Technical Memorandum

Passenger Transportation
Existing and Future Conditions

Prepared for:

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1. ROADWAYS AND BRIDGES

The first half of this chapter provides an inventory of the existing conditions of roadways and bridges under the responsibility of the Ohio Department of Transportation (ODOT). As part of this section, roadway miles and pavement conditions are discussed. The bridge section includes information about the number and size of bridges, as well as their current condition. Future roadway and bridge needs are discussed in the second half of the chapter, with supporting sections provided in the Appendices.

1.1 Overview

ODOT is responsible for 17,270 centerline miles of roads, accounting for 14 percent of public roads in the state, and for 43,211 lane miles (16.7 percent of the total). State roads in areas classified as rural account for 82.4 percent of centerline miles and 74.4 percent of lane miles. Over 97 percent of state maintained road centerline miles have pavement in acceptable or better condition for ride quality, which exceeds ODOT Critical Success Factors (CSF).

ODOT owns and maintains 13,941 bridges, amounting to 31.1 percent of Ohio bridges in the state. One of ODOT's CSF is the General Appraisal (GA) rating, which is the measure of the major structural items of a bridge such as super-structure, piers, and abutments. On a scale of 0 to 9 with 9 being the best, ODOT currently maintains 97.6% of its bridges with a GA rating of 5 or better.

According to the long-range needs analysis conducted for Access Ohio, roadway and bridge preservation needs total $47 Billion from 2014 to 2040, as shown in **Table 1-1**.

Table 1-1: Ohio Roadway and Bridge Total Needs, 2014-2040, in Millions

Facility Type	System Element	$M
Roadway	Preservation and Reconstruction	$24,000
	TRAC	$9,000
	Safety	$3,000
	Maintenance	$2,000
Bridge	Non-Major Bridges	$7,437
	State-system less than 20 ft	$237
	State-Supported	$165
	Major Bridges	$721
	River Crossings	$149
	Culverts	$486
Total Needs		**$47,194**

The highway needs analysis describes the investments required to produce a roadway system that maintains its pavement integrity while addressing reconstruction needs and increasing capacity. The bridge analysis improves the system according to greatest need and user benefit leading to a bridge system that meets ODOT's current CSF's.

1.2 Existing Conditions of Ohio Roadways

Information provided by Ohio Department of Transportation (ODOT) to the Federal Highway Administration (FHWA) for the 2011 Highway Performance Monitoring System (HPMS) was reviewed and used to summarize existing roadway conditions in Ohio. The HPMS provides data on the condition and performance of all Federal-aid roadways in the state. Where additional data was necessary, the ODOT Road Inventory files were reviewed and used to verify and supplement the existing roadway conditions provided in the HPMS.

1.2.1 Roadway Miles

Ohio has 123,247 centerline miles of public roadways in the state and 258,774 lane miles. ODOT is responsible for 17,270 centerline miles (14 percent of total state) and 43,211 lane miles (16.7 percent). These roadways are classified as the state maintained roadway system. The majority of this section focuses on this system, which is defined as all Interstates, US Routes outside of municipalities, and State Routes outside of municipalities. Ohio's Home Rule law makes municipalities responsible for all roads within their jurisdiction with the exception of Interstates. Townships and counties are responsible for all roads within their jurisdiction with the exception of Interstates, US Routes, and State Routes.

The remaining miles in the Ohio roadway system are owned and maintained by municipality, county, and township agencies throughout Ohio. As shown in **Table 1-2** municipalities are responsible for 33,668 (27.3 percent) of the road miles and 75,712 (29.3 percent) of the lane miles. Counties and townships collectively own and maintain the largest share of the roadway system within Ohio. These jurisdictions are responsible for 70,404 (57.1 percent) of the centerline miles and 135,260 (52.3 percent) of the lane miles. While municipality, county, and township agencies are responsible for these miles, ODOT provides and maintains access to the roadways.

Table 1-2: Roadway Miles and Lane Miles by Responsible Agency

Road Maintenance Responsibility	Number of Centerline Miles	Number of Lane Miles
State	17,270	43,211
Municipality	33,668	75,712
County/Township	70,404	135,260
Turnpike Authority	241	1,263
Park/Federal Roads	1,664	3,328
Total	**123,247**	**258,774**

Source: 2011 Ohio HPMS; 2011 Ohio Roadway Inventory Files; ODOT Tech Services

In addition to the state system, the Ohio Turnpike Commission owns and operates the Ohio Turnpike, officially known as the James W. Shocknessy Ohio Turnpike. It is a 241 mile toll road that spans the northern tier of Ohio. The toll system is made up of parts of three separate interstate roadways. In the western region of the state the Turnpike is routed along I-80 and I-90. In Elyria, the Turnpike continues over I-80 as I-90 splits off from the Turnpike northward towards Cleveland. From the point at which I-80 intersects with I- 76, west of Youngstown, the Turnpike follows I-76 eastward to the Pennsylvania state border. User fees and a portion of the state gas tax help fund the maintenance and preservation of the

roadway and assets, such as bridges and interchanges. The turnpike miles and lane miles will not be reflected in any further tables within this chapter.

The park and federal roadways are not included in this analysis as funding and maintenance responsibility do not fall within ODOT's purview.

The state roadway system is subdivided into three categories: Priority, Urban, and General. ODOT maintains the Priority and General system, while municipalities maintain the Urban system. The remainder of this tech memo will focus on the Priority and General systems. The following provides a short description of each of the systems:

- Priority – Interstate and four-lane divided roadways
- Urban – State roadways within municipalities
- General – Primary two-lane roadways across the state

This system is further illustrated in **Table 1-3** where the functional class of each category is shown for the state roadway system. The general system is the largest component, with 14,360 centerline miles and 29,975 lane miles. However, the priority system contains all the interstate roadway miles and a good portion of the principal arterials. The priority system carries the largest share of traffic in the state.

Table 1-3: State Roadway Miles and Lane Miles by Functional Class

Road Classification	Priority		General		Total	
	Miles	Lane Miles	Miles	Lane Miles	Miles	Lane Miles
Rural Interstates	555	2,427	-	-	**555**	**2,427**
Rural Principal Arterials	927	3,701	1,040	2,227	**1,967**	**5,928**
Rural Minor Arterials	5	19	2,633	5,414	**2,638**	**5,433**
Rural Major Collectors	-	-	7,953	16,106	**7,953**	**16,106**
Rural Minor Collectors	-	-	1,123	2,247	**1,123**	**2,247**
Rural Local Roads	-	-	3	5	**3**	**5**
Rural Subtotal	**1,486**	**6,148**	**12,751**	**25,999**	**14,238**	**32,147**
Urban Interstates	778	4,393	-	-	**778**	**4,393**
Urban Expressways	478	2,019	-	-	**478**	**2,019**
Urban Principal Arterials	163	659	715	1,979	**879**	**2,638**
Urban Minor Arterials	4	17	582	1,346	**586**	**1,364**
Urban Collectors	-	-	312	651	**312**	**651**
Urban Local Roads	-	-	-	-	**-**	**-**
Urban Subtotal	**1,424**	**7,088**	**1,609**	**3,976**	**3,032**	**11,063**
Total	**2,910**	**13,235**	**14,360**	**29,975**	**17,270**	**43,210**

Source: 2011 Ohio HPMS; 2011 Ohio Roadway Inventory Files

The majority of the state roadway system is classified as rural, accounting for 14,238 centerline miles (82.4 percent) and 32,147 lane miles (74.4 percent). The largest component of the state's rural network is the class of Rural Major Collectors, which account for 7,953 centerline miles and 16,106 lane miles.

Figure 1-1 shows the roadway network by functional class. Only the state roadway system is highlighted.

Figure 1-1: State Roadway Miles by Functional Class

1.2.2 Roadway Pavement

ODOT has a pavement condition rating (PCR) scale that is used for the Department's pavement needs analysis. PCR ratings are based on a visual survey of pavement conditions, and account for deficiencies such as rutting, cracking, and potholes. A deficient pavement in Ohio is defined as having PCR rating of under 65 for the Priority system and 60 for the General system. The PCR score is calculated by deducting points based on both the frequency and severity of the distresses present in the section. Scoring is both a manual and subjective process.

A translation from PCR to International Roughness Index (IRI) was required for the analysis. This process is outlined in **Appendix A**. From this effort, the following minimum pavement quality levels, as shown in **Table 1-4**, were determined for Access Ohio.

Table 1-4: Pavement Condition Thresholds for IRI (In/Mi)

Condition	Priority	General
Good	< 60	< 60
Acceptable	<= 115	<= 133
Not Acceptable	> 115	> 133

According to these standards 16,757 miles (97 percent) of the state's roadway system falls with the acceptable conditions range for pavement. **Table 1-5** presents the distribution of pavement conditions according to the condition thresholds shown in Table 1-4. 'Good' is based on FHWA levels for adequate pavement. ODOT's CSF for pavement is the threshold between 'Acceptable' and 'Not Acceptable.' The Priority system has 2,837 miles of acceptable pavement, which amounts to 97.5 percent of the total Priority system mileage. Of the total General system mileage, 13,920 are in acceptable condition, (96.9 percent). In 2012, the State roadway system exceeded the goal levels of 95 percent of Priority system pavement at 60 PCR or above and 90 percent of General system pavements at 55 PCR or above.

