FFY 2023

Environmental Justice

SUMMARY

Reading Area Transportation Study

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ENVIRONMENTAL JUSTICE BACKGROUND

Environmental justice addresses fairness of federal actions in regards to disadvantaged persons, particularly low-income and racial minority populations. Environmental justice became an active part of federally funded planning activities with Executive Order 12898, issued in 1994, that required federal agencies to examine the potential for their programs, policies and activities to have negative impacts on minority and low-income populations. The Environmental Justice executive order is based on Title VI of the Civil Rights Act of 1964, which requires recipients of federal aid to certify and ensure nondiscrimination.

The roadway and transit projects identified and programmed in the proposed Reading Area Transportation Study FFY 2023 Transportation Improvement Program (TIP) and FFY 2023-2045 Long Range Transportation Plan must address the principles of Executive Order 12898 relating to Environmental Justice. Specifically, the plan must identify and address disproportionately high and adverse human health or environmental effects of its programs and policies on minority and low-income populations. Basic principles addressed by the Environmental Justice analysis include:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

In response to the USDOT order and the FHWA guidelines, the Pennsylvania Department of Transportation (PennDOT) developed *Every Voice Counts* in 2004, updated in 2012, to guide PennDOT and the local transportation planning agencies in Pennsylvania to address EJ issues. This guidance is found at:
PennDOT Environmental Justice Guidance
In general, this means that for any program or activity for which any federal funds will be used, the agency receiving the federal funds:

- Must make a meaningful effort to involve low income and minority populations in the processes established to make the decision about the use of the federal funds; and
- Must evaluate the nature, extent, and incidence of probable favorable and adverse human health or environmental impacts of the program or activity upon minority or low-income populations.

The Reading Area Transportation Study (RATS) is the regional transportation planning organization for the Reading, Pennsylvania metropolitan area. The Reading MPO is co-terminus with the political boundary of Berks County. RATS prepares this Environmental Justice report to respond to the federal and state requirements and facilitate the fair transportation planning process in Berks County. This document supersedes the July 2018 EJ document.
RATS will assess the impacts of the transportation planning process, the Long Range Transportation Plan (LRTP) and the Transportation Improvement Program (TIP) on selected populations, identify their transportation needs, and explore ways to satisfy these needs. Our assessment of the potential for environmental justice concerns relies on relative measures, not specific thresholds or measures. This includes our professional judgment of the disproportionate impacts and judgment of efforts made during the planning process to inform people potentially impacted.

PUBLIC PARTICIPATION

RATS supports and encourages active public participation throughout the transportation planning process. RATS adopted a public participation policy in 2017 to ensure that specific opportunities exist for the public to offer input and provide feedback as active participants in the decision-making process. Public participation takes many forms, and RATS uses a wide range of methods and media to enhance the public's participation in the process.
As part of the FFY 2023 TIP and FFY 2023-2045 Long Range Transportation Plan, RATS took/will take a number of steps to ensure consideration of the public's views, including using the public participation plan, developing and contacting a comprehensive listing of stakeholders, utilizing a variety of methods to involve the public, and considering public comments in developing the list of transportation projects. The overall goal of the TIP and LRTP is to develop plans and strategies that promote an efficient and effective transportation system for Berks County.

DEFINITIONS

Minority means a person who is: (1) Black (a person having origins in any of the black racial groups of Africa); (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); (4) American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition); and (5) Native Hawaii or Other Pacific Islanders (a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands). Additionally, any person who responded to the US Census as being some other race or two or more races qualifies as being in the minority population.

Low-Income means a person whose household income (or if in a community or group their median household income) is at or below the Department of Health and Human Services poverty guidelines and identified as such in the U.S. Census American Community Survey, 2015-2019 5-Year Estimates.

Limited English Proficiency includes people ages 5 and older who do not speak English as their primary language and who have reported to the Census Bureau an ability to read, write, speak, or understand English less than very well.

Persons with a Disability includes people with mobility limitation, self-care limitation, or people with both limitations. Those limitations can include a long-lasting physical, mental or emotional condition, and can make it difficult for a person to do activities such as walking, climbing stairs, dressing, bathing, learning or remembering. Limitations can also impede a person from being able to go outside the home alone or to work at a job or business.

Female Head of Household with Child includes households with a female maintaining the household with no husband of the householder present and with own children of the householder under 18 years.

Elderly population includes persons age 65 and older.

Carless Households includes households that possess no cars, vans, and pickup or panel trucks of one-ton capacity or less that are kept and available for use.

Poverty includes any individual with an income less than $36 per day or a family of four with income less than $72 per day. This is calculated from the poverty threshold as set by the U.S. Census Bureau.

Census Block Groups are statistical geographic subdivisions of a census tract and are the smallest geographic areas for which the Census Bureau provides sample data, primarily from the ACS 5 -year period estimates.

American Community Survey (ACS) is an ongoing demographics survey program conducted by the U.S. Census Bureau that provides information on a yearly basis about the nation and its people which aids in determining how federal and state funds are distributed each year.

DEMOGRAPHICS BACKGROUND

Berks County is an urban county of the third class, comprised of one city of the third class, 27 boroughs, and 44 townships. It is located in southeastern Pennsylvania, surrounded by six other counties: Schuylkill County to the north, Lebanon County to the west, Lehigh and Montgomery Counties to the east and Chester and Lancaster Counties to the south. Reading, a city of the third class, serves as the county seat. The County's geographic location and transportation network promote accessibility and mobility for people and freight to several surrounding larger metropolitan areas including Allentown (39 miles), Philadelphia (56 miles), Baltimore (97 miles), and New York City (125 miles).
As of 2019, Berks County is home to 418,025 residents. In comparison to the six neighboring counties, it ranks fourth in overall population. From 2000-2010, population increased 10.2 percent, exceeding both the state and national figures, and placing 5th highest amongst the other counties. Population growth slowed substantially from 2010-2019, slightly above the state, but below national figures for the period. The county ranked sixth out of the seven counties for percentage of population growth from 2010-2019.

Table 1

County Population Between 2000 and 2019					
County	**2000**	**2010**	**2019 Est.**	**% Change 00-10**	**% Change 10-19**
Berks	**373,638**	**411,850**	**418,025**	**10.2%**	**1.5%**
Chester	433,501	499,797	519,560	15.3%	4.0%
Lancaster	470,658	520,156	540,999	10.5%	4.0%
Lebanon	120,327	133,688	139,729	11.1%	4.5%
Lehigh	312,090	350,106	365,052	12.2%	4.3%
Montgomery	750,097	801,052	823,823	6.8%	2.8%
Schuylkill	150,336	148,228	142,674	-1.4%	-3.7%
Pennsylvania	12,281,054	12,702,379	12,791,530	3.4%	0.7%
United States	281,421,906	308,745,538	324,697,795	9.7%	5.2%

Source: U.S. Census, Census 2000, and Annual Estimates of the Resident Population 2010, 2015-2019: ACS 5-Year Estimates

DEMOGRAPHIC METHODOLOGY

For this document the Statewide Environmental Justice Analysis Methodology 2023-2026 Pennsylvania Transportation Improvement Program was used. A full copy of this document can be found as an Appendix to this document. This statewide methodology was created as a way to keep all 67 Pennsylvania Counties using a uniform scale across all counties in the state. It also provides a uniform, easily communicated and understood way of classifying the relative concentrations of low-income and minority populations across the state of Pennsylvania. In the past, minority and low-income population percentages were based on natural breaks of the percentages of those populations present within block groups for each county. This led to conducting 67 separate analyses when looking at this data on a statewide level or multiple different analyses for multicounty planning partners and across PennDOT Districts.

The current methodology classifies census block groups into intervals based on the ratio of census block group minority or low-income percentage to county overall minority or low-income percentage. For example, a ratio of 1 indicates the census block group has the same minority or low-income percentage as the county average. A noted side effect of this approach is that it resulted in some counties not having all intervals. Through use of the United States Census Bureau American Community Survey 2015-2019 5-Year Estimates the county averages for minority and low-income populations were calculated. The Berks County average minority population percentage was determined to be 31.67% and the average low-income population percentage was determined to be 13.61%. All intervals are present within Berks County except for Minority Interval 5. The Minority Interval 5 for Berks County would account for census block groups with a minority population percentage greater than 126.68%.

Tables 2 and 3 show the definitions of the minority and low-income population concentration intervals that are used throughout this plan. The specific Berks County equivalents for these intervals can also be found on these tables.

Table 2

Minority Intervals	Berks County Equivalent	Ratio of Minority Population Percentage in Census Block Group to County Minority Population Percentage
	Definition of Minority Population Intervals	
1	<= 15.84%	Census Block Minority Population Percentage / County Minority Population Percentage <= 0.5 (Census block group minority population percentage less than or equal to half of countywide minority population percentage)
2	> 15.84% and <= 31.67%	Census Block Minority Population Percentage / County Minority Population Percentage > 0.5 and <= 1 (Census block group minority population percentage greater than half and less than or equal to the countywide minority population percentage)
3	> 31.67% and <= 63.34%	Census Block Minority Population Percentage / County Minority Population Percentage > 1 and <= 2 (Census block group minority population percentage greater than the countywide minority population percentage and less than or equal to twice the countywide minority population percentage)
4	> 63.34% and <= 126.68%	Census Block Minority Population Percentage / County Minority Population Percentage > 2 and <= 4 (Census block group minority population percentage greater than twice and less than or equal to four times the countywide minority population percentage)
5	> 126.68% (Not applicable)	Census Block Minority Population Percentage / County Minority Population Percentage > 4 (Census block group minority population percentage greater than four times the countywide minority population percentage)

Table 3

Low-Income Intervals	Berks County Equivalent	Ratio of Low-Income Population Percentage in Census Block Group to County Low-Income Population Percentage
	Definition of Low-Income Population Intervals	
1	<= 6.81%	Census Block Low-Income Population Percentage / County Low-Income Population Percentage <= 0.5 (Census block group low-income population percentage less than or equal to half of countywide low-income population percentage)
2	> 6.81% and <= 13.61%	Census Block Low-Income Population Percentage / County Low-Income Population Percentage > 0.5 and <= 1 (Census block group low-income population percentage greater than half and less than or equal to the countywide low-income population percentage)
3	> 13.61% and <= 27.22%	Census Block Low-Income Population Percentage / County Low-Income Population Percentage > 1 and <= 2 (Census block group low-income population percentage greater than the countywide low-income population percentage and less than or equal to twice the countywide low-income population percentage)
4	> 27.22% and <= 54.44%	Census Block Low-Income Population Percentage / County Low-Income Population Percentage > 2 and <= 4 (Census block group low-income population percentage greater than twice and less than or equal to four times the countywide low-income population percentage)
5	> 54.44%	Census Block Low-Income Population Percentage / County Low-Income Population Percentage > 4 (Census block group low-income population percentage greater than four times the countywide low-income population percentage)

DEMOGRAPHIC ANALYSIS of the 2023-2026 TIP

RATS has identified the following groups to be included in this analysis. The United States Census Bureau American Community Survey 2015-2019 5-Year Estimates provides the data supporting the analysis. The method for this analysis identifies census block groups where minority and low-income populations are above the Berks County average.

Table 4 shows the Population by Race for Berks County by number and percentage. While the White, Non-Hispanic population makes up nearly three quarters of the population, the Hispanic population makes up more than 20% of Berks County population, with the next highest minority being Black or African American, Non-Hispanic. Included in this table is the number and percentage of Low-Income Population. The Other Potentially Disadvantaged Populations are also displayed in this table by number and percentage. These numbers show that of the Other Potentially Disadvantaged Populations, Elderly and Persons with a Disability are the highest in this category making up 16.92% and 13.52% respectively. The other three demographic indicators in this category, Limited English Proficiency, Female Head of Household with Child, and Carless Households all make up between 6.21% to 8.47% of Berks County. Inclusion of these populations is imperative to determine the broader transportation and social needs of disadvantaged populations and ideas of transportation equity.

