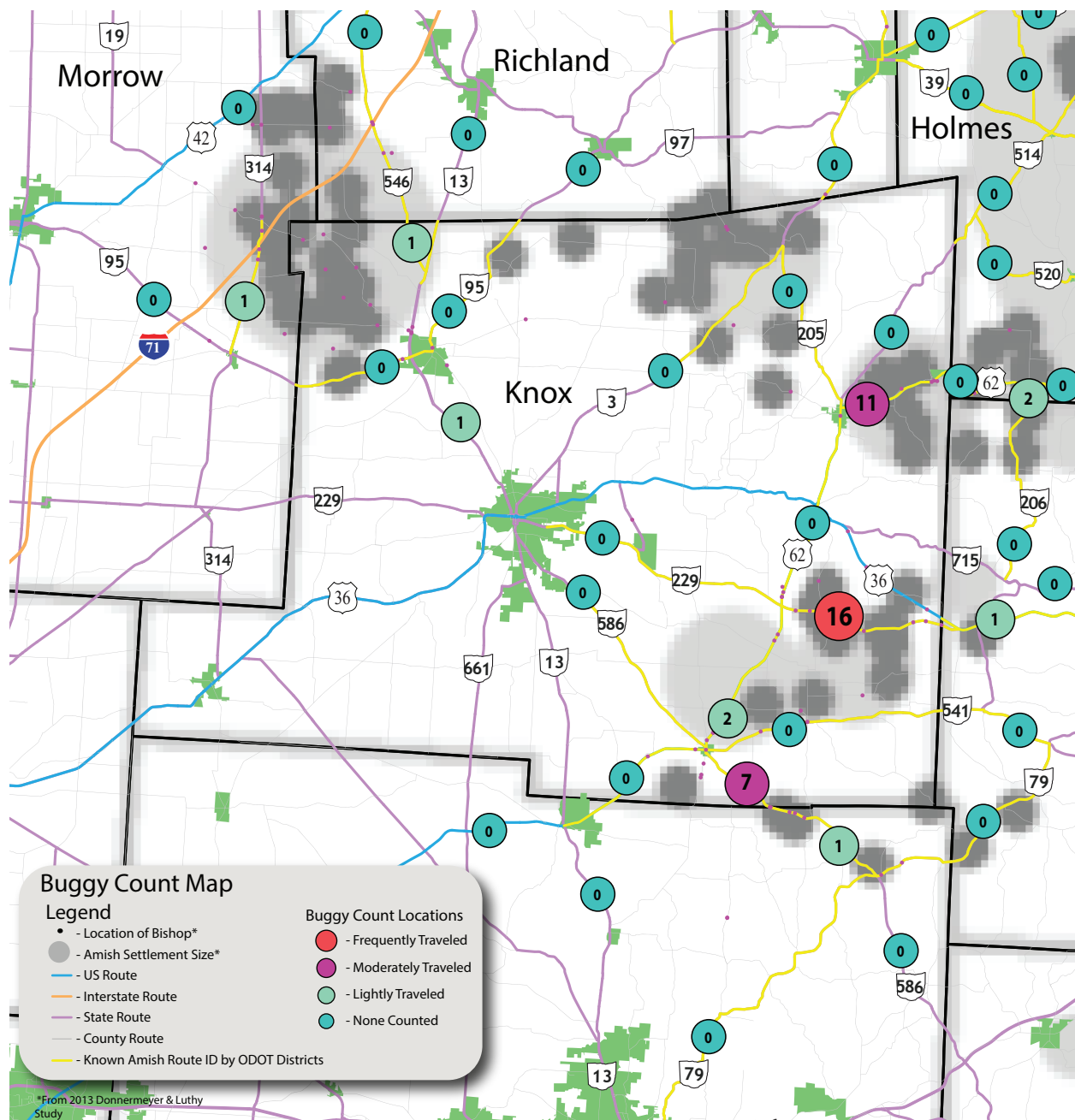
As mentioned above, SR 314 between US 42 and IR 71 was also identified as the area’s biggest safety concern along state routes. The roadway is frequently used by the local Amish and has high volumes of truck traffic coming from Mansfield, high motor vehicle speeds, limited shoulder width, and lack of sight distance.



## Crash Data/Buggy Counts

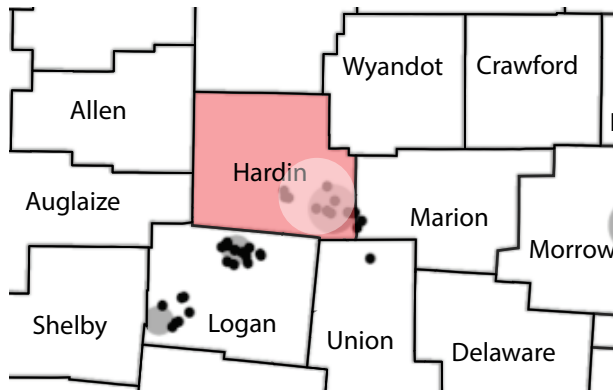
No state routes in the local area returned high crash rates/mile/year. The highest was along SR 95 between the Morrow/Knox County line and SR 13 with a 0.07 crash rate/mile/year. There were no fatal crashes recorded in the area along state routes, though locals cited multiple fatal crashes on local routes in the past.

Of the buggy counts conducted within the local area only two (along SR 314 and SR 546) returned a single buggy at their respective locations. A buggy count was conducted along SR 314 just south of IR 71. No count was conducted to the north of IR 71 along SR 314. This area was cited by locals as a primary route. Public engagement and buggy count collection occurred concurrently during the study. If improvements are considered in this area in the future, additional buggy counts should be considered.




# Mt. Victory Area

## Hardin County




### Public Survey Summary


Local Amish travel primarily by buggy or on foot throughout this community as 95% of respondents travel by buggy at least once a week and nearly 60% walk at least once a week. Bicycle and scooters are not used in the area. This community is one of the more conservative within the State and, as such, uses limited buggy safety equipment. While all respondents (19 in total) use reflective tape on their buggies, no other safety equipment was utilized by more than 40% of respondents. Roughly 36% of respondents use lanterns. From observation, buggies that arrived at the community meeting were generally not equipped with any lights or SMV emblems. Even with the general lack of buggy safety equipment, 64% of respondents were concerned with being seen at dusk/dark. Other safety concerns cited included aggressive motor vehicle driving (95%) and not being seen by cars going over hills or around corners (68%).




**1,260 - 2019 Population (Kenton/  
Mt. Victory Settlement)**



**21 - Survey Responses**

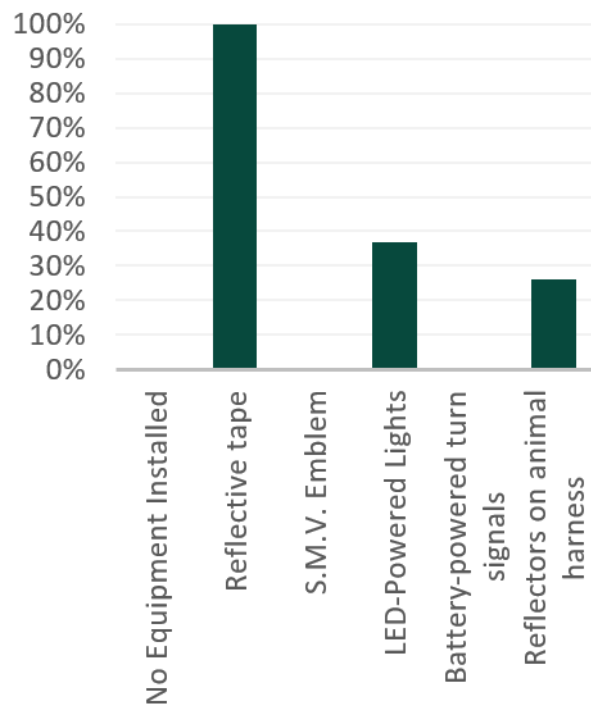


**34 - Community Meeting Attendees**



**Bicycles/Scooters Allowed?**

Buggy Safety Equipment Installed

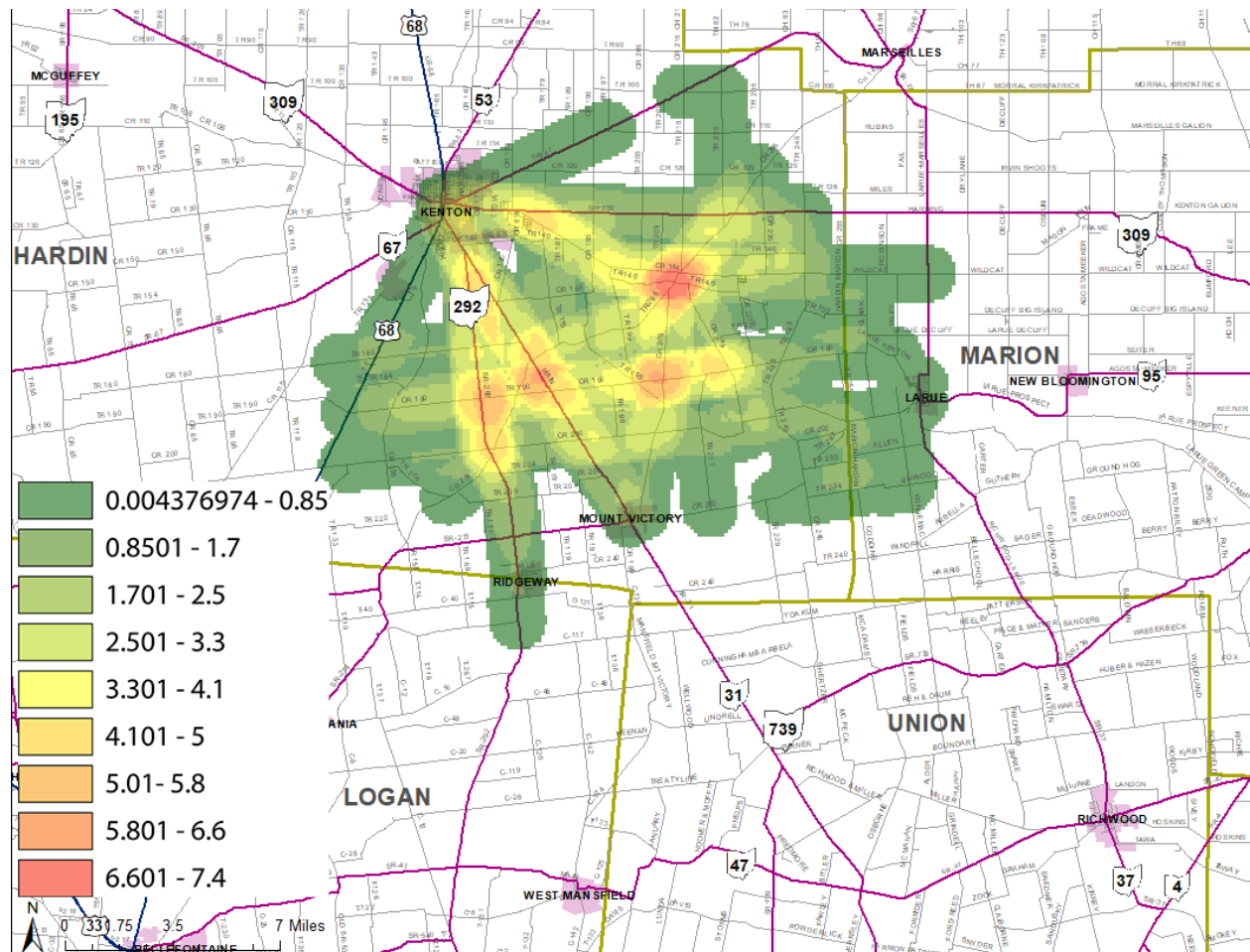


## Community Meeting Summary

This was the only meeting where a number of non-Amish local residents attended alongside the local Amish community. There is some tension between the two groups with regards to roadway usage and roadway maintenance. Complaints from the non-Amish centered around young, inexperienced Amish children driving buggies on local roadways, lack of Amish buggy visibility, and the frequency of horse droppings on roadways.

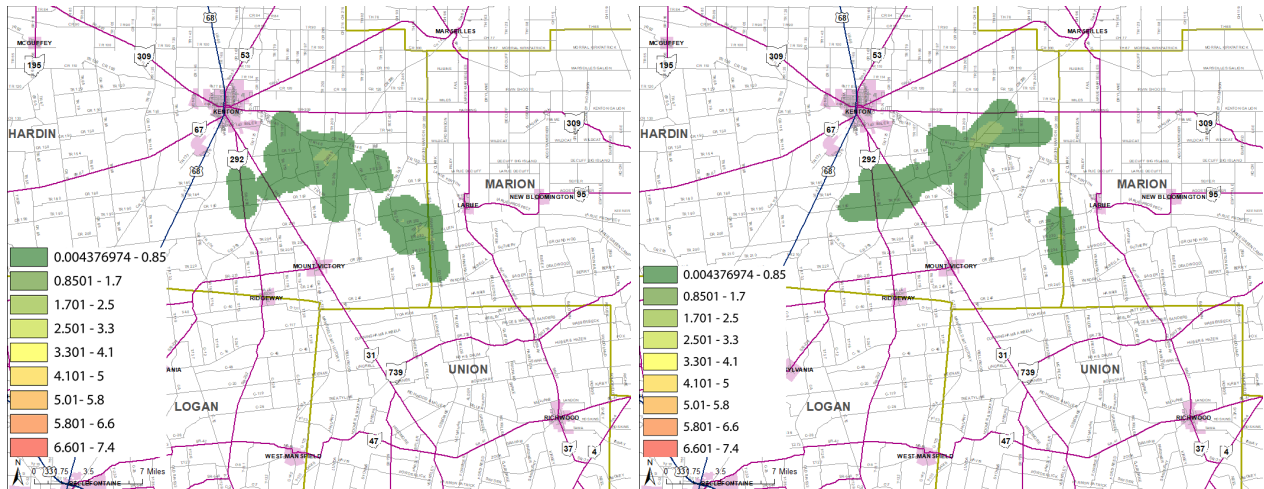
### Buggy Travel Exercise

Many state routes are used frequently by the local Amish. SR 292 (CR 265 north to SR 31 just south of Kenton) was the most utilized buggy route. Other frequented buggy routes included SR 31 (Mt. Victory and Kenton) and SR 309 (Kenton, east to CR 195).



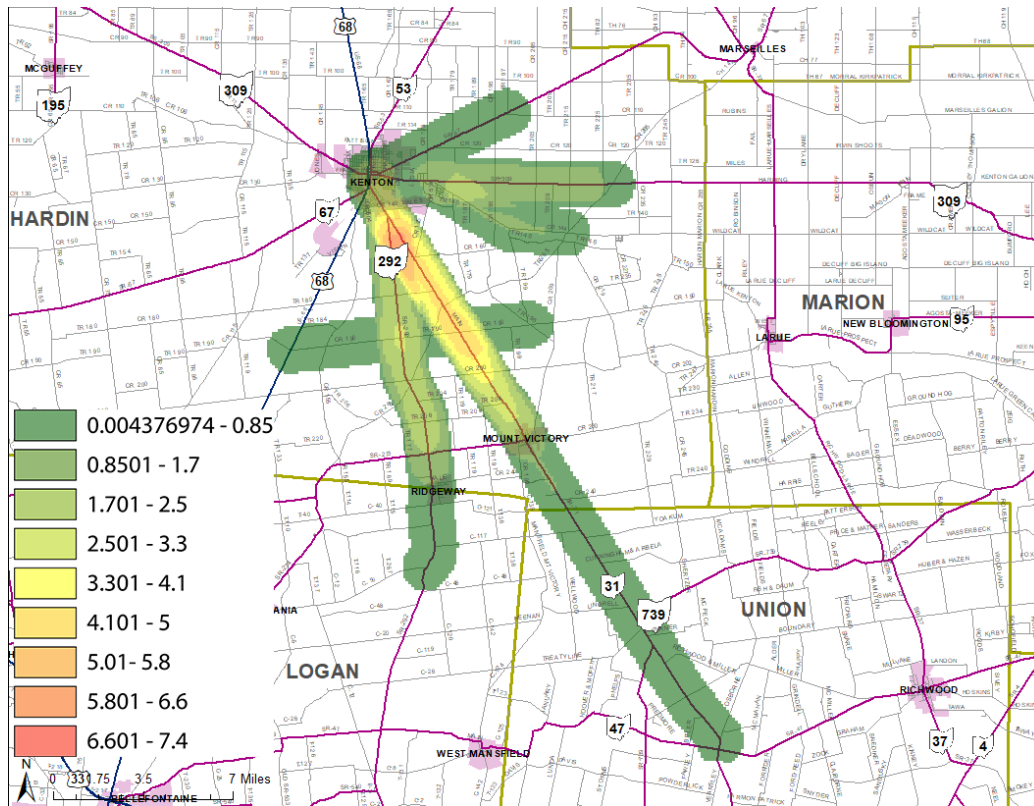
### Bike/Ped Exercise

There were limited responses to the bike and pedestrian exercise along state routes with only one instance being recorded by pedestrians on a small portion of SR 31 and SR 292. This community does not utilize bicycles or scooters.



### Safety Location Exercise

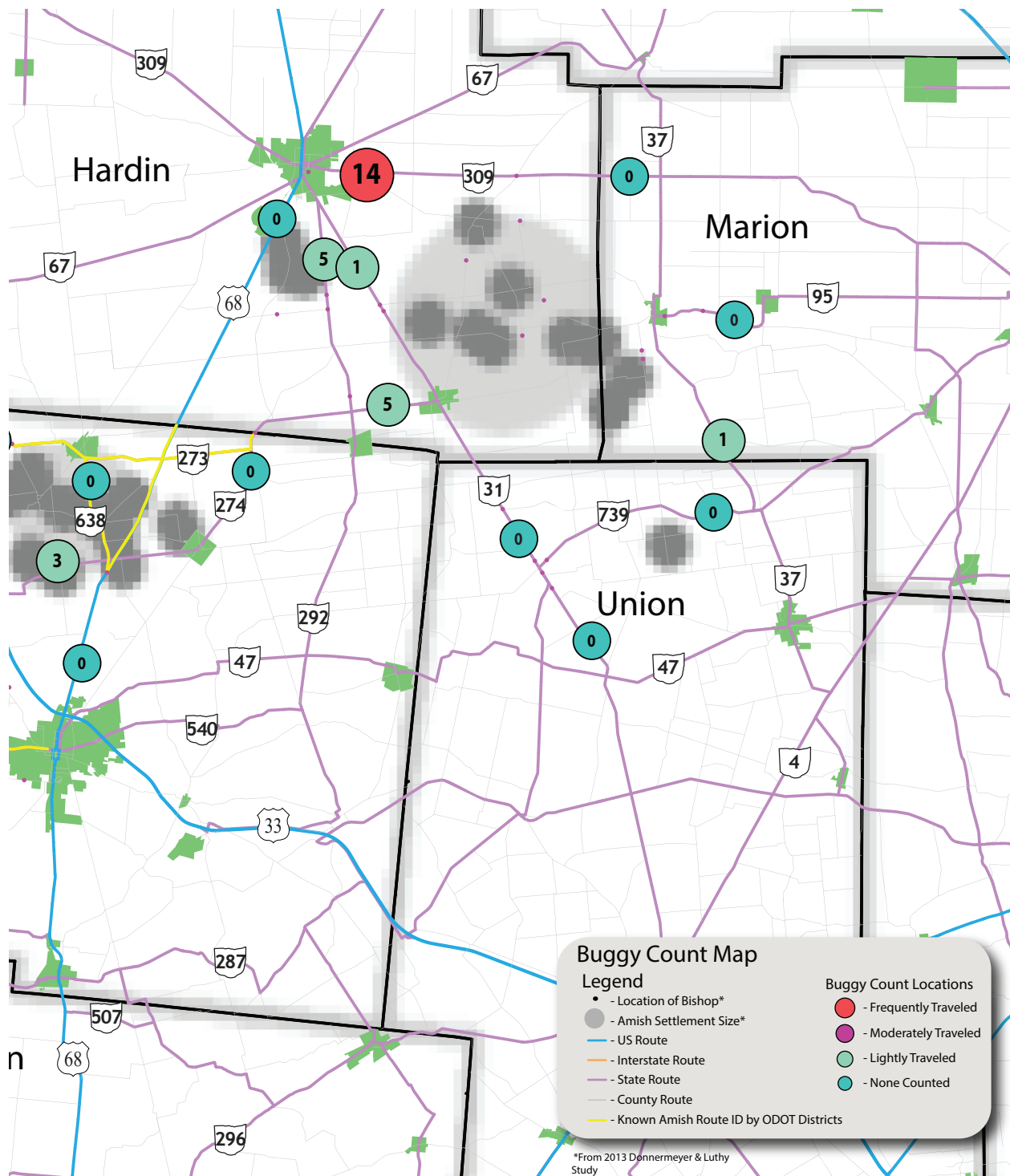
Many local Amish expressed safety concerns with traveling along SR 31 between Mt. Victory and Kenton. They cited truck volume, high speeds, and narrow shoulders as reasons for the concern. Many Amish use this route to deliver goods to Kenton. SR 31 between Mt. Victory and Kenton was ranked the highest safety concern within the area. SR 292 (SR 273 to SR 31) was also cited as a route with elevated safety concerns by the local Amish.



## Crash Data/Buggy Counts

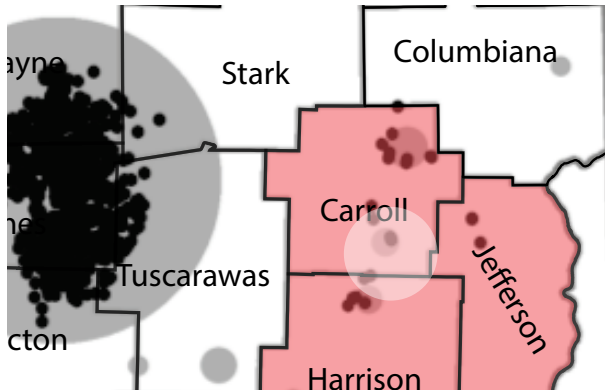
SR 31 just south of Kenton ranked as the highest buggy crash rate/mile/year in the area with a 0.1 crash rate. There were only a few other buggy or pedestrian crashes logged along state routes within the area over the last ten-year period.

The majority of buggy count locations within Hardin County returned at least some buggy volumes. SR 309 just east of Kenton was the segment with the highest volume (14 buggies). SR 31, SR 273 and SR 292 exhibited buggy counts between one and five.



# Kilgore Area

## Carroll County



### Public Survey Summary

Local Amish in the area are very progressive with regards to buggy safety equipment and acceptance of bicycle and scooter use. Three quarters of respondents use a bicycle or scooter at least once a month. All respondents (26 in total) use reflective tape, a SMV emblem, and LED-powered lights on their buggies. In addition, nearly 70% of respondents have battery-powered turn signals installed on their buggies as well. While aggressive motor vehicle driving (81%) was the top local safety concern, truck traffic was ranked second with 65% of respondents (17 in total), followed closely by going over hill or around curves (60% of respondents).



*“County roads are rough”*

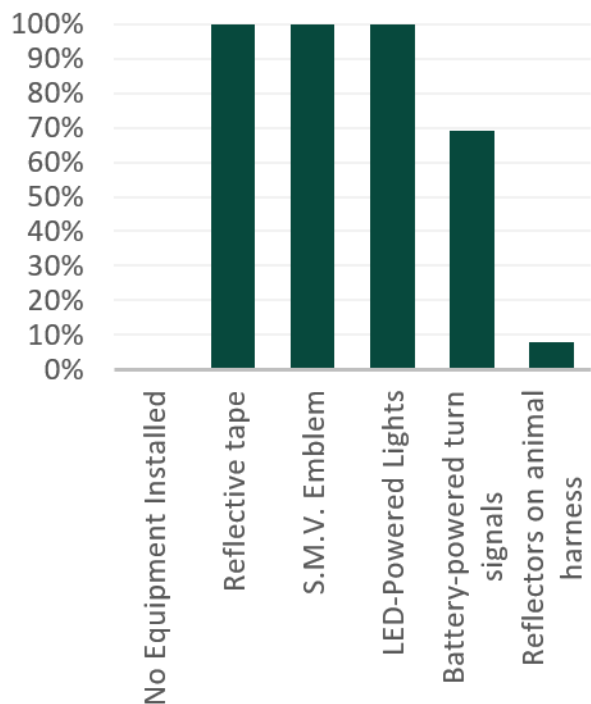
**780 - 2019 Population (Carrollton Settlement)**

**27 - Survey Responses**

**31 - Community Meeting Attendees**

**Bicycles/Scooters Allowed?**

### Buggy Safety Equipment Installed

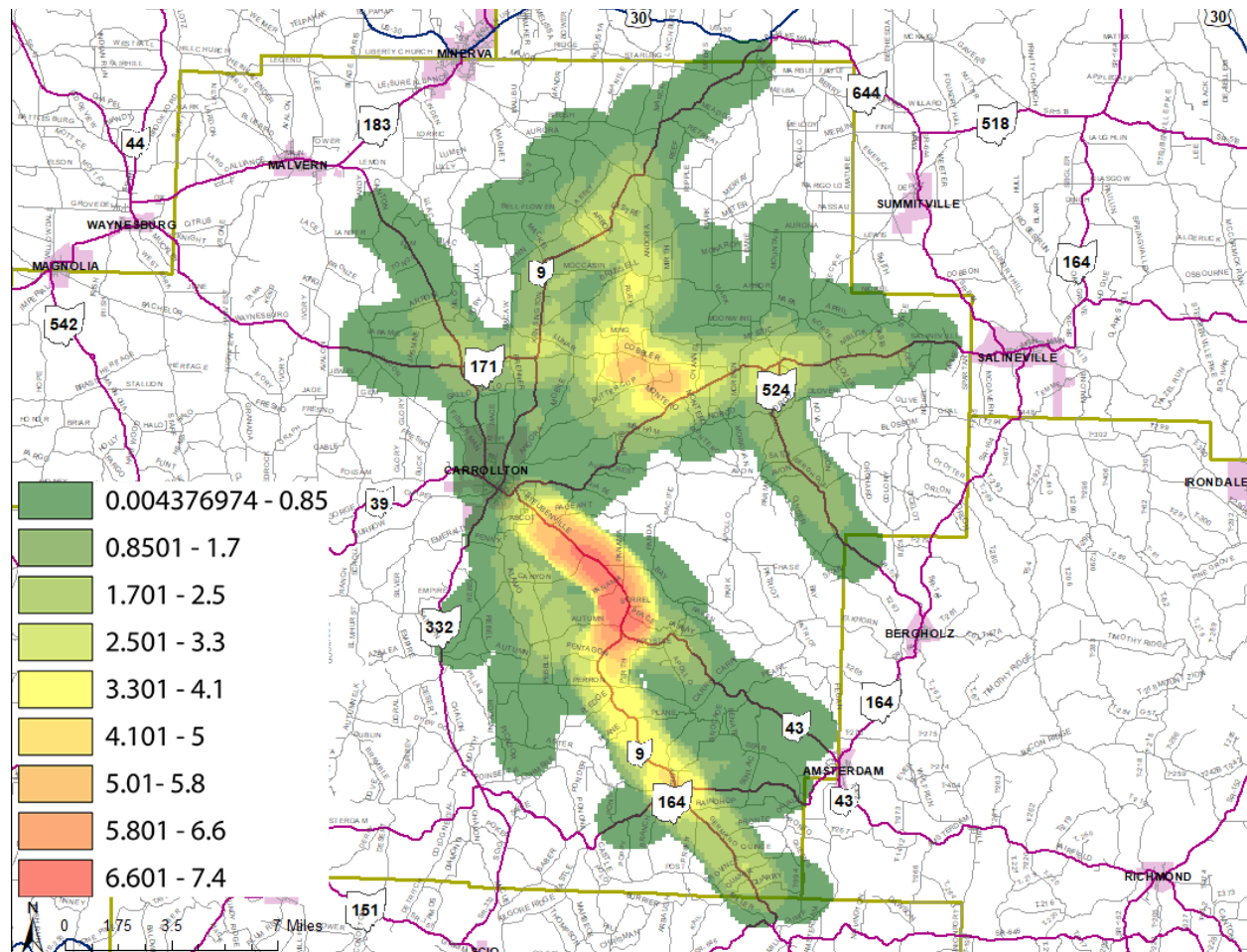


## Community Meeting Summary

Amish that attended the community meeting stated that they try to avoid state routes due to the amount of truck traffic in the area. Some of this traffic can be attributed to recent natural gas pipeline construction in the area. Additionally, many Amish complained about the maintenance of the local road system in the area, particularly the county-maintained roads. Many of these roads are in extremely bad condition, which forces many Amish to ride on heavily traveled state routes in the area.