Table 1-5: Base Year Pavement Condition by State Roadway System Classification

Condition	Priority		General		State Total	
	Miles	Percent	Miles	Percent	Miles	Percent
Good	2,151	73.9%	6,806	47.4%	8,957	51.9%
Acceptable	686	23.6%	7,115	49.5%	7,800	45.2%
Total Acceptable	**2,837**	97.5%	**13,920**	96.9%	**16,757**	97.0%
Unacceptable	73	2.5%	440	3.1%	513	3.0%
Total	**2,910**	**100.0%**	**14,360**	**100.0%**	**17,270**	**100.0%**

1.3 Existing Conditions of Ohio Bridges

Information provided by ODOT to FHWA for the 2011 National Bridge Inventory (NBI) was reviewed to summarize the existing conditions of bridges in Ohio. The NBI file is an annual submittal to the FHWA by all states. It contains over 100 attribute level data items that are collected continuously by state bridge inspectors. The NBI includes information for large culverts as well as bridges, but for purposes of this section culverts were excluded from the analysis.

1.3.1 Number of Bridges

Ohio has 44,766 bridges with a total deck area of more than 157.5 million square feet[1]. **Table 1-6** categorizes bridge by maintenance responsibility, service type, number of bridges, and deck area. Non-roadway bridges refer to railroad, bikeway, pedestrian crossing, or some other non-automobile oriented purpose. There are 1,184 of these bridges in the database. However, the following discussion in this report will be focused on the 43,582 roadway bridges.

Table 1-6: Bridges and Deck Area by Service Type and Responsibility

Maintenance Responsibility	Service Type	Structure Count	Deck Area (sq ft)	Structure Count	Subtotal Deck Area	Structure Count	Total Deck Area
State	Roadway	13,941	104,116,496	43,582	152,361,076	44,766	157,511,928
County/City		28,771	39,730,986				
Turnpike		541	6,143,044				
Other		329	2,370,550				
State	Non-roadway	109	484,219	1,184	5,150,852		
County/City		183	438,244				
Turnpike		8	68,966				
Other		884	4,159,423				

The roadway bridges total includes 13,941 state maintained bridges. These bridges span over 104 million square feet of deck area, which accounts for 66.1 percent of all deck area within the state of Ohio. County and municipality bridges account for the largest number of bridges at 28,771 – over 64 percent of all bridges in the state. The use of "maintained" in this report refers to the maintenance responsibility of the bridge as prescribed in the ODOT database.

Table 1-7 presents the distribution of the state's 43,582 roadway bridges by maintenance responsibility. As mentioned previously, there are 13,941 state maintained bridges in Ohio. This is 32 percent of all roadway bridges. It is important to realize that, for example, river crossing bridges are also major bridges, which are all state maintained; however, they have been separated in this table because construction and maintenance costs for river crossing bridges are sometimes shared with border states.

Table 1-7: Roadway Bridges by Responsibility

Maintenance Responsibility	Description Type	Structure Count	Percent	Structure Count	Percent	Structure Count
State	Non-major ODOT Bridges	10,085	23.1%	13,941	32.0%	43,582
	Non NBI-length ODOT Bridges	3,670	8.4%			
	Major Bridges	155	0.4%			
	River Crossings	31	0.1%			
Local	Locally Maintained Bridges (FAE)	15,906	36.5%	28,771	66.0%	
	Non-Federal Aid Eligible	12,797	29.4%			
	State-Supported	68	0.2%			
Other	Turnpike	541	1.2%	870	2.0%	
	Federal and park, private	329	0.8%			

[1] Bridge counts and deck area as of March 13, 2013 per ODOT Office of Structural Engineering.

The following existing conditions discussion is derived from data provided by the National Bridge Inventory (NBI), which contains information about bridges at least 20 feet in length. There are 26,245 total structures (58.6 percent of Ohio bridges) spanning almost 136.2 million square feet (86.5 percent of the state's bridge area) within the NBI database. This is composed of the Non-major ODOT Bridges (10,085), Major Bridges (155), River Crossings (31), Locally Maintained Bridges (15,906), and the local State-Supported bridges (68). These bridges comprise the majority of state and county/city roadway bridges. The file does not, however, collect information on bridges less than 20 feet in length, which affects Ohio as the Department of Transportation includes any bridge greater than 10 feet in length in its own bridge inventory. Bridges between 10 and 20 feet (3,670 total as shown in Table 1-7) are considered separately because of their exclusion from the National Bridge Inventory. They are included in the needs analysis.

1.3.2 Size of Bridges

Bridge size, as measured by deck area, ranges from less than 1,000 to almost 600,000 square feet in Ohio. Ninety percent of bridges have a deck area of 12,000 sq. ft. or less. The average bridge size is almost 6,000 sq. ft., which is equivalent to a two lane structure approximately 170 feet long. Just one percent of bridges exceed 50,000 sq. ft in deck area, as shown in **Figure 1-2**.

1.3.3 Bridge Sufficiency Ratings

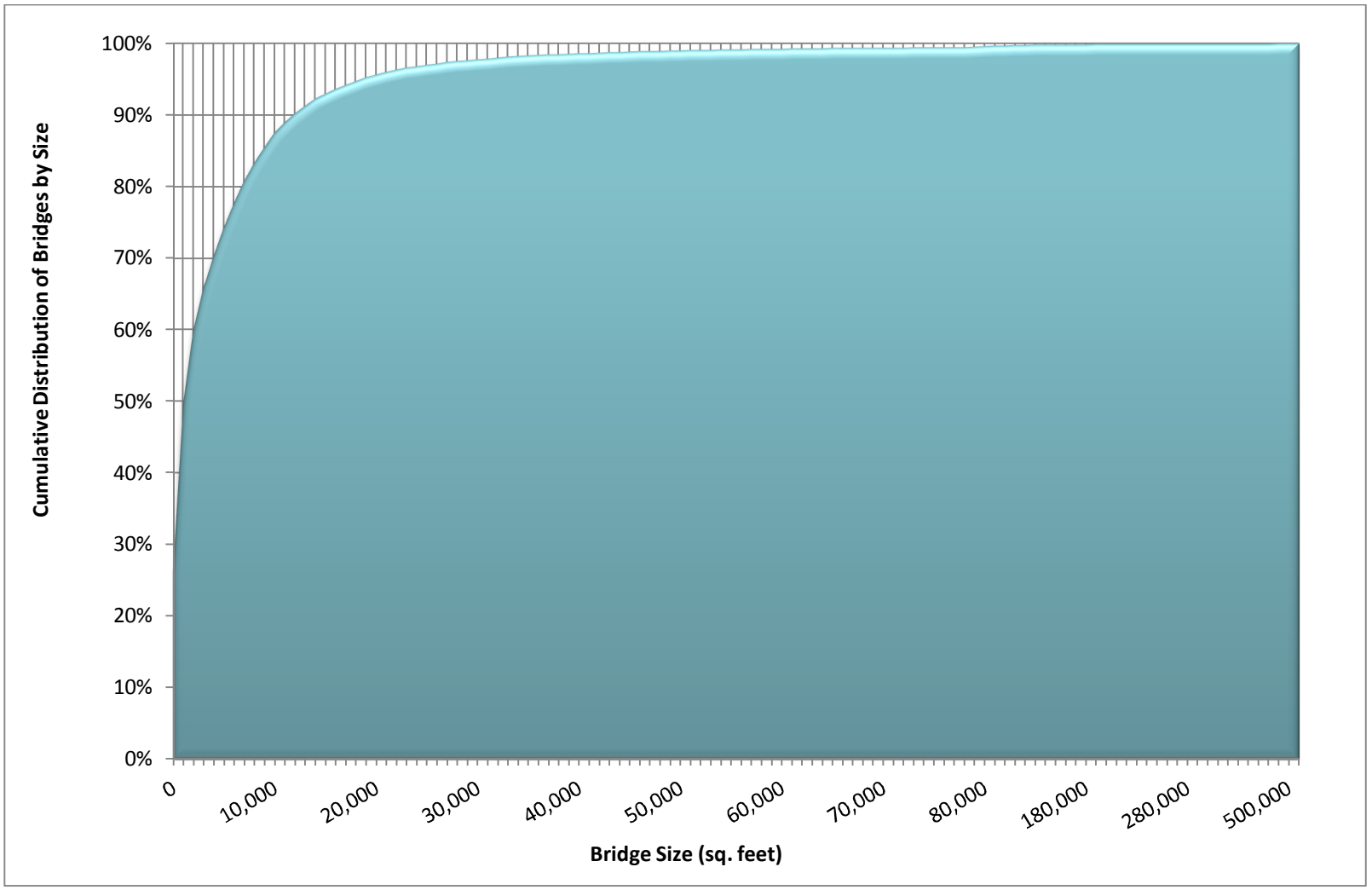
Until 2012, a bridge condition rating known as the sufficiency rating had been used determine a bridge's eligibility for Federal funding. With the enactment of the Federal highway legislation known as MAP-21 in 2012, sufficiency rating was dropped as the trigger for Federal funding eligibility. Funding for bridges is now contained within four primary programs: National Highway Performance Program (NHPP), Surface Transportation Program (STP), Highway Safety Improvement Program (HSIP), and Congestion Mitigation and Air Quality Improvement Program (CMAQ). State departments of transportation are being encouraged to think of the roadways and bridges, especially those on the National Highway System, as a unified whole that must be managed regardless of ownership.

Under MAP-21, states are required to maintain minimum condition thresholds for bridges on the NHS that are supported with NHPP funding. According to this legislation, the deck area of structurally deficient bridges may not account for more than 10 percent of the total NHS bridge deck area in a state. Failure to meet this criterion may impact NHPP funding. Similarly, the other funding programs have flexible performance criteria for any federal-aid roadway or public road.