Table 4

Demographic Indicator	Berks County, Pennsylvania	
	County Population	County Percentage
Total	418,025	
White, Non-Hispanic	299,730	71.70%
Minority	**118,295**	**28.30%**
Black or African American, Non-Hispanic	17,728	4.24%
American Indian and Alaska Native, Non-Hispanic	353	0.08%
Asian alone, Non-Hispanic	5,711	1.37%
Native Hawaiian and Other Pacific Islander, Non-Hispanic	50	0.01%
Some other race, Non-Hispanic	603	0.14%
Two or more races, Non-Hispanic	5,936	1.42%
Hispanic	87,914	21.03%
Low-Income Population *out of the 404,844 for whom poverty status is determined	**48,573**	**12.00%***
Other Potentially Disadvantaged Populations		
Limited English Proficiency (LEP) **out of 393,824 Population 5 years and over	29,738	7.55%**
Persons with a Disability	56,526	13.52%
Female Head of Household with Child ***out of 154,696 Occupied Housing Units	9,600	6.21%***
Elderly (65 years or older)	70,728	16.92%
Carless Households ****out of 154,696 Occupied Housing Units	13,096	8.47%****

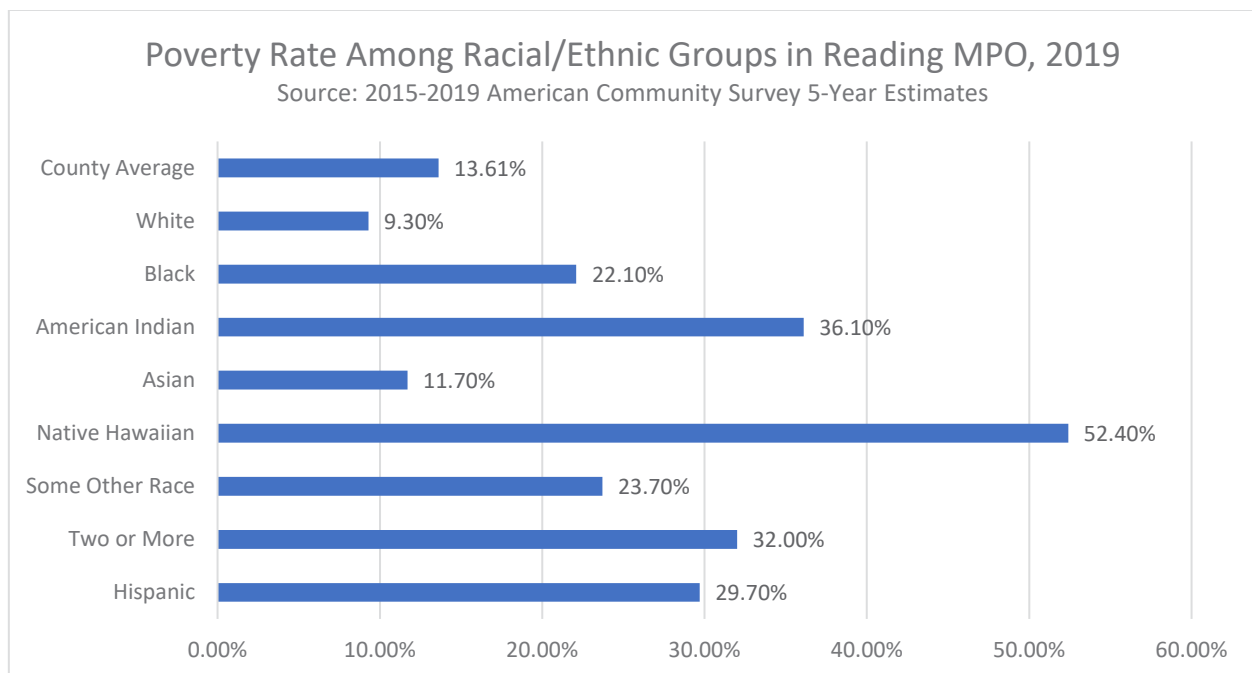Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles Tables: B03002, DP02, DP04, DP05, S1701

Table 5 identifies the total population by race and the amount of each population that is Low-Income. Using the percentages found in *Figure 1*, while the Native Hawaiian population has the highest poverty percentage, they also however have the lowest total population. On the opposite side of the spectrum, the White population has the highest population and most individuals that are Low-Income, however, the overall poverty percentage only accounts for 9.30%, which is the lowest among the races, and lower than the county average of 13.61%. The only minority population lower than the county Low-Income average is the Asian population with 11.70%. 20%-30% of each the Black, Some Other Race, and Hispanic populations are also categorized as Low-Income. Meanwhile, 30-40% of the American Indian and Two or More Races populations are considered Low-Income.

Table 5

		Berks County, Pennsylvania
White	Total:	334,339
	Low Income:	31,050
Black	Total:	20,941
	Low Income:	4,618
American Indian	Total:	2,409
	Low Income:	870
Asian	Total:	5,674
	Low Income:	663
Native Hawaiian	Total:	63
	Low Income:	33
Some Other Race	Total:	22,977
	Low Income:	5,436
Two or More	Total:	18,441
	Low Income:	5,903
Hispanic	Total:	85,828
	Low Income:	25,502
Total Population		490,672
Total Poverty		74,075

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles Table: S1701

Figure 1

Poverty Rate Among Racial/Ethnic Groups in Reading MPO, 2019
Source: 2015-2019 American Community Survey 5-Year Estimates

- County Average: 13.61%
- White: 9.30%
- Black: 22.10%
- American Indian: 36.10%
- Asian: 11.70%
- Native Hawaiian: 52.40%
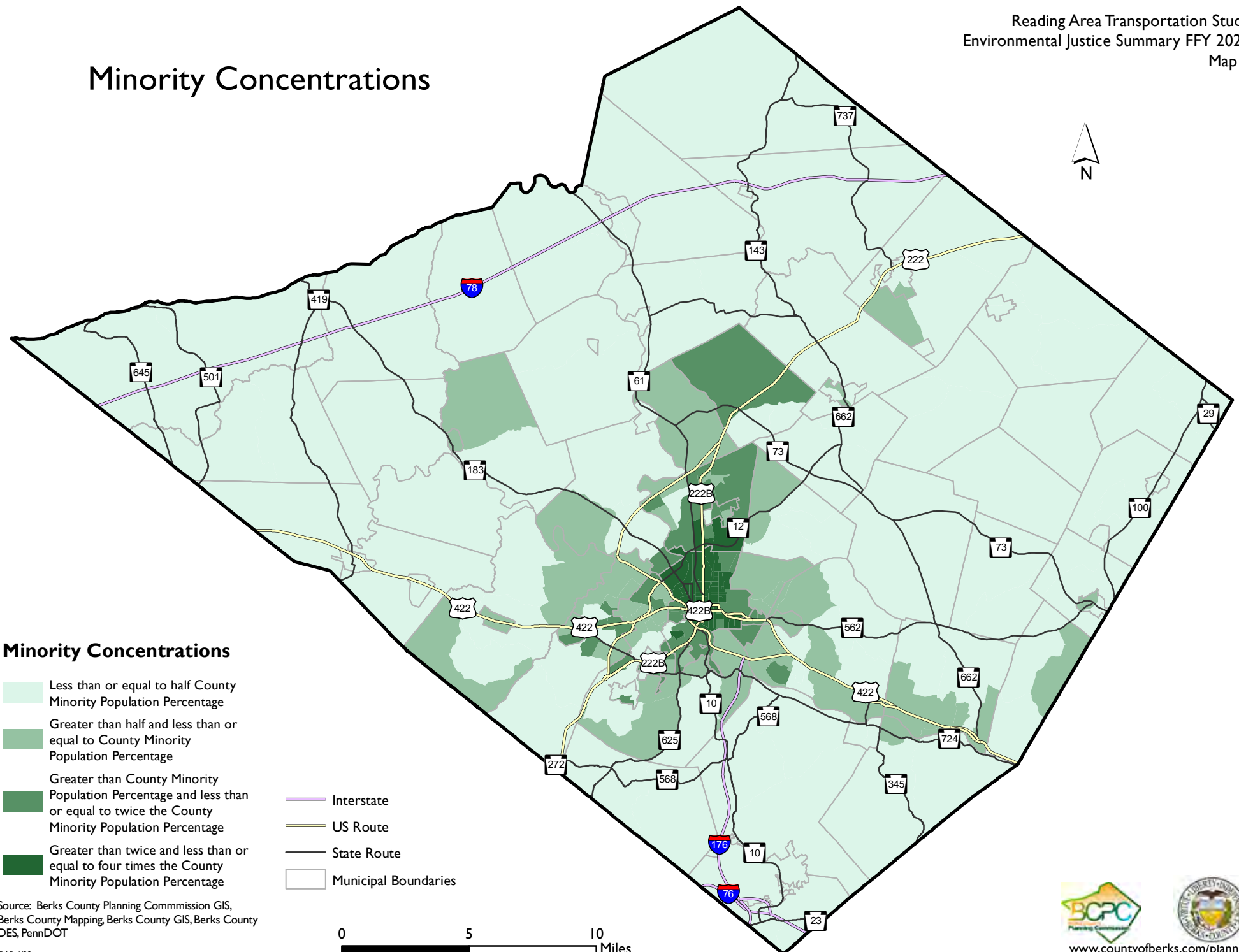- Some Other Race: 23.70%
- Two or More: 32.00%
- Hispanic: 29.70%

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles

The Concentrations of Minority Populations in Berks County and the Concentrations of Low-Income Populations in Berks County can be found on *Map 01* and *Map 02* on the following pages.
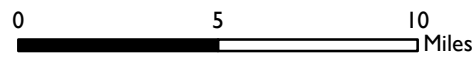
Minority Concentrations

N

Minority Concentrations

Less than or equal to half County
Minority Population Percentage

Greater than half and less than or
equal to County Minority
Population Percentage

Greater than County Minority
Population Percentage and less than
or equal to twice the County
Minority Population Percentage

Greater than twice and less than or
equal to four times the County
Minority Population Percentage

Interstate

US Route

State Route

Municipal Boundaries

Source: Berks County Planning Commmission GIS,
Berks County Mapping, Berks County GIS, Berks County
DES, PennDOT

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Low-Income Concentrations
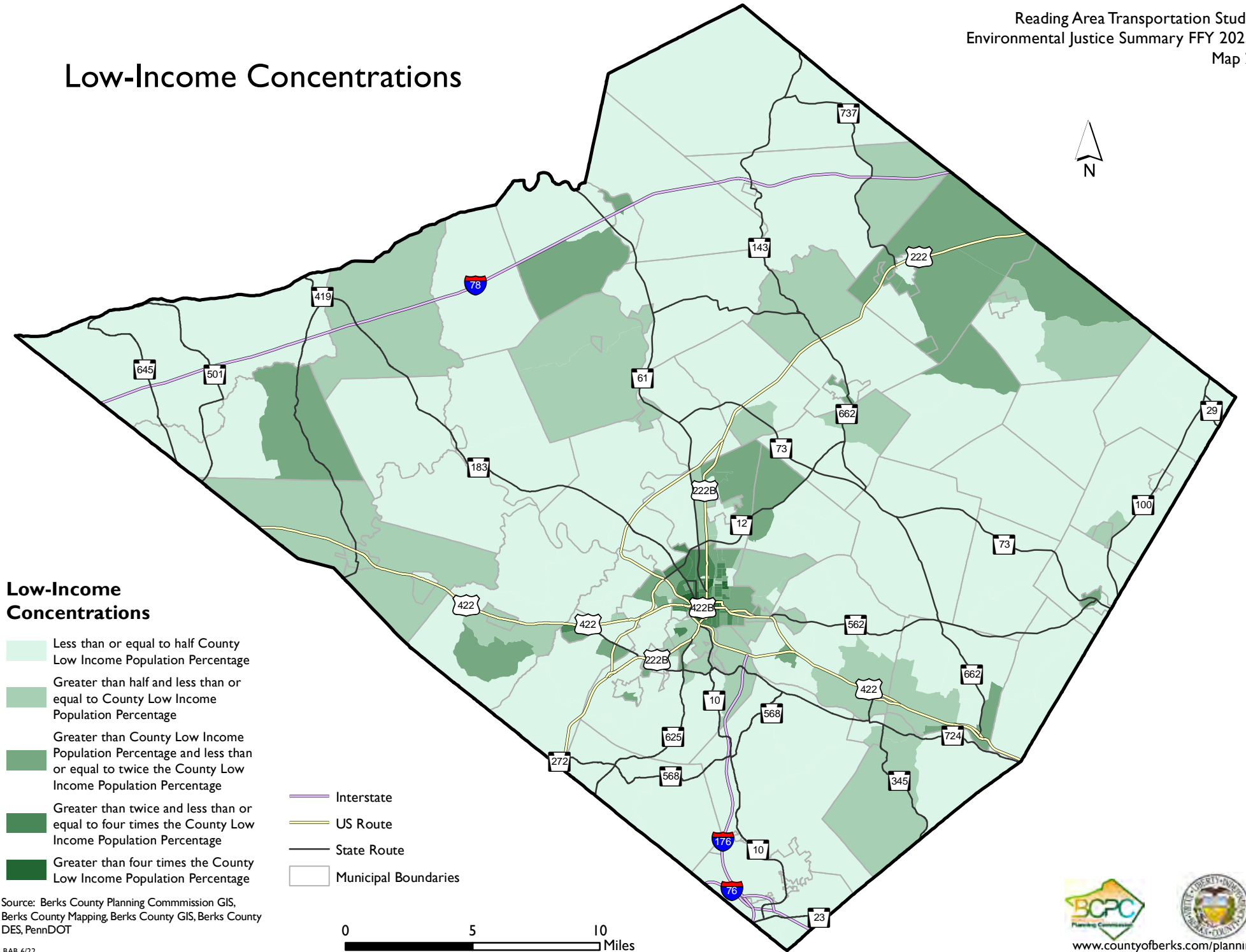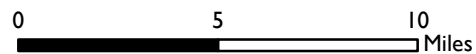
N

**Low-Income
Concentrations**

Less than or equal to half County
Low Income Population Percentage

Greater than half and less than or
equal to County Low Income
Population Percentage

Greater than County Low Income
Population Percentage and less than
or equal to twice the County Low
Income Population Percentage

Greater than twice and less than or
equal to four times the County Low
Income Population Percentage

Greater than four times the County
Low Income Population Percentage

Interstate

US Route

State Route

Municipal Boundaries

Source: Berks County Planning Commmission GIS,
Berks County Mapping, Berks County GIS, Berks County
DES, PennDOT

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0   5   10

Miles

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737

222

143

419

78

645   501

61

662

29

183

73

100

222B

12

73

422

422

422B

562

222B

422

662

10

568

10

625

272

568

724

345

176

10

76

23

CRASH AND INJURY ANALYSIS OF THE 2023-2026 TIP

Table 6 and Table 7 display the Number and Percentage of Bicycle-related Crashes, Fatalities, and Suspected Serious Injuries in Berks County from 2015-2019. There is a higher percentage for bicycle related crashes amongst the highest concentrations of Minority populations at 41% compared to a range of 9.1% to 28.4% amongst intervals with a lower concentration of Minority populations. The concentrations of incidents are centered around areas where non-motorized transportation use is more prevalent. Cities typically have a higher proportion of users traveling by means of non-motorized transportation, thus the City of Reading has the highest concentrations of incidents. However, the number of fatalities and suspected serious injuries in the highest concentrations of Minority populations are lower or equal to the other Minority Intervals.