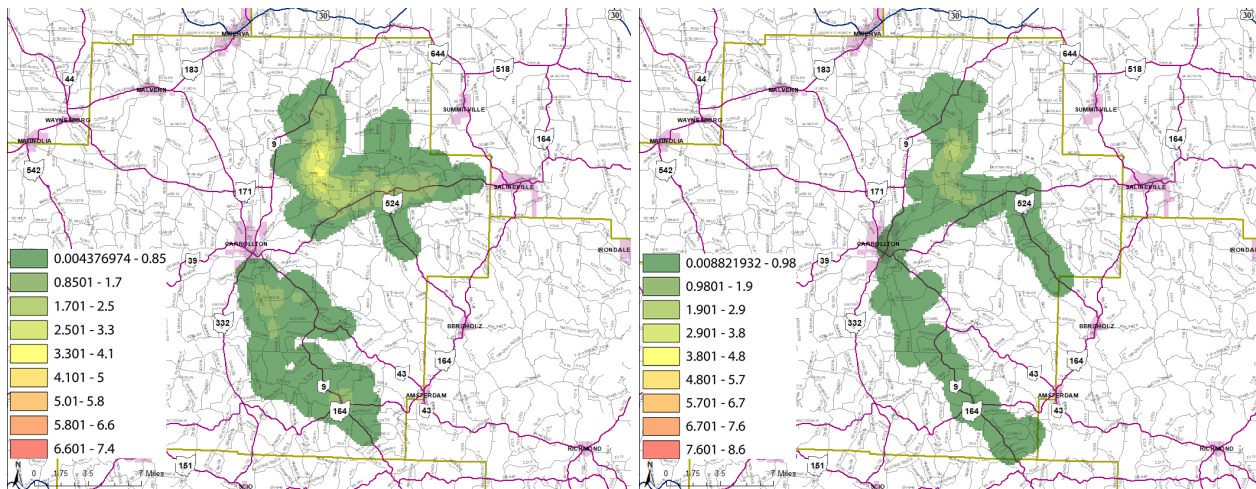
### *Buggy Travel Exercise*

SR 9 from SR 164 to Carrollton was cited as the most frequently used state route in the area. Other state routes cited for frequent use included SR 43 (south of SR 9), SR 39 (west of Mechanicstown) and SR 524 (south of Mechanicstown).



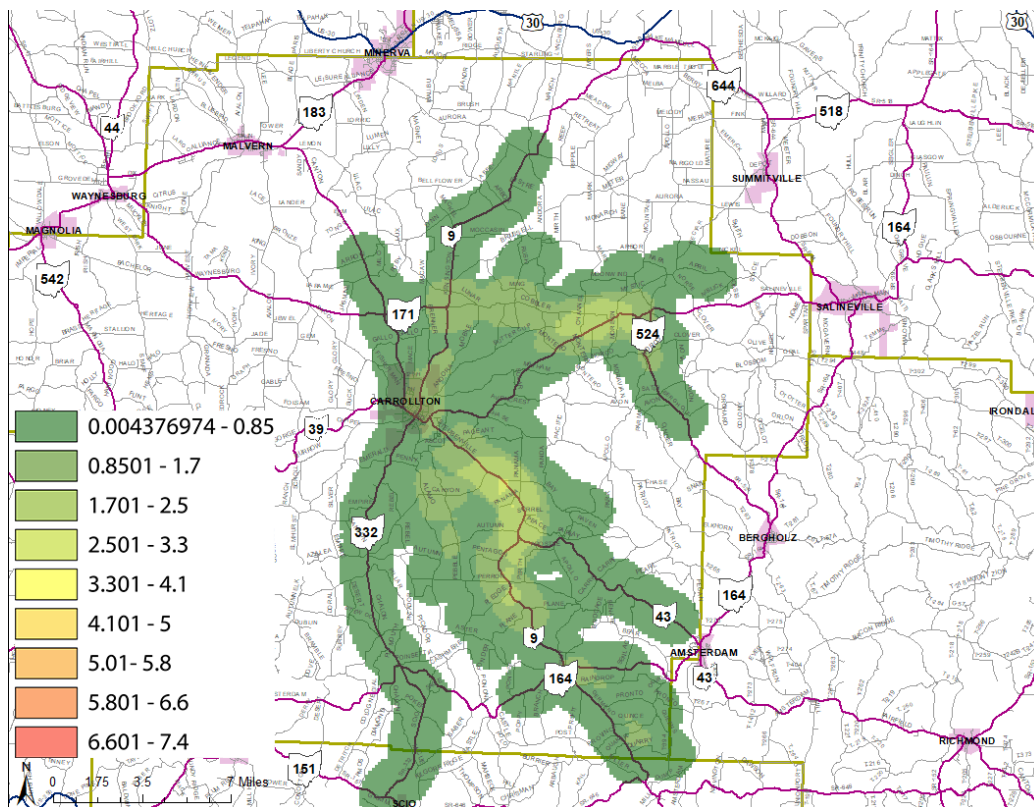
### Bike/Ped Exercise

SR 39 and SR 524 near Mechanicstown were cited as the most frequently state routes to bike and/or walk on (four and three instances respectively). Though there is a general acceptance of bicycles within the area, few cited state routes where they travel by bicycle.



### Safety Location Exercise

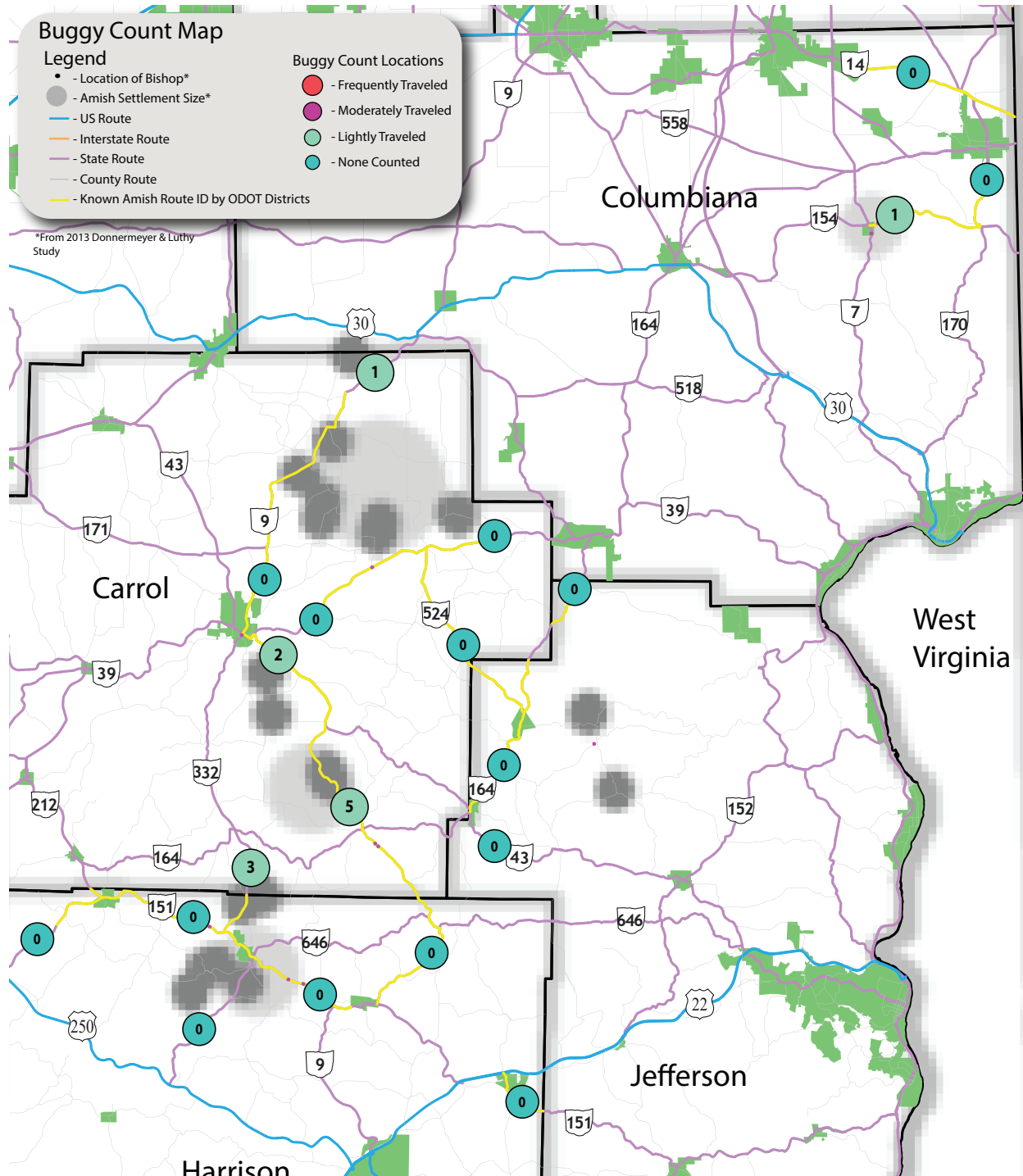
Both SR 9 (south of SR 43) and SR 39 (west of Mechanicstown) were cited as the areas of highest safety concern along state routes in the area. Conversations with local Amish at the community meeting revealed concerns over lack of adequate buggy signage and high volumes of truck traffic along these routes.



## Crash Data/Buggy Counts

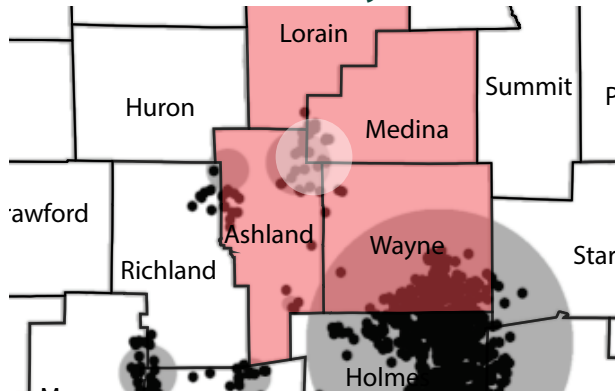
There were few buggy or bike/pedestrian crashes observed in the area over the last ten-year period. The highest location for buggy crashes was along SR 9 from the Carroll/Harrison County line to the SR 164 intersection with a 0.06 crash rate/mile/year.

The Amish population in this area is scattered within the eastern portion of Carrollton County and Northern Harrison County. Buggies were recorded traveling along SR 9 at both the northern and southern ends of Carrollton County as well as along SR 332 by the Carrollton/Harrison County border.



## Tri-County Area

### Ashland/Medina/Wayne County




### Public Survey Summary


This Amish community relies heavily on travel by both buggy and by foot. Nearly 100% of respondents use a buggy for travel at least once a week, while over 90% of respondents walk to destinations at least once a week. This community does not use bicycles or scooters. The local Amish do not equip their buggies with much safety equipment as only reflective tape was cited as being used by 100% of respondents (53 in total). No other safety equipment was utilized by more than 33% of respondents. This community is well known for being very conservative with regards to buggy safety equipment. Roads in the area are generally straight and flat, but still high crash volumes and some fatal crashes prevail. The local Amish cited aggressive motor vehicle driving (90% response rate) as their biggest safety concern while traveling. These sentiments were also prevalent within the write-in questions of the survey. A sample is illustrated below.




*“Honestly, I would have to say I have the biggest concern while I am driving in broad daylight on a straight flat road”*




**2,085 - 2019 Population (Lodi/Homerville Settlement)**



**65 - Survey Responses**

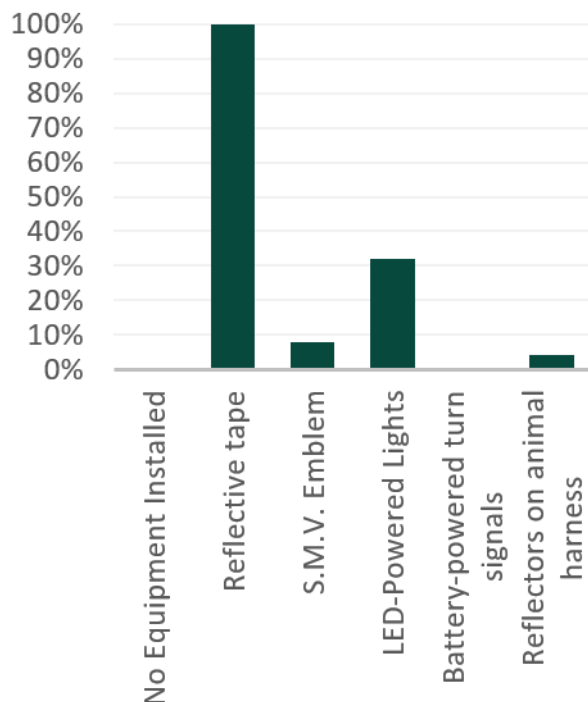


**55 - Community Meeting Attendees**



**Bicycles/Scooters Allowed?**

### Buggy Safety Equipment Installed



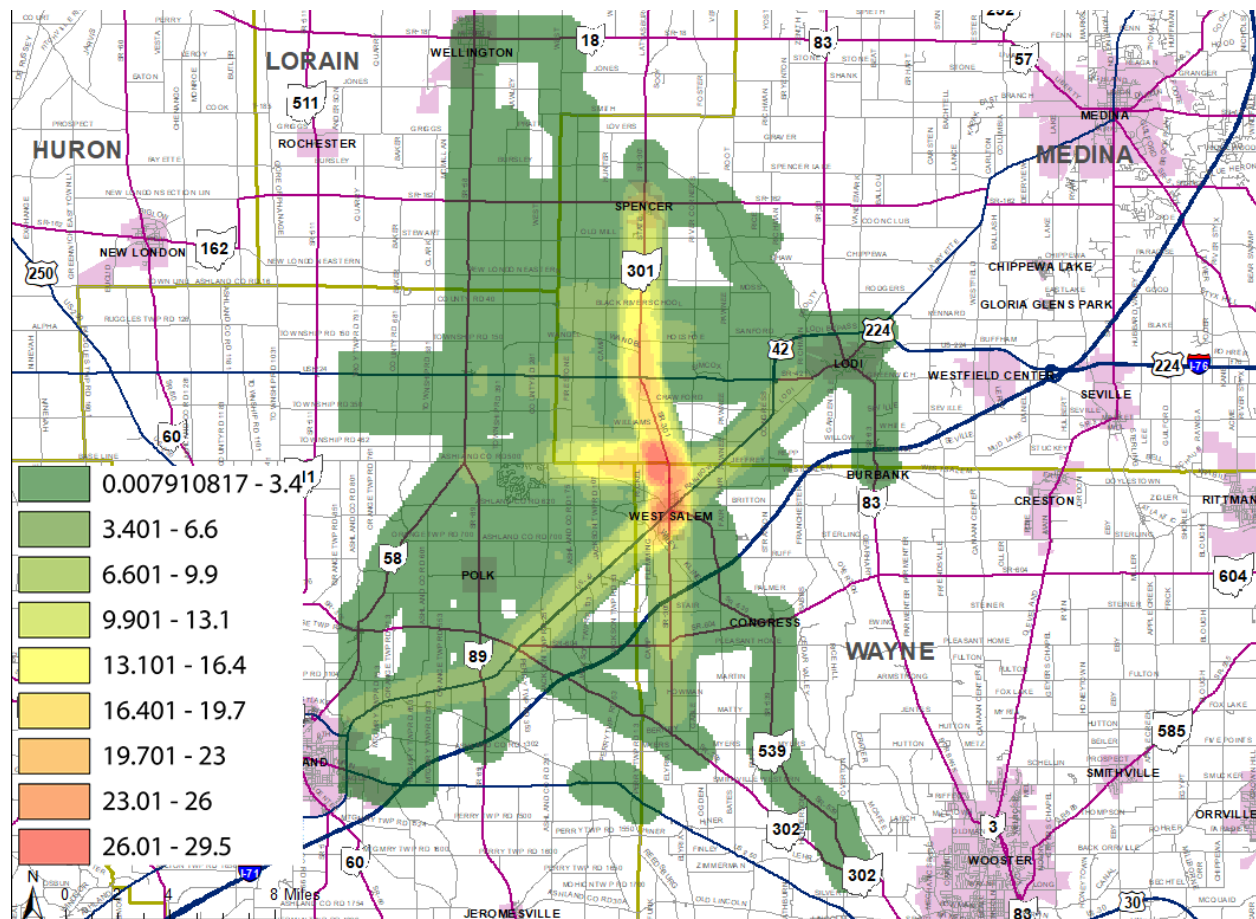
## Community Meeting Summary

During the meeting there were two major routes, US 42 and SR 301, that local Amish identified as areas of roadway safety concern. US 42 between SR 604 and the Ashland/Wayne County line is the only state route segment within the state with multiple fatal crashes over the last ten years. That segment also has an elevated crash rate/mile/year of 0.25. From the Amish's perspective, the most troubling aspect is that the majority of these crashes occur during the day on straight, flat portions of the roadway. In addition, this section of US 42 is a divided four lane highway with relatively low traffic volumes. The Amish attributed crashes along US 42 to distracted drivers and high motor vehicle speeds.

SR 301 is another highly traveled route by the local Amish. The community meeting was held at the County Line Produce Auction at the Medina/Wayne County line along SR 301, which is a major center of local Amish commerce. The Amish expressed that they were concerned with the high volumes and speeds of trucks in the area. Many of these trucks are transporting vehicles and goods to the nearby Dragway. Most of SR 301 also has narrow shoulders which contribute to the safety concerns.

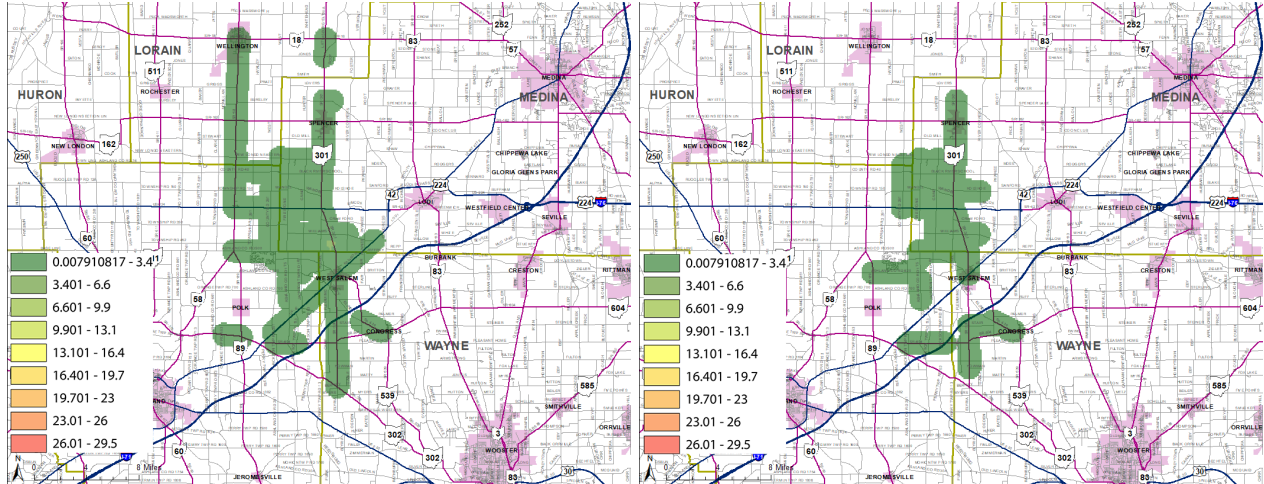
### Buggy Travel Exercise

Overwhelming, both US 42 and SR 301 were identified as the most frequented buggy routes by local Amish. US 42 between SR 604 and Lodi, spanning portions of Ashland, Wayne and Medina Counties was identified as most frequented. SR 301 from IR 71, north to the Village of Spencer, spanning the Wayne/Medina County line was identified as the second most frequented route in the area. Few other routes were identified in the local area by meeting attendees.



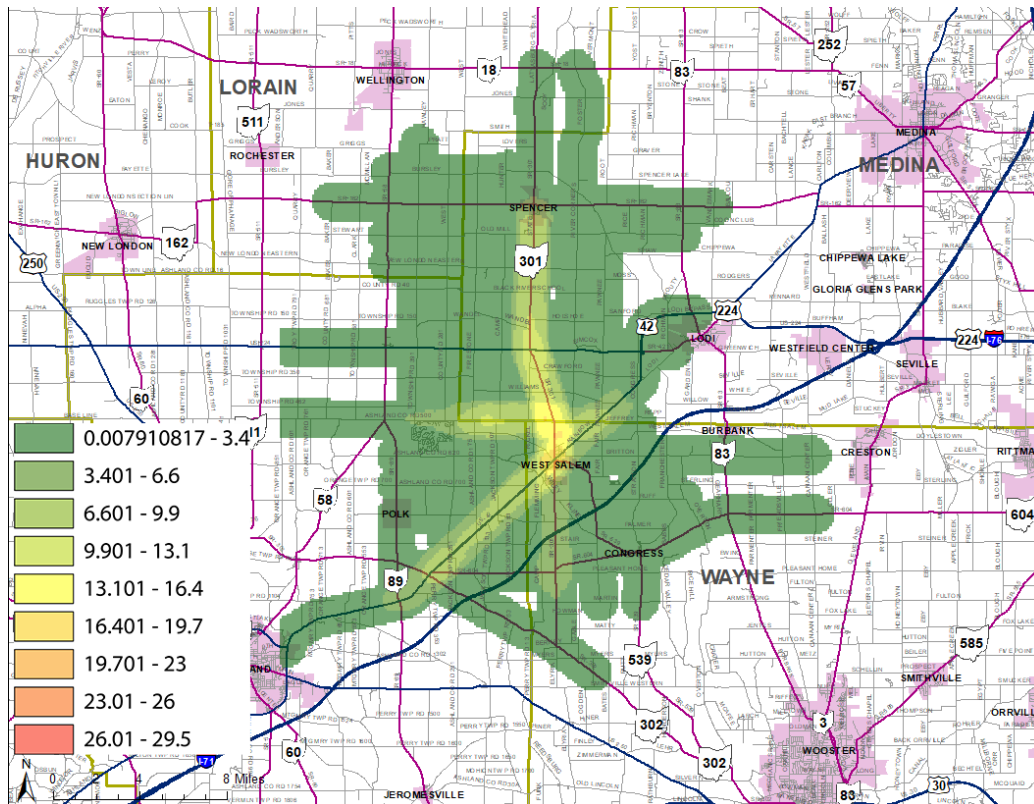
### Bike/Ped Exercise

Though the community generally does not use bicycles, a few respondents stated they bike along SR 301 between West Salem and Homerville (six instances). No route was highly identified by the local Amish as a route frequently used for walking. Many cited that the state routes in the area are too dangerous to walk along.



### Safety Location Exercise

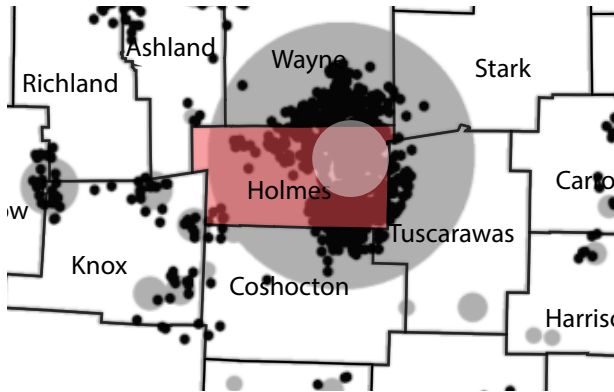
Consistent with other feedback from the community meeting, both SR 301 and US 42 were identified as locations with the highest safety concern. SR 301 just north of West Salem was ranked as the most concerning safety segment in the area. Other portions of SR 301 were also identified from IR 71 to Spencer. US 42 from SR 604 to Lodi was also highly identified as a safety concern by local Amish.






# Mt. Hope Area

## Holmes County




### Public Survey Summary


Northern Holmes County is very accepting of alternative modes of transportation. Many local Amish use e-bikes, scooters, or golf carts to move around the community. As such, respondents cited frequently using varying modes of transportation to travel throughout the community including by buggy (90% responded at least once a week), bicycle/scooter (75% responded at least once a week), walking (75% responded at least once a week). The area is also very progressive in terms of buggy safety equipment, with over 90% of respondents citing the use of reflective tape, a SMV emblem, LED-powered lights, and battery-powered turn signals on their buggies. The top local safety concerns were (1) aggressive motor-vehicle drivers and (2) traveling over hills or around curves. In addition, 45% were concerned with safety while making a left turn by buggy.




**36,755** - 2019 Population (Holmes Settlement)



**199** - Survey Responses



**85** - Community Meeting Attendees



**Bicycles/Scooters Allowed?**

This concern was echoed in the write-in comments shown below.









*“Battery powered bicycles have added another dimension (hazard?) to the traffic mix”*



*“Drivers pay no attention to buggy left turn signal when turning left”*

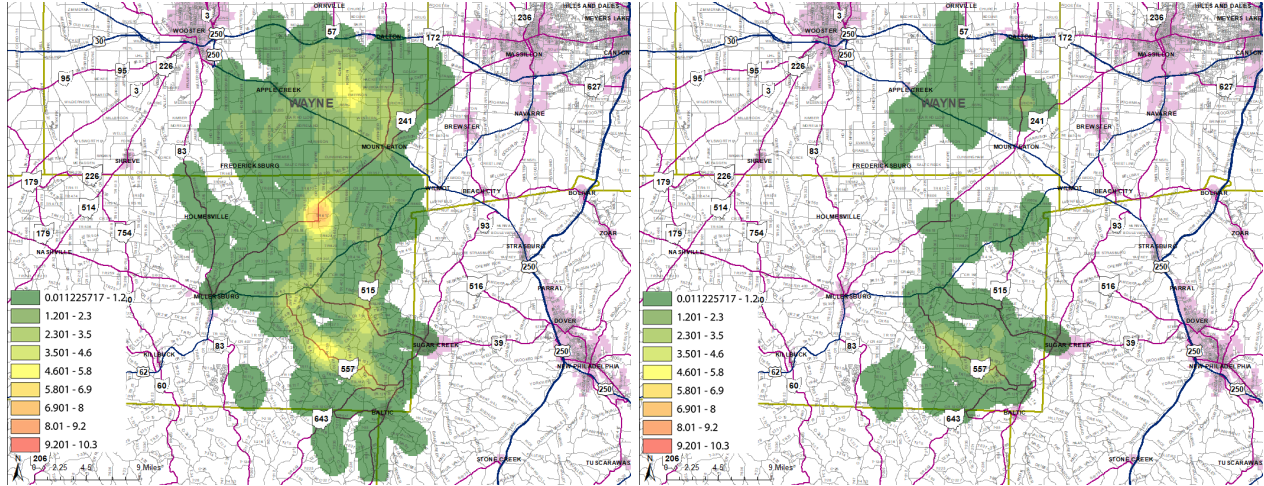
### Local Safety Concerns

|   |   |   |   |   |   |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| <b>Aggressive Drivers</b>   | <b>Over Hills /Curves</b>   | <b>Turning Left</b>   | <b>Truck Traffic</b>  | <b>Seen at Dusk</b>   | <b>Entering Roadway</b>   |
| <b>89%</b>  | <b>61%</b>  | <b>45%</b>  | <b>35%</b>  | <b>26%</b>  | <b>14%</b>  |



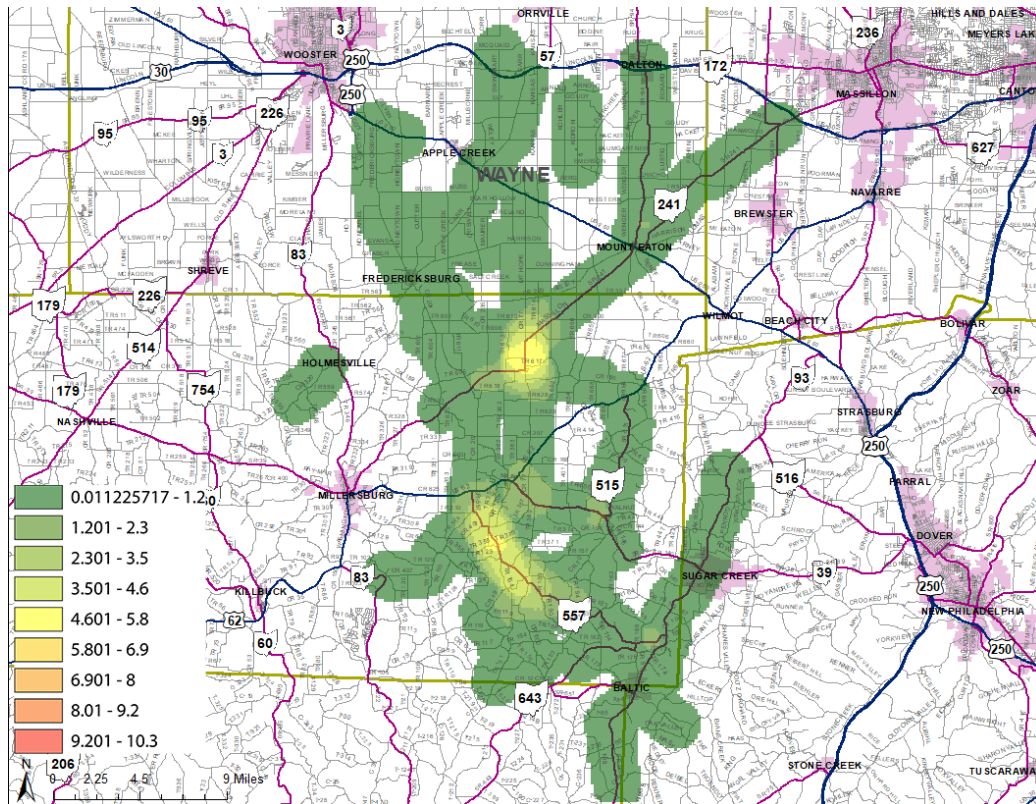
### Bike/Ped Exercise

SR 241 both east and west of Mt. Hope was cited as the state route most frequently traveled by bike. SR 557 (SR 643 and US 62) and SR 39 around Walnut Creek were also cited as high-volume bike areas. SR 557 also stood out as the most frequented walking route by local Amish.