While the use of sufficiency ratings for funding has changed, they remain useful indicators of bridge condition. The sufficiency rating formula provides a single numeric value that is indicative of a bridge's ability to remain in service[2]. The sufficiency formula includes factors for structural condition, bridge geometry, traffic considerations, and special items dealing with safety and detour length. This rating system, developed by FHWA, is based on a scale from 0 to 100 with 0 being an unusable structure and 100 being new. Bridges with ratings under 50 may need replacement or major rehabilitation.

[2] http://www.fhwa.dot.gov/bridge/preservation/guide/guide.pdf

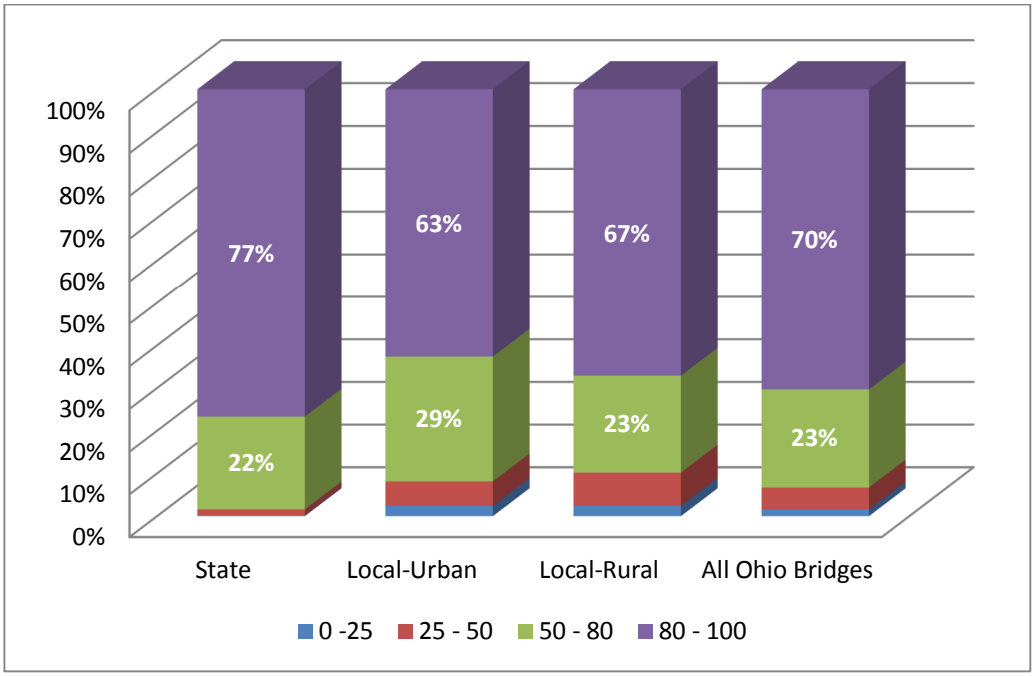
Figure 1-2: Size Distribution of Bridges in the State of Ohio



Source: 2011 Ohio NBI

Almost 70 percent of bridges (18,654) in the state have a sufficiency rating of 80 or higher, with just seven percent (1,777) having a rating of below 50. Ratings for State bridges tend to have higher rating values than the local bridges, as shown in **Figure 1-3**. "Local-Urban" bridges are those structures maintained by county and city agencies that are within an urban area while "Local-Rural" are bridges in rural locations.

Figure 1-3: Sufficiency Ratings of All Bridges in Ohio



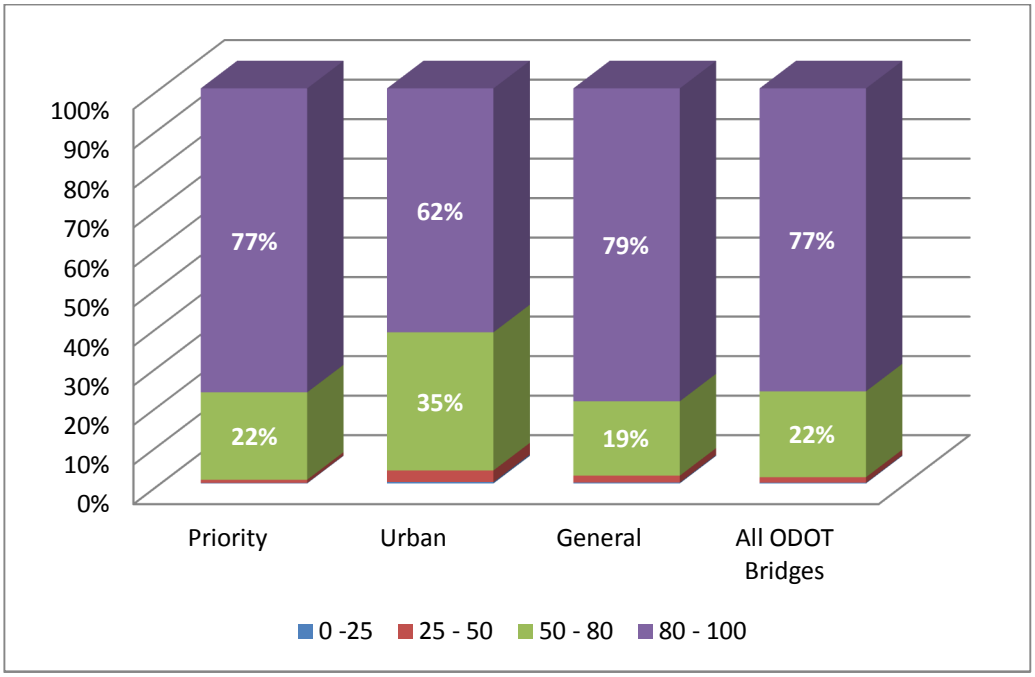
Source: 2011 Ohio NBI, ODOT Planning

A review of the bridges maintained by ODOT that are of NBI length indicates that almost 77 percent of these ODOT bridges (7,788) have a sufficiency rating of 80 or higher, while less than two percent (161) have a rating below 50, as shown in **Figure 1-4**. A breakdown to the PUG system, Priority-Urban-General, shows that 99 percent of the Priority system has a sufficiency rating of 50, with 77 percent having a sufficiency rating of 80 or higher. Ninety-seven percent of urban structures have a 50 or greater sufficiency rating (62 percent with sufficiency rating of 80 or higher) and 98 percent of General bridges have a rating above 50 (79 percent with sufficiency rating of 80 or higher).

ODOT has identified 186 bridges as being "Major" bridges. The average size (deck area) of bridges identified as Major is over 99,000 sq. ft., compared to 5,600 sq. ft. for all bridges in Ohio. As shown in **Figure 1-5**, 54 percent (100) have a rating of 80 or higher, with 7 percent (13) having a rating below 50. Figure 1-5 also breaks down the bridges in the PUG system for discussion purposes.

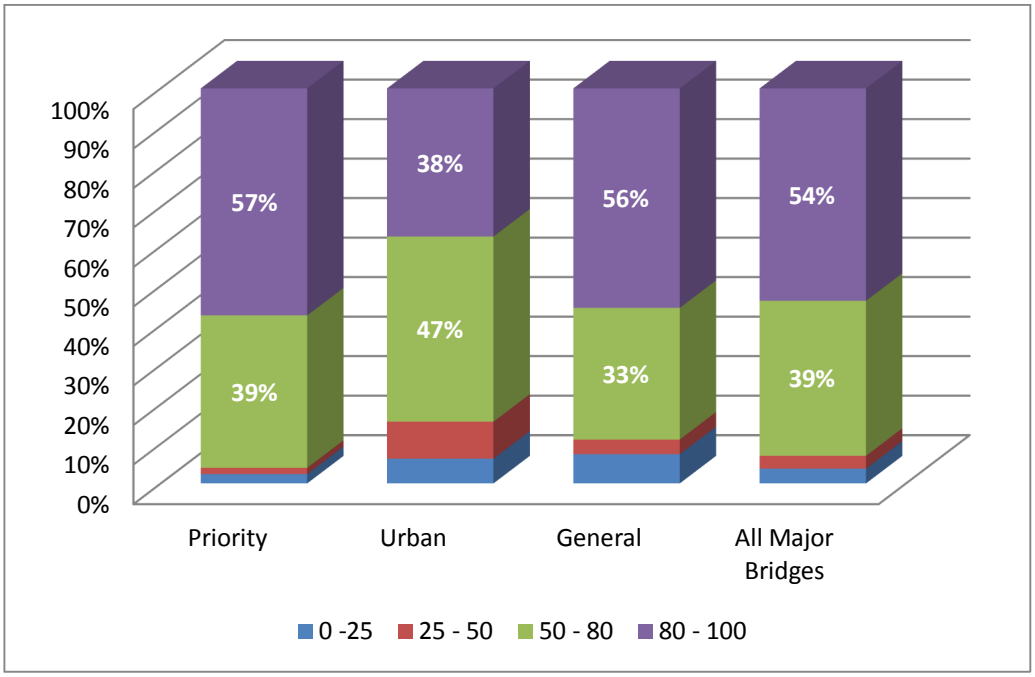
In Figures 1-3, 1-4, and 1-5, the "All Bridges" column is a comprehensive total of all bridges within the chart, regardless of maintenance responsibility.