When looking at Low-Income intervals, the number of bicycle related crashes are more evenly distributed with the highest Low-Income interval being towards the lower end of these types of crashes. It can be noted that the number of fatalities and suspected serious injuries are also lower or equal to the other Low-Income Intervals, which mirrors what is seen within the Minority Intervals. This indicates a higher proportion of bicycle crashes are occurring in areas that utilize non-motorized transportation more than interval areas with lesser concentrations of Minority or Low-Income populations. However, there are also fewer Bicycle-related fatalities and suspected serious injuries in these areas that utilize non-motorized transportation. The risk of fatality and suspected serious injury to these vulnerable road users is closely tied to speed limits. The average chance of an adult pedestrian being seriously injured or killed when hit by a vehicle traveling 30MPH or less is only 10%. As the vehicle speed increases over 30MPH, the risk of serious injury and fatality increases sharply and significantly to the vulnerable road user.

Table 6
Number and Percentage of Bicycle Related Crashes, Berks County, PA (2015-2019)

Minority Intervals	1	2	3	4
Minority Population	11,484	17,910	22,073	66,828
Percent Minority	6.06%	19.67%	38.77%	82.99%
# of People on Bicycles Involved	50 (28.4%)	16 (9.1%)	38 (21.6%)	72 (41.0%)
# of Fatalities	2 (66.7%)	1 (33.3%)	0 (0%)	0 (0%)
# of Suspected Serious Injuries	5 (45.5%)	2 (18.2%)	2 (18.2%)	2 (18.2%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Table 7
Number and Percentage of Bicycle Related Crashes, Berks County, PA (2015-2019)

Low-Income Intervals	1	2	3	4	5
Low-Income Population	5,439	7,164	10,871	14,913	10,186
Percent Low-Income	2.82%	8.34%	17.17%	33.08%	57.55%
# of People on Bicycles Involved	48 (21.6%)	33 (14.9%)	51 (23.0%)	56 (25.2%)	34 (15.3%)
# of Fatalities	2 (100.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
# of Suspected Serious Injuries	3 (20.0%)	7 (46.7%)	2 (13.3%)	2 (13.3%)	1 (6.7%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Table 8 and Table 9 display the Number and Percentage of Pedestrian-related Crashes, Fatalities, and Suspected Serious Injuries in Berks County from 2015-2019. The locations of pedestrian crashes like the locations of bicycle crashes are primarily concentrated in urbanized areas. These are also the areas that have higher Minority and Low-Income populations. Additionally, areas with sidewalks such as boroughs also have a higher amount of pedestrian crashes than bicycle crashes. Although there are many more pedestrian related crashes in areas greater than the county average for Minority and Low-Income populations, there are only slightly more fatalities and suspected serious injuries in these areas. Minority Intervals 1 and 2, which are below the county average for Minority populations, have only 25% of pedestrian crashes, but have 45.8% of pedestrian fatalities and 48% of pedestrian suspected serious injuries in Berks County. Similarly, Low-Income Intervals 1 and 2, which are below the county average for Low-Income populations, account for only 25.9% of pedestrian crashes, however, account for 48.3% of pedestrian fatalities and 44.5% of pedestrian suspected serious injuries in Berks County. As mentioned in the analysis of ***Table 4 and Table 5***, this is attributed to the lower speeds found in these areas significantly decreasing the risk of fatality and suspected serious injury.

Table 8
Number and Percentage of Pedestrian Related Crashes, Berks County, PA (2015-2019)

Minority Intervals	1	2	3	4
Minority Population	11,484	17,910	22,073	66,828
Percent Minority	6.06%	19.67%	38.77%	82.99%
# of Pedestrian Crashes	121 (14.3%)	90 (10.7%)	194 (23.0%)	440 (52.1%)
# of Fatalities	6 (25.0%)	5 (20.8%)	6 (25.0%)	7 (29.2%)
# of Suspected Serious Injuries	27 (27.6%)	20 (20.4%)	20 (20.4%)	31 (31.6%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Table 9
Number and Percentage of Pedestrian Related Crashes, Berks County, PA (2015-2019)

Low-Income Intervals	1	2	3	4	5
Low-Income Population	5,439	7,164	10,871	14,913	10,186
Percent Low-Income	2.82%	8.34%	17.17%	33.08%	57.55%
# of Pedestrian Crashes	161 (14.9%)	119 (11.0%)	283 (26.1%)	325 (30.0%)	196 (18.1%)
# of Fatalities	8 (27.6%)	6 (20.7%)	9 (31.0%)	2 (6.9%)	4 (13.8%)
# of Suspected Serious Injuries	26 (24.1%)	22 (20.4%)	28 (25.9%)	21 (19.4%)	11 (10.2%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Within the 2023-2026 TIP, there are a few locations where bicycle and pedestrian safety improvements are taken into consideration within higher concentrated areas of Low-Income and Minority populations such as construction of anew roadway in the City of Reading (PennDOT Project Id: 70274) and intersection improvements through Maidencreek Township (PennDOT Project Id: 92414) as well as in the design and ultimate construction or the US 422 West Shore Bypass Reconstruction project (PennDOT Project Id: 114439). Additionally, each highway and bridge project is reviewed for bicycle and pedestrian use and improvements, which are included in those projects as appropriate. Throughout the development of the 2025-2028 TIP, more emphasis will be made to reduce the amount of bicycle and pedestrian accidents and fatalities through identifying areas where bike and pedestrian safety improvements can be made in areas of higher concentrations of Low-Income and Minority populations. A resource that will be used to make these determinations is the newly updated Berks County Bicycle and Pedestrian Plan which was adopted over the Summer of 2020.

Table 10 and Table 11 display the number and percentage of Total Reportable Crashes, Persons Involved in Reportable Crashes, Crash Suspected Serious Injuries, and Crash Fatalities in Berks County from 2015-2019. Within the Minority populations block group intervals, the majority of total reportable crashes (44.5%), persons involved in reportable crashes (41.0%), crashes resulting in fatality (60.8%), and crash suspected serious injury (60.8%) occurred in block groups with less than the County average of Minority population. Similarly, the majority of fatality (52.7%) and suspected serious injury (48.1%) crashes occurred in Low-Income block groups less than half of the county average. This information shows that there is not a disproportionate amount of injury and fatal crashes occurring in block groups with a higher population of low-income and minority populations. This could be attributed to the lower speed limits found where these populations are concentrated, as the City of Reading has speed limits posted below 35MPH on a majority of its roads. Lower speed limits, like those posted on the roads in the City of Reading, lessen the force of impact, which in turn lessens the chance of a crash being fatal or causing serious injury. Across the state of Pennsylvania fatality rates are twice the amount on rural roads as compared to urban roads.

Table 10
Number and Percentage of Total Reportable Crashes, Persons Involved in Reportable Crashes, Crash Suspected Serious Injuries & Crash Fatalities, Berks County, PA (2015-2019)

Minority Intervals	1	2	3	4
Minority Population	11,484	17,910	22,073	66,828
Percent Minority	6.06%	19.67%	38.77%	82.99%
# of Total Reportable Crashes	12,649 (44.5%)	6,347 (22.3%)	4,843 (17.0%)	4,591 (16.1%)
# of Persons Involved in Reportable Crashes	26,457 (41.0%)	14,575 (22.6%)	12,295 (19.0%)	11,242 (17.4%)
# of Crash Fatalities	149 (60.8%)	43 (17.6%)	33 (13.5%)	20 (8.2%)
# of Crash Suspected Serious Injuries	459 (51.9%)	157 (17.8%)	122 (13.8%)	146 (16.5%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Table 11
Number and Percentage of Total Reportable Crashes, Persons Involved in Reportable Crashes, Crash Suspected Serious Injuries & Crash Fatalities, Berks County, PA (2015-2019)

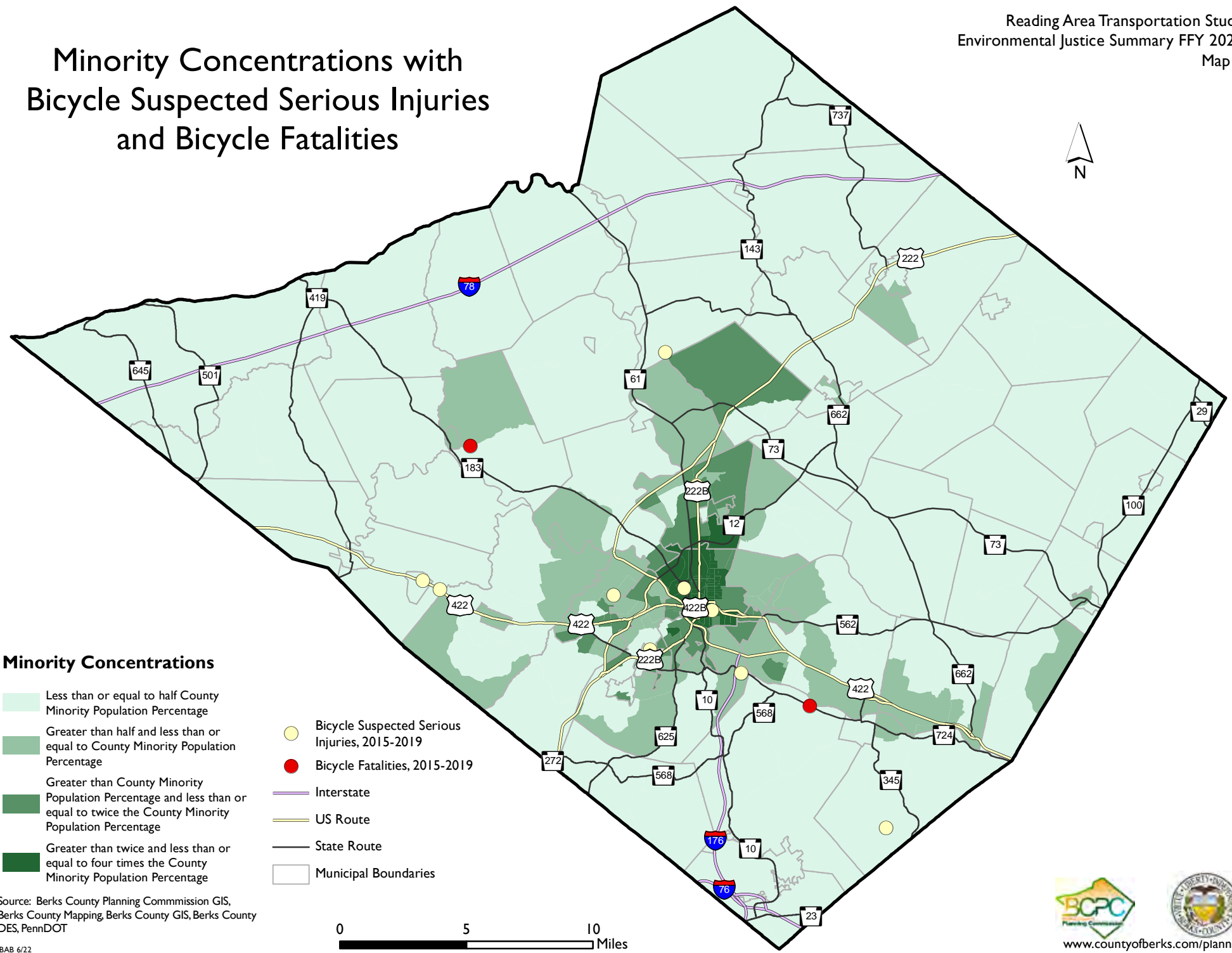| Low-Income Intervals	1	2	3	4	5
Low-Income Population	5,439	7,164	10,871	14,913	10,186
Percent Low-Income	2.82%	8.34%	17.17%	33.08%	57.55%
# of Total Reportable Crashes	13,725 (43.5%)	6,779 (21.5%)	6,438 (20.4%)	3,008 (9.5%)	1,602 (5.1%)
# of Persons Involved in Reportable Crashes	30,448 (42.0%)	15,319 (21.1%)	15,480 (21.3%)	7,240 (10.0%)	4,034 (5.6%)
# of Crash Fatalities	137 (52.7%)	66 (25.4%)	37 (14.2%)	12 (4.6%)	8 (3.1%)
# of Crash Suspected Serious Injuries	468 (48.1%)	191 (19.7%)	171 (17.6%)	99 (10.2%)	43 (4.4%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Maps 03 and 04 give a visual representation of locations of Bicycle Crashes with Suspected Serious Injuries and Fatalities for 2015-2019 in relation to Minority and Low-Income populations in Berks County.