### Safety Location Exercise

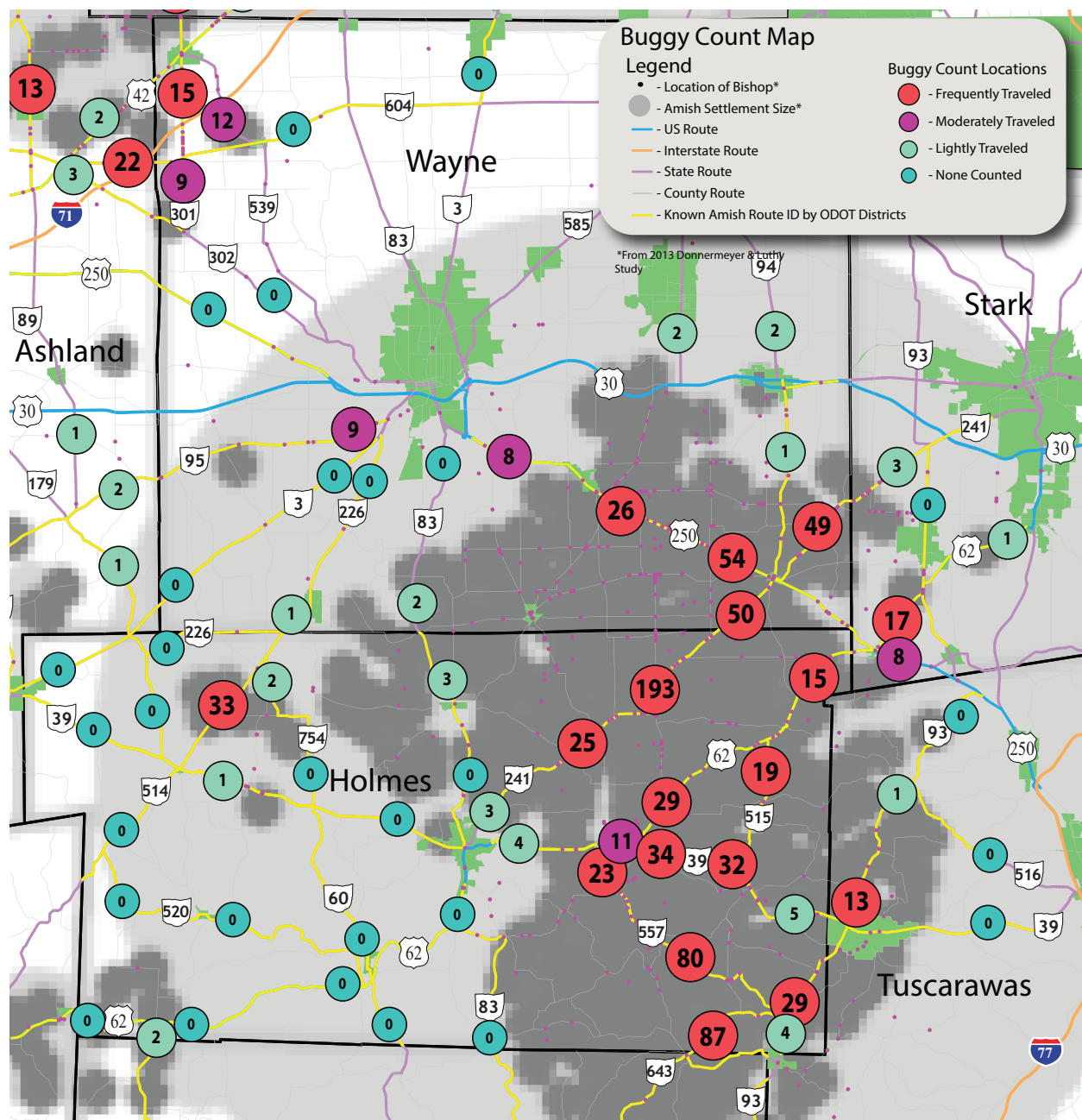
Similar to other community meeting feedback, SR 557 and SR 241 were the top two safety concern locations locally. Roadway maintenance and high buggy/bike volumes along on routes with narrow shoulders were cited as reasons for the concern.



## Crash Data/Buggy Counts

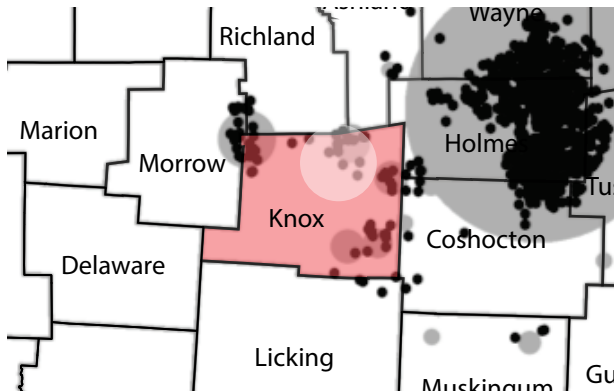
Five of the top ten highest crash rates/mile/year within the State are within Northern Holmes County. SR 39 (SR 515 and CR 114) and SR 241 just north of Mt. Hope (SLM 9.1 to 11.6) rank first and second, respectively, in crash rate with a 0.875 and 0.72. Both locations also have experienced a fatal buggy crash within the last ten years. Other sections of SR 241 to the west of Mt. Hope (SLM 5.3 to 9.1) rank sixth and seventh in the State for crash rate/mile/year. Crash rates in this area are naturally higher than other areas of the State due to the high concentration of Amish buggy, bike and pedestrians navigating all state routes.

As expected, buggy counts recorded in this area returned the highest volumes in the State. SR 241 just north of Mt. Hope witnessed 193 buggies within a 12-hour period. Other segments of SR 241 along with sections of US 62, SR 39, SR 515 and SR 557 all returned high volumes of buggy traffic ranging from 19 to 87 buggies in a 12-hour period.




# Jelloway/Danville Area

## Knox County




### Public Survey Summary


While bicycle and scooter use is allowed within the local Amish community, few use bikes or scooters to travel the area with over 70% of respondents never using a bike/scooter. Locals heavily rely on buggy travel to get to/from destinations with nearly 100% of respondents stating they travel by buggy at least once a week. Unlike most other Amish communities within the State, buggy usage for work commutes was fairly low with only 40% traveling to work by buggy more than once per week. The primary reasons for weekly travel include attending church (75%) and selling goods (65%). Nearly all respondents (70 in total) cited they use reflective tape, a SMV emblem, and LED-powered lights on their buggies. In addition, nearly 60% have battery-powered turn signals installed on their buggies. Unlike other areas of the State where aggressive motor vehicle drivers was cited as the local Amish area's biggest safety concern, the Jelloway/Danville area cited going over hill or around curves (95% of respondents) as the biggest travel safety concern. This sentiment was also echoed within the write-in comments section as illustrated to the right.




**530 - 2019 Population (Danville/Butler Settlement)**



**73 - Survey Responses**



**34 - Community Meeting Attendees**

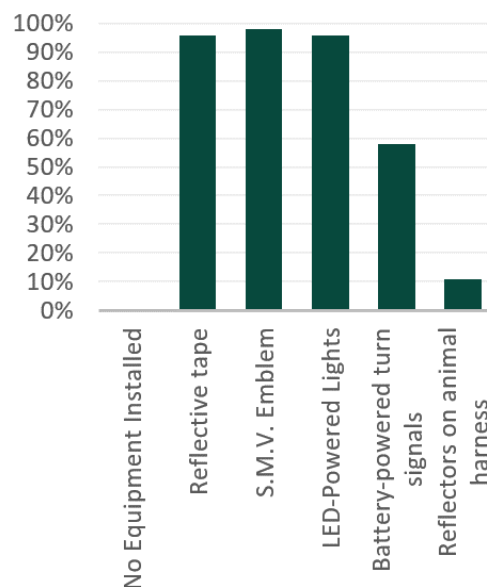


**Bicycles/Scooters Allowed?**



***“SR 205 has poor road berms particularly on hills”***

Buggy Safety Equipment Installed

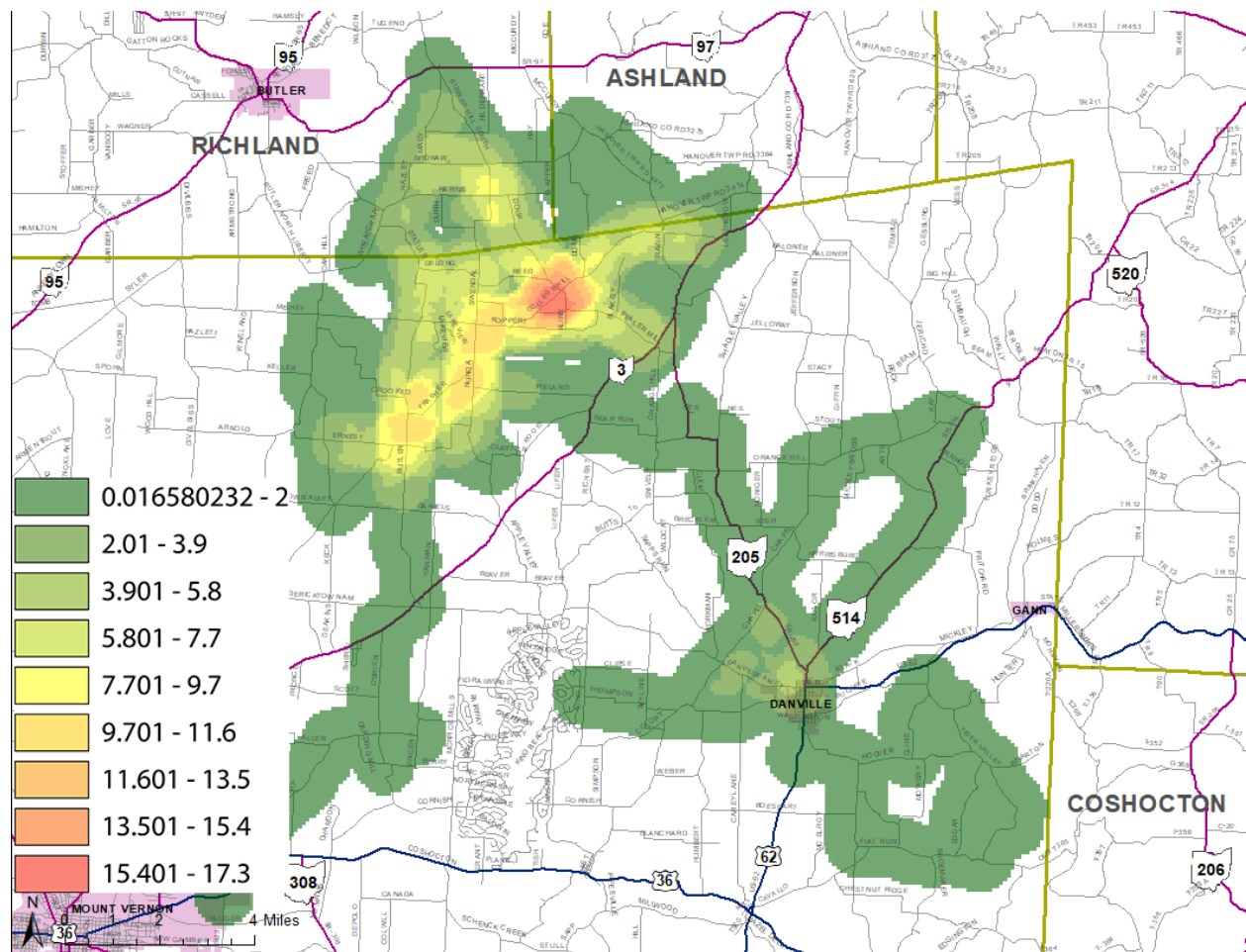


## Community Meeting Summary

Though the meeting was held in the Jelloway area, Amish from the Danville area to the east were in attendance. Local roadway maintenance was a topic of concern for the Amish in the area, as many of the local roads are in need of repair. SR 205 (north of Danville) was cited as one of the more heavily-traveled routes in the area. Many Amish suggested installing buggy lanes be considered in that location due to the high volume of Amish buggy and vehicular traffic in the area.

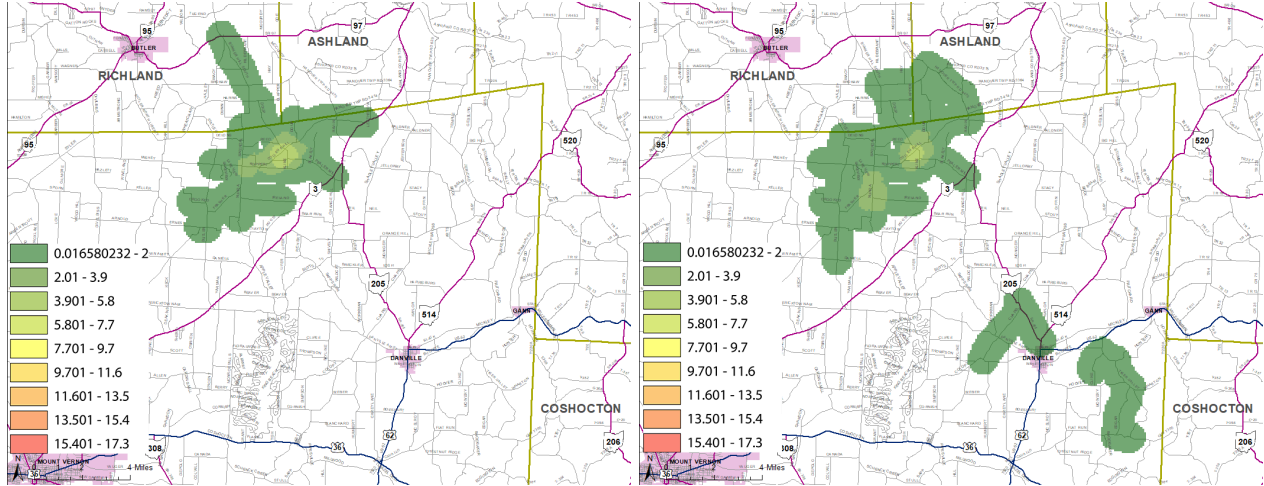
### Buggy Travel Exercise

SR 514 north of Danville was cited as the most frequently traveled state route by buggies in the area. SR 3 (south of the SR 205) was also cited as a high buggy volume location. Due to the multiple Amish communities in attendance, results for the exercises were split between each community.



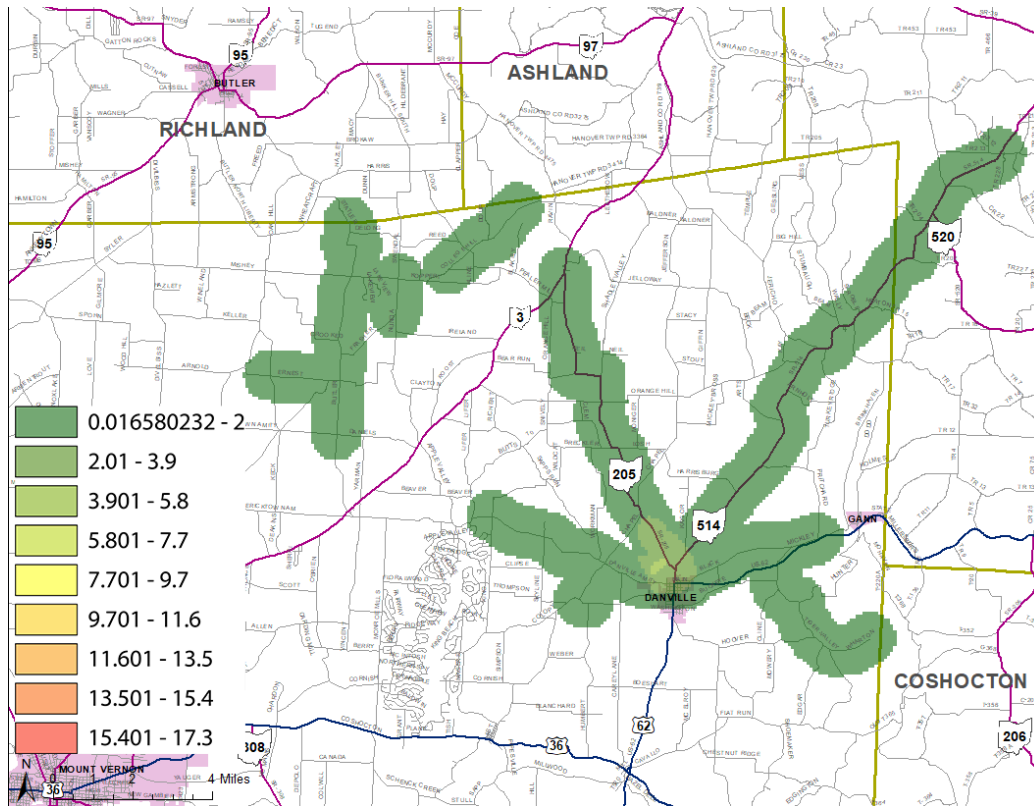
### Bike/Ped Exercise

There was very limited feedback regarding biking and walking within the local Amish community along state routes. From survey results and anecdotal information gathered at the community meeting, few Amish in the area bike to destinations.



### Safety Location Exercise

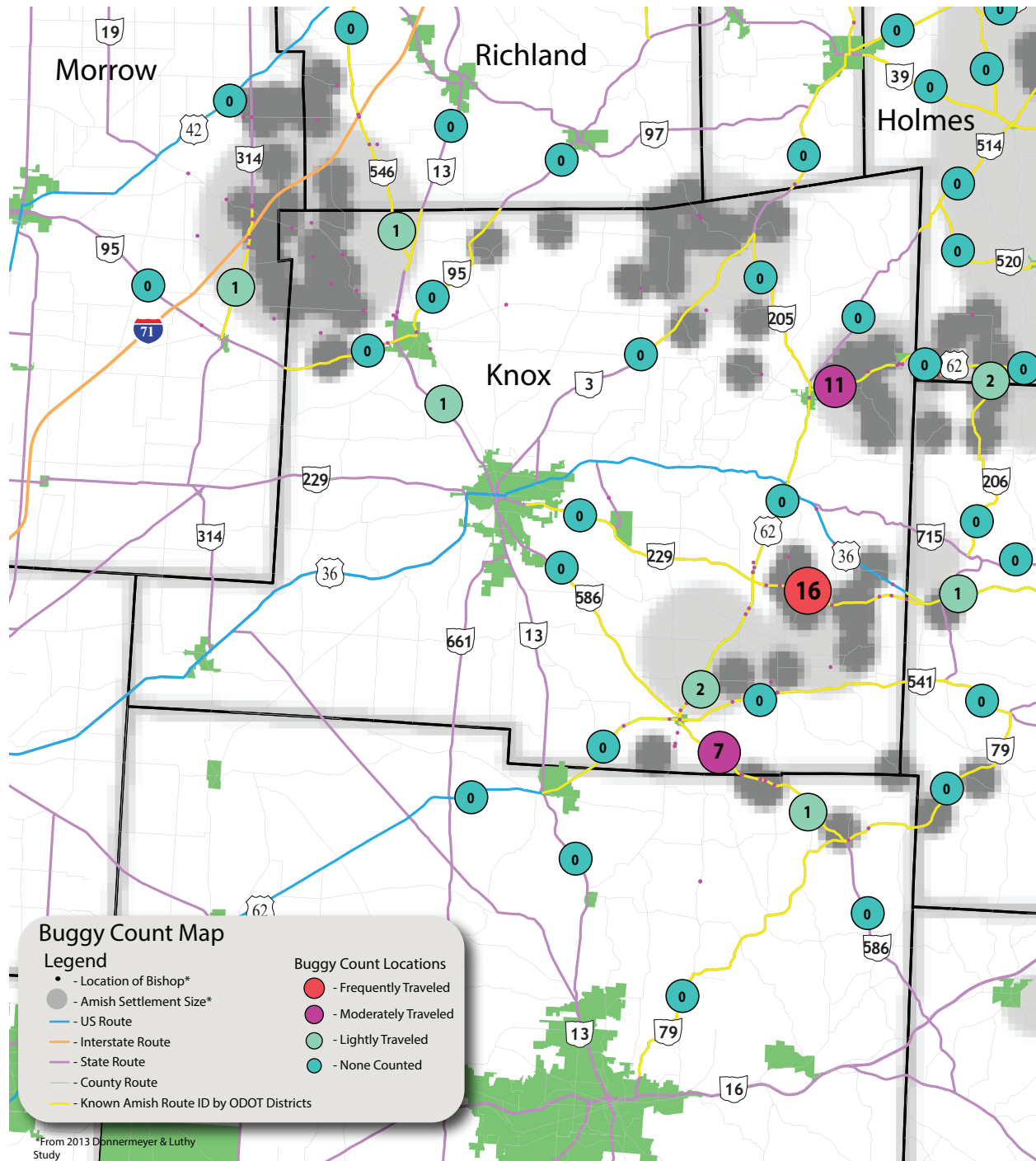
SR 205 north of Danville was cited as the state route with the biggest safety concern locally. SR 514 north of Danville was also cited as a location of high safety concern. Respondents stated high Amish usage, along with narrow shoulders, contribute to the safety concern.



## Crash Data/Buggy Counts

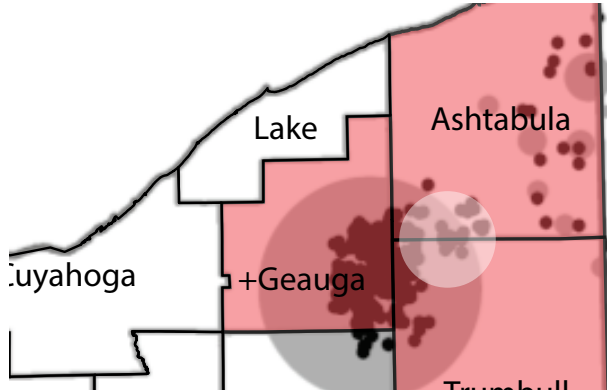
The majority of high crash rates/mile/year within Knox County occur within the Southeastern section of the County within an area where the local Amish population did not want to conduct a community meeting. Within Northern Knox County, only US 62 from Danville to the Knox/Holmes County line recorded a relatively high buggy crash rate/mile/year of 0.11.

Buggy counts were conducted throughout northern and southern Knox County. The highest buggy volumes recorded were along SR 229 in the southeastern portion of the County. US 62 (east of Danville) and SR 586 (near the Knox/Licking County border) both recorded elevated buggy count volumes. All other locations returned either few or no buggy volumes.



# Orwell Area

## Ashtabula/Trumbull County



### Public Survey Summary

Bicycle and scooter use is permitted within the local Amish community and, in turn, many Amish utilize bicycles and scooters, with over 60% of respondents riding bicycles or scooters at least once a week. Nearly all respondents use a buggy at least once a week and over 75% walk to destinations at least once a week. Amish within this community are very progressive in terms of buggy and bicycle/pedestrian safety while traveling. Nearly all respondents use reflective tape, a SMV emblem and LED-Powered lights on their buggies with over 75% of respondents using battery-powered turn signals as well. Aggressive motor-vehicle drivers were cited as the biggest safety concern while driving. Being hit while turning left was the second biggest Amish travel concern.

**18,325 - 2019 Population (Part of Geauga Settlement)**

**38 - Survey Responses**

**27 - Community Meeting Attendees**

**Bicycles/Scooters Allowed?**

This mimics write-in feedback as illustrated below.



*“Some corners have signs and bushes in the way to plainly look for traffic when we want to cross or pull onto the other roadway. Horse has to be too far out on the highway in order to see.”*

| Local Safety Concerns     |                     |                      |                           |                     |                         |
|---------------------------|---------------------|----------------------|---------------------------|---------------------|-------------------------|
|                           |                     |                      |                           |                     |                         |
| <b>Aggressive Drivers</b> | <b>Turning Left</b> | <b>Truck Traffic</b> | <b>Over Hills /Curves</b> | <b>Seen at Dusk</b> | <b>Entering Roadway</b> |
| <b>92%</b>                | <b>67%</b>          | <b>39%</b>           | <b>31%</b>                | <b>28%</b>          | <b>22%</b>              |

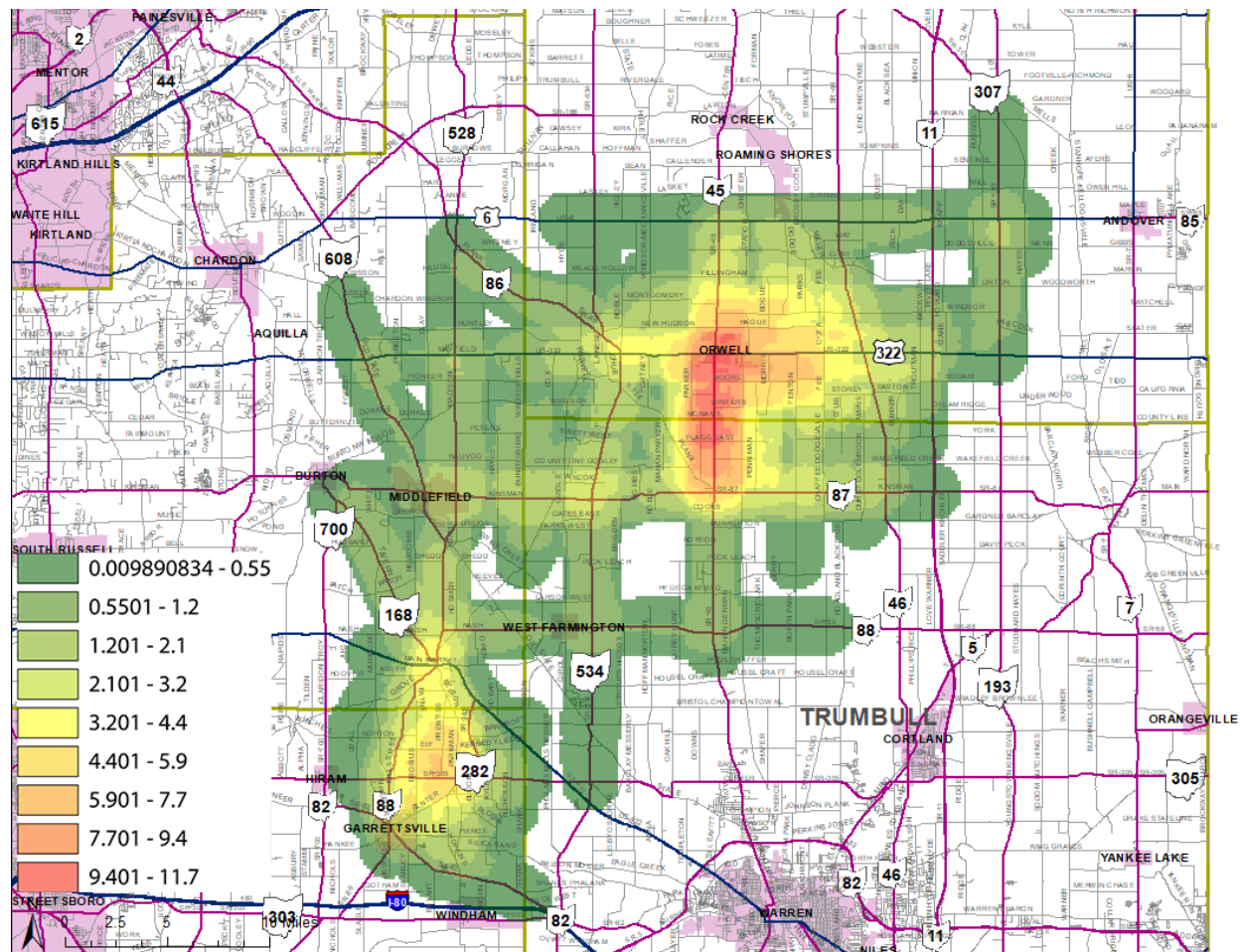
## Community Meeting Summary

A consistent theme throughout the community meeting was rapid population growth and an emphasis on buggy and bike/pedestrian safety. The Amish compared Ashtabula and Trumbull Counties to the “sprawl of Middlefield”, similar to the sprawl occurring around major non-Amish cities in Ohio. They cited that many Amish have moved away from Middlefield due to over population. The Middlefield settlement within Geauga County is the fourth largest Amish settlement in the United States with over 18,000 Amish. Locals also noted that different Amish communities to the east are growing westward toward Orwell. Where there used to be a large separation geographically between the groups, now almost none exists. Much of the area lacks basic signage alerting motor-vehicle drivers of Amish buggies on the roadways.

Local Amish also noted the importance of highly-visible buggy and bike/pedestrian safety equipment. Many Amish in the area have advanced, battery-powered signals and lights on their buggies and many wear reflective gear while walking or biking on the roadways.