Figure 1-4: Sufficiency Ratings of Bridges Maintained by ODOT



Source: 2011 Ohio NBI, ODOT Planning

Figure 1-5: Sufficiency Ratings of Major ODOT Bridges



Source: 2011 Ohio NBI, ODOT Planning

1.3.4 Bridge Status

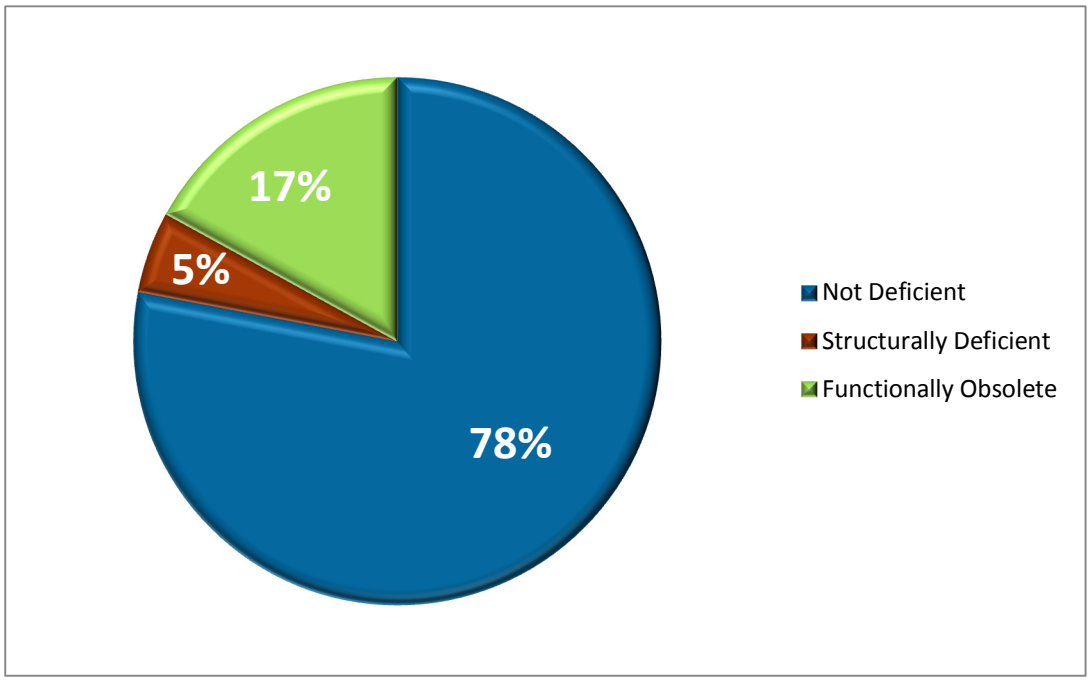
The NBI database defines the status of a bridge as:

- Not Deficient
- Structurally Deficient
- Functionally Obsolete

According to the FHWA, a bridge is structurally deficient if the load-carrying elements are in diminished condition due to deterioration and/or damage. A bridge may also be Structurally Deficient if the waterway opening is inadequate and causes significant traffic delays. Structurally deficient bridges are not unsafe, but could require traffic limitations. On the other hand, the term functionally obsolete deals with geometric deficiencies (lane width, clearances, etc.) when compared to current design standards and traffic levels. A bridge that is both structurally deficient and functionally obsolete is classified only as structurally deficient.

When all bridges in Ohio are considered, over nine percent (2,323) are structurally deficient and 14 percent (3,634) are functionally obsolete. For bridges maintained by ODOT, five percent (475) have a status of structurally deficient, while 17 percent (1,665) are functionally obsolete, as shown in **Figure 1-6**. Of the Major bridges maintained by ODOT, 9 percent (16) are structurally deficient and 29 percent (51) are functionally obsolete.

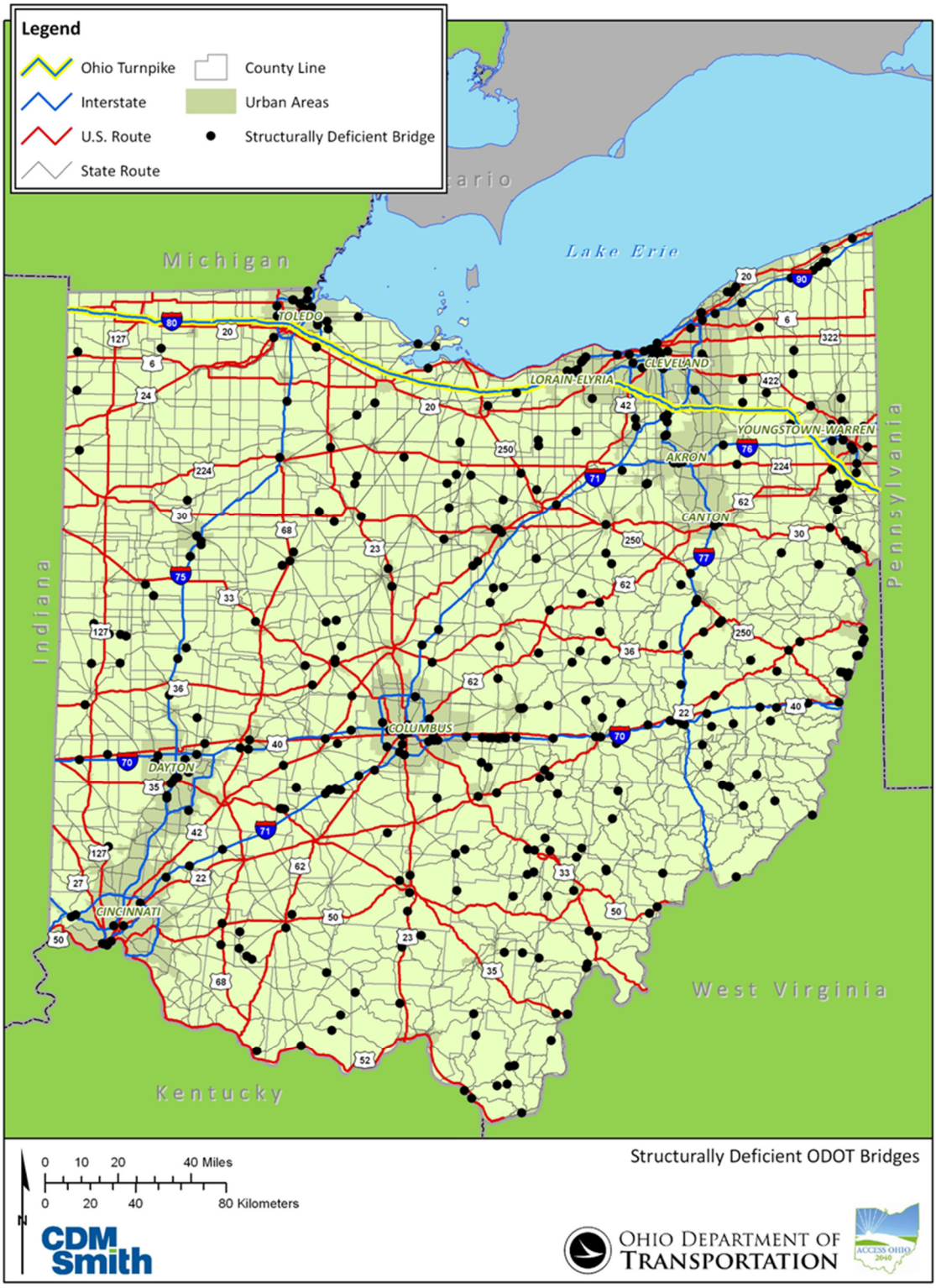
Figure 1-6: Status of Bridges Maintained by ODOT



Source: 2011 Ohio NBI

Figure 1-7 shows the structurally deficient bridges (475 total) in Ohio under the responsibility of ODOT.

Figure 1-7: Structurally Deficient ODOT Bridges



1.4 Roadway Needs Methodology

Needs for roadways on the state maintained roadway system were assessed using FHWA's HERS-ST – Highway Economics Requirements System, State Version. The HERS-ST model[3] is designed to analyze the effects of alternative funding levels on roadway performance. The model simulates roadway conditions and performance levels and identifies deficiencies through the use of engineering principles. In selecting improvements for implementation, the model is designed to select only those projects whose benefits exceed initial construction costs.

1.4.1 HPMS Database

The roadway condition database known as the Highway Performance Monitoring System (HPMS) provides the input information for this analysis. ODOT updates the state roadway system component of the HPMS annually. The FHWA and the U.S. Congress use the HPMS data for roadway needs analyses, fiscal projections, and performance studies.

In this analysis, HERS-ST estimated future needs utilizing Ohio HPMS data for 2011. ODOT staff helped establish the values for key HERS-ST input parameters, including design standards, thresholds for roadway improvements, and improvement costs, as well as other parameters that are customized to reflect ODOT's business practices. HERS-ST defines various types of roadway improvements. For summary purposes, these improvements have been grouped into preservation and reconstruction for use in this analysis. Detailed information on the technical aspects of the roadway analysis, such as unit cost and acceptable thresholds, can be found in **Appendix B**.

HERS-ST doesn't account specifically for needs related to signals, signage, safety, operational improvements, or new highway capacity on new rights of way. ODOT substituted Transportation Review Advisory Council (TRAC) information to identify future capacity addition needs. The Transportation Review Advisory Council (TRAC) guides ODOT's selection of significant transportation improvements for major new construction funding in the near and long-term. Safety, signals, and signage needs were developed using historical allocation information.

1.4.2 Roadway Need Categories

The roadway needs are presented in terms of five categories:

- **Preservation** – the improvement of pavement only - actions that do not change roadway geometry
- **Reconstruction** – includes full-depth replacement of the roadway
- **TRAC** – capacity adding projects or any committed projects that exceed $12 million dollars
- **Safety –** Roadway system upgrades, such as rail/road grade separations, that address identified safety issues

[3] HERS-ST, Version 4.x, Highway Economic Requirements System State Version, Users Guide, U.S. Department of Transportation, FHWA. July 2009.