Maps 05 and 06 show the locations of Pedestrian Crashes and with Suspected Serious Injuries and Fatalities from 2015-2019 in Berks County amongst concentrations of Minority and Low-Income Populations.

Maps 07 and 08 show the locations of Reportable Crashes with Suspected Serious Injuries and Fatalities from 2015-2019 in Berks County amongst concentrations of Minori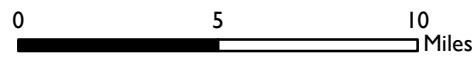ty and Low-Income Populations. Many of the reportable crashes with suspected serious injury or fatality that occur in block groups with a higher population of low-income and minority populations are occurring on highways that transect these areas.

Minority Concentrations with Bicycle Suspected Serious Injuries and Bicycle Fatalities

N

Minority Concentrations

Less than or equal to half County Minority Population Percentage

Greater than half and less than or equal to County Minority Population Percentage

Greater than County Minority Population Percentage and less than or equal to twice the County Minority Population Percentage

Greater than twice and less than or equal to four times the County Minority Population Percentage

○ Bicycle Suspected Serious Injuries, 2015-2019

● Bicycle Fatalities, 2015-2019

— Interstate

— US Route

— State Route

▢ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10
Miles

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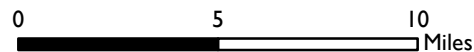# Low-Income Concentrations with Bicycle Suspected Serious Injuries and Bicycle Fatalities

N

Low-Income Concentrations

Less than or equal to half County Low Income Population Percentage

Greater than half and less than or equal to County Low Income Population Percentage

Greater than County Low Income Population Percentage and less than or equal to twice the County Low Income Population Percentage

Greater than twice and less than or equal to four times the County Low Income Population Percentage

Greater than four times the County Low Income Population Percentage

○ Bicycle Suspected Serious Injuries, 2015-2019

● Bicycle Fatalities, 2015-2019

—— Interstate

—— US Route

—— State Route

☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10
Miles

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Minority Concentrations with Pedestrian Suspected Serious Injuries and Pedestrian Fatalities

N

Minority Concentrations

- Less than or equal to half County Minority Population Percentage
- Greater than half and less than or equal to County Minority Population Percentage
- Greater than County Minority Population Percentage and less than or equal to twice the County Minority Population Percentage
- Greater than twice and less than or equal to four times the County Minority Population Percentage

- ● Pedestrian Suspected Serious Injuries, 2015-2019
- ● Pedestrian Fatalities, 2015-2019
- —— Interstate
- —— US Route
- —— State Route
- ☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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Miles

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Low-Income Concentrations with Pedestrian Suspected Serious Injuries and Pedestrian Fatalities
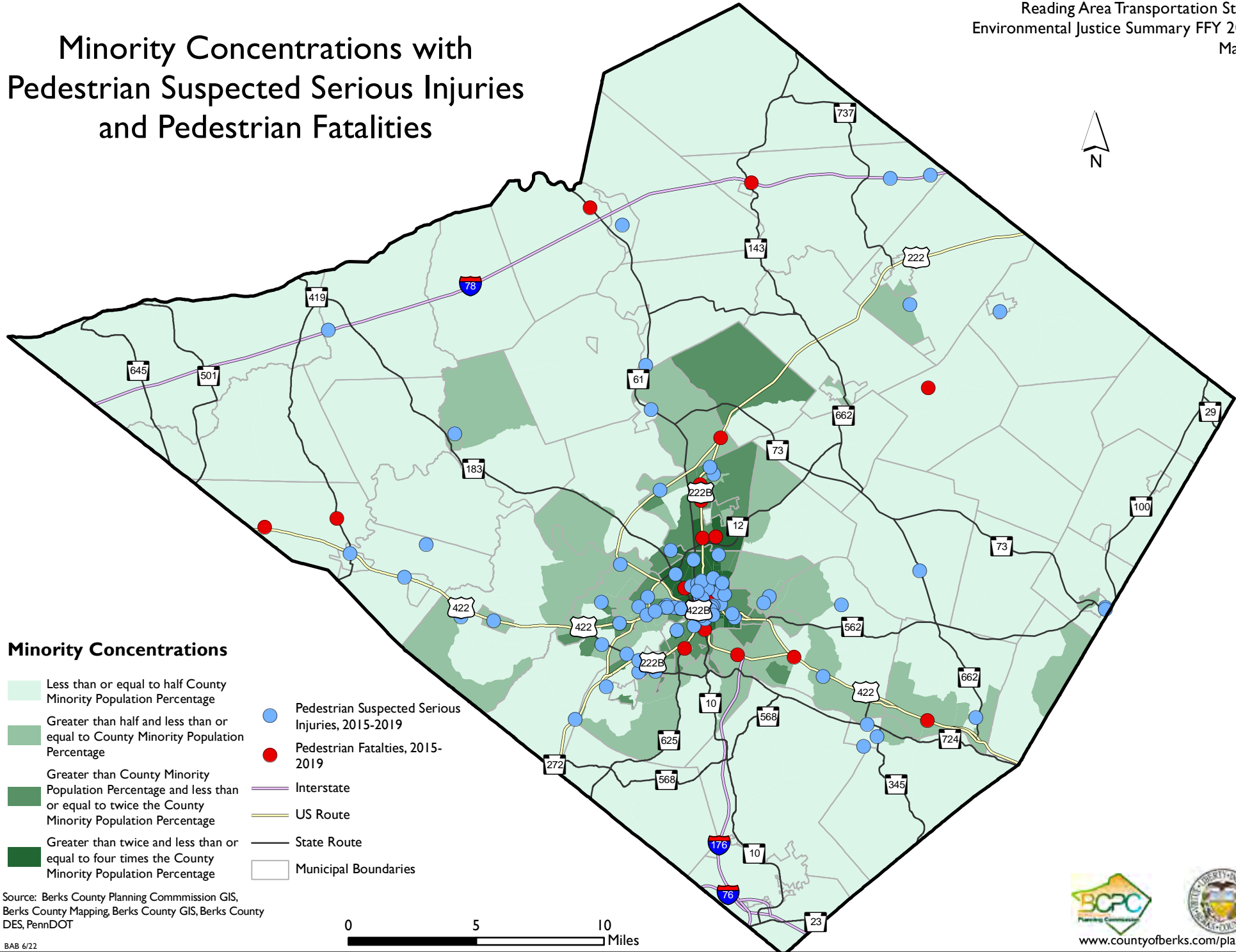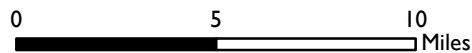
N

Low-Income Concentrations

Less than or equal to half County Low Income Population Percentage

Greater than half and less than or equal to County Low Income Population Percentage

Greater than County Low Income Population Percentage and less than or equal to twice the County Low Income Population Percentage

Greater than twice and less than or equal to four times the County Low Income Population Percentage

Greater than four times the County Low Income Population Percentage

● Pedestrian Suspected Serious Injuries, 2015-2019

● Pedestrian Fatalities, 2015-2019

—— Interstate

—— US Route

—— State Route

☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10 Miles

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Minority Concentrations with Crash Suspected Serious Injuries and Crash Fatalities

N

Minority Concentrations

Less than or equal to half County Minority Population Percentage

Greater than half and less than or equal to County Minority Population Percentage

Greater than County Minority Population Percentage and less than or equal to twice the County Minority Population Percentage

Greater than twice and less than or equal to four times the County Minority Population Percentage

Number of suspected serious injuries per crash
- 1
- 2
- 3 - 5
- 6 - 10
- Over 10

Number of deaths per crash
- 1
- 2
- 3
- 4
- 5

Interstate
US Route
State Route
Municipal Boundaries

Source: Berks County Planning Commission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10
Miles

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Low-Income Concentrations with Crash Suspected Serious Injuries and Crash Fatalities

N

Low-Income Concentrations

Less than or equal to half County Low Income Population Percentage

Greater than half and less than or equal to County Low Income Population Percentage

Greater than County Low Income Population Percentage and less than or equal to twice the County Low Income Population Percentage

Greater than twice and less than or equal to four times the County Low Income Population Percentage

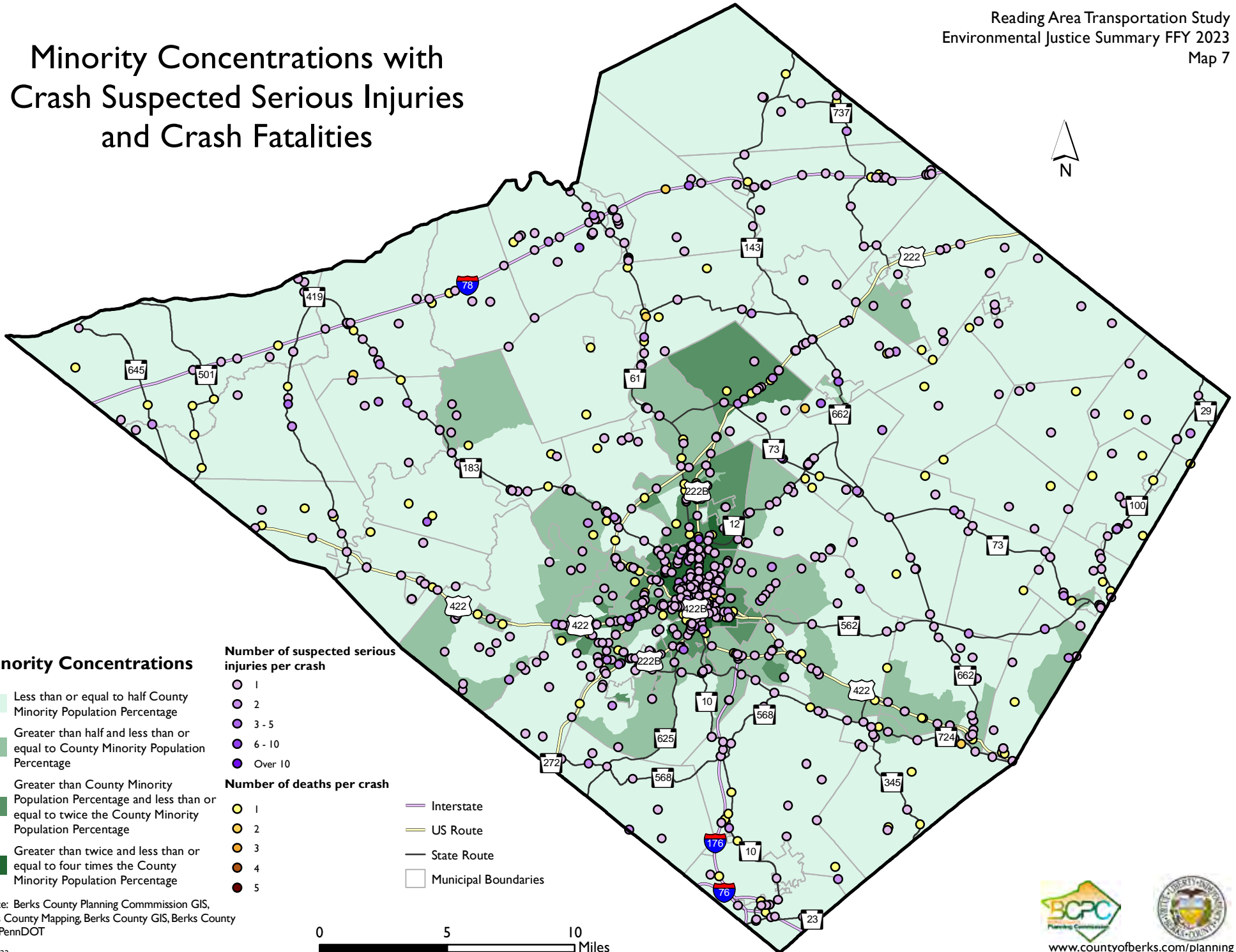Greater than four times the County Low Income Population Percentage

Number of suspected serious injuries per crash
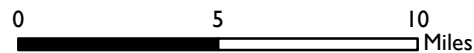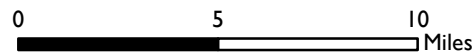- 1
- 2
- 3 - 5
- 6 - 10
- Over 10

Number of deaths per crash
- 1
- 2
- 3
- 4
- 5

— Interstate
— US Route
— State Route
☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10
Miles

Bridge and Pavement Conditions Analysis of the 2023-2026 TIP

Table 12 identifies the percentage of State Owned and Locally Owned Poor Condition or Worse Bridges and Fair Condition or Better Bridges amongst concentrations of Minority and Low-Income populations within Berks County.