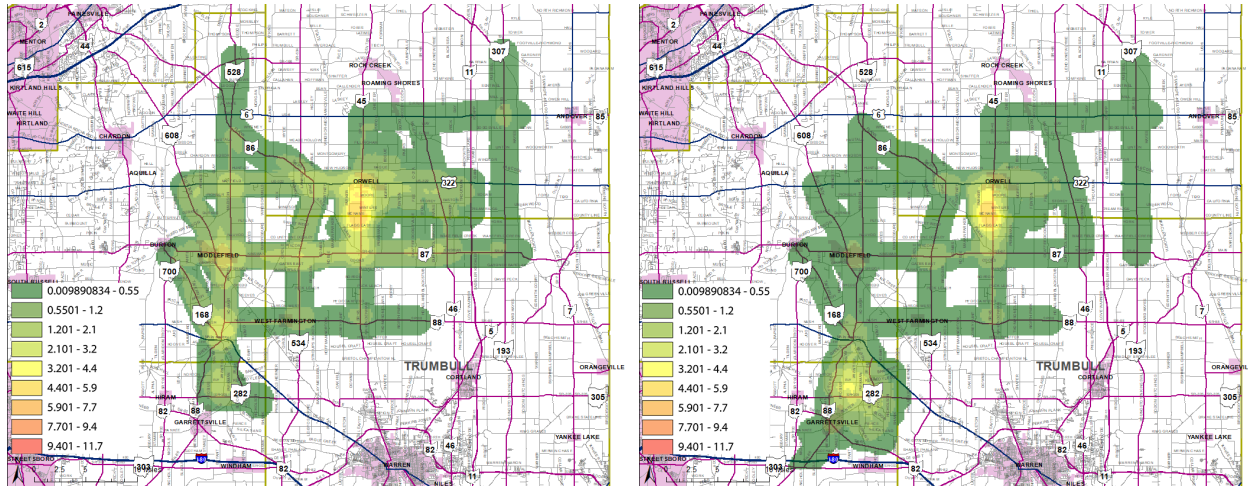
### Buggy Travel Exercise

SR 45 between North Bloomfield and Orwell was cited as the most heavily utilized buggy route in the area. High buggy traffic was also noted on US 322 to the east of Orwell. Moderate buggy travel was noted on SR 87 from the Geauga/Trumbull County line to North Bloomfield.



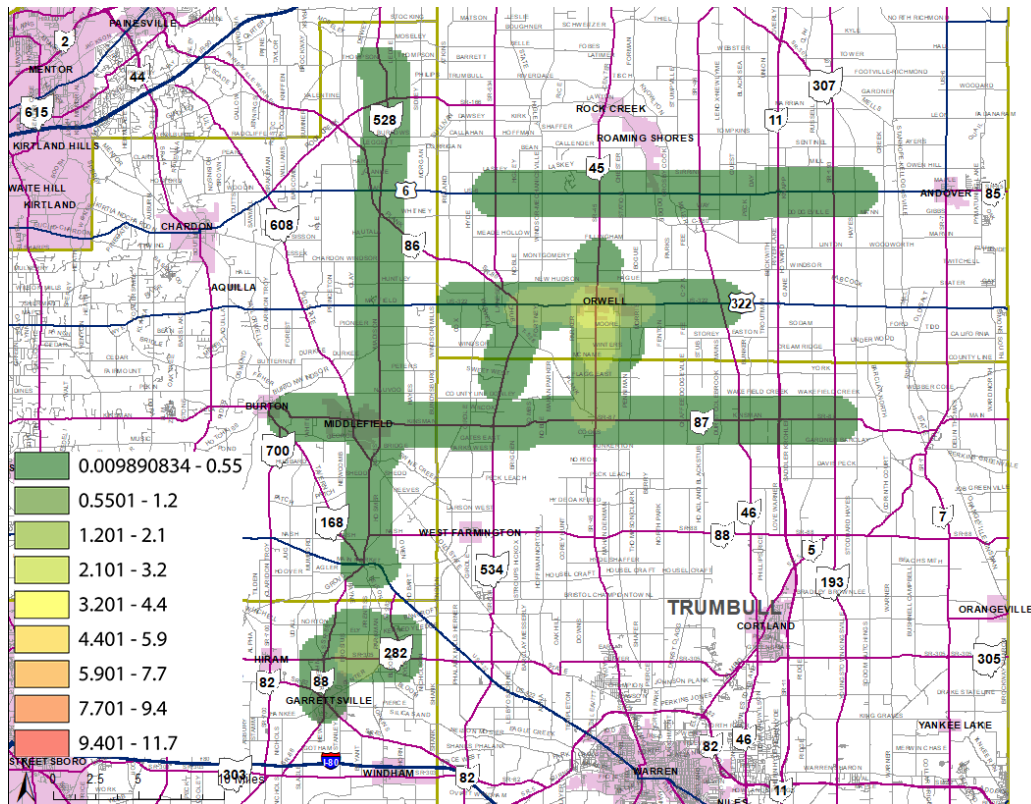
### Bike/Ped Exercise

Similar to the buggy travel exercise, local Amish cited SR 45 between North Bloomfield to Orwell as the most frequented bike and pedestrian route in the area. Both US 322 (east and west of Orwell) and SR 87 (Geauga/Trumbull County line to North Bloomfield) were also cited as frequented bike and pedestrian routes.



### Safety Location Exercise

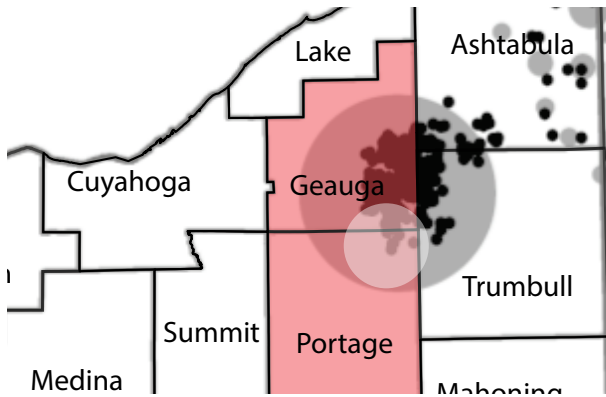
SR 45 from the Ashtabula/Trumbull County line to Orwell was cited as the state route with the highest safety concern for Amish travelers. Locals cited high motor-vehicle speeds and narrow shoulders as contributing factors. US 322 east of Orwell was also ranked as a high safety concern location.





# Garrettsville Area

## Portage County



### Public Survey Summary

The local Amish community is very progressive when it comes to buggy/bicycle safety equipment. Over 70% of survey respondents use reflective tape, a SMV emblem, LED-powered lights, and battery-powered turn signals on their buggies. The community does allow cycling and scooter use. While the most respondents stated that aggressive motor-vehicle driving was their biggest concern, 50% cited going over hills and around curves as their second biggest safety concern. This correlates with the general lack of signage and intersection lighting in the area.



***“Too many blind areas on SR 305 and SR 282 to see and pass animal drawn vehicles”***

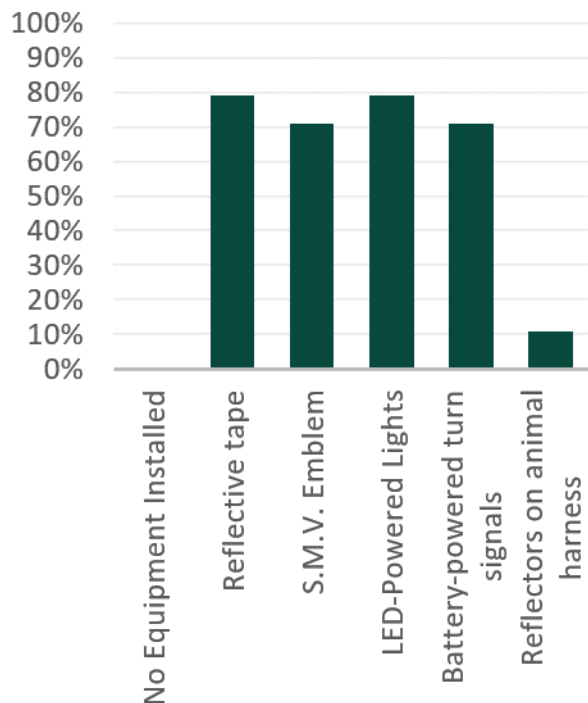
**18,325 - 2019 Population (Part of Geauga Settlement)**

**16 - Survey Responses**

**16 - Community Meeting Attendees**

***Bicycles/Scooters Allowed?***

### Buggy Safety Equipment Installed

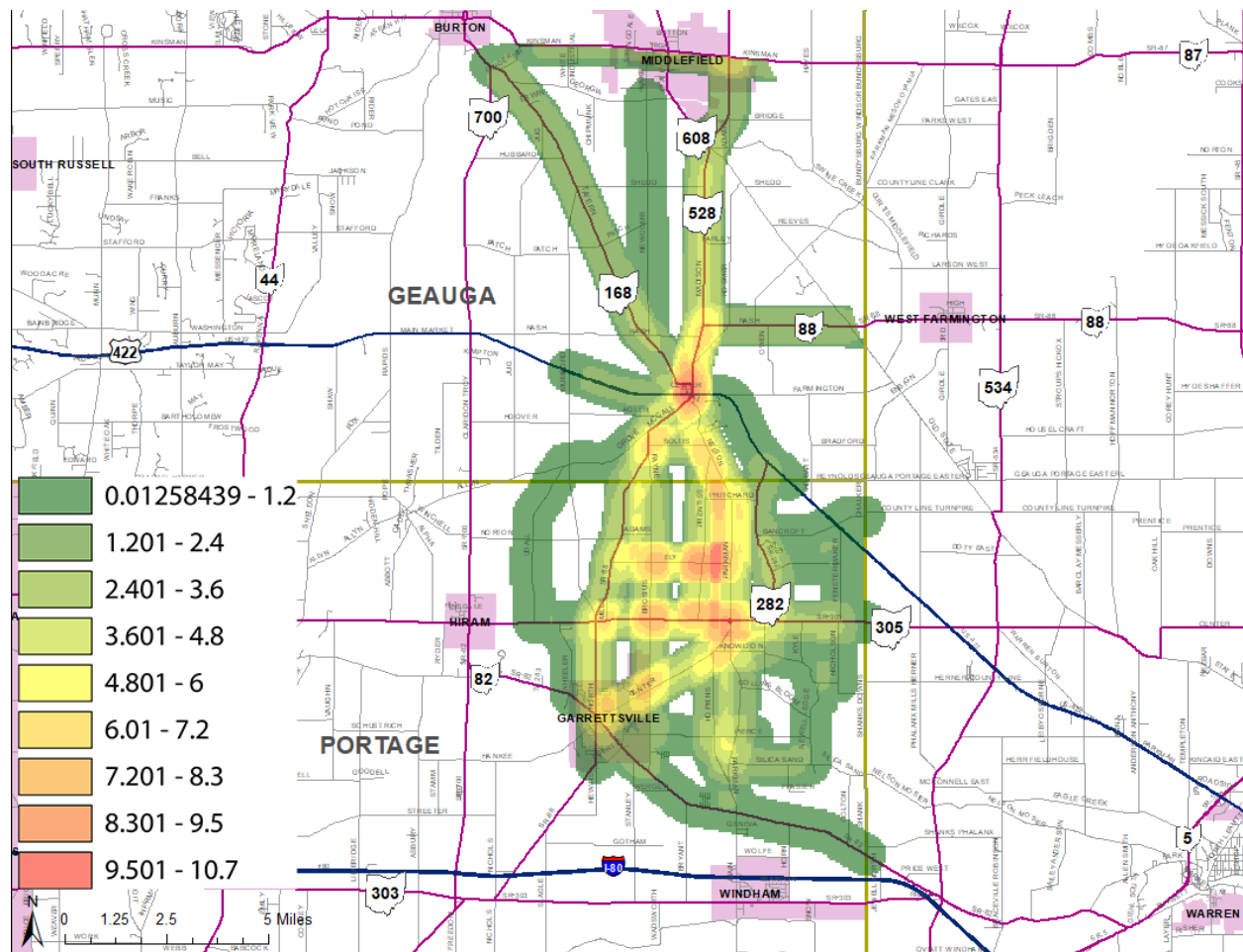


## Community Meeting Summary

The local Amish noted rapid population growth, as multiple new Amish schools were recently constructed in the area. Much of the growing Amish population comes from the Geauga County settlement to the north. Sight distance over hills and around curves were cited by many local Amish as a constant safety concern. Some of the routes in the area have tight curves and it is difficult for the locals to see. SR 305 between SR 88 and SR 282 was cited as an example.

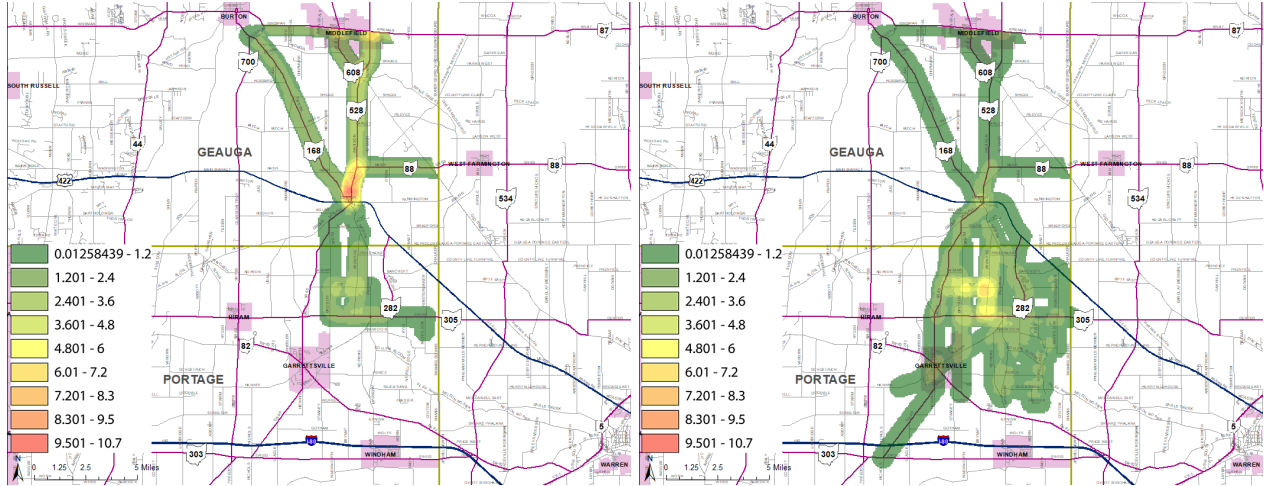
### Buggy Travel Exercise

Three state routes were heavily identified as buggy travel routes: SR 305 (SR 88 and SR 282), SR 88 (north of SR 305), and SR 282 (north of SR 305). These routes are consistent with the current extent of the Amish population within Portage County.



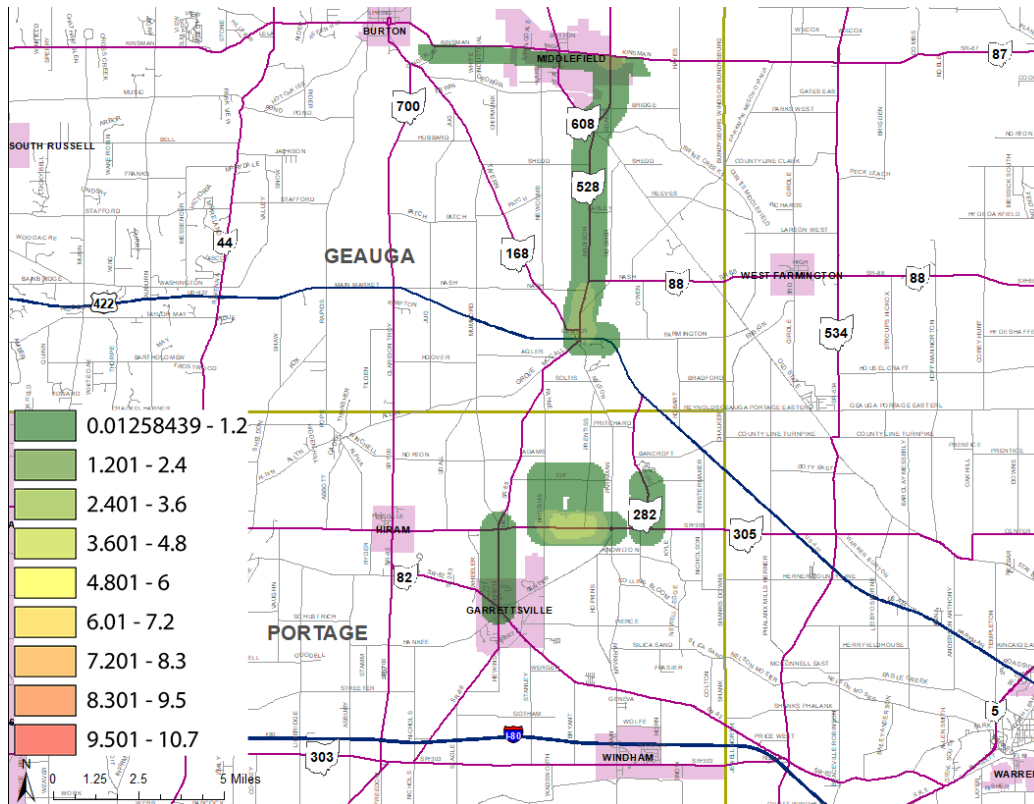
### Bike/Ped Exercise

Though bicycling and scooter use is utilized within the community, there were few responses as to where Amish travel by bike/foot along state routes. Only SR 305 around Nelson Township Hall was cited in a couple instances as a route traveled by bike/foot.



### Safety Location Exercise

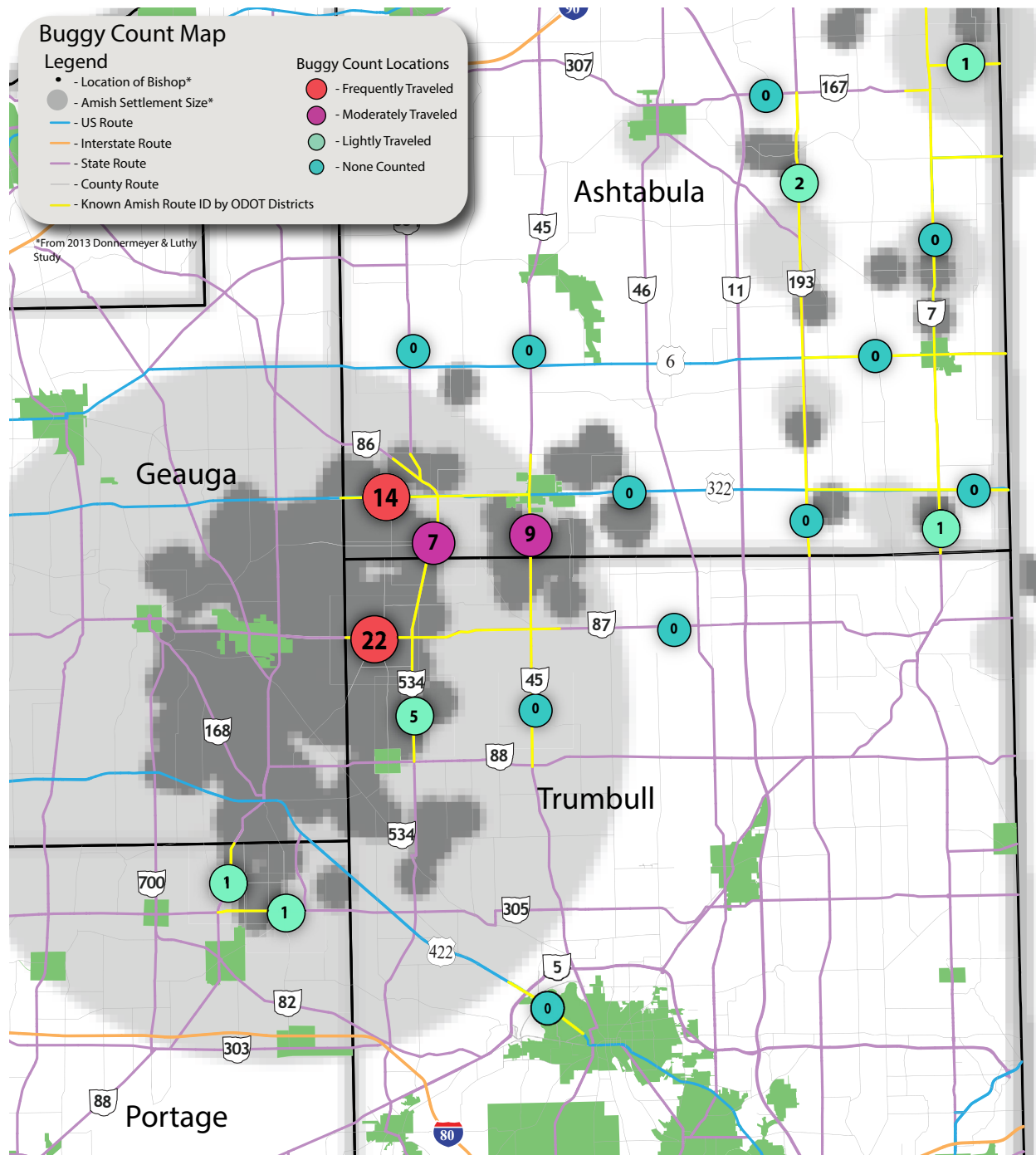
SR 305 between SLM 3.3 and 4.8 was cited as the highest location of safety concern along state routes in the area. No other state route was consistently identified.



## Crash Data/Buggy Counts

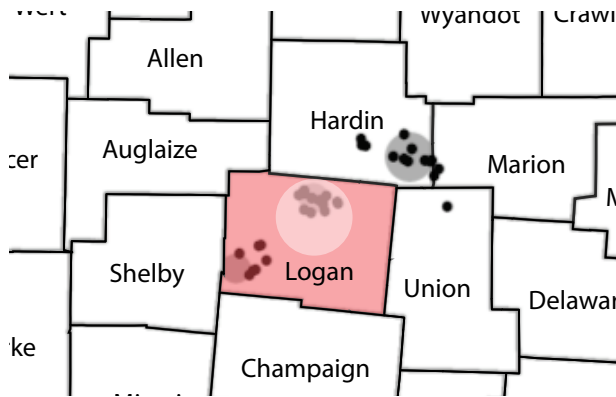
There is a limited history of buggy or bike/pedestrian crashes within Northern Portage County over the last ten years. The few crashes that have occurred do not exhibit a systemic crash problem along any roadway segment.

Only two buggy counts were conducted within Portage County. Each returned a single buggy over the 12-hour period.



# Belle Center Area

## Logan County



### Public Survey Summary

Local Amish within this community heavily utilize bicycle and scooter travel, with over 90% of respondents using a bike or scooter at least once a week. Buggy travel was also cited as a heavily utilized form of transportation with over 95% of respondents using a buggy at least once a week. The community is progressive in terms of buggy safety equipment with over 85% of respondents using reflective tape, a SMV emblem, LED-powered light and battery-powered turn signals on their buggies. While aggressive motor vehicle driving was cited as the local Amish's primary safety concern while traveling, being seen after dusk/dark and truck traffic were cited as the next highest concerns.



*"Motorists ignore turn signals on horse drawn vehicles"*

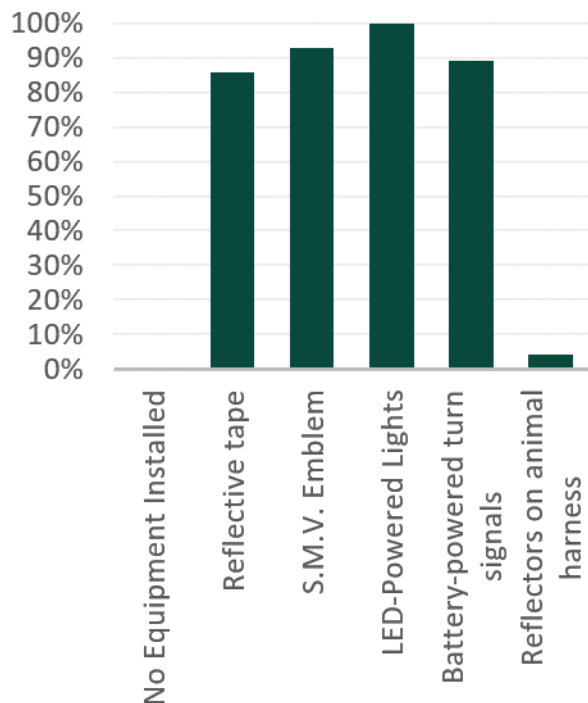
**360 - 2019 Population (Belle Center Settlement)**

**31 - Survey Responses**

**21 - Community Meeting Attendees**

**Bicycles/Scooters Allowed?**

### Buggy Safety Equipment Installed

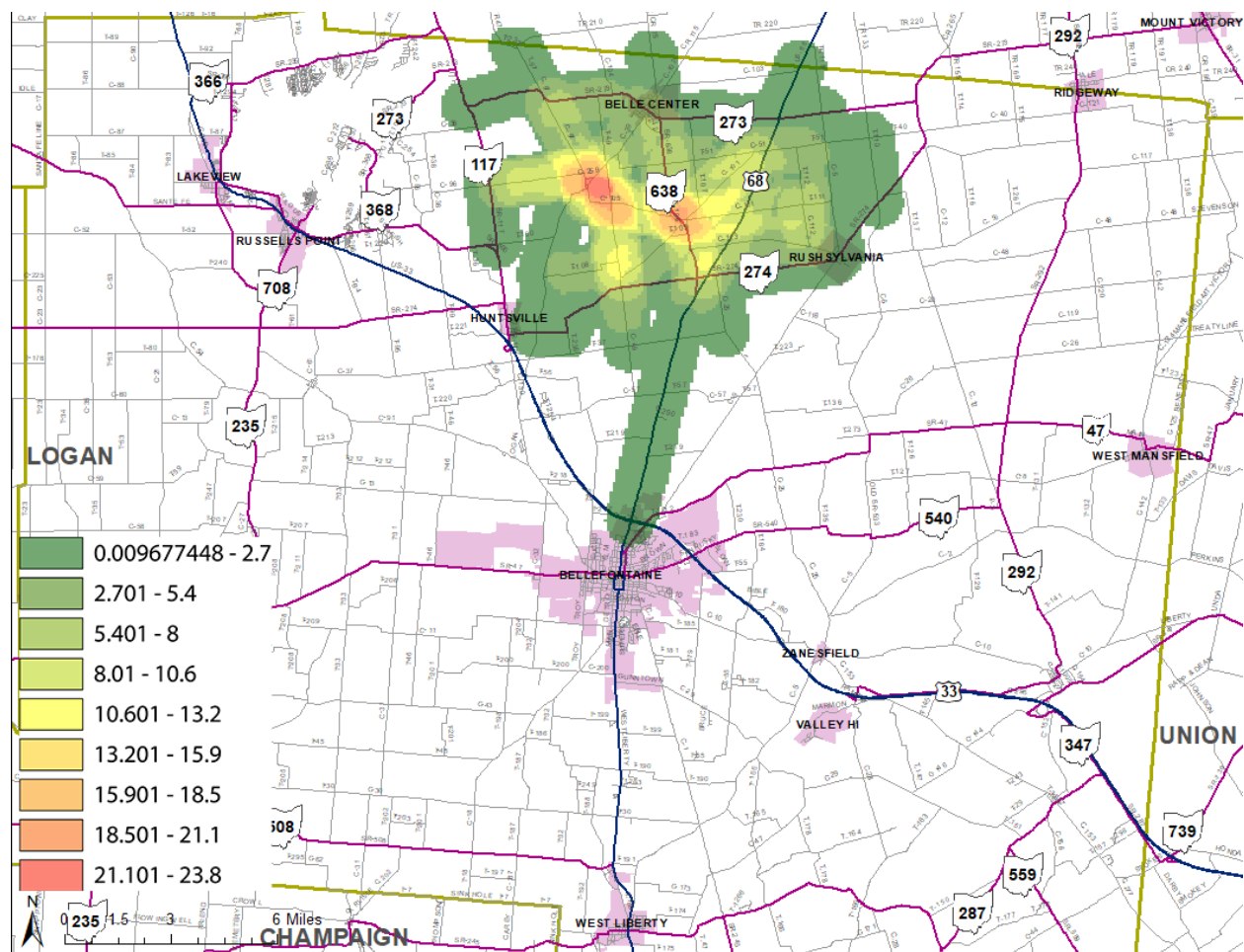


## Community Meeting Summary

Results from the public survey were also echoed at the community meeting. Local Amish expressed concerns over the high volumes of truck traffic along US 68 and cited the need for all cyclists to wear reflective gear while traveling. This community relies heavily on bicycle transportation for mobility.