- **Maintenance –** Capital improvements, such as signage, guardrail replacement, and interchange reconfigurations that improve or sustain the safe and efficient operation of the roadway system

1.4.3 Projected State Roadway Needs

Table 1-8 shows the total roadway needs for Ohio through the analysis period from 2014 to 2040. The majority of needs (63 percent) are projected to be for preservation activities, while the TRAC program will account for another 24 percent. The TRAC program is inclusive of committed projects that foster economic development, increase safety, and add capacity. A list of the committed TRAC projects can be found in **Appendix C.** Safety needs account for 8 percent of total roadway needs. Maintenance of signals, signs, and guardrail account for the other 5 percent of roadway needs.

Table 1-8: Summary of State Maintained Roadway Needs, 2014-2040, in Billions

Type of Roadway Need	Total ($B)	Percent
Preservation and Reconstruction	$24	63%
TRAC	$9	24%
Safety	$3	8%
Maintenance	$2	5%
Total	**$38**	100%

1.5 Bridge Needs Methodology

Needs for bridges on the state's roadway system were assessed using FHWA's NBIAS Tool – National Bridge Investment Analysis System.

1.5.1 National Bridge Investment Analysis System (NBIAS)

NBIAS is an investment analysis tool that predicts bridge repair, rehabilitation, and functional improvement needs. The system estimates bridge needs in dollars and by the number of bridges; distribution of work done; aggregate and user benefits; benefit-cost ratios for work performed, and physical measures of bridge conditions. Outcomes can be presented by type of work, functional classification, whether the bridges are part of the National Highway System (NHS), and whether the bridges are part of the Strategic Highway Network.

NBIAS is based on the same analytical framework as the Pontis bridge program first developed by the Federal Highway Administration (FHWA) in 1989 and subsequently taken over by the American Association of State Highway and Transportation Officials (AASHTO). AASHTO now owns and licenses Pontis to over 50 State transportation departments and other agencies. Pontis provides the bridge engineer with the tools to conduct detailed analysis of the performance of bridges. In order to perform analysis at such a detailed level, Pontis requires data on over 100 attributes pertaining to each individual bridge.

NBIAS incorporates economic forecasting analysis tools to provide planning staff with the ability to forecast the multiyear funding needs required to meet user-selected performance metrics over the length of a specified period. NBIAS is modified to work with bridge conditions as reported by the States

for the National Bridge Inspection System, as well as the attribute/condition state inspection regime used in Pontis.

1.5.2 Identifying Bridge Needs

Ohio's Bridge needs were identified through the analysis of the National Bridge Inventory (NBI) dataset. Although the NBI contains information about structures greater than 20 feet, ODOT defines any structure longer than 10 feet as a bridge. Thus NBIAS's analysis reflects needs for bridges over 20 feet. Life-cycle methods and ODOT expertise were used to evaluate the structures between 10 and 20 feet in length. NBIAS analyzes bridge structures only and removes culvert records from the NBI dataset. NBIAS can only predict and maintain needs for existing bridges. New bridge location analysis has to be performed outside of NBIAS, which is added to the NBIAS results.

NBIAS uses a parameter table to determine if a bridge is under the acceptable threshold for a structure based on roadway functional class, NHS status, or traffic level. If the bridge is deemed to be deficient by falling below any given level, then an action is required. This action is given a cost to improve, determined from unit cost data. Based on the available funds and the project's ranking related to the cost/benefit ratio, an action will be implemented or passed over to the next year of analysis.

The objective of NBIAS is to optimize the system condition and performance year by year. This will give a state the most efficient and reliable system possible. NBIAS uses the Pontis model to help determine the deterioration of the bridge over time and decide whether the bridge falls into a structurally deficient or functionally obsolete status.

1.5.3 NBIAS Parameters

In order to identify those bridges in need of rehabilitation, the NBIAS relies on input tables from the user. These include the improvement policy criteria for when a bridge should be:

- Widened,
- Raised, or
- Strengthened.

The criteria, also referred to as threshold conditions, are specific to each state and contain the legal condition standards for each bridge type, as defined by roadway functional class, National Highway System (NHS) status, and Annual Average Daily Traffic (AADT) class. The deficiency values trigger an improvement action when a bridge falls below the respective standard. Additionally, design values standards set the bridge dimensions and engineering specifications NBIAS uses to determine the need for a replacement bridge.

Parameters used by NBIAS include design and legal standards for lane and shoulder widths, as well as the swell factor which is a cost-increase coefficient used to estimate bridge replacement costs. All values used were modified through conversations with experts within ODOT and through reviewing DOT design manuals to reflect ODOT's practices and preferences. NBIAS parameters used in the needs analysis and unit costs for Ohio bridges are provided in **Appendix D**. The measurement values in these tables are feet, although NBIAS stores all values using the metric system.

1.5.4 Types of Bridge Needs

As with roadway needs, bridge needs have been presented in terms of three categories in this report:

- **Maintenance**: - Routine and as need maintenance;
- **Rehabilitation** – Major work to improve structural integrity, safety, and functionality; and
- **Replacement** - replacement of bridge.

The bridge improvement terms rehabilitation and maintenance describe similar activities as do preservation and modernization in the context of roadways. However, the triggers for bridge replacement are somewhat different than those for roadway reconstruction. For example, bridge replacement is an appropriate improvement when a bridge is not wide enough to handle an expanded roadway with additional travel lanes. When the age and reoccurring maintenance of a given bridge overshadows the cost to replace it, a bridge replacement will be recommended since the long-term benefit/cost ratio is favorable. This applies also to rehabilitation needs. When a potential rehabilitation action is determined, as for an example, raising a bridge with clearance deficiencies, NBIAS will also consider the long-term impacts and the potential benefits that could be realized if the bridge were to be replaced. If the long-term benefit/cost ratio of replacement is just as viable (or better) than the long-term benefit/cost for the respective rehabilitation or maintenance action, NBIAS will replace the bridge.

1.6 Projected State Bridge Needs

Total state system bridge needs over the 27 year period from 2014 to 2040 are projected to be $9.2 billion (**Table 1-9**). Each category shown in Table 1-9 will be discussed in detail in the following sections.

Table 1-9: Bridge Needs on the State Maintained System, in Millions

Category	$M
Non-major ODOT Bridges	$7,437
Non NBI-length ODOT Bridges	$236
State-Supported	$165
Major Bridges	$721
River Crossings	$149
Culverts	$486
State System Total	**$9,194**

1.6.1 Non-major ODOT Bridges

There are 13,941 structures that are state maintained in Ohio. **Table 1-10** presents the long-term needs estimate for the share of these structures - 10,085 - that are greater than 20 feet in length and that are not Major or River Crossing bridges, which are treated separately in terms of funding commitments and/or analysis procedures. Of the remaining 3,856, 186 are the Major and River Crossing bridges and 3,670 are on the state system but less than 20 feet in length.

As shown in Table 1-10, the needs for the 10,085 state-maintained bridges total $7.4 billion between 2014 and 2040.

Table 1-10: Non-major ODOT Bridge Needs, in Millions

All ODOT Bridges > 20 feet	$M	No. of Bridges
Maintenance	$2,120	N/A
Rehabilitation	$582	802
Replacement	$4,735	2,029
Total Needs	**$7,437**	**2,831**

Notes: Expressed in base year 2011 Dollars.

The analysis finds that 2,029 bridges need to be replaced through 2040, at a cost of $4.7 billion. A total of 802 bridges are rehabilitated through some modernization effort, for $582 million. Basic maintenance totals $2.1 billion from 2014 to 2040.

1.6.2 Non NBI-length ODOT Bridges

As noted earlier, ODOT maintains bridges greater than 10 feet in overall length. The NBI database, which was used for the NBIAS analysis, only contains bridges greater than 20 feet. Therefore an additional analysis for the needs of these 3,670 bridges was required. A life-cycle analysis was conducted, based on the methodology provided by ODOT and County Engineers Association of Ohio, and is presented in **Appendix E.** Through this process, the total needs from 2014-2040 for these bridges are estimated to be $236 million.

1.6.3 State-Supported System

Throughout Ohio, there are several bridges that are maintained by the State but whose ownership rests with a county or city agency. The routes served by these bridges typically are higher functional classification roadways (such as Major Arterials) and thus receive special ODOT consideration for maintenance and preservation. There are 68 such bridges with a deck area of 1,688,196 square feet. Using the life-cycle analysis based on the methodology provided by ODOT and County engineers in Appendix E, the total needs from 2014-2040 for these bridges are estimated to be $165 million.

1.6.4 Major Bridge

Major Bridges are maintained by ODOT. The average size (deck area) of bridges identified as Major is over 99,000 sq. ft. There are 186 of these structures in Ohio. However, 31 of these structures cross the Ohio River into Kentucky or West Virginia. This subset of Major Bridges is discussed in the subsequent section.

Improvement actions for Major Bridges (excluding bridges at river border crossings) are shown in **Table 1-11**. The needs total $721 million for these major bridges, accounting for only 8 percent of the total $9 billion in bridge needs. This comparatively small percentage is due to the considerable recent improvement investments to Major Bridges made by ODOT.

Table 1-11: Major Bridge Needs, in Millions

Major ODOT Bridges	$M	No. of Bridges
Maintenance	$457	N/A
Rehabilitation	$11	3
Replacement	$253	10
Total Needs	**$721**	**13**

1.6.5 River Crossing Bridge

There are a number of bridges that cross the Ohio River to West Virginia and Kentucky. These are a subset of the 186 major bridges mentioned previously. Of these bridges, ODOT is the lead agency for two structures:

- **U.S. Grant Bridge** – carrying U.S. Route 23 across the Ohio River between Portsmouth, OH and South Shore, KY.
- **Ironton-Russell Bridge** – carrying State Route 93 across the Ohio River between Ironton, OH and Russell, KY.