Table 12
Number and Percentage of Poor Condition or Worse Bridges and Fair Condition or Better Bridges, Berks County, PA

Minority Intervals	1	2	3	4
Minority Population	11,484	17,910	22,073	66,828
Percent Minority	6.06%	19.67%	38.77%	82.99%
# of Poor Condition or Worse Bridges	104 (72.7%)	26 (18.2%)	8 (5.6%)	5 (3.5%)
# of Fair Condition or Better Bridges	959 (61.4%)	356 (22.8%)	169 (10.8%)	78 (5.0%)
Total Bridges	1,063 (62.4%)	382 (22.4%)	177 (10.4%)	83 (4.87%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019
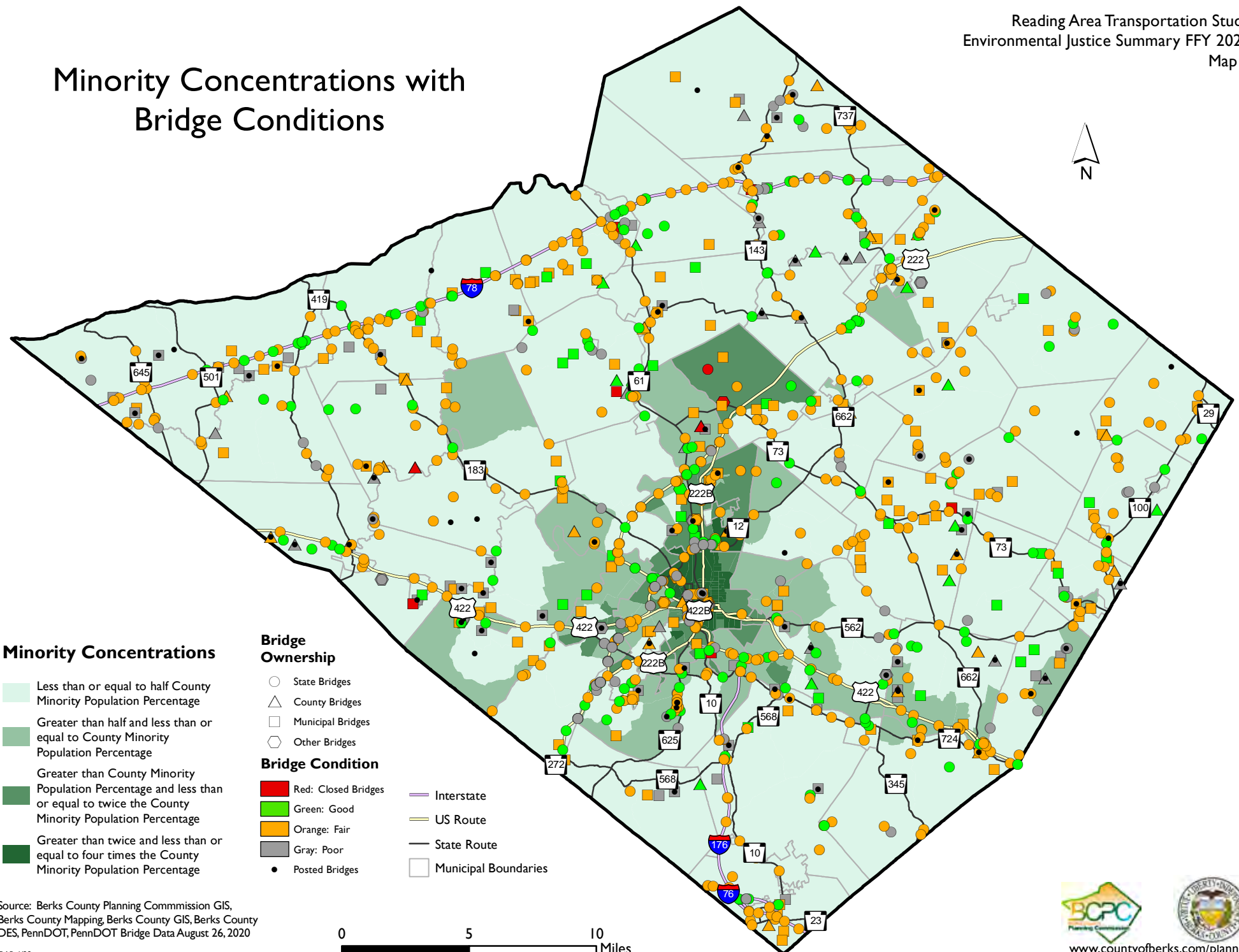
Table 13
Number and Percentage of Poor Condition or Worse Bridges and Fair Condition or Better Bridges, Berks County, PA

Low-Income Intervals	1	2	3	4	5
Low-Income Population	5,439	7,164	10,871	14,913	10,186
Percent Low-Income	2.82%	8.34%	17.17%	33.08%	57.55%
# of Poor Condition or Worse Bridges	91 (64.1%)	37 (26.1%)	8 (5.6%)	4 (2.8%)	2 (1.4%)
# of Fair Condition or Better Bridges	913 (78.6%)	385 (23.9%)	265 (16.4%)	34 (2.1%)	14 (0.9%)
Total Bridges	1,004 (57.3%)	422 (24.1%)	273 (15.6%)	38 (2.2%)	16 (0.9%)

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Table 12 and Table 13 show there is not a disproportionate amount of Poor condition bridges in areas with high concentrations of Minority and Low-Income populations. Instead, a higher number of Poor condition or worse bridges are found in the block groups where Minority and Low-Income populations are below the county average with 130 and 128 bridges respectively in Poor condition or worse. The block groups with higher concentrations of Minority and Low-Income populations account for 13 and 14 bridges respectively in Poor condition or worse. Throughout Berks County, bridges included in the TIP and LRTP are selected based on the recommended treatments needed at this time based on a lowest life cycle cost approach to project programming.

Minority Concentrations with Bridge Conditions

N

Minority Concentrations

Less than or equal to half County Minority Population Percentage

Greater than half and less than or equal to County Minority Population Percentage

Greater than County Minority Population Percentage and less than or equal to twice the County Minority Population Percentage

Greater than twice and less than or equal to four times the County Minority Population Percentage

Bridge Ownership

○ State Bridges
△ County Bridges
□ Municipal Bridges
⬡ Other Bridges

Bridge Condition

■ Red: Closed Bridges
■ Green: Good
■ Orange: Fair
■ Gray: Poor
● Posted Bridges

—— Interstate
—— US Route
—— State Route
☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT, PennDOT Bridge Data August 26, 2020

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0   5   10 Miles

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Low-Income Concentrations with Bridge Conditions

Low-Income Concentrations

- Less than or equal to half County Low Income Population Percentage
- Greater than half and less than or equal to County Low Income Population Percentage
- Greater than County Low Income Population Percentage and less than or equal to twice the County Low Income Population Percentage
- Greater than twice and less than or equal to four times the County Low Income Population Percentage
- Greater than four times the County Low Income Population Percentage

Bridge Ownership

- ◯ State Bridges
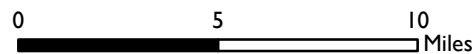- △ County Bridges
- ☐ Municipal Bridges
- ⬡ Other Bridges

Bridge Condition

- Red: Closed Bridges
- Green: Good
- Orange: Fair
- Gray: Poor
- • Posted Bridges

— Interstate
— US Route
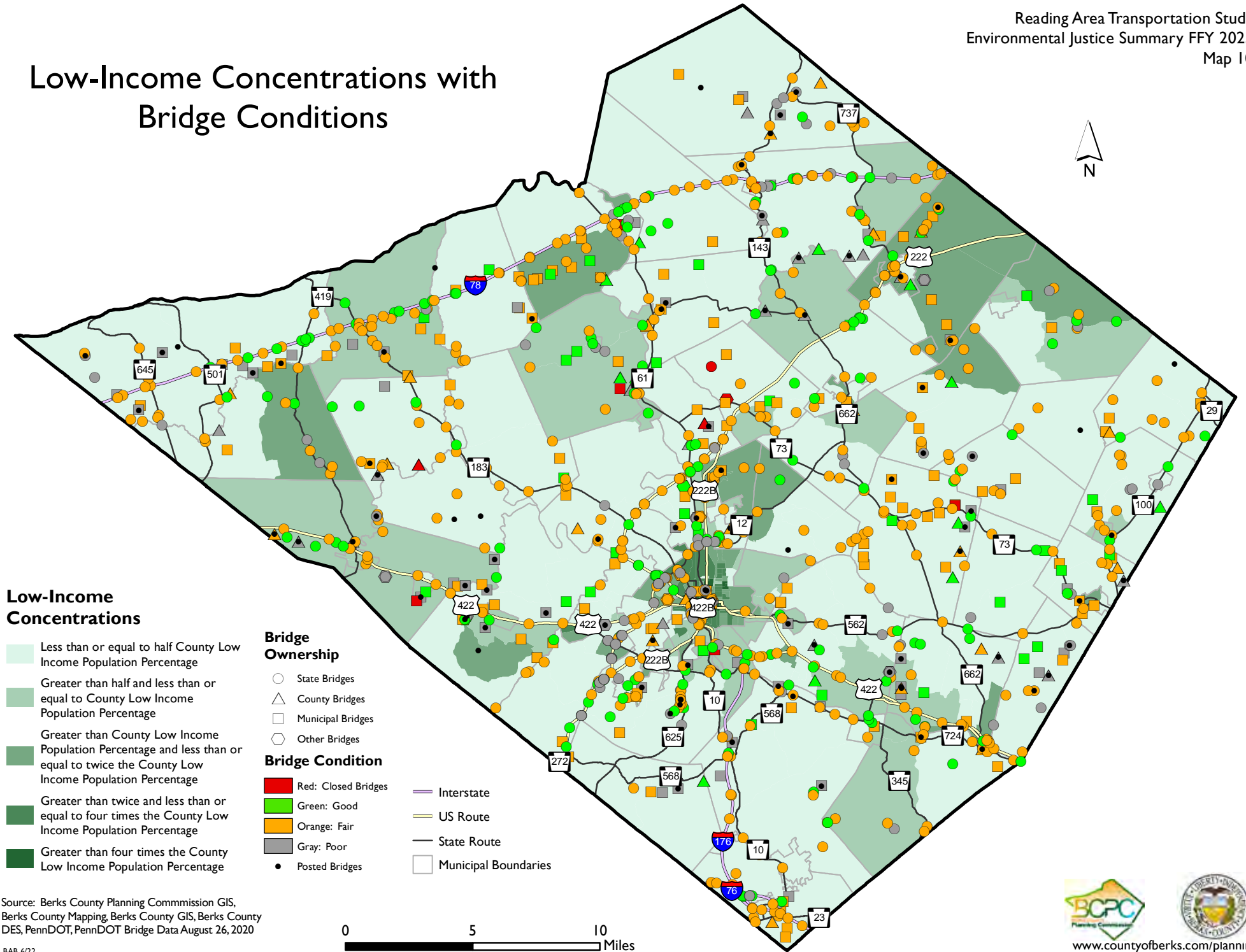— State Route
☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT, PennDOT Bridge Data August 26, 2020

BAB 6/22

0   5   10
Miles

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Maps 09 and 10 display the locations of all Locally-owned and State-owned bridges in Poor Condition or Worse and Fair Condition or Better in relation to Minority and Low-Income populations.

Table 14 shows the distribution of Federal Aid Segment Miles and condition of pavement miles amongst the Minority Populations. **Table 15** shows the distribution of Federal Aid Segment Miles and condition of pavement miles amongst the Low-Income Populations.