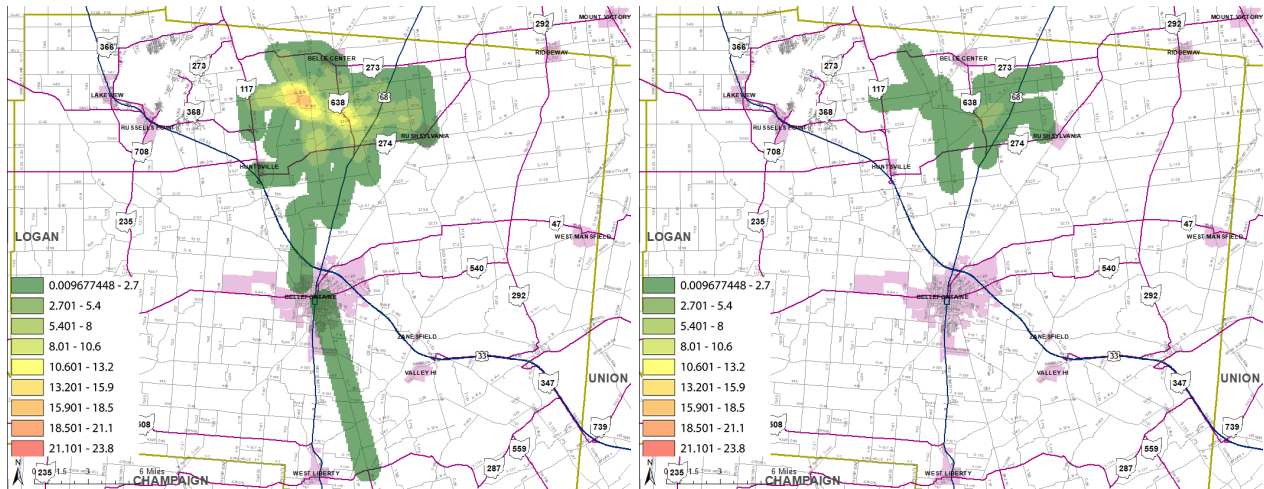
### Buggy Travel Exercise

The highest buggy frequency cited centered around Belle Center. SR 638 just south of Belle Center was cited as the most frequented route in the area. Both US 68 (SR 274 to SR 273) and SR 273 (just west of Belle Center), were also heavily identified buggy travel routes in the area.



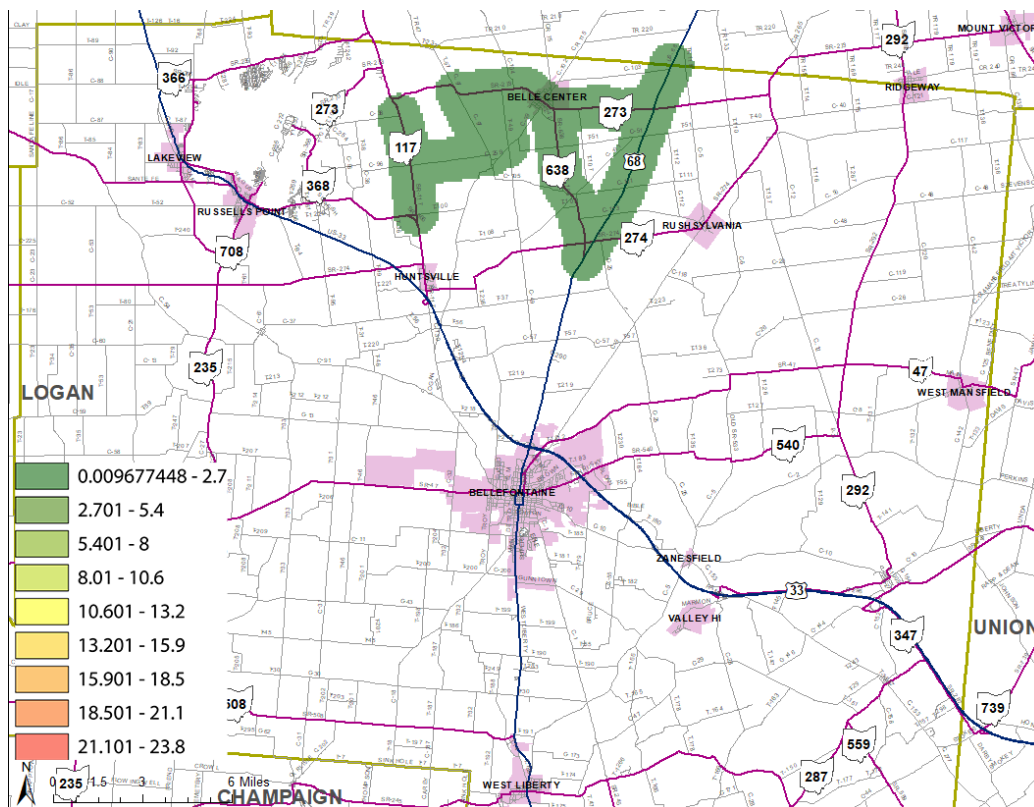
### Bike/Ped Exercise

SR 638 between SR 274 and Belle Center was also cited as the most frequented bike and pedestrian route in the area. SR 273 both east and west of Belle Center was also cited highly. Unlike the buggy volume exercise, US 68 was not cited as a highly traveled bike and pedestrian route. This mimics concerns shared at the community meeting by local Amish regarding heavy truck volumes and high motor vehicle speeds along that route.



### Safety Location Exercise

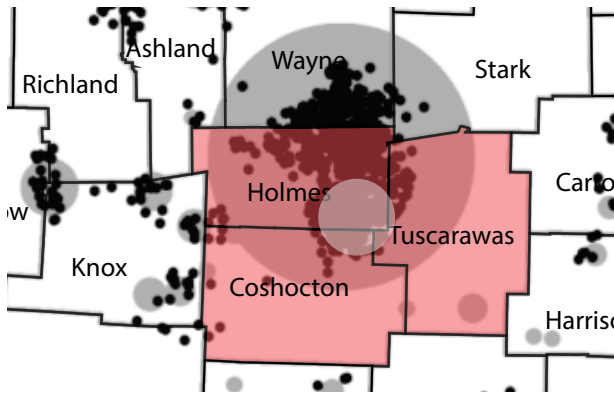
Both US 68 between SR 274 and SR 273, along with SR 638 south of Belle Center, were cited as locations with the highest safety concern while traveling. No other state routes in the area were highly cited.





## Charm Area

### Holmes/Coshocton County



### Public Survey Summary

Respondents from southern Holmes County cited both biking/scooters and walking as primary modes of transportation with both being used by 75% of respondents at least once a week. Nearly all respondents (95%) traveled by buggy at least once a week. Church was the top trip purpose locally with 85% traveling to church at least once a week. Surprisingly, shopping/selling goods (75%) was the second most frequent trip purpose within the area, ahead of work commutes. The local area is very progressive in terms of buggy safety equipment. Over 90% of respondents have reflective tape, a SMV emblem, LED-powered lights and battery-powered turn signals installed on their buggies. In addition, 23% use reflectors on the animal harnesses. Aggressive motor vehicle drivers was cited as the number one local Amish safety concern. Other frequently cited safety concerns included going over hills or around curves (68%), being hit while turning left (48%) and truck traffic (38%). Concerns regarding the volume of truck traffic on state routes and fears of being hit while motor vehicles pass were both concerns shared within the write-in portion of the survey. Below are some common themes from this area.



**36,755** - 2019 Population (Part of Holmes Settlement)



**324** - Survey Responses



Community Meeting Held at Holmes County Health & Safety Days



**Bicycles/Scooters Allowed?**



**“Buggy lanes that are already in place are a great comfort for a slow moving vehicle driver.”**



**“E bikes are not safe - they go too fast”**



**“Not enough roadway space for both slow vehicles and fast vehicles”**

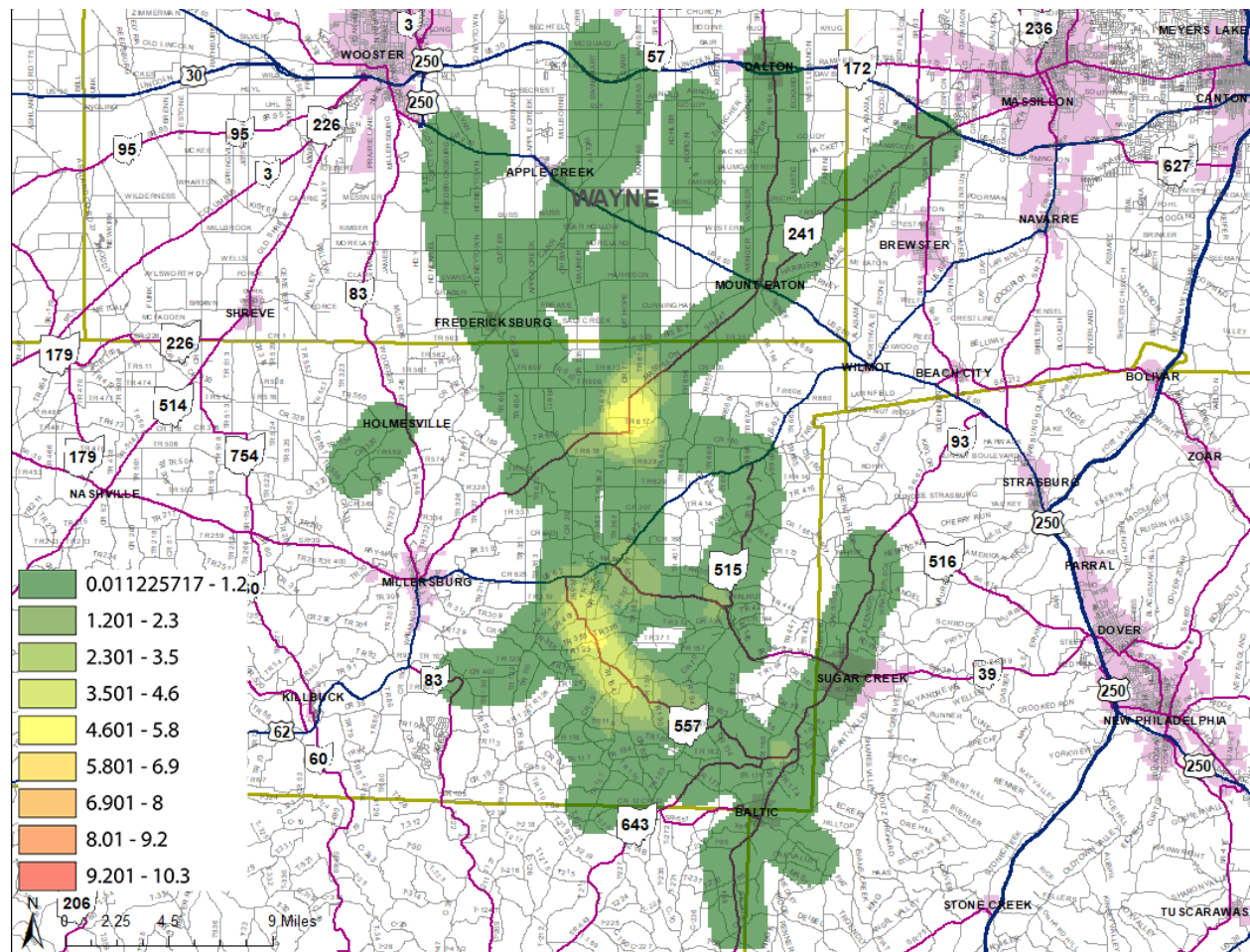
## Community Meeting Summary

This meeting was held at the Holmes County Amish Health and Safety Day event in Charm. This event has a trade show format with vendors and public agencies in attendance. Display booths focused on general health or safety information to educate the Amish or for them to use. This Health and Safety Day event typically attracts over 2,000 Amish.

For this study, ODOT set up a booth to gather feedback from local Amish on roadway safety concerns and travel patterns. Due to the fast-paced nature of the event, the project team asked the Amish participants to focus their responses to the safety concerns exercise, instead of trying to complete all four exercises at once. Thus, there are only results in this area for the safety concerns exercise.

### Safety Location Exercise

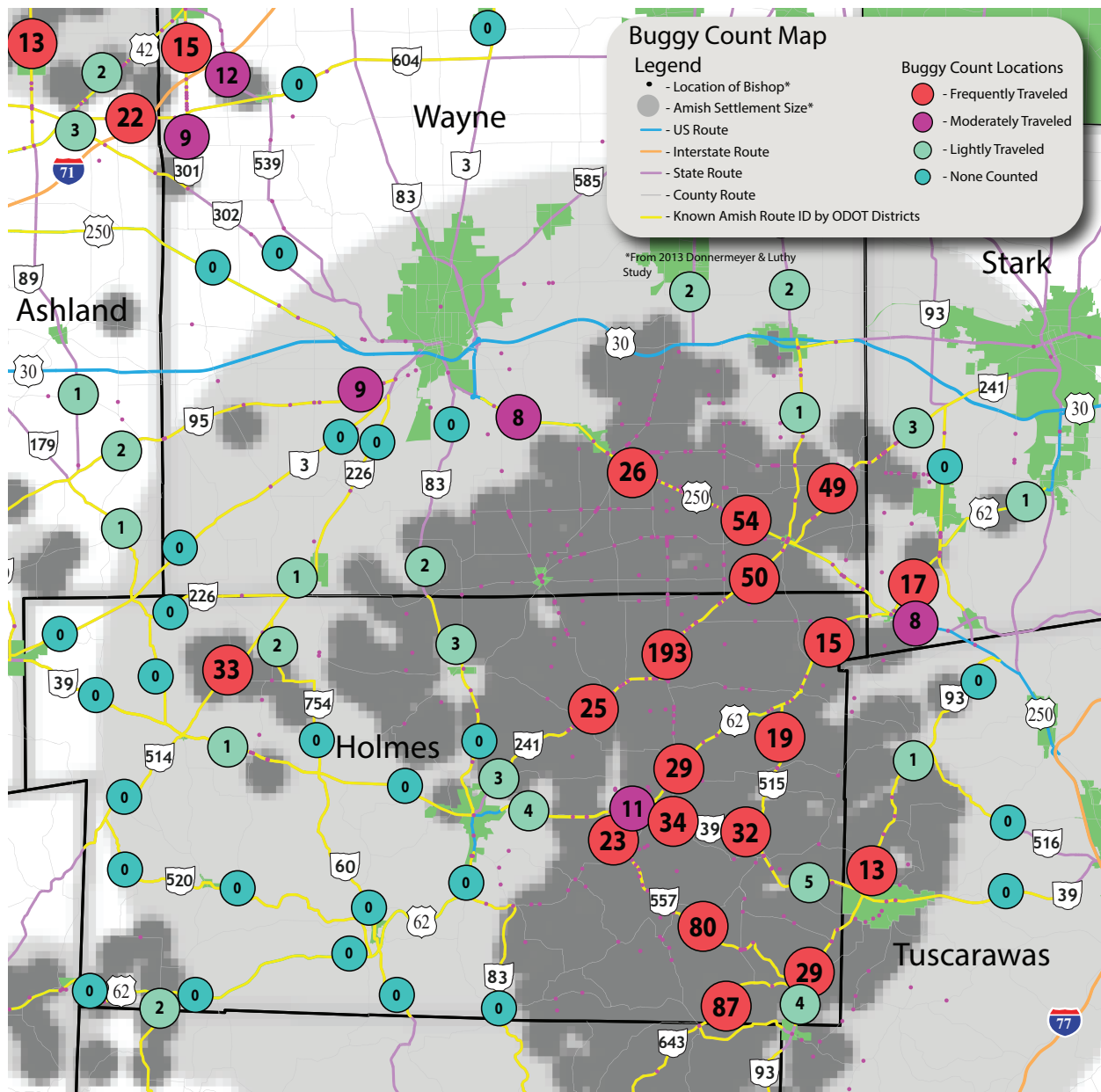
The state route cited as the highest safety concern in the area was SR 557 from SR 643 to US 62. This route is heavily traveled by local Amish. Concerns stated by participants at the Health and Safety Days included narrow shoulders and high volumes of both buggy and motor vehicle traffic on the route. The only other state route in the area cited was SR 39 around Walnut Creek.



## Crash Data/Buggy Counts

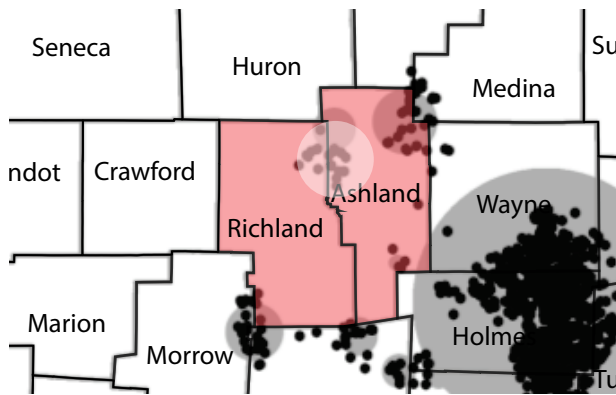
Contrary to the results of the safety concerns exercise, SR 39 (SR 515 and CR 114), just east of Walnut Creek has the highest buggy crash rate/mile/year (0.875) in the State. A fatal crash was also recorded within the last ten years at this location. Multiple segments of SR 39 also ranked high with regards to bicycle and pedestrian crashes. Three of the top five highest bicycle and pedestrian crash locations in the State were documented along SR 39 between US 62 and the Holmes/Tuscarawas County line.

All state routes within southeast Holmes, northern Coshocton and western Tuscarawas Counties documented some volumes of buggy traffic, with most exhibiting high volumes. The highest volumes were documented along SR 643 by the Holmes/Coshocton County line, followed closely by counts conducted along SR 557. SR 83 and routes to the west returned few buggies during the 12-hour count period.



# Shiloh Area

## Ashland/Richland County



### Public Survey Summary

The local Amish community utilizes bicycle/scooters frequently, with nearly 80% of respondents using bicycles/scooters at least once a week. Buggy use was also frequent with all respondents stating they use a buggy to travel at least once a week. Compared to other areas of the State, walking frequency was low as only 40% walk to destinations at least once a week. Some buggy safety equipment is used throughout the area. Over 90% of respondents use a SMV emblem and LED-powered lights on their buggies. In contrast with many of the other communities across the State, reflective tape usage was low, with only 45% of respondents citing its use. Aggressive motor vehicle driving was cited as the number one safety concern while traveling. Truck traffic and going over hills or around curves were cited as the number two and three biggest safety concerns by 53% and 48% of respondents, respectively. Similar concerns were referenced in the write-in responses to the public survey. A few frequently represented comments are shown to the right.

**910 - 2019 Population (Ashland/ Shiloh Settlement)**

**101 - Survey Responses**

**Community Meeting Held at Ashland County Health & Safety Days**

**Bicycles/Scooters Allowed?**



***“Vehicles passing on hills or at crossroads”***



***“One of our concerns is the condition of some or most of the roads. There are holes some places that could break a horse’s ankle and throw a bicycle rider.”***

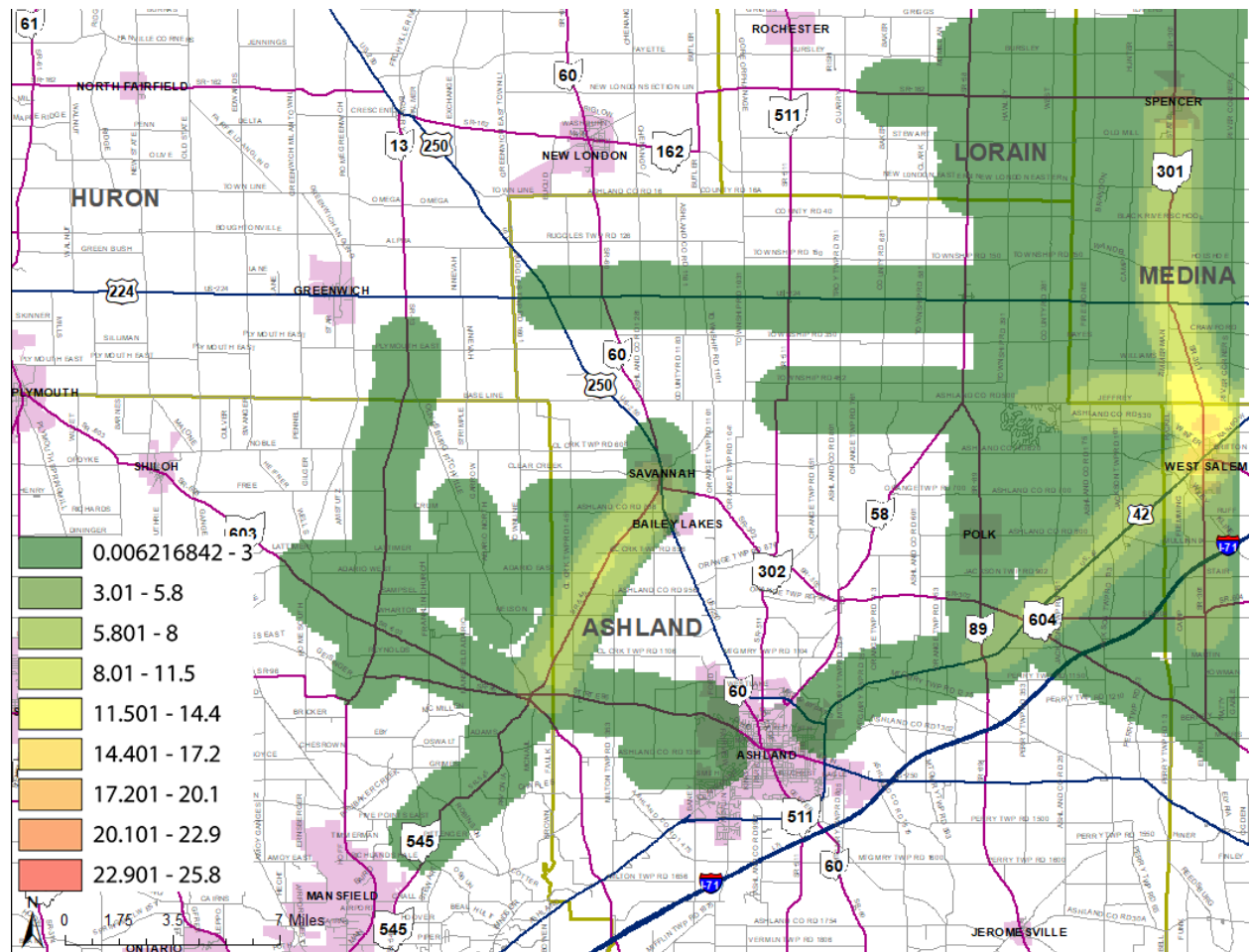
## Community Meeting Summary

This meeting was held at the Ashland County Amish Health and Safety Day event near Ashland. This event has a trade show format with vendors and public agencies in attendance. Exhibitors booths contained general health or safety information to educate the Amish or for them to use. This Health and Safety Day event typically attracts over 700 Amish.

For this study, ODOT set up a booth to gather feedback from local Amish on roadway safety concerns and travel patterns. Due to the fast-paced nature of the event, the project team asked the Amish who participated in the exercises to focus their responses to the safety concerns exercise, instead of trying to complete all four exercises at once. Thus, there are only results in this area for the safety concerns exercise.

### Safety Location Exercise

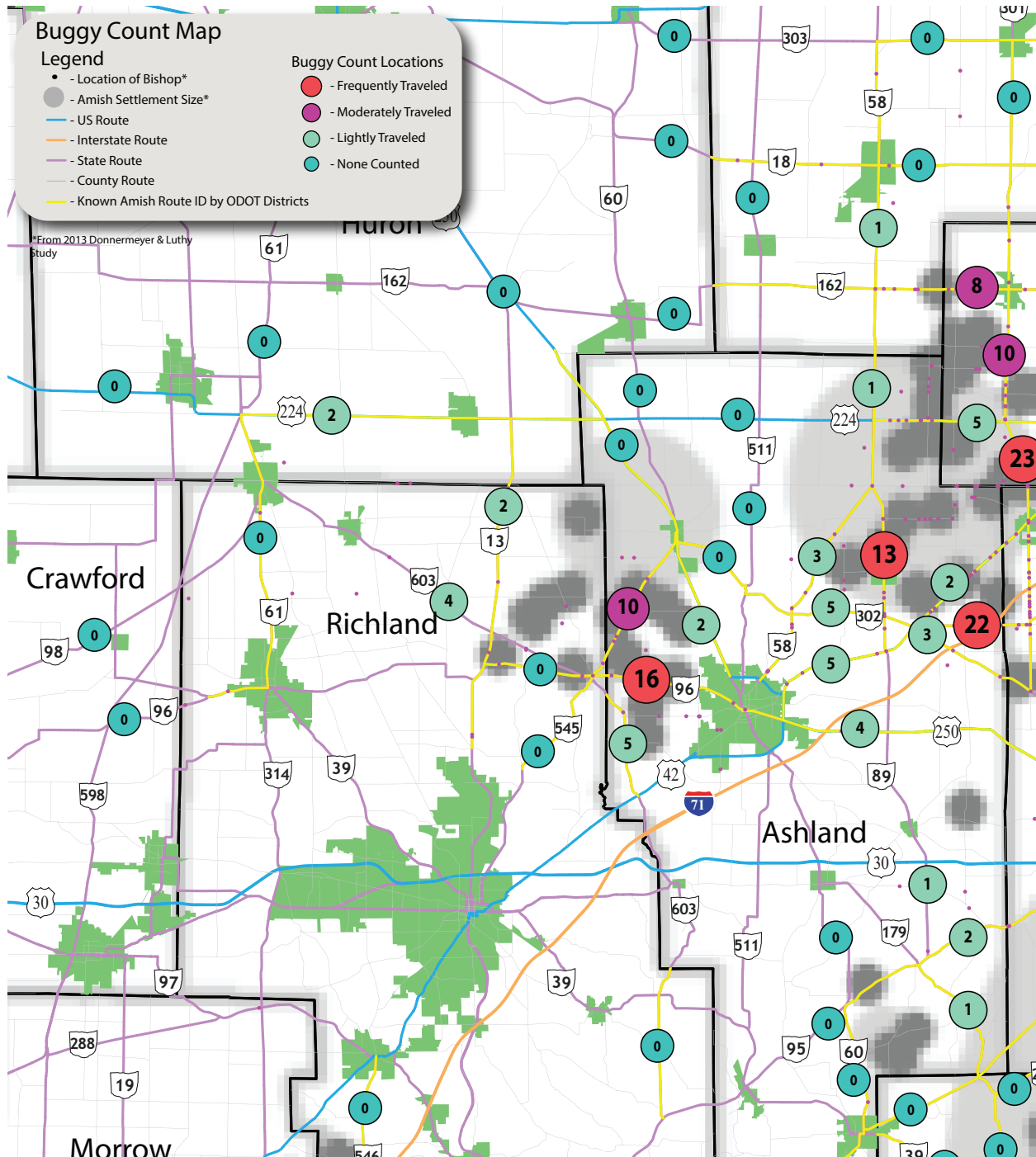
Resoundingly, SR 545 stood out as a common safety concern for almost all of the Amish who participated in the safety concern exercise. The limits of the concern extend from SR 96 in the south to Savannah in the north. Local Amish cited sharp hills with limited sight distance, narrow shoulders, and poor roadway maintenance as major concerns while traveling this route.



## Crash Data/Buggy Counts

SR 545 within both Richland and Ashland Counties illustrated an elevated buggy crash rate of with a 0.18 crashes/mile/year. This buggy crash rate was the highest crash rate in the area. SR 96 between the Ashland/Richland County line and SR 60 documented one fatal buggy crash within the past ten years and a moderately elevated crash rate of 0.12.

High buggy volumes were documented on SR 96 between the Ashland/Richland County line and SR 60. Elevated buggy volumes were observed on SR 545 south of Savannah. Other buggy count locations in the area returned either low or no buggy volumes over the 12-hour count period.



## Prioritization Criteria

To aid in determining which segments of state routes warrant certain countermeasure improvements a prioritization matrix was produced from utilizing ten sets of weighted criteria. Each criterion will score each segment of ODOT roadway on a 1 to 4 scoring system. A score of one will represent the lowest impact or concern for each specific criteria along a roadway segment. A four is the highest or most concerning score for the criteria. Each criterion has been assigned a different weighting based on the impact each criterion will have on future countermeasure needs. A weighting of 1 represents a lower impact criterion, while a weighting of 4 represent a high impact criterion. Each criterion's rank and weighting will be multiplied together to determine the score of each criterion. Each segment will be scored based on each of the ten criteria detailed on the following pages.

The average score of those ten criteria will determine the segment's overall priority. Average scoring was used as some criteria relies heavily on public survey or community meeting feedback. Some areas of the State were not represented by a community meeting or had limited survey feedback. In these cases, a score of 0 was given to the segment. As it is an average scoring system across all criteria, the criteria that scored a 0 is not included in average score calculation and thus will not penalize a roadway segment for not receiving public feedback. The prioritization criteria scoring diagram on the following page illustrates how a roadway segment is scored and prioritized.

Based on a segment's scoring, a range of typical countermeasures will be recommended to improve safety within each segment. Based on a segment's average score a High, Elevated, Medium or Low priority will be assigned. The average score range that defines those priorities is illustrated to the top right.