This means ODOT is primarily responsible for maintenance with support from neighboring states. While a state may be the lead agency for certain structures, both states contribute financially to the maintenance of the bridge. ODOT supports Kentucky and West Virginia on the maintenance of the other bridges, contributing up to 30 percent of annual maintenance costs and splitting the cost of major investments in bridge replacements when necessary.

Table 1-12 lists the bridge structures along the Ohio, Kentucky, and West Virginia borders. These bridges are open to roadway traffic only and the list does not include any railroad or toll structure under the authority of other public or private agencies other than ODOT, WVDOT, or KYTC.

The following paragraphs discuss specific developments and important crossing bridges. These bridges are included in the above tables, but special efforts are underway that deserve further discussion.

1.6.5.1 Ironton-Russell Bridge

In January 2012, ODOT awarded a contract for the replacement of the Ironton-Russell Bridge, which was originally built in 1922. The old bridge is the oldest remaining cantilever truss over the entire Ohio River. However, it was in dire need of replacement with over 10,000 vehicles crossing it every day. Commercial vehicle use of the bridge was restricted to vehicle widths under 7.5 feet in 2008[4].

The new structure will be a two-tower, cable suspension bridge with two-lanes of travel in each direction. This project broke ground on May 3, 2012[5] and is scheduled to be open to traffic by the fall of 2015. The structure will fully replace the existing bridge between Ironton, OH and Russell, KY. The full price for the bridge is $81.3 million.

[4] http://www.herald-dispatch.com/news/x1660283210
[5] http://www.wsaz.com/news/headlines/Ironton-Russell_Bridge_Meeting_Scheduled_114496844.html

Table 1-12: Ohio River Crossing Bridges

ODOT District	SFN	Border State	Border State SFN	Bridge Name	Alias Bridge Names	Owner	Lead State
8	3107787	KY	059B00046N	Brent Spence		KY	KY
8	3102475	KY	059B00049N	Clay Wade Bailey	C & O	KY	KY
8	3101584	KY	059B00048N	Roebling	'Suspension Bridge'	KY	KY
8	3101975	KY	019B00076N	Taylor Southgate	Central Bridge	KY	KY
8	3117677	KY	019B00039L	Dan Beard SB	Big Mac	KY	KY
8	3117685	KY	019B00039R	Dan Beard NB		KY	KY
8	3117278	KY	019B00040L	Combs-Hehl WB	New Interstate Bridge	KY	KY
8	3117286	KY	019B00040R	Combs-Hehl EB		KY	KY
9	0801305	KY	081B00069N	William Harsha	Maysville - Aberdeen	KY	KY
9	0800333	KY	081B00041N	Simon Kenton		KY	KY
9	7306830	KY	045B00064N	Carl Perkins	New Portsmouth	KY	KY
9	7300026	KY	045B00086N	US Grant/Portsmouth		OH	OH
9	*4401263*	*KY*	*-*	*Ironton Russell*	*New bridge under construction*	*OH*	*OH*
9	**4401255**	**KY**	**045B00087N**	**Ironton Russell**	**Old bridge to be demolished**	**OH**	**OH**
9	4400992	KY	010B00040N	Ashland 12th St.	Old Ashland-Coal Grove	KY	KY
9	4401018	KY	010B00058N	Ashland 13th St.	New Ashland-Coal Grove	KY	KY
9	4401174	WV	00000000006A215	West Huntington		WV	WV
9	4404084	WV	00000000006A222	Huntington	Sixth St. Bridge, Robert C Byrd Bridge	WV	WV
9	4400089	WV	00000000006A168	East Huntington	Proctorville	WV	WV
10	2701448	WV	27351795(2765)	Silver Memorial		WV	WV
10	5300916	WV	0000000010385WV	Bridge of Honor	Pomeroy Mason Bridge	WV	WV
10	5301815	WV		William S Ritchey	Ravenswood	WV	WV
10	8401608	WV		Blennerhassett		WV	WV
10	8401225	WV	B54A103	Parkersburg Belpre		WV	WV
10	8402485	WV	B54A159	Williamstown-Marietta		WV	WV
10	8402906	WV	B54A141	IR-77	Williamstown-Marietta, I-77	WV	WV
10	8490007	WV		Hi Carpenter	Newport- St. Mary's Bridge	WV	WV
10	5602866	WV		New Martinsville	Hannibal	WV	WV
11	0705950	WV	260020034000010	Arch Moore	Moundsville	WV	WV
11	0706396	WV	354700011000010	Veterans Memorial		WV	WV
11	0703095	WV	350700011000014	Fort Henry	Back Channel	WV	WV
11	0701823	WV	350400020000000	Military Order of the Purple Heart	Bridgeport-Wheeling	WV	WV
11	4101960	WV	00000000005A060	Veterans Memorial	Steubenville-Weirton	WV	WV
11	1502395	WV	150300021000012	Jennings Randolph	Liverpool-Chester Bridge	WV	WV

1.6.5.2 Brent Spence Bridge

Originally opened in 1963, the Brent Spence Bridge carries both I-75 and I-71 traffic over the Ohio River in the Cincinnati/Northern Kentucky area. This important river crossing is vital to state and national commerce as it carries commodities worth an estimated four percent of the nation's gross domestic product[6]. It is also a major thoroughfare for local and regional mobility. Efforts by Ohio and Kentucky to address the aging bridge have been initiated. Improvements would cost an estimated $2.4 billion, of which Ohio expects to pay $1.277 billion. This cost leaves Ohio and Kentucky looking to new funding options, such as public-private partnerships or tolling.

1.6.5.3 Brilliant Bridge

A proposed bridge between Brilliant, OH and Wellsburg, WV is under review currently. The bridge is needed as the existing bridges in the area are subject to restrictions. One of these, the Market Street Bridge, is under weight restrictions even after a significant rehabilitation project by WVDOH in 2011. The new structure is a vital connection in an area with limited crossing options. The bridge will connect WV 2 to State Route 7 and significantly decrease the amount of traffic that rerouted, especially for commercial vehicles that can only cross the Veterans Memorial Bridge, which carries U.S. Route 22 traffic. Early design analyses project that the potential bridge alignments would cost $125 million (2011 dollars). Ohio would most likely pay for 30 percent of the total project cost, which puts Ohio's share at $37.5 million. The process is still in the analysis and public involvement phase, and no completion date has been scheduled. U.S. Senators Jay Rockefeller and the late Robert C. Byrd (both of West Virginia) have secured $18 million in federal funding for the planning, design and initial construction of the proposed bridge.

The needs analysis estimates total Ohio River crossing bridge needs at $149 million, including replacements, maintenance, minor rehabilitation, and painting. This total reflects only ODOT's share of the total costs. Since ODOT doesn't anticipate financing the Brent Spence Bridge with traditional transportation funding sources, the replacement costs of the Brent Spence Bridge aren't reflected in the total Ohio River crossing bridge needs estimate. However, the needs do include ODOT's share of the construction cost of the new bridge in Brilliant. Any bridge needs estimate at the U.S. Grant location were included in the major bridge analysis as the structure in 100 percent ODOT maintained.

The border bridge inventory and analysis can be found in detail in **Appendix F**.

1.6.6 Culvert Needs

ODOT estimates that annual culvert needs will amount to approximately $1.5M per district or $18M statewide. Based on these estimates, culvert needs are estimated at $486M over 27 years, from 2014 to 2040.

[6] http://news.cincinnati.com/article/20120629/BIZ/306290124/Bill-won-t-impact-Brent-Spence-Bridge-funding

1.7 State Needs Summary

The analysis in this document determined the total needs for Ohio's roadways and bridges at $47 Billion from 2014 to 2040, as shown in **Table 1-13**. The $47 billion estimate accounts for:

1. Roadway preservation and reconstruction
2. TRAC projects
3. Roadway safety upgrades
4. Maintenance improvements
5. Non-major bridges on the state-system greater than 20 ft
6. Non-major state-system bridges less than 20 ft
7. State-supported bridges
8. Major bridges
9. River crossing bridges
10. Culverts

Table 1-13: Ohio Roadway and Bridge Total Needs, 2014-2040, in Billions

	$ Billions
Roadway	$38
Bridges (including culverts)	$9
Total Needs	**$47**

1.8 Local Roadway and Bridge Needs

Needs for local roadways and bridges are detailed in Appendix E.

2. TRANSIT

This public transportation section presents the existing transit system in the state of Ohio. It includes a discussion of the urban and rural transit agencies, ridership, funding programs, and future needs.

2.1 Overview

The 2040 Access Ohio Long-Range Transportation Plan (AO40) is a multi-year strategic plan that sets forth the direction for future transportation corridors for the state of Ohio. Public transportation is a major component of this plan that continues to become a more important modal choice for many residents. Public transportation empowers individuals to be independent, seek and retain employment, access medical care, and gain access to new opportunities.

This final report of the AO40 Plan describes current public transportation services within the state of Ohio. The report also discusses future transportation needs and challenges facing the state. The development of the future needs includes a review of existing transportation plans that identifies needs and projects for specific regions of Ohio. Needs were also identified through public outreach from the Advisory Committee, Executive Committee, local staff, and the general public.

Central Ohio Transit Authority

The vision and goals for this plan include maximizing multimodal opportunities to provide Ohio residents what they are looking for:

- Whether going to work or to the grocery store, Ohio residents want faster travel, more transportation options, and less traffic; a faster commute and better quality of life.
- AO40 Plan will invest billions of dollars over the next two decades to develop a balanced transportation system that will provide new options for travel, including enhanced public transportation.
- The success of this AO40 Plan relies not only on local funding, but for public transit and other modes to receive a fair share of state and federal funds.