Table 14

Number and Percentage of Condition of Federal Aid Segment Miles, Berks County, PA

Minority Intervals	1	2	3	4
Minority Population	11,484	17,910	22,073	66,828
Percent Minority	6.06%	19.67%	38.77%	82.99%
Excellent IRI Federal Aid Segment Miles	84.37 (28.0%)	13.57 (12.2%)	3.46 (6.4%)	1.14 (6.2%)
Good IRI Federal Aid Segment Miles	129.93 (43.1%)	52.20 (47.1%)	24.42 (44.9%)	7.63 (41.8%)
Fair IRI Federal Aid Segment Miles	61.78 (20.5%)	36.01 (32.5%)	18.08 (33.3%)	4.73 (25.9%)
Poor IRI Federal Aid Segment Miles	20.28 (6.7%)	9.15 (8.3%)	8.40 (15.5%)	4.57 (25.0%)
Other IRI Federal Aid Segment Miles	5.36 (1.8%)	0.00 (0.0%)	0.00 (0.0%)	0.20 (1.1%)
Total Federal Aid Segment Miles	301.72	110.94	54.36	18.27

Source: American Community Survey 2019: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2015-2019

Table 15

Number and Percentage of Condition of Federal Aid Segment Miles, Berks County, PA

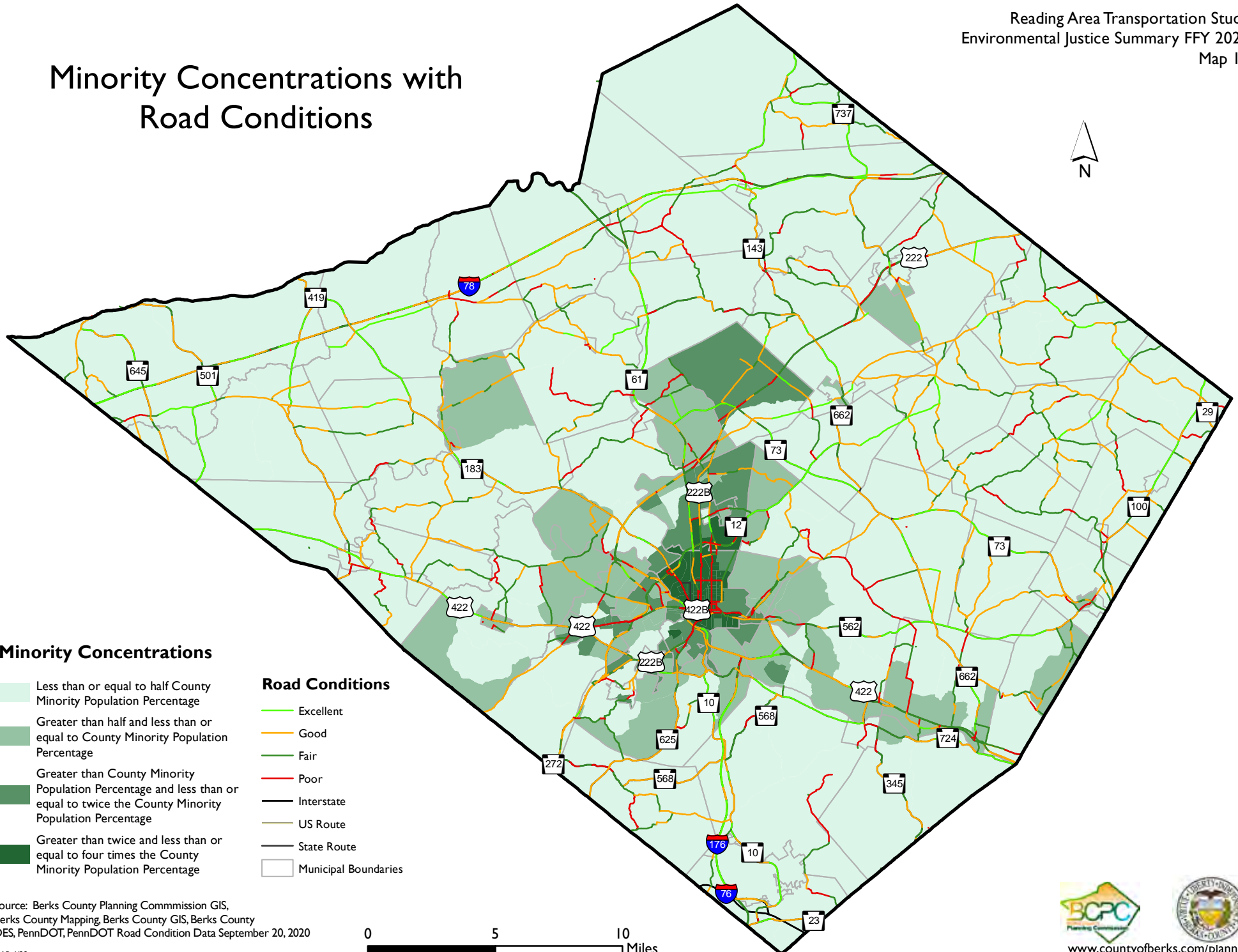| Low-Income Intervals	1	2	3	4	5
Low-Income Population	5,439	7,164	10,871	14,913	10,186
Percent Low-Income	2.82%	8.34%	17.17%	33.08%	57.55%
Excellent IRI Federal Aid Segment Miles	69.69 (24.0%)	33.84 (24.0%)	7.82 (10.5%)	0.46 (2.4%)	1.14 (11.0%)
Good IRI Federal Aid Segment Miles	133.70 (46.0%)	57.35 (40.7%)	26.63 (35.9%)	6.59 (33.9%)	3.67 (35.4%)
Fair IRI Federal Aid Segment Miles	60.34 (20.8%)	38.77 (27.5%)	27.74 (37.4%)	7.37 (37.9%)	1.44 (13.9%)
Poor IRI Federal Aid Segment Miles	21.36 (7.4%)	11.06 (7.8%)	11.76 (15.9%)	4.85 (24.9%)	3.91 (37.8%)
Other IRI Federal Aid Segment Miles	5.36 (1.9%)	0.06 (0.0%)	0.20 (0.3%)	0.20 (1.0%)	0.20 (1.9%)
Total Federal Aid Segment Miles	290.46	141.09	74.14	19.47	10.36

Source: American Community Survey 2017: ACS 5-Year Estimates Data Profiles, PennDOT PennShare 2019

To fully analyze the information provided in *Tables 14 and 15*, as well as *Maps 11 and 12* on the following pages, one must understand the usage of International Roughness Index (IRI) as a unit of measure for pavement conditions. The IRI is a statistic used to measure how smooth or rough a pavement surface. The IRI is separated into four categories, which are Excellent, Good, Fair, and Poor where Excellent IRI is in the best condition and Poor IRI is in the worst condition. The total number of Excellent, Good, Fair, and Poor Federal Aid Segment Miles differ between tables due to the buffer used to create the Minority and Low-Income Intervals. However, after breaking down the numbers approximate totals for each category can be provided with 108 Excellent Federal Aid Segment Miles, 221 Good Federal Aid Segment Miles, 128 Fair Federal Aid Segment Miles, and 48 Poor Federal Aid Segment Miles. The way *Tables 14 and 15* are analyzed is by comparing the percentages by interval for each condition.

Intervals 1 and 2 for Minority Populations are less than the county average while Intervals 3 and 4 are above the county average for Minority Population. Block Groups with less than the county average of Minority Population have a total of 412.66 Federal Aid Segment Miles block groups with higher than the county average of Minority Population add up to a total of 72.63 Federal Aid Segment Miles, which is only one fifth to one sixth of the total Federal Aid Segment Miles of Intervals 1 and 2. This should be considered when seeing high percentages next to low numbers. For all Minority Intervals, the highest percent of Federal Aid Segment Miles are in Good condition. When considering each Minority Interval separately, the distribution for Interval 1 and 2 shows mainly Excellent and Good IRI Federal Aid Segment Miles, the distribution for Interval 3 and 4 shows that Excellent and Good IRI Federal Aid Segment Miles are nearly equal to the Fair and Poor IRI Federal Aid Segment Miles. To have a more equal percentage of IRI condition of Federal Aid Segment Miles within each interval, the consideration of resurfacing/repaving projects to Poor IRI Federal Aid Segment Miles should be focused in small amounts in the areas with a higher than county average of Minority Populations. Smaller projects of resurfacing/repaving could add to a more equal distribution within each of these Minority Intervals as they have less total Federal Aid Segment Miles.

Intervals 1 and 2 for Low-Income Population are less than the county average while intervals 3, 4, and 5 are above the county average for Low-Income Population. For block groups with the smallest amount of Low-Income Population, the highest percent of roads have a Good IRI rating. Intervals 3 and 4 have a majority of their Federal Aid Segment Miles with a Fair IRI rating. Interval 5 has the highest Low-Income Population percentage, greater than four times the countywide Low-Income percentage, and also has a majority of Federal Aid Segment Miles with a Poor IRI rating as compared to higher IRI ratings. Although 37.8% of Federal Aid Segment Miles located within Interval 5 have a Poor IRI, this only accounts for 3.91 of the total 535.52 Federal Aid Segment Miles within Berks County. There are also 52.94 Poor IRI Federal Aid Segment Miles, so Interval 5 only has 7.4% of all the Poor IRI segment miles countywide. By focusing resurfacing/repaving projects in the area encompassed by Interval 5, smaller projects would reduce this percentage by a much greater amount than the larger projects that would take place in areas covered by Interval 1 which has a total of 290.46 Federal Aid Segment Miles compared to the 10.36 Federal Aid Segment Miles in Interval 5. This will be considered when adding repaving/resurfacing projects to the TIP.

Minority Concentrations with Road Conditions

N

Minority Concentrations

Less than or equal to half County Minority Population Percentage

Greater than half and less than or equal to County Minority Population Percentage

Greater than County Minority Population Percentage and less than or equal to twice the County Minority Population Percentage

Greater than twice and less than or equal to four times the County Minority Population Percentage

Road Conditions

Excellent
Good
Fair
Poor
Interstate
US Route
State Route
Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT, PennDOT Road Condition Data September 20, 2020

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0   5   10
Miles

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Low-Income Concentrations with Road Conditions

Low-Income Concentrations

Less than or equal to half County Low Income Population Percentage

Greater than half and less than or equal to County Low Income Population Percentage

Greater than County Low Income Population Percentage and less than or equal to twice the County Low Income Population Percentage

Greater than twice and less than or equal to four times the County Low Income Population Percentage

Greater than four times the County Low Income Population Percentage

Road Conditions

Excellent
Good
Fair
Poor
Interstate
US Route
State Route
Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT, PennDOT Road Condition Data September 20, 2020

BAB 6/22

0   5   10
Miles

N

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Transit and Environmental Justice

While the 2023-2026 TIP looks to equitably manage where and how funds are spent relative to the population, one factor often overlooked is the impact of the access to public transportation within a geographic area. The transit system is primarily provided by the South Central Transit Authority (SCTA), which oversees the Berks Area Regional Transportation Authority (BARTA), that serves Berks County.

Transit projects are generated by the operating agency - the South Central Transit Authority (SCTA) and include both fixed route and Special Services to provide transportation services to individuals with disabilities, older adults, and people with low-incomes. The Americans with Disabilities Act (ADA) mandates that federally funded public transportation operators must accommodate passengers who live within ¾ mile of a fixed bus route but are physically unable to access the service. To provide this accommodation, most public transportation providers use a paratransit service to provide eligible passengers service from their origin to their destination. The Special Services program is used to address that mandate.

The County has looked at potential pedestrian and potential bicyclist transportation needs in the Berks County Bicycle and Transportation Plan 2020 to grow and maintain access to BARTA's Fixed Route System. When considering potential pedestrian transportation needs to access this transit system a buffer of ½ mile is used since the average transit user travels 10 minutes or less to and from their bus stop. When considering potential bicyclist transportation needs to access this transit system the buffer is raised to 2 miles, representing the distance a beginner or average cyclist can travel in 10 minutes. Through spatial analysis of *Maps 13 and 14*, these buffers were taken into consideration to determine whether a block group has access to the BARTA Fixed Route System or not.

Maps 13 and 14 display the proximity of residents to the transit system, especially concerning access for Minority and Low-Income populations.   The population is broken into block groups identified by Minority and Low-Income populations in the following maps. *Map 13* shows that a majority of the block groups with Minority populations above the county average are along BARTA routes. Only two of these block groups do not have a BARTA route adjacent or running through their respective geographic area and are further than ½ mile from the route, which limits pedestrian access. However, these block groups are within 2 miles of the BARTA Fixed Route System, which would allow for bicyclist access. *Map 14* shows that the Low-Income groups centrally located around the City of Reading are serviced by BARTA routes, however, six of the outlying block groups of with Low-Income populations above the county average are not along or within ½ mile of the BARTA Fixed Route System. Five out of these six block groups are also more than 2 miles from these transit routes leaving residents without BARTA fixed route service even if accessed via bicycle.