**Low Priority**  
*Average Score Below 1.5*

**Moderate Priority**  
*Average Score Between 1.5 and 2.1*

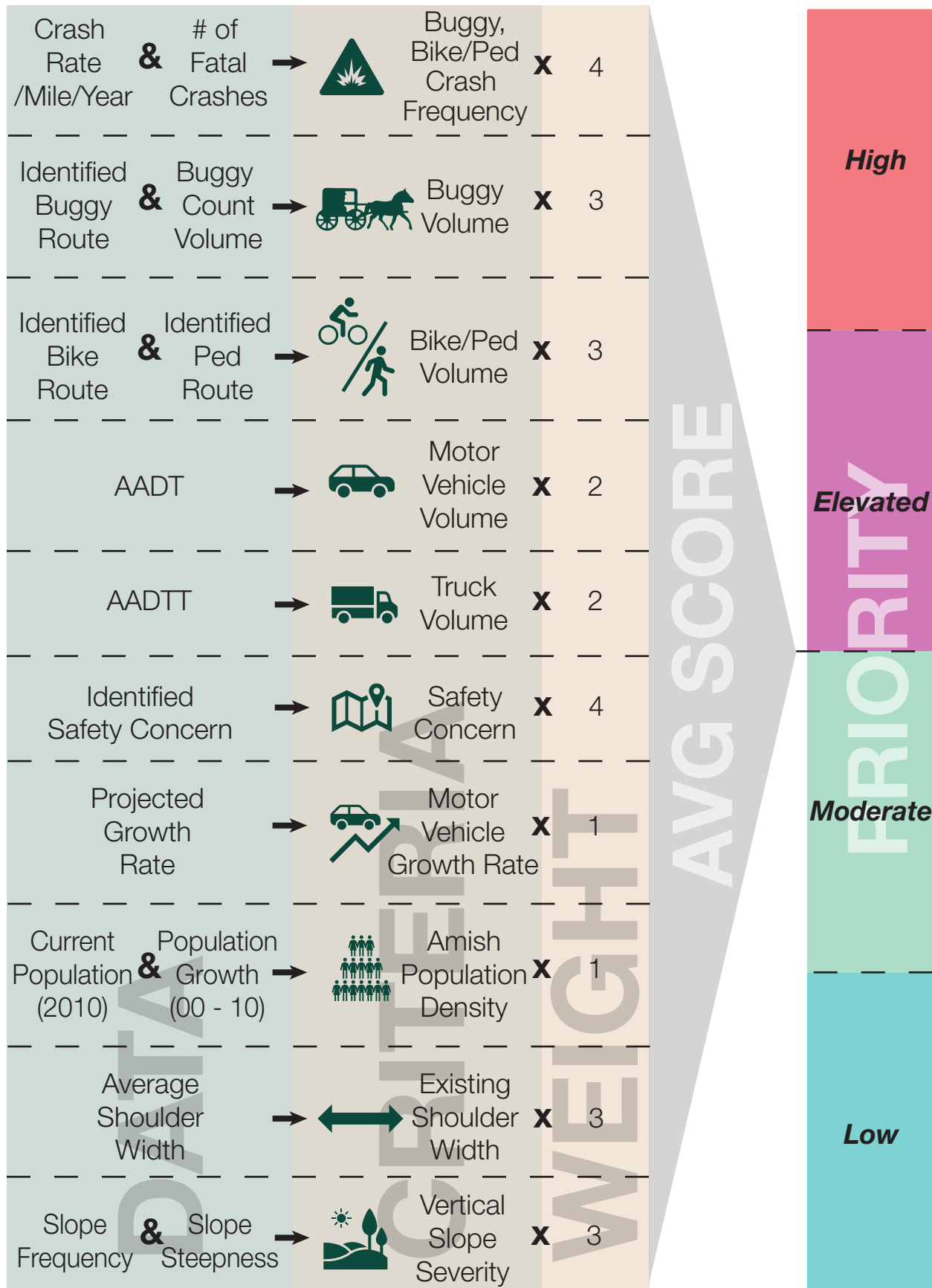
**Elevated Priority**  
*Average Score Between 2.1 and 2.6*

**High Priority**  
*Average Score Above 2.6*

## Criteria Definitions

The following pages describe each of the ten criteria used to determine a roadway segments priority. The ten criteria include the following: Frequency of Buggy/Pedestrian/Bicycle Crashes, Volume of Buggy Traffic, Volume of Pedestrian/Bicycle Traffic, Volume of Vehicle Traffic, Volume of Truck Traffic, Identified Safety Concern, Projected Vehicle Growth Rates, Projected Amish Population Growth Rates, Existing Shoulder Width, and Vertical Slope Severity.

## Prioritization Criteria Scoring Diagram





## Frequency of Buggy, Pedestrian or Bicycle Crashes

### *Weight 4*

Prioritization will be based on the ratio of the total number of buggy, pedestrian and bicycle crashes within a roadway segment per mile, per year from 2009 through 2018 utilizing ODOT's historical crash data. Segments with no crashes or a limited number of crashes will score as a lower priority as compared to segments with larger crash per mile, per year ratios. Segments with multiple fatal crashes will be prioritized above locations with similar non-fatal crash statistics. The point scale for crash frequency is shown at the top right of the page.

- 1 **Low Concern**  
*No History of Crashes*
- 2 **Moderate Concern**  
*0.1 to 0.5 Crashes/Mile/Year and  
No Fatal Crash*
- 3 **Elevated Concern**  
*0.6 to 1 Crashes/Mile/Year or 1  
Fatal Crash*
- 4 **High Concern**  
*Exceeds 1 Crash/Mile/Year or  
Exceeds 1 Fatal Crash*



## Volume of Buggy Traffic

### Weight 3

Prioritization will be determined based on analyzing a variety of different data sources including information collected through the public engagement process (e.g. Amish surveys, community meeting feedback) and from buggy counts collected as part of this study (e.g. ODOT-identified Amish travel routes and traffic counts). Due to the anecdotal nature of some of the information and the limited scope of the traffic counts (one day, 12-hour counts), scoring will be determined by weighing all available data sources together. In areas where a public meeting was not conducted, prioritization will be based on traffic count data and ODOT identified Amish travel routes. Due to the varying size of Amish populations throughout the State, routes identified during the public engagement process as highly traveled buggy routes will be scored against other routes in the local area rather than the entire State. This approach will allow the most heavily used routes in each local area to be identified, rather than only the majority of the routes in

**1 Low Concern**  
*Seldom Identified Route (Lowest Quarter of Responses)/Low Buggy Volumes (ODOT Identified Route with Traffic Count volume = 0)*

**2 Moderate Concern**  
*Infrequently Identified Route (2nd Lowest Quarter of Responses) /Low Buggy Volumes (ODOT Identified Route with Traffic Count volume = 1 – 5)*

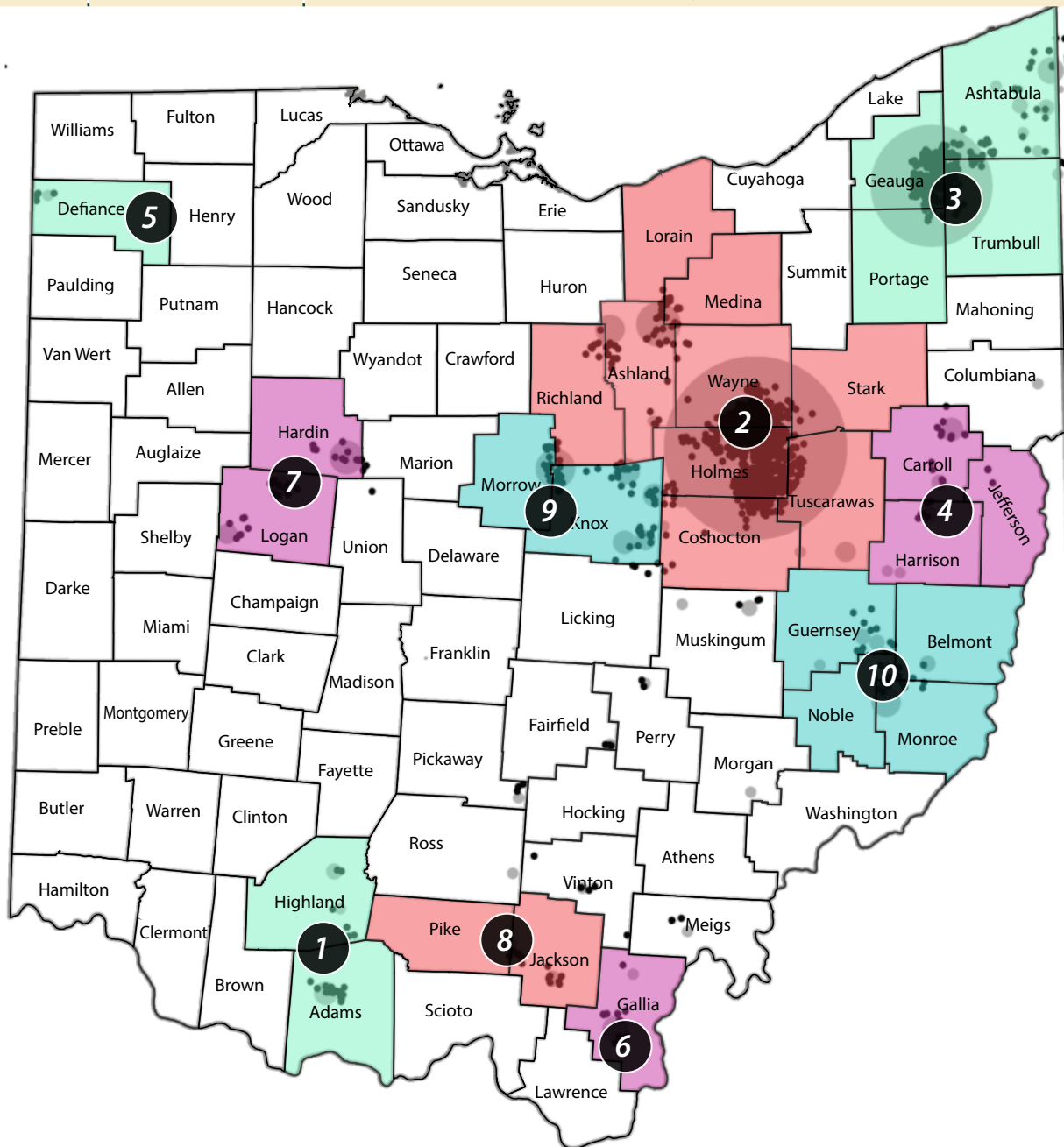
**3 Elevated Concern**  
*Commonly Identified Route (2nd Highest Quarter of Responses) /Moderate Buggy Volumes (ODOT Identified Route with Traffic Count volume = 6 to 12)*

**4 High Concern**  
*Frequently Identified Route (Highest Quarter of Responses) /High Buggy Volumes (ODOT Identified Route with Traffic Count volume > 13)*

a highly populated Amish area. Local Amish areas were defined by county as illustrated in the map on the following page. Below is a listing of the Buggy Volume scoring scale based on the number of responses gathered in local Amish areas divided into quarters.

| <b>Buggy Scoring Scale</b> |                                   |                                       |                                      |                                 |
|----------------------------|-----------------------------------|---------------------------------------|--------------------------------------|---------------------------------|
| <b>Meeting Group</b>       | <b>Highest Quarter (4 Points)</b> | <b>2nd Highest Quarter (3 Points)</b> | <b>2nd Lowest Quarter (2 Points)</b> | <b>Lowest Quarter (1 Point)</b> |
| ADA                        | 6                                 | 5                                     | 3                                    | 2                               |
| ASD/HOL/WAY                | 39                                | 29                                    | 20                                   | 10                              |
| ATB/TRU                    | 19                                | 14                                    | 10                                   | 5                               |
| CAR                        | 10                                | 8                                     | 5                                    | 3                               |
| DEF                        | 14                                | 11                                    | 7                                    | 4                               |
| GAL                        | 9                                 | 7                                     | 5                                    | 2                               |
| HAR/LOG                    | 7                                 | 5                                     | 4                                    | 2                               |
| JAC                        | 11                                | 8                                     | 6                                    | 3                               |
| KNO/MRW                    | 7                                 | 5                                     | 4                                    | 2                               |
| NOB                        | 4                                 | 3                                     | 2                                    | 1                               |

|    | Local Area  | Counties Included   |
|----|-------------|---|
| 1  | ADA         | Adams, Highland   |
| 2  | ASD/HOL/WAY | Ashland, Coshocton, Holmes, Lorain, Medina, Richland, Stark, Tuscarawas |
| 3  | ATB/TRU     | Ashtabula, Geauga, Portage, Trumbull                                    |
| 4  | CAR         | Carroll, Harrison, Jefferson  |
| 5  | DEF         | Defiance  |
| 6  | GAL         | Gallia  |
| 7  | HAR/LOG     | Hardin, Logan   |
| 8  | JAC         | Jackson, Pike   |
| 9  | KNO/MRW     | Knox, Morrow  |
| 10 | NOB         | Belmont, Guernsey, Monroe, Noble  |





## Volume of Bicycle and Pedestrian Traffic

### Weight 3

Prioritization will be determined based on analyzing information collected through the public engagement process (e.g. Amish surveys, public meeting feedback). Due to the varying size of Amish populations throughout the State, routes identified during the public engagement process as highly traveled bicycle or pedestrian routes will be scored against other routes in the local area rather than the entire State. This approach will allow the most heavily used routes in each local area to be identified, rather than only routes in highly populated Amish areas. In areas where a public meeting was not conducted, prioritization will be based on Amish population data and public survey feedback. Below is a listing of the Bicycle and Pedestrian Volume scoring scale based on the number of responses gathered in local Amish areas divided into quarters.

**0** **No Points**  
*No Community Meeting in Area and Not identified Route*

**1** **Low Concern**  
*Seldom Identified Route (Lowest Quarter of Responses) /Community Identified they do not use Bicycles*

**2** **Moderate Concern**  
*Infrequently Identified Route (2nd Lowest Quarter of Responses) /Some of the Community uses Bicycles*

**3** **Elevated Concern**  
*Commonly Identified Route (2nd Highest Quarter of Responses) /Community Widely uses Bicycles*

**4** **High Concern**  
*Frequently Identified Route (Highest Quarter of Responses) /Community Widely uses Bicycles*

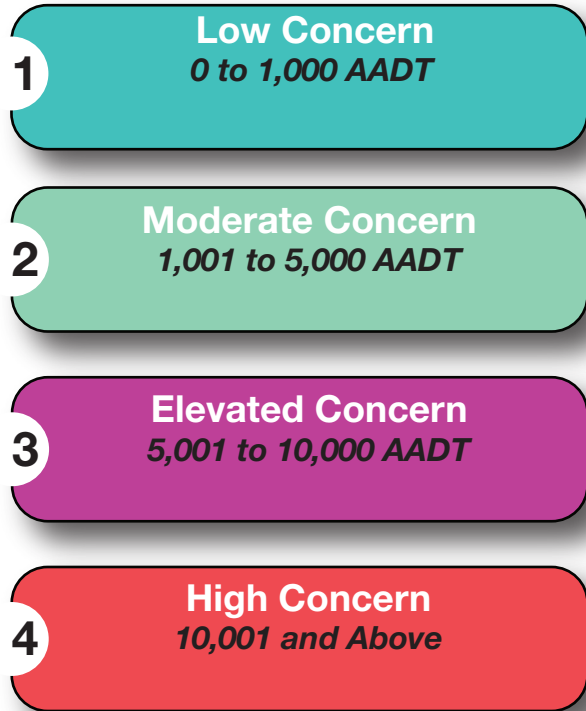
| <b>Combined Bike &amp; Ped Scoring Scale</b> |                                   |                                       |                                      |                                 |
|--|-----------------------------------|---------------------------------------|--------------------------------------|---------------------------------|
| <b>Meeting Group</b>                         | <b>Highest Quarter (4 Points)</b> | <b>2nd Highest Quarter (3 Points)</b> | <b>2nd Lowest Quarter (2 Points)</b> | <b>Lowest Quarter (1 Point)</b> |
| ADA  | 5                                 | 4                                     | 3                                    | 1                               |
| ASD/HOL/WAY                                  | 21                                | 16                                    | 11                                   | 5                               |
| ATB/TRU                                      | 15                                | 11                                    | 8                                    | 4                               |
| CAR  | 4                                 | 3                                     | 2                                    | 1                               |
| DEF  | 14                                | 11                                    | 7                                    | 4                               |
| GAL  | 2                                 | 2                                     | 1                                    | 1                               |
| HAR/LOG                                      | 10                                | 8                                     | 5                                    | 3                               |
| JAC  | 1                                 | 1                                     | 1                                    | 0                               |
| KNO/MRW                                      | 6                                 | 5                                     | 3                                    | 2                               |
| NOB  | 4                                 | 3                                     | 2                                    | 1                               |



## Volume of Motor Vehicle Traffic

### Weight 2

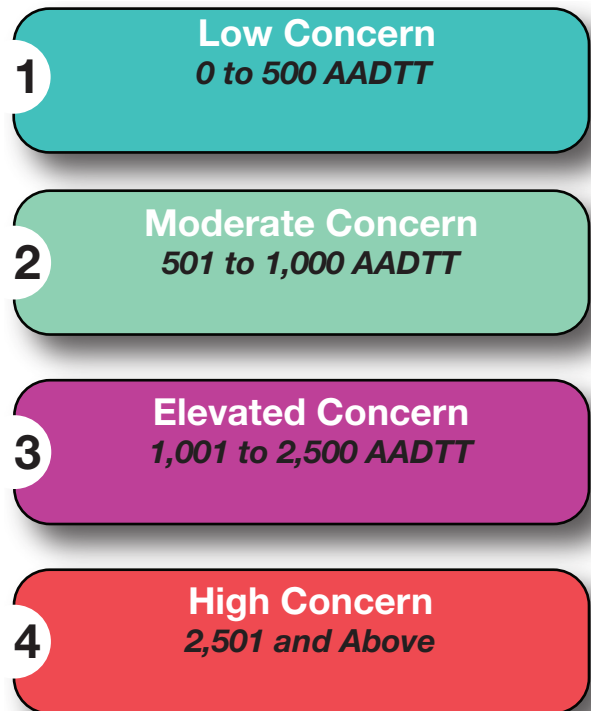
Prioritization will be determined using Average Annual Daily Traffic (AADT) numbers from ODOT’s TIMS data. Where AADT volumes vary along a roadway segment, the maximum AADT volume will be used to score the segment. Detailed to the top right are the point ranges for prioritization.



## Volume of Truck Traffic

### Weight 2

Prioritization will be determined using Average Annual Daily Truck Traffic (AADTT) numbers from ODOT’s TIMS data. Where AADTT volumes vary along a roadway segment, the maximum AADTT volume will be used to score the segment. Detailed to the bottom right are the point ranges for prioritization.





## Identified Location of Safety Concern

### Weight 4

Prioritization will be based on the frequency of a roadway segment or intersection being identified as a “safety concern” by the local Amish Community from data collected through public surveys and public meetings. Due to the varying size of Amish populations throughout the State, routes identified as safety concerns will be scored against other routes in the local area rather than the entire State. This approach will allow the most unsafe routes in each local area to be identified, rather than only routes in highly populated Amish areas. Below is a listing of the Safety Location scoring scale based on the number of responses gathered in local Amish areas divided into quarters.

**0** **No Points**  
*Not Identified*

**1** **Low Concern**  
*Seldom Identified (Lowest Quarter of Routes)*

**2** **Moderate Concern**  
*Infrequently Identified (Second Lowest Quarter of Routes)*

**3** **Elevated Concern**  
*Commonly Identified (2nd Highest Quarter of Routes)*

**4** **High Concern**  
*Frequently Identified (Highest Quarter of Routes)*

## Safety Location Scoring Scale

| Meeting Group | Highest Quarter (4 Points) | 2nd Highest Quarter (3 Points) | 2nd Lowest Quarter (2 Points) | Lowest Quarter (1 Point) |
|---------------|----------------------------|--------------------------------|-------------------------------|--------------------------|
| ADA           | 7                          | 5                              | 4                             | 2                        |
| ASD/HOL/WAY   | 24                         | 18                             | 12                            | 6                        |
| ATB/TRU       | 7                          | 5                              | 4                             | 2                        |
| CAR           | 4                          | 3                              | 2                             | 1                        |
| DEF           | 7                          | 5                              | 4                             | 2                        |
| GAL           | 2                          | 2                              | 1                             | 1                        |
| HAR/LOG       | 10                         | 8                              | 5                             | 3                        |
| JAC           | 4                          | 3                              | 2                             | 1                        |
| KNO/MRW       | 5                          | 4                              | 3                             | 1                        |



## Projected Motor Vehicle Volume Growth Rates

### Weight 1

Prioritization will be determined using ODOT's TIMS data for projected CMS growth rates (by percentage) of vehicles on State Routes. The higher the projected growth rate, the higher the priority. Where growth rates vary along a roadway segment, the maximum growth rate will be used to score the segment. To the top right is a listing of the growth rate point ranges for prioritization.

- 1** **Low Concern**  
*0 Growth Rate*
- 2** **Moderate Concern**  
*0.001 to 1 Growth Rate*
- 3** **Elevated Concern**  
*1.001 to 2 Growth Rate*
- 4** **High Concern**  
*Above 2.001 Growth Rate*



## Amish Population Density

### Weight 1

Prioritization will be based on county-level data from the 2000 and 2010 U.S. Religion Census completed by the Association of Religion Data Archives (ARDA) and anecdotal information provided by local Amish during public meetings. To the bottom right is a listing of the Amish population density point ranges for prioritization.

- 0** **No Points**  
*County Population had Major Loss from 2000 to 2010*
- 1** **Low Concern**  
*Low County Population (less than 134 residents) and a Newly Populated County from 2000 to 2010*
- 2** **Moderate Concern**  
*Moderate County Population (between 134 and 275 residents) with Minor Growth from 2000 to 2010*
- 3** **Elevated Concern**  
*Growing County Population (between 276 and 620 residents)*
- 4** **High Concern**  
*High County Population (over 620 residents) with Major Population Gains from 2000 to 2010*



## Existing Shoulder Widths

### Weight 3

Prioritization will be based off existing shoulder widths taken from ODOT's TIMS data. Segments with little to no shoulders will receive the highest scoring, while wider shouldered areas will receive a low score. In segments where shoulder width varies, the shoulder width that represents the majority of that segment will be used for the entire roadway segment. To the top right is a listing of the shoulder width point ranges for prioritization.

**1** **Low Concern**  
*Shoulder Width Exceeds 6'*

**2** **Moderate Concern**  
*Shoulder Width is 4' to 6' Wide*

**3** **Elevated Concern**  
*Shoulder Width is 1' to 4' Wide*

**4** **High Concern**  
*Shoulder Width is Less than 1' Wide*



## Vertical Slope Severity

### Weight 3

Prioritization will be based off both the frequency of steep slopes and the steepness of each slope within a segment of Amish traveled roadway. A steep slope along Amish traveled roadway is defined as a slope exceeding a four percent grade (per L&D Figure 203-1 for rural roadways). The steepness of each vertical slope is given a steepness score as defined below. The steepness scores of each steep slope within a given segment are then summed and divided by the segment length to determine a segment's vertical slope severity score. Vertical slope severity scoring is shown to the right.

**1** **Low Concern**  
*Vertical Slope Severity  $\leq 2$*

**2** **Moderate Concern**  
*Vertical Slope Severity  $\leq 4$*

**3** **Elevated Concern**  
*Vertical Slope Severity  $\leq 6$*

**4** **High Concern**  
*Vertical Slope Severity  $> 6$*

| Steepness Score |       |
|-----------------|-------|
| Vertical Grade  | Score |
| 4% to 6%        | 1     |
| 7% to 9%        | 2     |
| 10% to 12%      | 3     |
| > 13%           | 4     |

# Route Prioritization Matrix

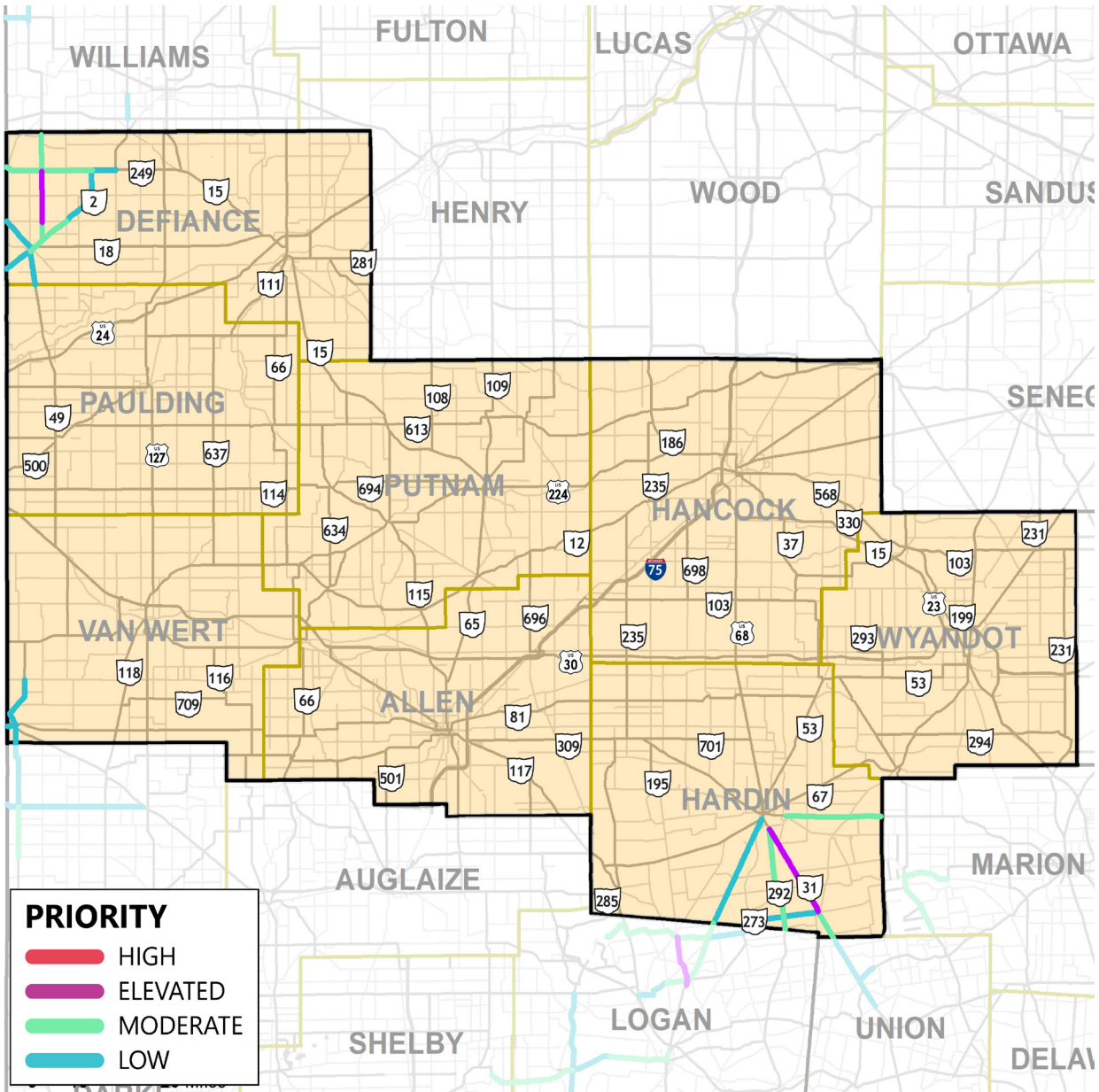
State routes with identified Amish travel along them were broken into segments and scored using the prioritization criteria defined in the previous chapter. State routes were segmented based on major cross streets (typically other state routes or county routes) or intersections with county or state lines. Segments typically range from 1 to 5 miles in length. Routes with the highest average score received high priority rankings. These routes represent locations where larger, more comprehensive improvements or a combination of smaller improvements may be needed to alleviate safety concerns. All Amish traveled state routes were scored and compared both on a State and ODOT District level. The table below illustrates segment priorities broken down on a District level. The following pages detail the top 5 highest priority route segments within each ODOT District, along with maps of the highest priority locations.