- This AO40 Plan builds upon and recognizes the existing public transit agencies in the state, who are leaders in sustainable transportation options, transit-oriented development, and renewable power.
- Ohio transit agencies are exploring all conservation and smart growth opportunities at transit facilities, bus stations, and park and ride facilities to meet the environmental challenge.

ODOT's Office of Transit, as a part of the Division of Planning, administers the provision of transit services in partnership with the federal government and local communities. This role is maintained through the development of policies and programs that provide technical and financial assistance to local transit programs; evaluate and improve performance of local rural transit systems; ensure effective utilization of state and federal investment in rural public transportation; and ensure compliance of rural subrecipients with all pertinent state and federal laws, rules, and regulations. The roles and purpose of the Office of Transit include the following:

- Provide both federal and state funding to public and human service passenger transportation agencies;
- Provide support, training, and technical assistance to FTA funded public and human service passenger transportation providers; and
- Ensure compliance of rural transit subrecipients with federal and state requirements.

The Office of Transit staff continuously works with local and regional providers in meeting the goals and improving mobility alternatives to Ohio residents. This includes an emphasis on coordination, which began several years ago with the statewide Coordination Plans. These plans included public transit agencies and human service providers who began the collaborative process to better serve each region with improved efficient and effective transportation services.

Toledo Area Regional Transit Authority

Over the past few years, public transportation has advanced nationally due to partnerships with the Housing and Urban Development (HUD) office and with the Environmental Protection Agency (EPA). This active partnership recognizes that by considering housing and environmental concerns, transportation becomes more connected to the major issues of the day, such as energy, environment, economy, and quality of life, all of which can be positively affected by a broader public transportation program. From an ODOT Office of Transit perspective, these partnerships and concepts provide opportunities to build upon the work that is already being accomplished through its current goals and programs to develop new ideas for the future. There is an opportunity for public transportation to be communicated through this statewide plan with a vision that conveys the value of multimodal opportunities for Ohio residents.

The current public transportation network in Ohio includes rural, small urban, and large urban public transit systems. This public transit network is a vital component of the overall transportation system serving the state, with grantees and providers serving the mobility needs of the general public including the elderly, persons with disabilities, low-income persons, commuters, students, and recreational users. Public transit service in Ohio can be divided into three main categories of service:

- Urban transit;
- Rural transit;
- Elderly and persons with disabilities.

Intercity bus service is another type of public transportation service. These intercity bus programs are discussed in a separate section.

2.2 Federal Transit Administration Programs

The Federal Transit Administration began the 2013 fiscal year in October with the new transportation bill, *Moving Ahead for Progress in the 21st Century* (MAP-21).[7] A few changes were made within the transit section of the bill, compared to the previous bill SAFETEA-LU. MAP-21 maintains its 20 percent share of funding and the volume of funding remains the same, which is approximately $10.6 billion per year.

Akron METRO Bus

Highlights of the new MAP-21 programs are shown in **Table 2-1**. MAP-21 consolidated the overall number of programs by two-thirds to improve efficiency. Several unknowns regarding the policy provisions will be clarified over the coming year. The new bill also:

- Increases funding for improving the state of good repair;
- Includes new reporting requirements;
- Requires performance measures for state of good repair, planning, and safety; and
- Implements flexible capital funding to operating dollars for transit systems with populations over 200,000, with 100 buses or less.

FTA 5307 and 5311 programs fund operating expenses at 50 percent reimbursement and capital expenses at 80 percent reimbursement. Obtaining dedicated operating dollars to meet the FTA local match creates issues for some transit agencies who compete for general fund monies. Large urban systems are more likely to have dedicated local funding streams through either county sales tax or property tax. Many small urban and rural transit systems lack this type of dedicated funding stream, which typically indicates annual allocations from local governments. The state does not provide any local match for assistance due restrictions on the state gas tax revenue, which cannot be used for any other purpose than roads.

[7] http://www.fta.dot.gov/documents/chapter53redlineMAP21.pdf

Table 2-1: Highlights of MAP-21 Program

New	Repealed	Consolidated	Modified
Safety Authority (5329)	Clean Fuels Grants (5308)	Urbanized Area Formula Grants (5307) (JARC)	Fixed Guideway Capital Investment Grants (5309)
State of Good Repair Grants (5337)	Job Access and Reverse Commute (5316) (JARC)	Enhanced Mobility of Seniors and Individuals with Disabilities (5310) (New Freedom)	Metropolitan and Statewide Planning (5303 & 5304)
Asset Management (5326)	Paul S. Sarbanes Transit in the Parks (5320)	Rural Area Formula Grants (5311) (JARC)	Research, Development, Demonstration, and Deployment (5312)
Bus and Bus Facilities Formula Grants (5339)	Alternatives Analysis (5339)		Technical Assistance and Standards (5314)
Public Transportation Emergency Relief (5324)	Over-the Road Bus (Sec 3038 – TEA-21)		Human Resources and Training (5322)
TOD Planning Pilot Grants (20005(b) of MAP-21)			

Source: http://fta.dot.gov/documents/MAP-21_Public_Presentation.pdf

The following estimates are based on the current MAP-21 program structure, formulas, and authorized funding levels. The estimates take 2010 Census data into account, including the designation of new urbanized areas (population greater than 50,000). In addition, the estimates use the same data on transit service from the National Transit Database (NTD) as that used for apportioning FY2012.[8] **Table 2-2** shows FY 2013 MAP-21 FTA Apportionments.

In FY2013, urbanized areas will receive apportionments from four programs:

- Urbanized Area Formula Program (section 5307, includes section 5340);
- Enhanced Mobility for Seniors and Individuals with Disabilities Program (section 5310);
- State of Good Repair Program (section 5337); and
- Bus and Bus Facilities Formula Grants Program (section 5339).

States will receive apportionments from the:

- Statewide & Metropolitan Planning Program (section 5305);
- Enhanced Mobility for Seniors and Individuals with Disabilities Program;
- Rural Program (section 5311); and
- Bus and Bus Facilities Formula Grants Program (section 5339).

As part of the AO40 Plan, the FTA future funding is presented in the Finance Tech Memo, along with federal highway funding programs.

[8] http://www.fta.dot.gov/legislation_law/about_FTA_14751.html

Table 2-2: FY 2013 MAP-21 FTA Apportionments

Program															Total
		Cincinnati, KY IN	*Cleveland*	*Columbus*											
5307 and 5340	Urbanized Area Formula Program – 1M and over	$17,399,386	$25,148,368	$14,439,357											$56,987,111
		Akron	*Canton*	*Dayton*	*Toledo*	*Youngstown, OH-PA*									
5307 and 5340	Urbanized Area Formula Program - from 200k - 999,999	$6,511,943	$3,522,476	$14,153,699	$6,036,678	$3,948,575									$34,173,371
		Varies													
5307 and 5340	Urbanized Area Formula Program – less than 200k	$9,254,545													$9,254,545
		Akron	*Canton*	*Cincinnati*	*Cleveland*	*Columbus*	*Dayton*	*Toledo*	*Youngstown, OH-PA*	*Mansfield*	*Middletown*	*Newark*	*Springfield*	*State*	
5339	Bus and Bus Facility Program Tier C - Bus Tier A	$705,997	$390,185	$1,894,190	$2,240,607	$1,551,454	$1,074,912	$651,693	$416,035	$101,964	$141,373	$112,309	$123,719	$1,250,000	$10,654,438
		Akron	*Canton*	*Cincinnati*	*Cleveland*	*Columbus*	*Dayton*	*Toledo*	*Youngstown, OH-PA*					*State*	
5310	Enhanced Mobility of Srs and Individuals w/ Disabilities	$547,508	$293,593	$1,361,944	$1,772,129	$924,830	$710,205	$494,880	$458,720					$2,759,349	$9,323,158
				Cincinnati	*Cleveland*	*Dayton*	*Toledo*								
5337	State of Good Repair			$10,734	$11,263,127	$10,493,239	$17,499								$21,784,599
	Total Program Funds														**$142,177,222**

Source: www.fta.gov

2.3 Ohio Transit

Ohio public transportation agencies provided more than 111 million trips to Ohio residents in the 2011 fiscal year, as shown below in **Table 2-3**. Transit ridership across the state increased in the early and mid-2000s, but declined in 2009 and 2010. Fiscal Year 2011 shows a four percent increase from 2010, with approximately four million additional transit trips. The average vehicle year of the fleet statewide is 2005, which includes all vehicles funded by the FTA programs. This equates to an average fleet age of seven years.

Table 2-3: Ohio Public Transit, FY2011

FTA Program		Ridership	Annual Service Hours	Annual Service Miles	Operating & Admin Budget
5307	Urban Transit Service	109,460,032	5,605,698	79,030,180	$631,746,937
5310	Elderly & Persons with Disability Services	16,882,763	n/a	n/a	n/a
5311	Rural Transit Service	2,204,951	695,314	11,246,451	$31,439,920
	General Public Service	**111,664,983**	**6,301,012**	**90,276,631**	**$663,186,857**
	Total Statewide Ridership	128,547,746			

Source: ODOT FY 2011 Transit Statistics

The overall decrease in ridership for 2009 and 2010 is primarily caused by service reductions due to budget constraints with the economic turndown and the fluctuation in fuel prices. Transit ridership will likely improve at a slow rate as the economy rebounds.