In order to best facilitate the needs of all residents to access the public transportation system, regardless of type of bus including fixed route service, paratransit service, or express route service, coordination should continue to occur between Reading MPO and SCTA to make sure all avenues are being explored to improve accessibility.
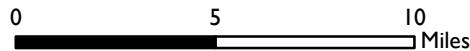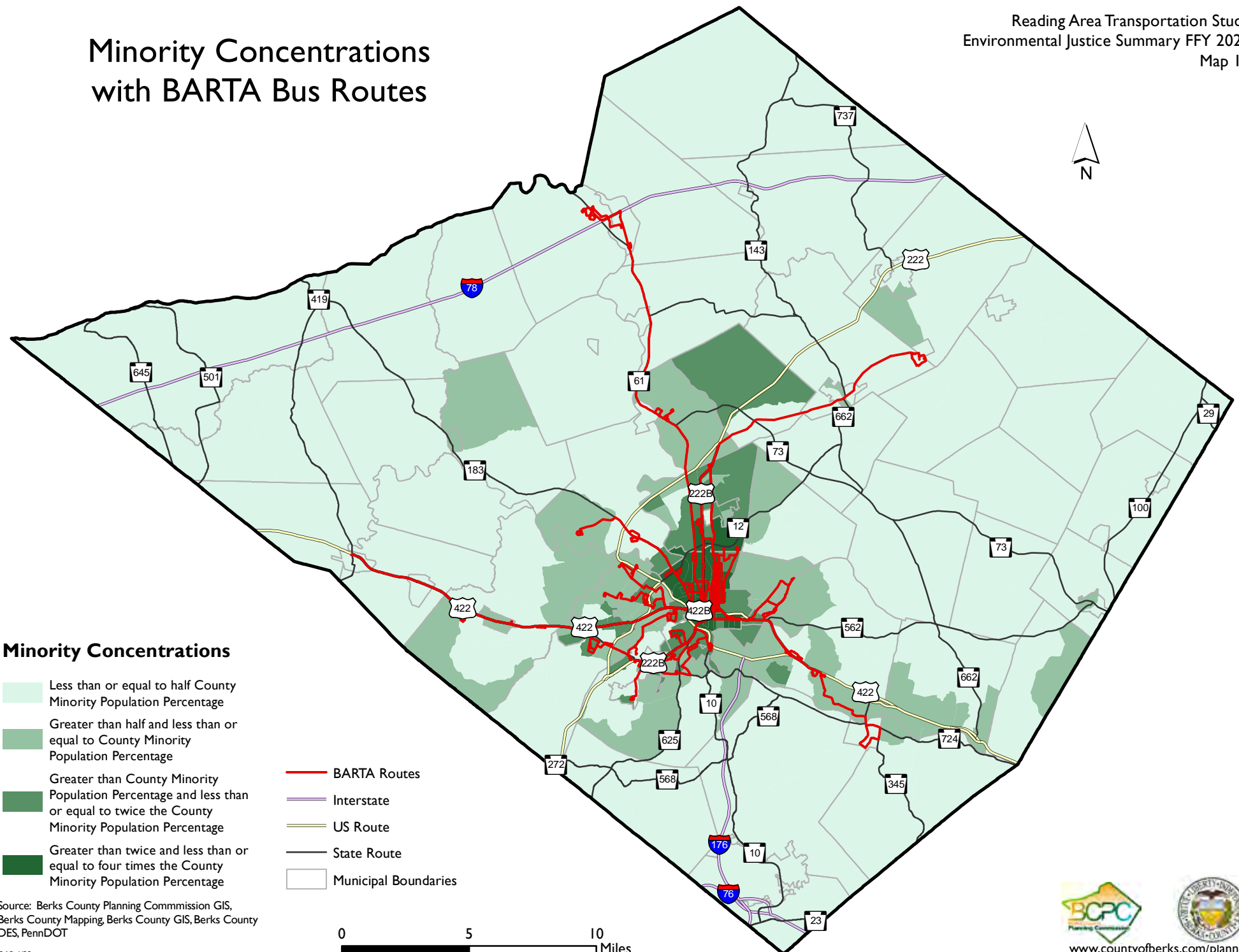
Minority Concentrations
with BARTA Bus Routes

N

Minority Concentrations

Less than or equal to half County Minority Population Percentage

Greater than half and less than or equal to County Minority Population Percentage

Greater than County Minority Population Percentage and less than or equal to twice the County Minority Population Percentage

Greater than twice and less than or equal to four times the County Minority Population Percentage

— BARTA Routes

— Interstate

— US Route

— State Route

☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10
Miles

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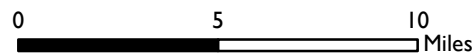# Low-Income Concentrations
with BARTA Bus Routes

N

Low-Income Concentrations

- Less than or equal to half County Low Income Population Percentage
- Greater than half and less than or equal to County Low Income Population Percentage
- Greater than County Low Income Population Percentage and less than or equal to twice the County Low Income Population Percentage
- Greater than twice and less than or equal to four times the County Low Income Population Percentage
- Greater than four times the County Low Income Population Percentage

- ——— BARTA Routes
- ——— Interstate
- ——— US Route
- ——— State Route
- ☐ Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10
Miles

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Types of Projects and Distribution

The 2023-2026 Highway and Bridge TIP totals $241,352,000, while the Interstate TIP totals $75,801,000 adding up to $317,153,000. The projects include roadway and bridge, studies, bike and pedestrian, intermodal, as well as Interstate. Transit projects totaling $61,891,000 are also proposed and are dedicated to maintaining the current operating system, as well as improving the local BARTA bus fleet through the SCTA Transit Asset Management Program and Capital Budget. The following chart gives a breakdown of the total cost of each project mode, the percent of the total cost and the total per capita cost.

Table 16

Project Mode	All Projects		
	Total Cost	Percent of Total Cost	Total Per Capita Cost
Bike/Ped	$2,317,000	.6%	$5.54
Bridge	$84,926,000	22.4%	$203.16
Intermodal/CMAQ/ Transit	$86,954,000	22.9%	$208.01
Interstate	$75,801,000	20.0%	$181.33
Roadway	$107,286,000	28.3%	$256.65
Miscellaneous	$21,760,000	5.7%	$52.05
Total	$379,044,000	100%	$906.74

Per *Table 16*, each project, including line items, has been grouped into a project mode: Bike/Ped, Bridge, Intermodal/CMAQ/ Transit, Interstate, Roadway, and Miscellaneous. Within the Intermodal category, projects such as transit improvement and CMAQ line items have been grouped to give us a projected total of $86,954,000. Furthermore, the Interstate maintenance program funding totals only come from the Interstate TIP, not the Highway & Bridge TIP and involve three (3) projects all associated with the I-78 corridor, which touches none of the block groups with Minority populations above the county average and one block group above the county average for Low-Income populations, which can be seen in *Maps 15 and 16*. Additionally, the total cost of the Interstate maintenance program accounts for 20% of the total 2023-2026 TIP allocation. Roadway projects include not only restoration and reconstruction projects, but also intersection improvements, safety improvements, and shoulder upgrades. The Miscellaneous category while $21,760,000 is for Delivery and Consulting and line items, but no actual project has been associated with this project mode.

Benefits and Burdens

As part of the Transportation Improvement Program (TIP) adoption process, the Reading Area Transportation Study (RATS) is required to analyze the impact that TIP projects have on the surrounding environments. One aspect of this analysis is evaluating the benefits and burdens a project may have on the socio-economic population surrounding a project area. The benefits that the regional transportation program can bring are access, mobility, safety and environmental quality. The burdens of the program can be a reduction in any of those areas to a community. Many transportation projects require a trade-off between those aspects of the transportation system and the distribution of the benefits and burdens. For example, a project that will decrease congestion in one community may result in a decrease in the environmental quality of another as additional vehicles begin utilizing the improved route. Increased safety may require a trade off in access or mobility, and increased access may bring mobility concerns. Benefits and burdens analysis in respect to environmental justice is done to ensure that the benefits of transportation investment are being shared equally and that the burdens created by new projects are not being allowed by one part of the public over another.

Projects on the FFY 2023 TIP are broken down into several categories including Maintenance, Bridges, Capacity, Safety, Bicycle and Pedestrian, and Intermodal. Each type of project has a unique set of impacts and will affect individual populations differently. For example, maintenance projects tend to cause the least amount of impact on the population since they typically involve highway resurfacing or repaving work on existing roadways. Although these projects can cause delayed travel time and transit service, traffic detours, and work zone noise and debris, the projects are typically shorter in duration and result in improvements to the functionality of the roadway network by providing smoother driving surfaces and new roadway markings. While most bridge projects are identified as either a rehabilitation or replacement, both types of projects can lend itself to significant traffic detours, traffic delay, and noise. However, the benefits of these types of improvements result in safer bridge structures, improved roadway conditions, and updated signage.

Capacity projects, which can involve the addition of new lanes to existing roadways, new roadways to the existing network, or at times the realignment of intersections or interchanges, in an effort to provide for more traffic mobility. Special attention needs to be made when planning capacity projects, especially to low-income and minority populations. Not only can these projects result in right-of-way acquisitions to account for the additional capacity, but also construction impacts are normally more severe due to longer construction periods, travel pattern shifts, and delayed travel times among others. The consequences of the completion of capacity projects can involve the loss of property, increased traffic volumes, and decreased air quality, while other benefits can include improved transit service time, decreased travel delay, and safer roadway conditions which will result in improved quality of life for all residents and users of the roadway system.

For the RATS FFY 2023 TIP, the majority of projects will not require right of way acquisition, displace residents or cause burdens on the mobility, access, or environmental health of any community, EJ Sensitive or not. This is due to the majority of candidate projects found within the RATS Highway TIP are programmed to maintain or enhance the existing transportation system.

Maps 15 and 16 display the 2023 TIP Projects and FFY 2023-2045 Long Range Transportation Plan Candidates by concentrations of Minority and Low-Income populations. The yellow hexagons denote locations of bridge candidate projects, while the red lines and circles identify highway reconstruction or resurfacing candidate projects. Any candidate projects shown in blue address the Interstate and green triangles denote Transit.
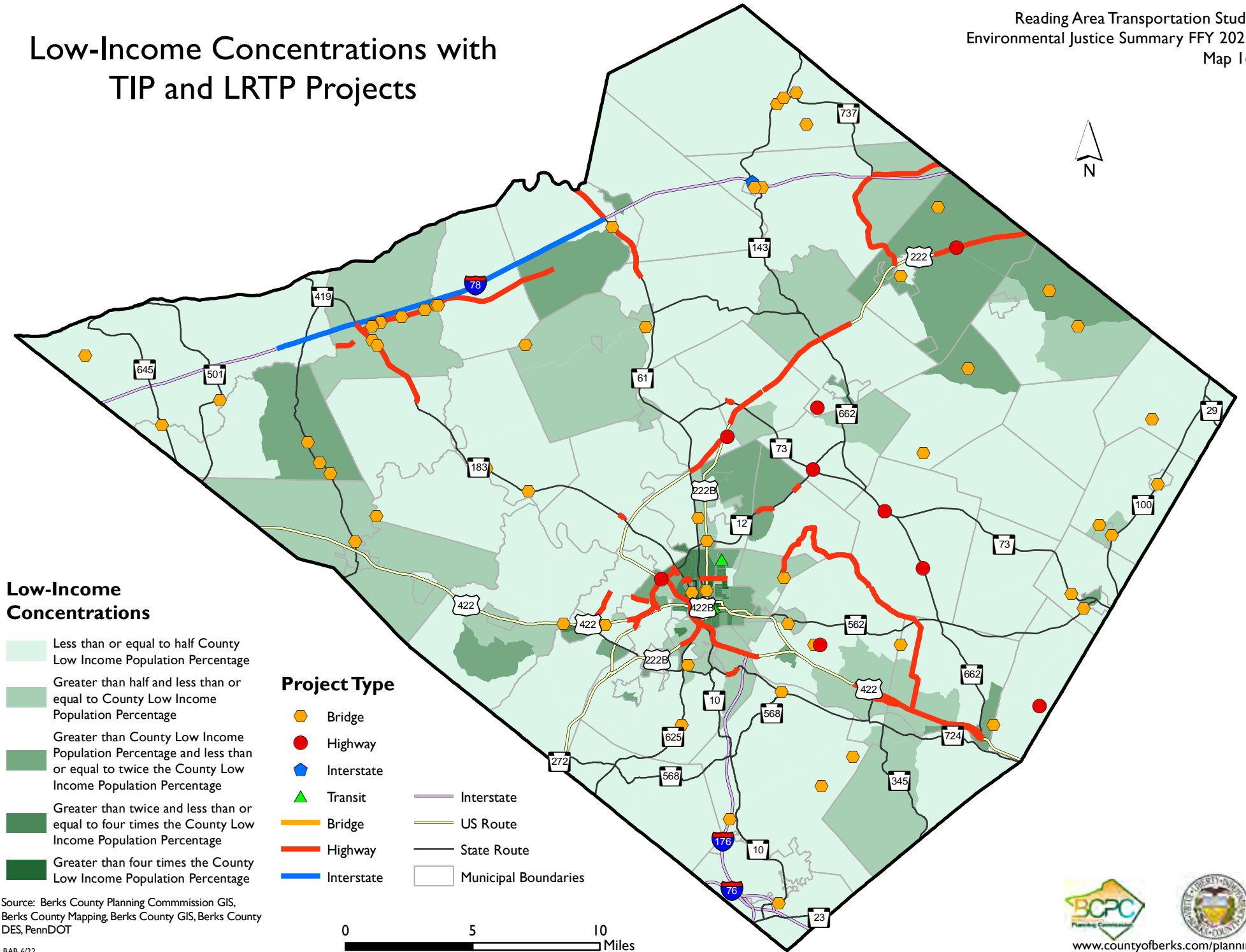
Minority Concentrations with TIP and LRTP Projects