## Route Prioritization Summary by District

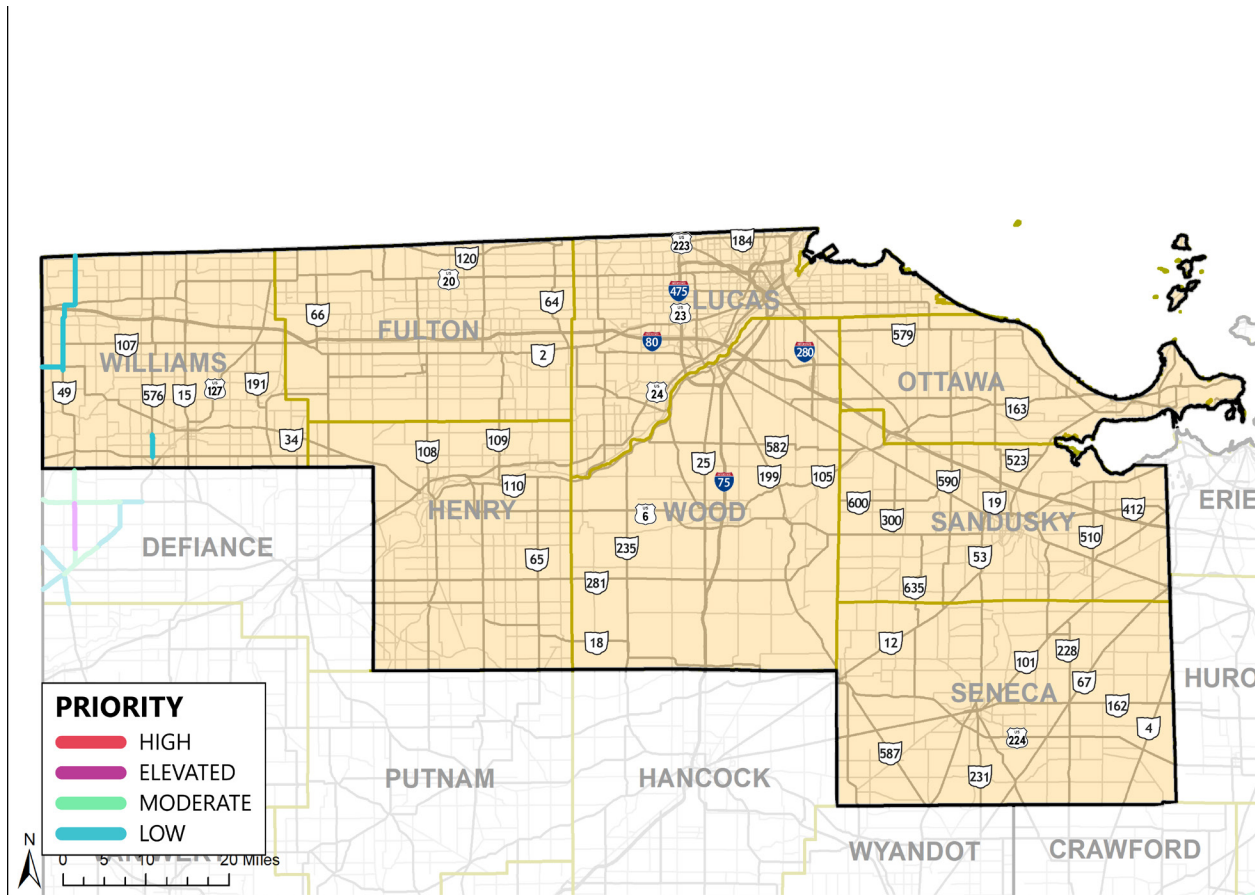
| District      | High Priority Segments | Elevated Priority Segments | Moderate Priority Segments | Low Priority Segments |
|---------------|------------------------|----------------------------|----------------------------|-----------------------|
| 1             | 0                      | 3                          | 10                         | 12                    |
| 2             | 0                      | 0                          | 0                          | 4                     |
| 3             | 8                      | 18                         | 86                         | 25                    |
| 4             | 1                      | 13                         | 34                         | 11                    |
| 5             | 0                      | 6                          | 60                         | 10                    |
| 6             | 0                      | 2                          | 2                          | 2                     |
| 7             | 0                      | 1                          | 18                         | 27                    |
| 8             | 0                      | 0                          | 4                          | 2                     |
| 9             | 0                      | 4                          | 47                         | 29                    |
| 10            | 0                      | 2                          | 54                         | 23                    |
| 11            | 12                     | 16                         | 90                         | 19                    |
| 12            | 0                      | 9                          | 13                         | 3                     |
| Totals        | 21                     | 74                         | 418                        | 167                   |
| % of Segments | 3%                     | 11%                        | 62%                        | 24%                   |

## District 1



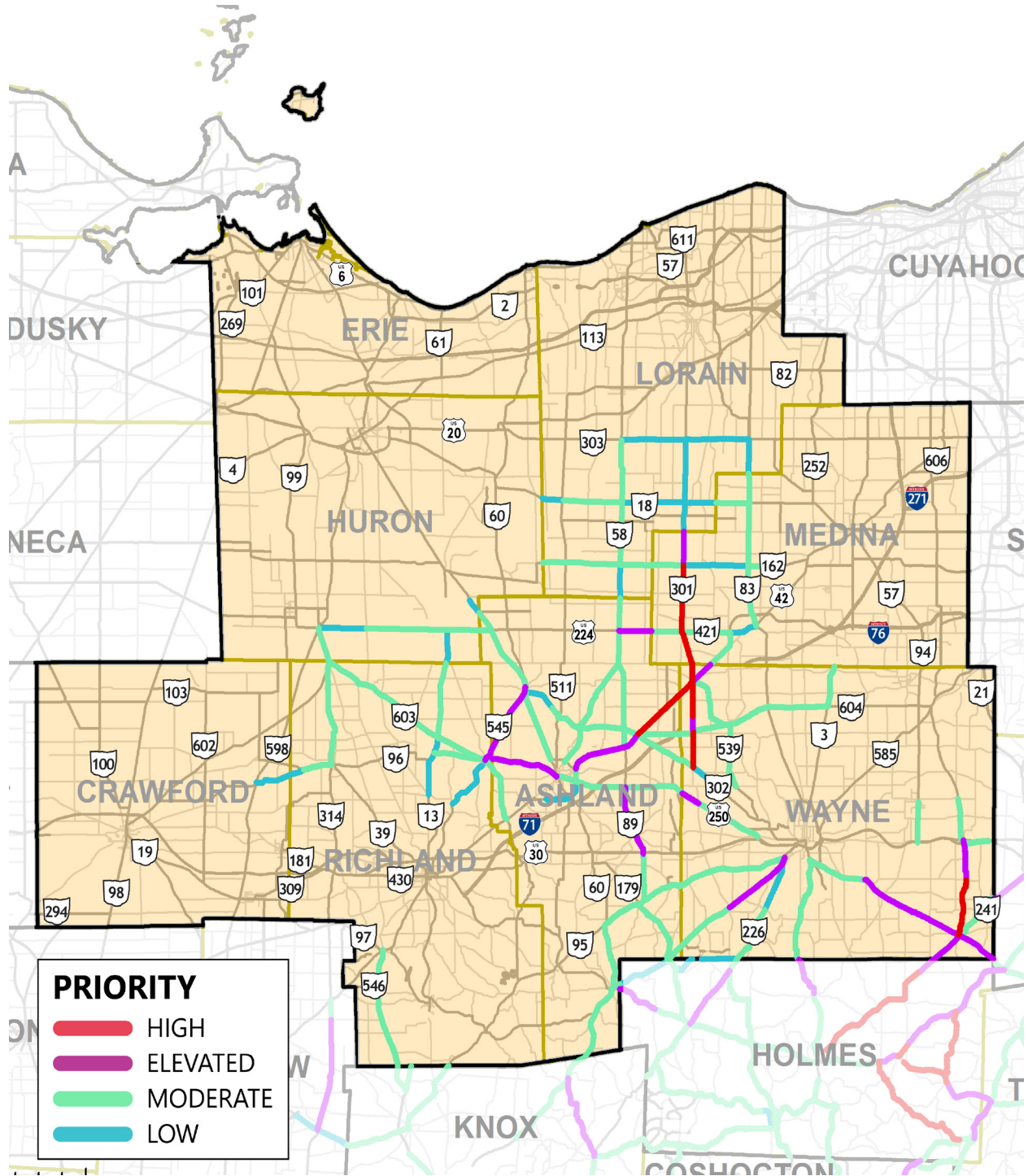
| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|-----------------|---------------|----------|
| DEF    | 49    | 5.4       | Buckskin Rd       | 9.4     | SR 249          | 6.20          | Elevated |
| HAR    | 31    | 6.1       | CR 190            | 10.1    | SR 292          | 6.20          | Elevated |
| HAR    | 31    | 2.4       | SR 273            | 6.1     | CR 190          | 5.80          | Elevated |
| DEF    | 49    | 9.4       | SR 249            | 12.3    | County Line     | 5.40          | Moderate |
| DEF    | 49    | 2.7       | SR 18             | 5.4     | Buckskin Rd     | 5.30          | Moderate |

## District 2



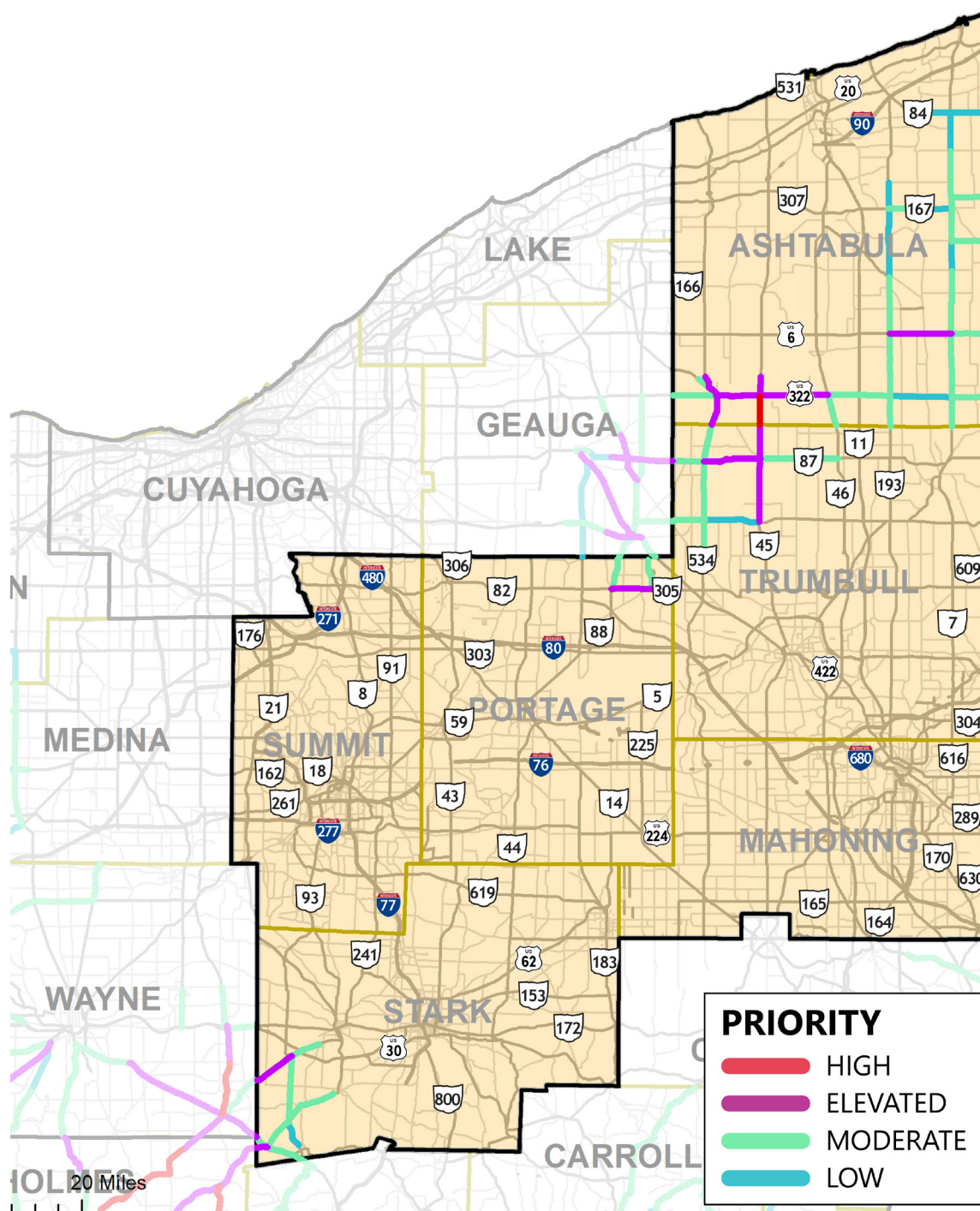
| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|-----------------|---------------|----------|
| WIL    | 34    | 0         | County Line       | 1.86    | SR 49           | 3.63          | Low      |
| WIL    | 49    | 11.8      | SR 107            | 15.3    | US 20           | 3.63          | Low      |
| WIL    | 49    | 9.49      | SR 34             | 11.8    | SR 107          | 3.50          | Low      |
| WIL    | 49    | 15.3      | US 20             | 20.54   | State Line      | 3.38          | Low      |
| WIL    | 576   | 1         | US 6              | 2.9     | CR D            | 3.38          | Low      |

### District 3



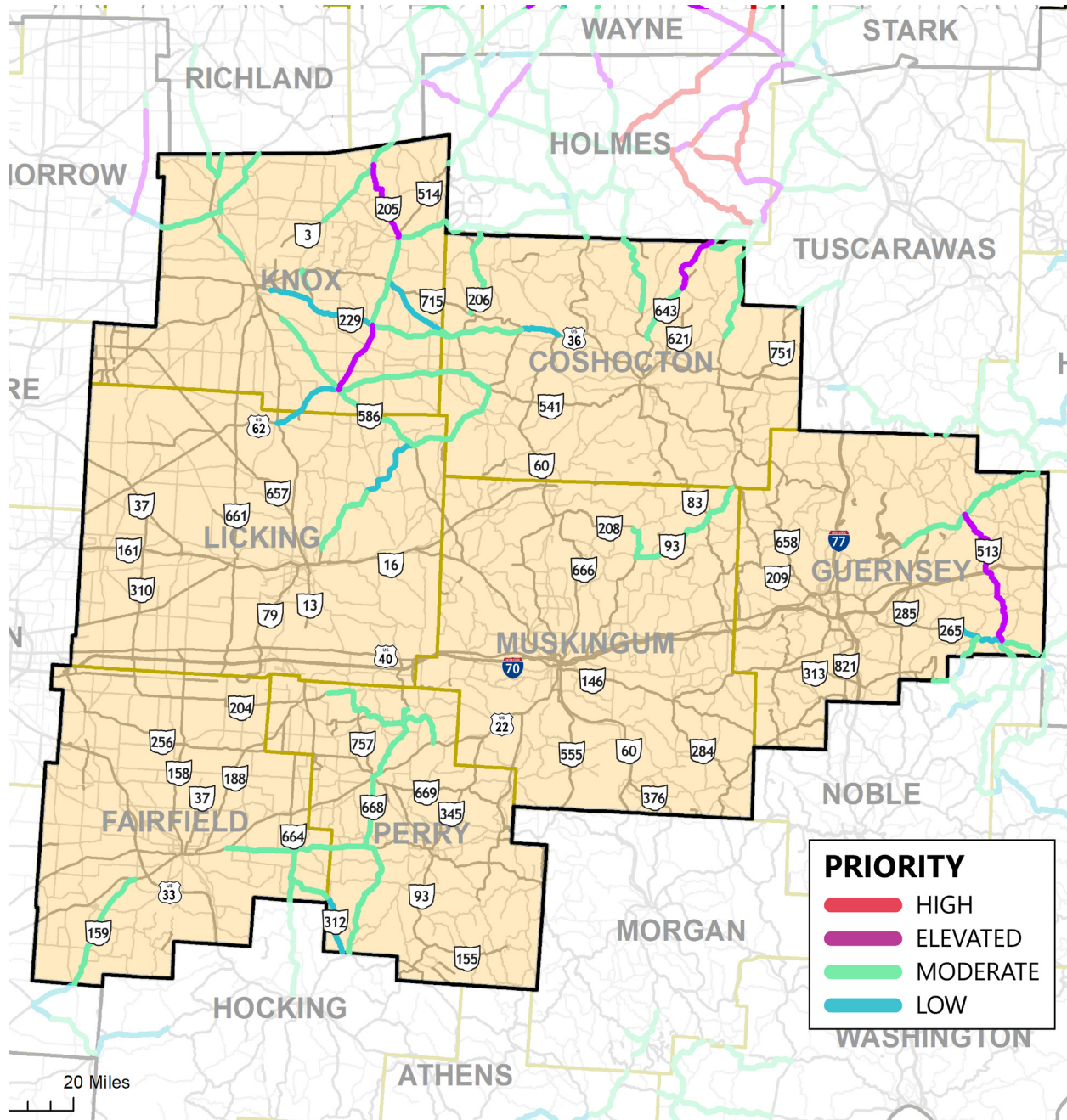
| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|-----------------|---------------|----------|
| ASD    | 42    | 14.9      | SR 604            | 19.3    | County Line     | 7.30          | High     |
| MED    | 301   | 2.5       | US 224            | 7.6     | SR 162          | 7.30          | High     |
| WAY    | 301   | 3.9       | IR 71             | 6.4     | US 42           | 7.30          | High     |
| MED    | 301   | 0         | County Line       | 2.5     | US 224          | 7.20          | High     |
| WAY    | 94    | 0         | US 250            | 4.3     | Hackett Rd      | 7.20          | High     |

## District 4



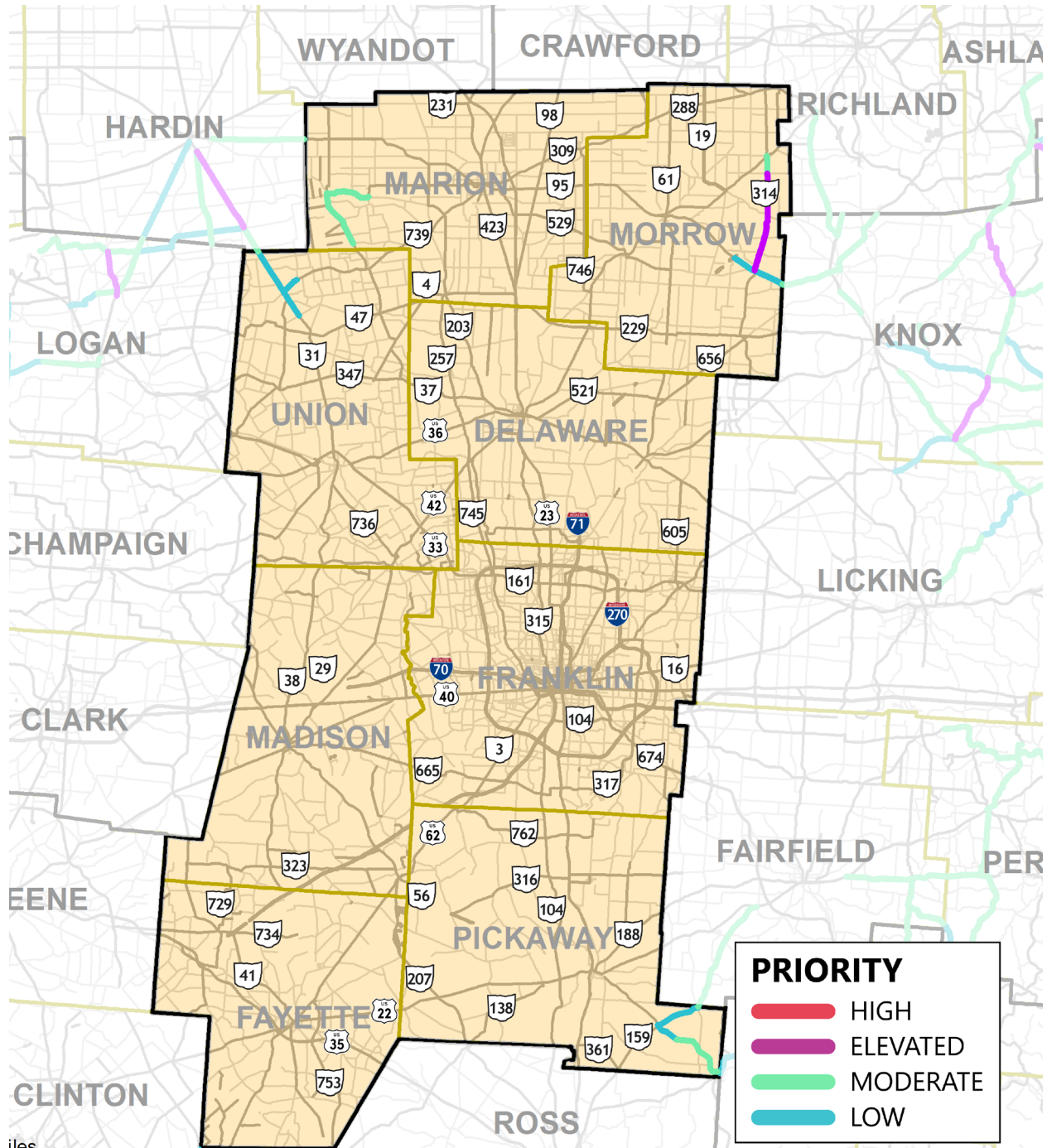
| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|-----------------|---------------|----------|
| ATB    | 45    | 0         | County Line       | 2.3     | US 322          | 6.90          | High     |
| ATB    | 45    | 2.3       | US 322            | 3.86    | W Windsor Rd    | 6.60          | Elevated |
| ATB    | 322   | 7         | SR 45             | 12.5    | SR 46           | 6.60          | Elevated |
| POR    | 305   | 2.34      | SR 88             | 4.91    | Parkman Rd      | 6.50          | Elevated |
| TRU    | 45    | 23.6      | SR 87             | 26.46   | County Line     | 6.30          | Elevated |

### District 5



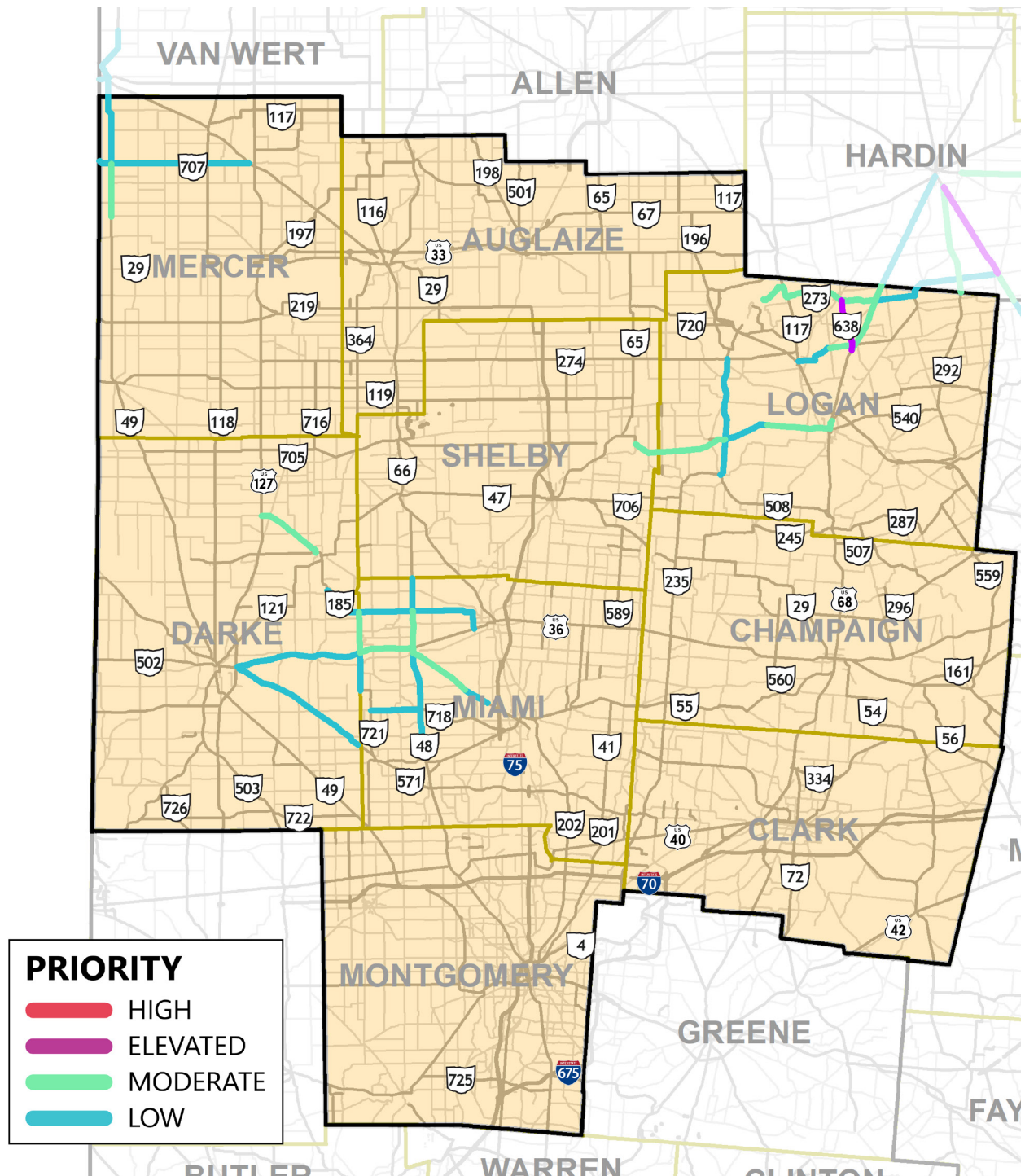
| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|-----------------|---------------|----------|
| COS    | 643   | 5.4       | CR 190            | 10.87   | County Line     | 6.70          | Elevated |
| GUE    | 513   | 8.7       | US 40             | 14.74   | US 22           | 6.10          | Elevated |
| KNO    | 205   | 0         | US 62             | 6.94    | SR 3            | 5.60          | Elevated |
| GUE    | 513   | 1.9       | SR 265            | 6.5     | Oxford Rd       | 5.50          | Elevated |
| GUE    | 513   | 6.5       | Oxford Rd         | 8.7     | US 40           | 5.50          | Elevated |

## District 6



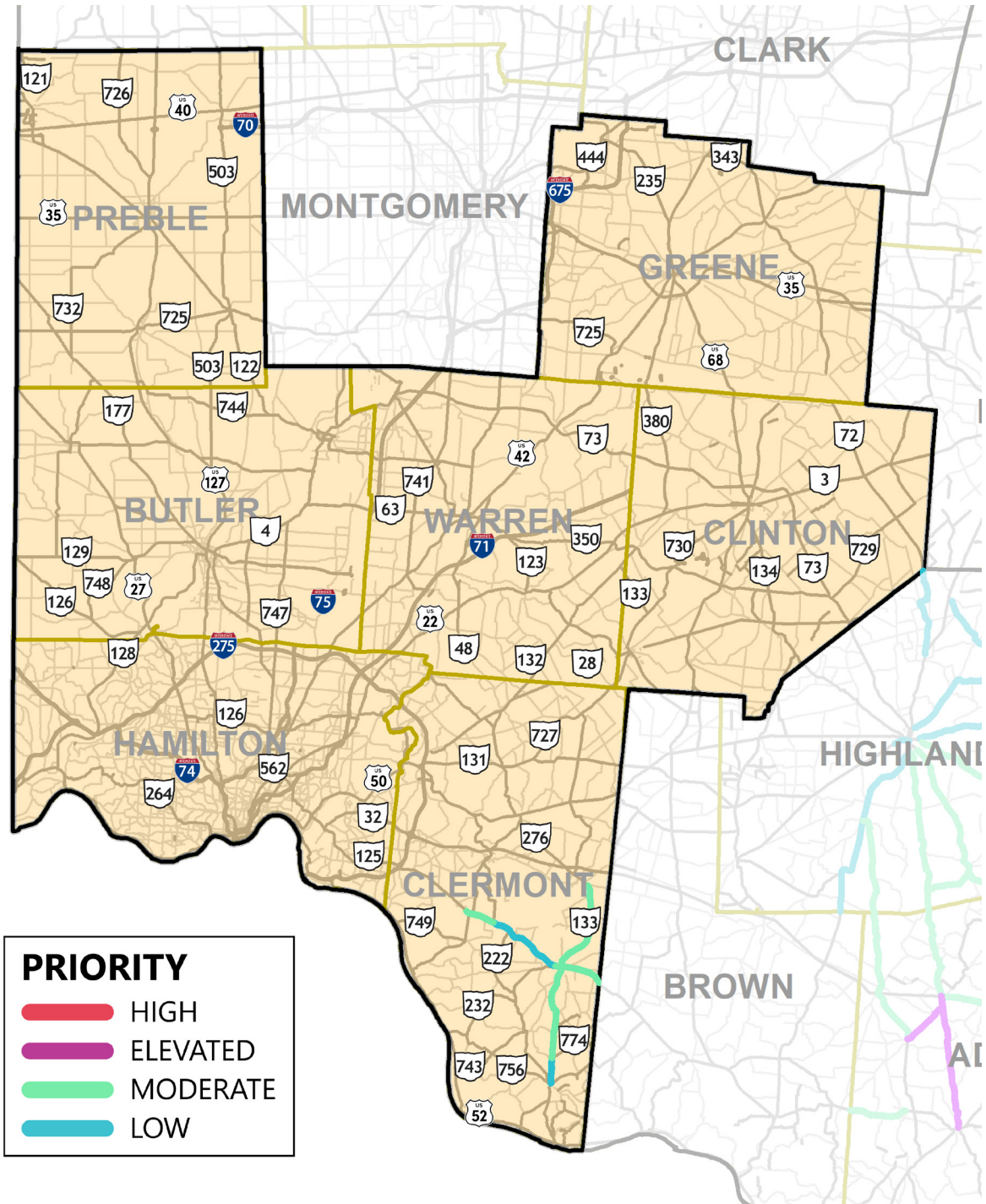
| County | Route | Begin SLM | Begin Cross Route     | End SLM | End Cross Route        | Average Score | Priority |
|--------|-------|-----------|-----------------------|---------|------------------------|---------------|----------|
| MRW    | 314   | 9.95      | SR 95                 | 14.97   | Waterford Rd           | 6.10          | Elevated |
| MRW    | 314   | 14.97     | Waterford Rd          | 18.5    | Woodbury Bellville Rd  | 5.80          | Elevated |
| MAR    | 37    | 8.1       | SR 95                 | 13.2    | Mt Olive Green Camp Rd | 4.50          | Moderate |
| MRW    | 314   | 18.5      | Woodbury Bellville Rd | 20      | US 42                  | 4.20          | Moderate |
| MAR    | 95    | 0         | SR 37                 | 3.8     | Mt Olive-Agosta Rd     | 4.13          | Moderate |