Minority Concentrations

Less than or equal to half County Minority Population Percentage

Greater than half and less than or equal to County Minority Population Percentage

Greater than County Minority Population Percentage and less than or equal to twice the County Minority Population Percentage

Greater than twice and less than or equal to four times the County Minority Population Percentage

Project Type

Bridge

Highway

Interstate

Transit

Bridge

Highway

Interstate

Interstate

US Route

State Route

Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

BAB 6/22

0   5   10
Miles

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Low-Income Concentrations with TIP and LRTP Projects

N

Low-Income Concentrations

Less than or equal to half County Low Income Population Percentage

Greater than half and less than or equal to County Low Income Population Percentage

Greater than County Low Income Population Percentage and less than or equal to twice the County Low Income Population Percentage

Greater than twice and less than or equal to four times the County Low Income Population Percentage

Greater than four times the County Low Income Population Percentage

Project Type

Bridge
Highway
Interstate
Transit

Bridge — Interstate
Highway — US Route
Interstate — State Route
       Municipal Boundaries

Source: Berks County Planning Commmission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT

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0   5   10   Miles

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Statewide Environmental Justice Analysis Methodology
2023-2026 Pennsylvania Transportation Improvement Program

Prepared by

Scott R Williams

Transportation Planning Supervisor

Lycoming County Department of Planning and Community Development

Williamsport Area Transportation Study Metropolitan Planning Organization (WATS MPO)

Step 1

Data collection

This analysis was conducted completely on "fresh" data acquired from the below identified sources in April 2021.

Topic	Data Set	Table
Census Block Group Boundaries	US Census Bureau, 2019 State Level Geodatabase for Pennsylvania	
Census County Boundaries	US Census Bureau, 2019 State Level Geodatabase for Pennsylvania	
Race	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	B03002 Hispanic or Latino Origin by Race
Minority	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	B03002 Hispanic or Latino Origin by Race
Low-Income Households	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	B17017 Poverty Status in the Past 12 Months by Household Type by Age of Householder
Low-Income Population	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	S1701 Poverty Status in the Past 12 Months
Minority Populations by Low-Income Status	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	S1701 Poverty Status in the Past 12 Months
Limited English Proficiency (LEP)	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	DP02 Selected Social Characteristics in the United States
Persons with a Disability	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	DP02 Selected Social Characteristics in the United States
Elderly (65 years or older)	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	DP05 ACS Demographic and Housing Estimates
Carless Households	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	DP04 Selected Housing Characteristics
Computerless Households	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	DP04 Selected Housing Characteristics
Internetless Households	US Census Bureau, 2015–2019 American Community Survey 5-Year Estimates	DP04 Selected Housing Characteristics
Crashes	PennDOT Crash Data	Statewide Crash Data for 2015, 2016, 2017, 2018, and 2019
Federal Aid Segment Miles	PennDOT RMS	FED_AID_PRIM_IND field = Y
Bridges	PennDOT BMS 2	

All US Census Bureau, 2015–2019 American Community Survey datasets were acquired for all Pennsylvania Counties and for all Pennsylvania Census Block Groups. Relevant columns from the Census tables were extracted into a two new tables to produce flat table profiles. These tables were then joined to the relevant Census geography features.

Step 2

Identifying EJ Populations

General Approach

Minority and low income populations was conducted substantially according to the methodology outlines in the South Central Pennsylvania Unified Environmental Justice Process and Methodology document distributed to Planning Partners ahead of the 2021–2024 TIP update cycle. As such, I will refer the reader to Appendix A and Appendix B of the South Central Pennsylvania Unified Environmental Justice Process and Methodology for detailed step-by-step recipes of how to bake the data ingredients into an analysis cake. However, my process differed in one crucial but important aspect that is necessary to allow a statewide uniform analysis.

The process followed for the 2021–2024 program update classified low income and minority population percentages based on natural breaks of the percentages of those populations present within the block groups of each county in Pennsylvania. The result of this was to create a custom classification of symbol intervals for each county. The presence of 67 different interval scales would lead to conducting 67 separate analyses downstream in the workflow.

Instead, I found that when Census block groups were classified into intervals based on the *ratio* of census block group minority/low income percentage to county or region overall minority/low income percentage (i.e. a ratio of "1" indicates a census block group has the same minority or low income percentage as the county average) that I was able to produce a uniform scale usable across all counties or regions in the state. One side effect of this approach is that it resulted in some counties not having all intervals. However, it gives us a uniform and easily communicated and understood way of classifying the relative concentrations of low income and minority populations across the state of Pennsylvania.

As an example, based on the procedure described above, I defined interval "1" as being all census block groups with a minority population percentage less than half the countywide or regional minority population percentage. The result is that any counties or regions with no census block groups that fit that criterion do not have that interval. By standardizing the intervals across the state we are able to make apples-to-apples comparisons between counties and regions and also the ability to scale the analysis up to larger geographic scales (or down to smaller scales) which gives us a stronger analytical product. This should make this product more useful for conducting analysis for multicounty planning partners and across PennDOT districts if we wanted to scale the analysis up to be more regional.

Definition of Minority Population and Low income Population Concentration Intervals

Minority Intervals	Ratio of Minority Population Percentage in Census Block Group to County or Planning Partner Minority Population Percentage
1	Census Block Minority Population Percentage / County or Planning Partner Minority Population Percentage <= 0.5 (Census block group minority population percentage less than or equal to half of countywide or regional minority population percentage)
2	Census Block Minority Population Percentage / County or Planning Partner Minority Population Percentage > 0.5 and <= 1 (Census block group minority population percentage greater than half and less than or equal to countywide or regional minority population percentage)
3	Census Block Minority Population Percentage / County or Planning Partner Minority Population Percentage > 1 and <= 2 (Census block group minority population percentage greater than County Minority Population Percentage and less than or equal to twice the countywide or regional minority population percentage)
4	Census Block Minority Population Percentage / County or Planning Partner Minority Population Percentage > 2 and <= 4 (Census block group minority population percentage greater than twice and less than or equal to four times the countywide or regional minority population percentage)
5	Census Block Minority Population Percentage / County or Planning Partner Minority Population Percentage > 4 (Census block group minority population percentage greater than four times the countywide minority population percentage)

Low Income Intervals	Ratio of Low Income Population Percentage in Census Block Group to County or Planning Partner Low Income Population Percentage
1	Census Block Low Income Population Percentage / County Low Income Population Percentage <= 0.5 (Census block group Low Income population percentage less than or equal to half of countywide or regional Low Income population percentage)
2	Census Block Low Income Population Percentage / County Low Income Population Percentage > 0.5 and <= 1 (Census block group Low Income population percentage greater than half and less than or equal to countywide or regional Low Income population percentage)
3	Census Block Low Income Population Percentage / County Low Income Population Percentage > 1 and <= 2 (Census block group Low Income population percentage greater than County Low Income Population Percentage and less than or equal to twice the countywide or regional Low Income population percentage)
4	Census Block Low Income Population Percentage / County or Planning Partner Low Income Population Percentage > 2 and <= 4 (Census block group Low Income population percentage greater than twice and less than or equal to four times the countywide or regional Low Income population percentage)
5	Census Block Minority Population Percentage / County Minority Population Percentage > 4 (Census block group minority population percentage greater than four times the countywide minority population percentage)

Step 3

Assessing Conditions

Assessment of conditions analysis was only conducted for components of the transportation system for which statewide datasets are available (namely pavement conditions of the Federal Aid System, bridges, and reportable crashes). All of these data are freely available from the PennDOT Open Data Portal (https://data-pennshare.opendata.arcgis.com/). Additional data that should be considered by planning partners would be walkway networks, transit stops, and bicycle infrastructure. If statewide datasets become available for these components of the state transportation system, they could be easily incorporated into future iterations of the analysis.

To perform the assessment of conditions analysis, two important steps were conducted:

1. A map layer was created from dissolving together block groups of the same interval classification within each county and region for low income and minority concentration. These "interval areas" describe the contiguous areas within a county that fall within the same classification.
2. Transportation assets and crash locations were considered in the analysis of an interval area if located within 50 meters of the boundary of the dissolved interval area. In other words, the dissolved interval areas were buffered 50 meters for the analysis. This would allow the capture of features on the border of block groups or providing access to them.

All analysis was conducted within ArcGIS Pro and any attempt to verify or replicate this analysis would most appropriately begin on that platform. As such, instead of trying to produce a written procedure of the analytical steps the next page shows the ArcGIS Pro model used to daisy-chain together the various geospatial processing tools that processed the data. In a general sense, the following aspects of the transportation system were summarized by county and low income and minority concentration interval:

- Federal aid segment miles with "excellent," "good," "fair," "poor," or "other" pavement condition
- Number and bridge deck area of poor/not poor bridges
- Reportable crashes occurring 2015–2019. The 5-year totals are provided in the data extract and can be divided by 5 to get the average annual amounts. Crashes of the following types were analyzed:
    - Total Crashes
    - Total Persons Involved in Crashes
    - All Bicycle Crashes
    - Bicycle Crash Fatalities

- o Bicycle Crash Suspected Serious Injuries
- o All Pedestrian Crashes
- o Pedestrian Crash Fatalities
- o Pedestrian Crash Suspected Serious Injuries
- o All Nonmotorized Crashes
- o Nonmotorized Fatalities
- o Nonmotorized Suspected Serious Injuries
- o All Horse and Buggy Crashes
- o Total Crash Fatalities
- o Total Crash Suspected Serious Injuries

Data Inputs

RMS Roadway Segments → Select → Federal Aid Miles

BMS Bridge Locations

PCIT Crash Locations

US Census Bureau, Block Groups with Demographic Data

Minority Interval Analysis

Dissolve → county_min_in... → Spatial Join (3) → bridges_min_5... → Summary Statistics (2) → bridges_min_s... → fed_aid_miles... → Summary Statistics (7) → fed_aid_min_o... → Pivot Table (4) → county_min_in... (8)

Add Field → Spatial Join (2)

Spatial Join

crashes_min_... → Summary Statistics → crashes_min_...

Pivot Table (2) → Pivot Table → Summary Statistics (5) → fed_aid_min_ir... → fed_aid_min_... → Join Field (10)

county_min_in... (2)

Calculate Field (2) → county_min_in... (3)

Join Field → county_min_in... (4)

bridges_min_c... → bridges_min_a...

Pivot Table (3) → fed_aid_min_l... → Join Field (9) → county_min_in... (7)

Join Field (7) → county_min_in... (5) → Join Field (8) → county_min_in... (6)

Low Income Interval Analysis

Dissolve (2) → county_li_inter... → Spatial Join (5) → bridges_li_50... → Summary Statistics (4) → bridges_li_stat... → Summary Statistics (8) → fed_aid_li_opi... → Pivot Table (9) → fed_aid_opi_m... → Join Field (6) → county_li_inter... (8)

Add Field (2) → Spatial Join (4) → crashes_li_50... → Summary Statistics (3)

Pivot Table (6) → Summary Statistics (6) → fed_aid_iri_sta... → Pivot Table (8) → fed_aid_iri_miles → Join Field (5) → county_li_inter... (7)

county_li_inter... (2) → Spatial Join (6) → fed_aid_miles... → crashes_li_sta...

bridges_li_cou... → Pivot Table (7) → bridges_li_area → Join Field (4) → county_li_inter... (6)

Calculate Field → county_li_inter... (3) → Join Field (2) → county_li_inter... (4) → Join Field (3) → county_li_inter... (5)