## District 7



| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|-----------------|---------------|----------|
| LOG    | 638   | 0         | US 68             | 3.99    | SR 273          | 6.10          | Elevated |
| LOG    | 68    | 15.3      | SR 274            | 19      | SR 273          | 5.40          | Moderate |
| SHE    | 47    | 25.14     | Baker Rd          | 27.09   | County Line     | 4.75          | Moderate |
| LOG    | 68    | 14.81     | SR 638            | 15.3    | SR 274          | 4.60          | Moderate |
| MER    | 49    | 19.95     | Tama Rd           | 21.4    | SR 707          | 4.50          | Moderate |

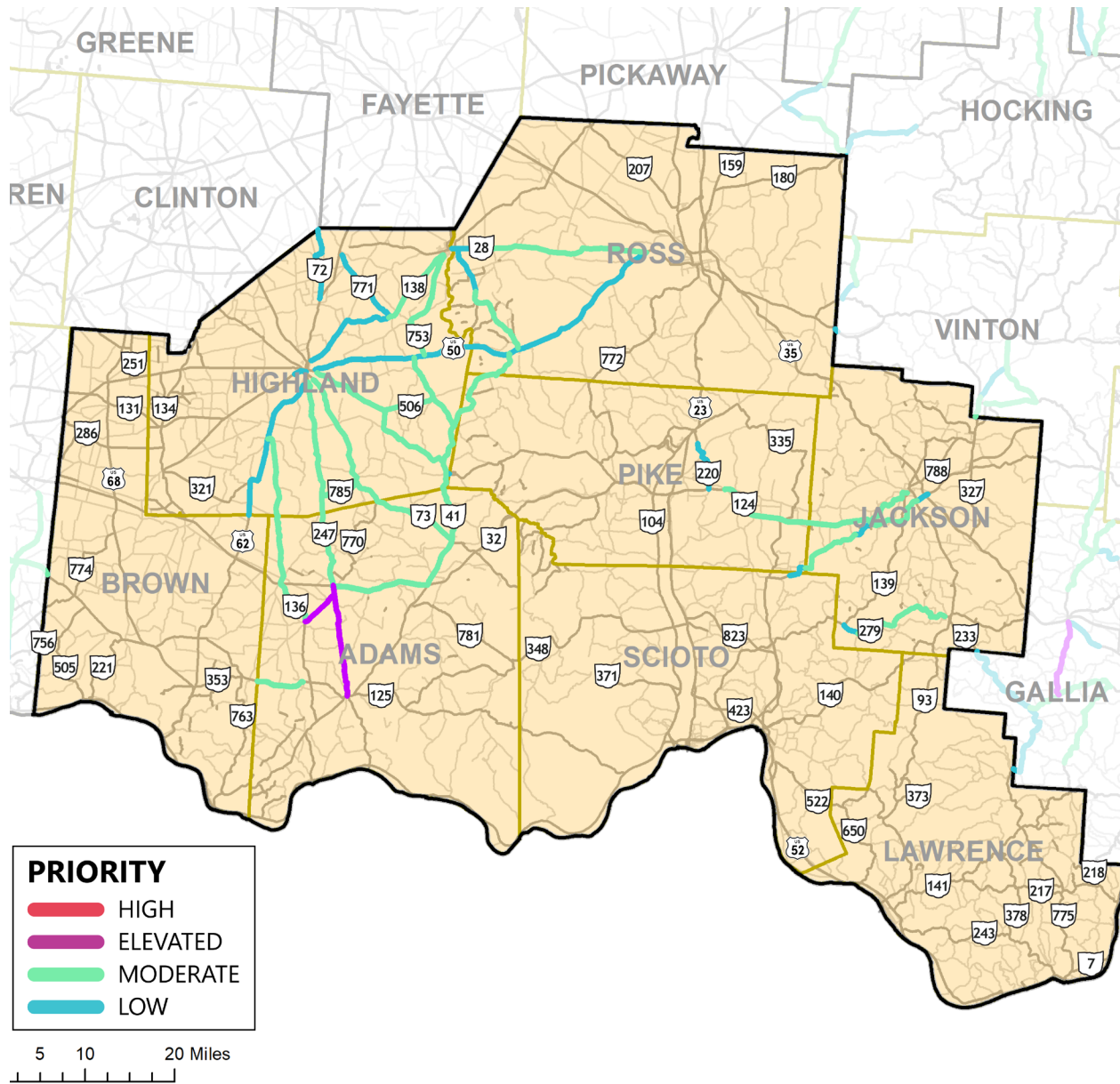
### District 8



les

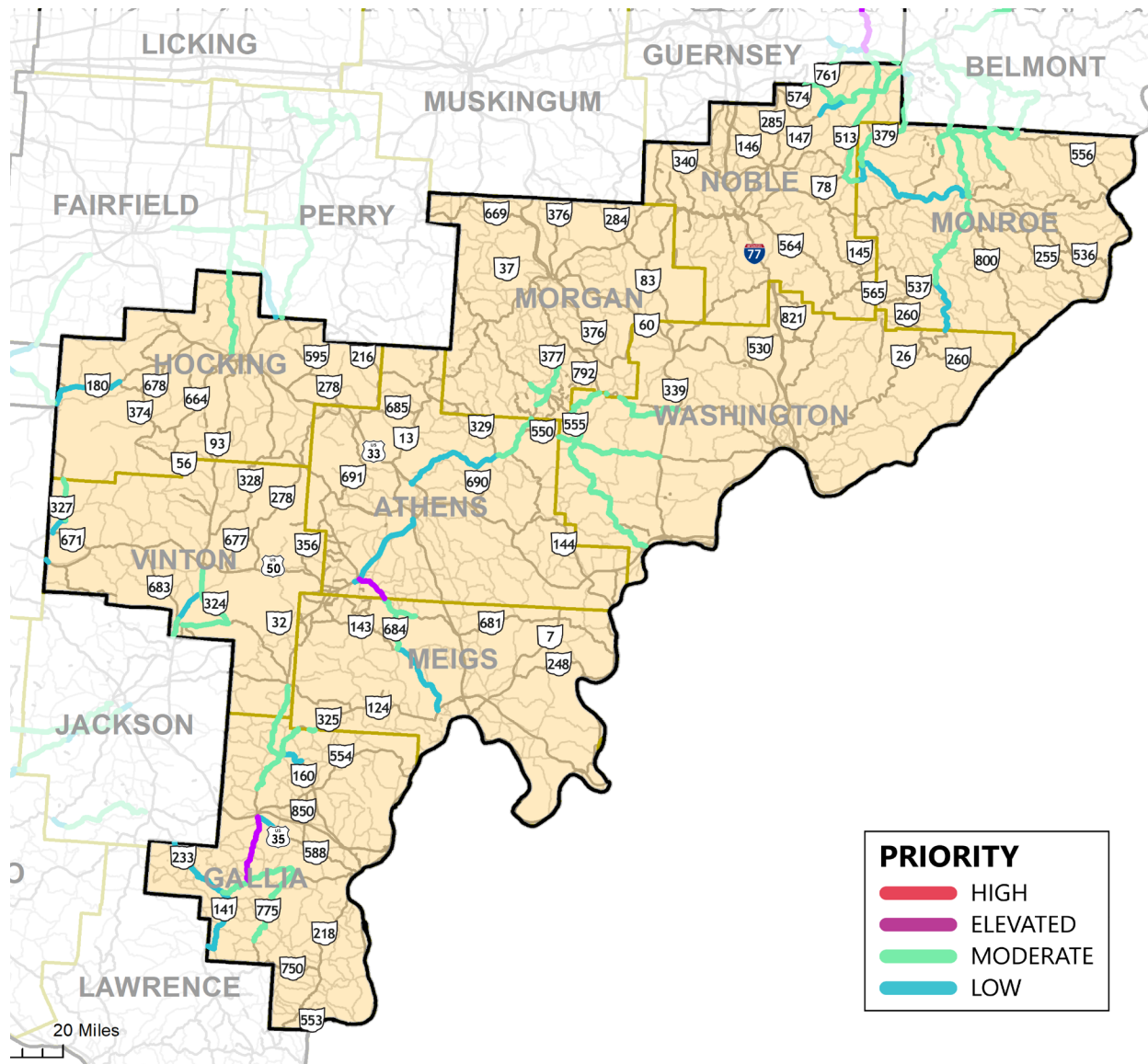
| County | Route | Begin SLM | Begin Cross Route     | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-----------------------|---------|-----------------|---------------|----------|
| CLE    | 133   | 13.2      | SR 125                | 20.24   | Old SR 32       | 5.38          | Moderate |
| CLE    | 133   | 6.5       | SR 774                | 13.2    | SR 125          | 4.88          | Moderate |
| CLE    | 125   | 14.6      | SR 232                | 18.16   | County Line     | 4.63          | Moderate |
| CLE    | 125   | 6.76      | Amelia Village Border | 8.9     | SR 222          | 4.00          | Moderate |
| CLE    | 125   | 8.9       | SR 222                | 14.6    | SR 232          | 3.88          | Low      |

## District 9



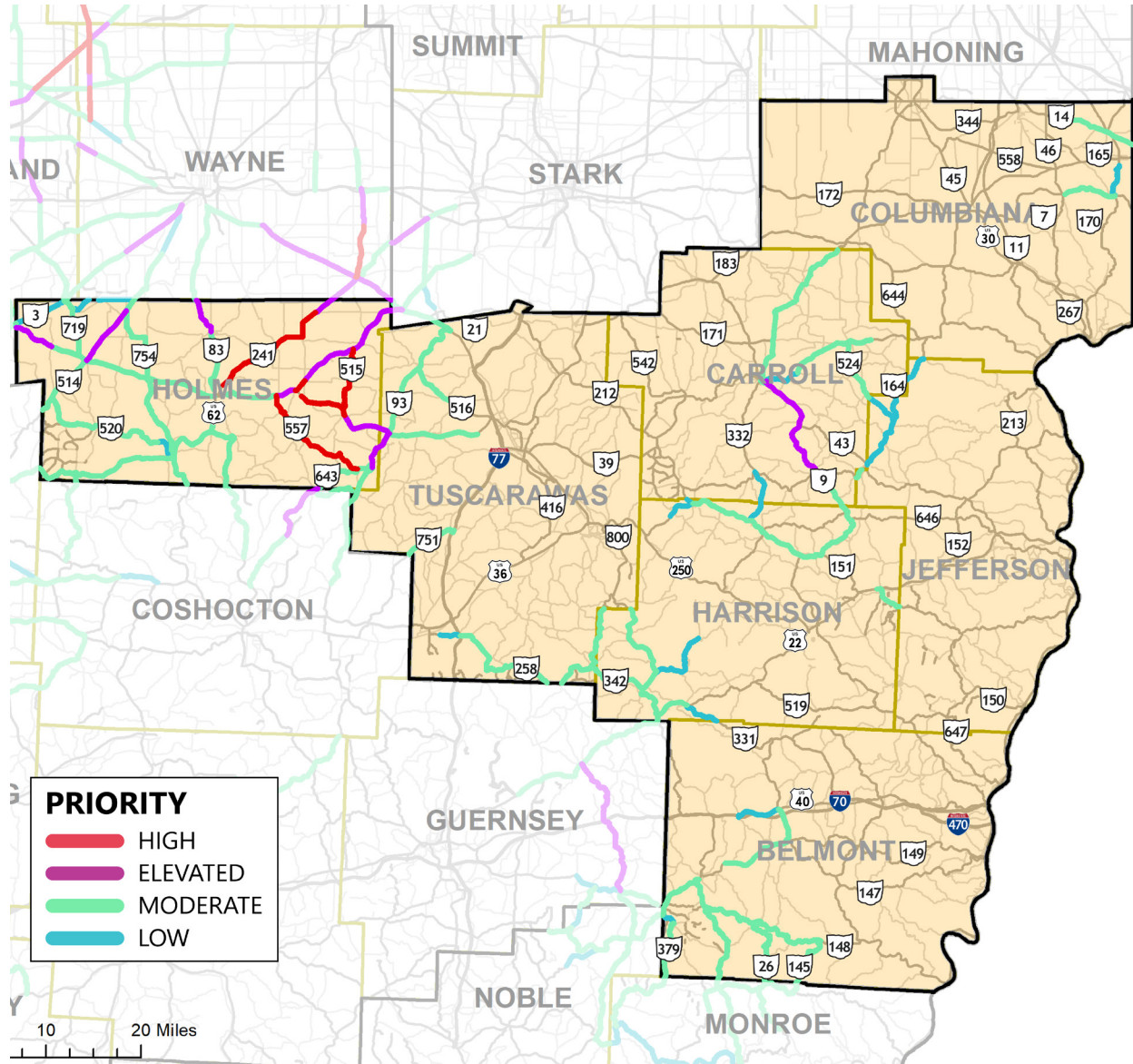
| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|-----------------|---------------|----------|
| ADA    | 247   | 7.4       | SR 41             | 10.4    | Unity Rd        | 6.50          | Elevated |
| ADA    | 247   | 10.4      | Unity Rd          | 16.4    | SR 137          | 6.40          | Elevated |
| ADA    | 137   | 0         | SR 136            | 3.56    | SR 247          | 5.90          | Elevated |
| ADA    | 247   | 16.4      | SR 137            | 17.2    | SR 32           | 5.50          | Elevated |
| ADA    | 73    | 2.7       | Elmville Rd       | 7.64    | US 41           | 5.30          | Moderate |

### District 10



| County | Route | Begin SLM | Begin Cross Route | End SLM | End Cross Route  | Average Score | Priority |
|--------|-------|-----------|-------------------|---------|------------------|---------------|----------|
| ATH    | 681   | 7.07      | US 50             | 10.49   | County Line      | 5.63          | Elevated |
| GAL    | 325   | 0         | Nebo Rd           | 6.82    | SR 588           | 5.60          | Elevated |
| HOC    | 664   | 15.94     | Hunter Rd         | 19.9    | Walnut Dowler Rd | 5.25          | Moderate |
| MOE    | 145   | 17.9      | SR 800            | 21.4    | SR 26            | 5.20          | Moderate |
| NOB    | 147   | 17        | SR 513            | 21.04   | County Line      | 5.20          | Moderate |

## District 11



| County | Route | Begin SLM | Begin Cross Route      | End SLM | End Cross Route | Average Score | Priority |
|--------|-------|-----------|------------------------|---------|-----------------|---------------|----------|
| HOL    | 241   | 9.1       | CR 77                  | 11.6    | CR 100          | 8.60          | High     |
| HOL    | 557   | 5.8       | CR 70                  | 8.7     | CR 407          | 8.00          | High     |
| HOL    | 241   | 5.3       | CR 507                 | 6.7     | CR 201          | 7.90          | High     |
| HOL    | 557   | 0         | SR 643                 | 2.7     | CR 114          | 7.80          | High     |
| HOL    | 241   | 1.15      | Millersburg Corp Limit | 5.3     | CR 207          | 7.60          | High     |



## Typical Countermeasures

The scope of this study is not to recommend specific improvements for every segment of state roadway traveled by the Amish, but to provide a variety of typical countermeasures that the Department could implement to improve roadway safety across the State in the future.

The following countermeasures are meant to assist the Department with determining which improvements are practical for a particular roadway segment based on the conditions evaluated within the prioritization matrix. A single countermeasure may not improve a segment's safety alone, multiple improvements may be needed. The goal

of these countermeasures is to provide the Department with various options and to help suggest which countermeasure is best for a segment's needs.

Similar to the prioritization matrix, the countermeasures are separated into Low, Moderate, Elevated and High Priority countermeasures. Typically, improvements included within a particular priority level are appropriate to address the safety concerns within a similar priority roadway segment, though this may not always be the case. Some segments may need various improvements to remedy safety concerns, while other segments may have to differ to other improvements based on physical or monetary constraints. The countermeasure priority levels are meant strictly as a guide and additional study may be needed to determine the exact solution.

### Low Priority Countermeasures

#### Pedestrian Warning signs/Beacons/RRFBs

*(Cost Estimate: \$9,000/pair)*

Provide pedestrian warning signs, or Rectangular Rapid Flashing Beacons (RRFB) at unsignalized intersections or mid-block crossing locations where motorists typically do not expect pedestrians. RRFBs are pedestrian actuated and flash as long as it takes to cross the roadway. Flashing beacons should be installed to warn drivers of pedestrian travel along roadways. Flashing beacons could be activated for limited hours in a day, during which high pedestrian activity is expected, such as the hour leading to school start and the hour following school dismissal times, work schedules, etc. RRFBs or flashing beacons are recommended along all major roadways that connect from residence to school. Solar powered RRFBs or flashing beacons are recommended. RRFBs or flashing



beacons could also be moved as the travel patterns change.

## Signage to inform/warn motorists

***(Cost Estimate: \$2,000/section)***

A warning sign is a sign that alerts road users of a situation that might not be apparently obvious. Warning signs such as (W11-14) with a symbol of horse and closed buggy should be provided on roadways carrying Amish buggies. These signs should be primarily located where Amish buggies enter traffic, and where vehicular drivers' sight distance is restricted, as well as intermittently on a roadway to remind motorists of Amish buggy presence.

Along with the buggy warning sign, a supplemental 'On Roadway' plaque is recommended



W11-14  
Sec. 2C.49



W16-1P  
Sec. 2C.60

## School Zone Signs for Amish Schools

***(Cost Estimate: \$11,000/zone)***

A change in state law allows school zone signs with 20 mph speed zones to be installed on state highways for Amish schools; however, ODOT is not responsible for installing the signs per state law, but is responsible for maintenance of the signs on State/US routes outside of city corporation limits. Amish school zone signage across the State varies from no signage, to static regulatory and warning signage, signs within flashing beacons, and flashing school ahead signs. The flashing beacons associated with these signs are activated during school start and departure timings and are effective in informing motorists to slow down and watch for school children. A solar-powered option is also available as displayed in the photo to the right.

Many Amish communities across the State expressed the need for more school signage in and around local schools.



\*School zone signage only to be used within school zones

## Pavement markings

*(Cost Estimate: Varies)*

Pavement markings such as edge lines, double yellow solid lines, dashed lines in passing zones etc., need to be restriped frequently. These pavement markings help pedestrians identify the travel lanes and stay away from the vehicular path along a roadway. Amish buggy and motor vehicle drivers also use pavement markings to position themselves on a roadway. Worn out pavement markings pose a safety risk to all users. Recently, ODOT has been installing wider edge lines on rural roadways to improve delineation and reduce roadway departure crashes.



## Moderate Priority Countermeasures

### Lower speed limits based on speed zone studies

*(Cost Estimate: \$25,000/section for study and implementation)*

A speed zone study is an engineering study that measures vehicle speeds, and identifies the speed that most drivers are comfortable driving in a given section. This study also takes into account crash history, sight distance, roadway characteristics, number of driveways, and cross streets within the study section. Reduced speed limits on rural State highways are based on a speed zone study. On sections with high buggy traffic and higher posted speed limits, a speed zone study is recommended that would consider interaction between motor vehicles and slow-moving Amish buggies. Though ODOT's current speed zone study process does not account for slow moving vehicles such as buggies, bicycles, and tractors, more emphasis should be placed on lowering



speeds where a greater amount of Amish buggies and pedestrians are observed more frequently.

The Amish survey feedback from all communities across the State indicates that aggressive motorists, and driving too fast or carelessly are the biggest safety concerns for buggy drivers. Even if speed limits are reduced, enforcement is a key component to ensure motorists properly observe the posted speed limit as lowering the speed limit alone may not alter driver behavior.

### **Add intersection lighting**

***(Cost estimate: \$5,000 plus \$75/month service fee)***

Driving or walking on, or across, a roadway is less safe in darkness than in a lighted area due to the reduced visibility of hazards and pedestrians. Adequate lighting improves safety by reducing night time crashes. The local public agency will be required to request service from the utilities to maintain the installation since ODOT does not typically maintain street lights in rural areas.

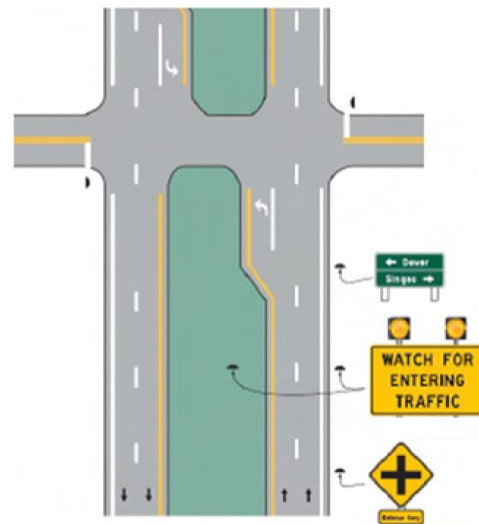


## **Elevated Priority Countermeasures**

### **Conflict Warning System with Flashing beacons: Standard and actuated beacons**

***(Cost estimate: \$25,000/sign location)***

This countermeasure entails installing flashing beacons with intersection warning signs on major street approaches in advance of a two-way STOP sign controlled intersection. The



two types of beacons include continually flashing beacons or vehicle-actuated beacons with a set criterion.

For example, when a buggy completes a turning maneuver onto a major street or has been waiting at a stop sign for a long time to turn, then the flasher is activated on the major street approaches to warn motorists to slow down and to expect a slow-moving vehicle ahead.

A disadvantage of this countermeasure is that power is required for these systems.



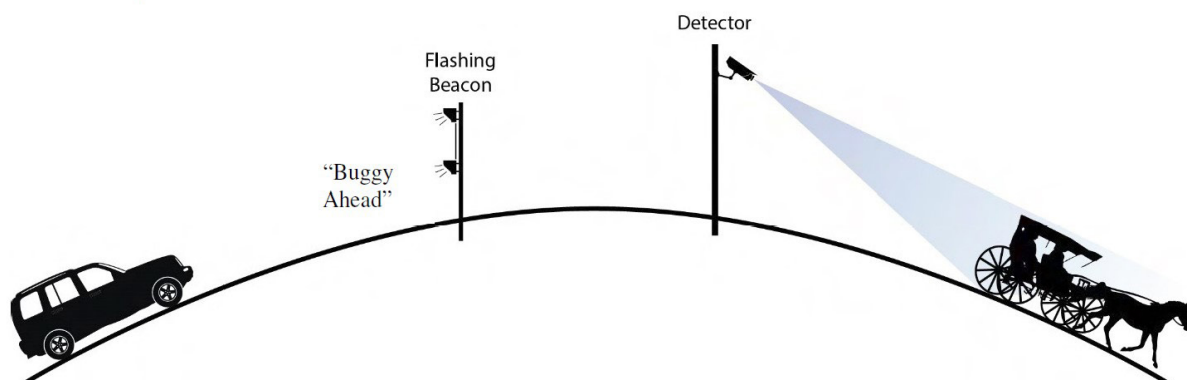
## Amish buggy warning detection system

*(Cost Estimate: \$20,000/sign location)*

Most warning signs are static signs, and over time motorists become indifferent to these signs. This condition can be addressed with an enhanced warning sign that is active when a conflict exists, (i.e. a detection system that can identify a slow-moving vehicle such as an Amish buggy), and activate the flashing sign to warn motorists of an Amish buggy presence. Higher brightness and better contrast attract motorists' attention, leading to cautious driving as compared to a conventional static sign. Detection systems

such as advanced radar are suggested. These detection systems are recommended for crest vertical curves. When an Amish buggy on the downhill side is detected and a warning sign is activated on the uphill side, drivers approaching the crest are informed of a slow-moving Amish buggy on the downhill side. This will alert motor vehicle drivers to slow down as they travel over the crest. This treatment can also be applied to locations with winding curves.

The Amish survey results show that going over hills or around curves with limited sight distance is most often the second biggest safety concern for horse drawn buggy travel across the State. The actuated warning system will allow motorists to slow down proactively for a downstream slow-moving vehicle, especially at night.



## **Hill Climbing and Downhill lanes/Buggy Pull-off Lanes**

***(Cost estimate: \$250,000/1,000 feet)***

Climbing uphill on steep crest curves against gravity causes horse-drawn Amish buggies to travel slower than on a flat roadway. This delay could result in long queues of vehicles behind buggies and frustrated motorists may try to pass around the Amish buggy even under the reduced visibility conditions.

Also, visibility is reduced when traveling uphill on steep crest curves as the downhill side is visible after you reach the crest. For a motorist climbing uphill that cannot see a slow-moving horse-drawn buggy on the downhill side, there may not be adequate reaction and breaking time to avoid striking the slow-moving buggy.

A hill-climbing lane and a downhill lane is a narrow lane meant for horse-drawn vehicles to use and allow motor vehicles to continue in the travel lane. These lanes must be long enough to account for Amish buggies that gain momentum on the downhill side and need to merge back into the travel lanes safely.

These lanes are less expensive than a standard full-length paved shoulder (buggy lanes).

The Amish survey results show that going over hills or around curves with sight distance issues is most often the second biggest safety concern for travel on a horse-drawn buggy across the State. This countermeasure would address this safety concern.



## Motor Vehicle Lane Reduction/Road Diet for Slow Moving Vehicle Lane

*(Cost Estimate: Varies)*

In some specific locations across the State, state routes have been built to accommodate future vehicle volumes that never were realized or vehicular travel has bypassed a once heavily utilized route. In these locations where an existing four-lane section exists, and Amish buggy travel is high, consideration should be given to reducing the number of motor vehicle lanes and separating slow moving, Amish buggy traffic. The cost of this improvement could be as minimal as restriping and would drastically improve roadway safety.

An example of this situation is along US 42 in Ashland County. The route has low motor-vehicle traffic volumes (AADT 2,196), high Amish buggy usage, and is a high buggy crash rate location.



**US 42 - Ashland County**

**SLM 18.5 AADT 2,196**

## High Priority Countermeasures

### Widen Shoulders to 4' wide

*(Cost Estimate: \$750,000/mile)*

Paved or treated shoulders allow pedestrians to walk safely. A wider shoulder would provide separation between high-speed vehicular traffic and pedestrians for improved safety. Generally this treatment would be implemented by shifting ditches in both directions of known travel paths. A 4' shoulder is preferred over 3'. To save cost and potentially avoid R/W purchases, the Department should consider a 4'-11'-11'-4' section in lieu of 4'-12'-12'-4'. This may require a design exception for state routes.



## Sidewalks

***(Cost Estimate= \$1.3M/mile  
assuming no curb currently  
exists)***

Sidewalks are dedicated space for pedestrians to walk safely, separated from vehicular traffic.

Generally this treatment would be with curbed pavement and inside corporation limits. Maintenance in winter season is a concern with sidewalks.



## Increase shoulder width to 8' for full buggy lane

***(Cost Estimate: \$2.0M/mile,  
ROW additional cost)***

Paved/treated shoulders of 8' in width can function as buggy lanes, so the slow-moving Amish buggies can be separated from the high speed motor vehicles. Construction costs are higher if right of way must be purchased, steep side slopes exist, or bridge or culvert widening is required for continuous shoulders. The approximate costs for right of way acquisition are \$0.5 million per mile that includes administrative costs to follow state/federal acquisition process. Increasing the shoulders to 10' to accommodate shy distance in areas where guardrail or barrier exists at the edge of pavement is recommended for increased buggy safety.

The Amish survey feedback from all communities across the State indicated that aggressive behavior by motorists is the primary safety concern for buggy drivers. This improvement will provide dedicated space for buggies and reduce the crash potential between buggies and motor vehicles.



## Conclusion

Ohio has the largest Amish population in the United States and is projected to continue to grow into new areas of the State in the foreseeable future. As Amish populations expand, it is important that ODOT and local governmental agencies continue to assess Amish travel along roadways and consider the application of typical countermeasures detailed within this study as necessary.

A goal of this study was to identify and prioritize travel safety concerns along ODOT maintained routes. While this study did provide a prioritization matrix to rank these routes, it represents locations that are current priorities. This matrix will need to be updated periodically as conditions in the Amish community change to reflect new route priorities over time.

Amish settlements are constantly evolving, growing into new locations and accepting new transportation technologies. While

some settlements adopt these changes at a faster pace, all are realizing the need for improved roadway safety. Each of the area profiles within this study, provides a unique perspective on various Amish settlements and valuable information for ODOT to consider before recommending detailed improvements within a specific area.

Improving roadway safety is always a focus of ODOT and the information provided within this study will continue to ensure that safety concerns across the State are being properly prioritized and addressed in the future.



# **Appendices**

**Appendix A - Complete Route Prioritization Spreadsheet for all Districts**

**Appendix B - Complete Public Survey Results**

**Appendix C - Community Meeting Documentation**

**Appendix D - Buggy Count Maps**

**Appendix E - 2016 Amish Safety Strategic Plan - Geauga County**