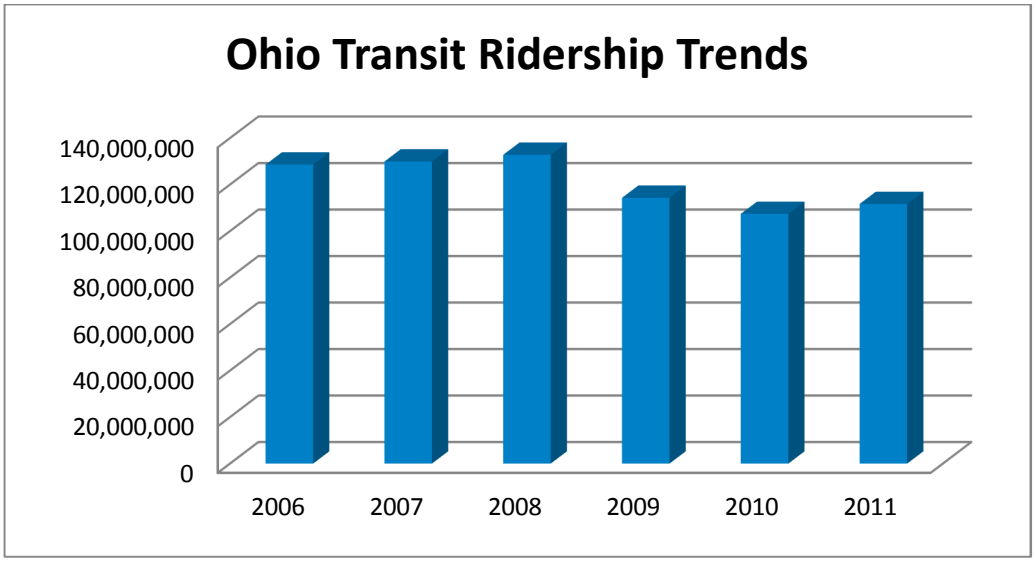
Greater Cleveland Regional Transit Authority

Another economic factor that influences transit ridership levels is the price of gasoline. As gasoline prices rise in Ohio, more people across the state reduce the use of cars and turn to public transportation to commute to work, go to school, travel to shopping centers, and for other various trips. Record high gas prices of $4 per gallon during the summer of 2008 contributed to a significant increase in transit ridership for many transit systems across the country. According to the American Public Transportation Association (APTA) historical ridership data, the percentage increase in total public transit ridership levels during the summer of 2008 over the summer of 2007 levels were an average of approximately five percent across the nation.[9] By the summer of 2009, gasoline prices fell approximately 36 percent from their 2008 summer peak.

[9] http://www.apta.com/mediacenter/pressreleases/2008/Pages/081208_ridership_surges.aspx

Figure 2-1 Illustrates Ohio transit ridership trends from 2006 to 2011. Many transit agencies experienced decreased ridership levels during this period, including those in Ohio.

Figure 2-1: Ohio Transit Ridership Trends



Source: ODOT Status of Public Transit, 2006-2012.

Another factor for decreasing ridership is the shift in population from the major urban areas. Ohio state population continues to show a small, but steady increase; however, there continues to be a shift in population to less dense areas, which directly affects transit service areas and the use of public transportation.

According to the US Census Bureau, 2010 American Community Survey (ACS), approximately 1.8 percent of all trips to work in Ohio are made by public transportation.[10] In addition, approximately 8.3 percent of Ohioans travel by carpool to work. Public transit and/or specialized transportation systems serve some portions of urban and rural communities for 86 of the 88 counties in Ohio. These agencies provide a range of service options to residents, such as fixed-route, route deviation, and demand response. A brief description follows:

- **Fixed-route transit service**: Transit service using rubber tired passenger vehicles operating on fixed routes and schedules. Services provided on a repetitive, fixed schedule basis along a specific route with vehicles stopping to pick up and deliver passengers to specific locations; each fixed route trip serves the same origins and destinations.

- **Route deviation service:** A type of transit service that operates as conventional fixed route bus service along a fixed alignment or path with scheduled time points at each terminal point and key intermediate locations. Route deviation service is different than conventional fixed route bus service in that the bus may deviate from the route alignment to serve destinations within a prescribed distance (e.g., ¾-mile) of the route. Following an off route deviation, the bus must return to the point on the route it left. Passengers may use the service in two ways:

[10] http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

- If they want to be taken off route as part of a service deviation, they must tell the bus operator when boarding; or
- If they want to be picked up at an off route location, they must call the transit system and request a pickup, and the dispatcher notifies the bus operator.

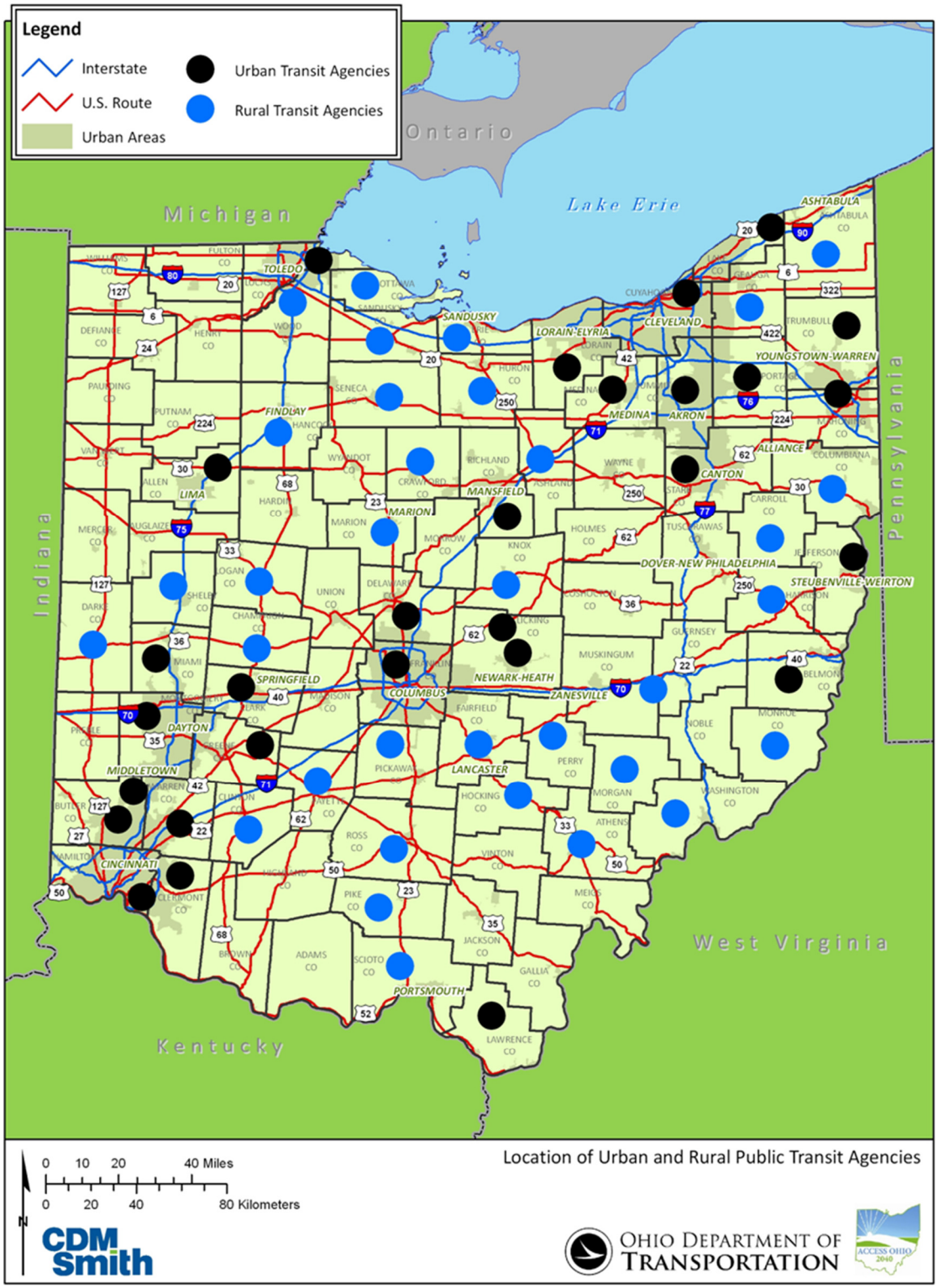
- **Demand response service:** A transit mode comprised of passenger cars, vans, or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations. A demand response (DR) operation is characterized by the following:
  - The vehicles do not operate over a fixed route or on a fixed schedule except, perhaps, on a temporary basis to satisfy a special need; and
  - Typically, the vehicle may be dispatched to pick up several passengers at different pick-up points before taking them to their respective destinations and may even be interrupted en route to these destinations to pick up other passengers.

Ohio has 27 urban transit agencies providing service within small and large urban areas throughout the state. Thirty-five rural transit agencies provide service to or within 36 counties; and the FTA 5310 specialized agencies provide service to or within 64 counties. **Figure 2-2** illustrates the 62 public transit agency locations. The following sections describe the existing transit services within the state.

In FY2013, Ohio has several transit agencies that are being reclassified. DATA, Warren, and Medina are changing from rural to small urban. The transit agencies for Washington County (CABL) and Sandusky (STS) are changing from small urban to rural. These changes are reflections of the population changes over the past decade, as discussed previously.

Central Ohio Transit Authority

Figure 2-2: Location of Urban and Rural Public Transit Agencies



Source: ODOT Status of Public Transit, 2012.

2.4 Urban Transit Systems

In 2011, 27 urban transit systems operated primarily fixed-route and demand-response bus systems in Ohio. For communities with a population over 200,000 persons, the transit agencies are considered large urban transit systems. For communities with 50,000 to 200,000 residents, the transit agencies are considered small urban transit systems. In FY2013, 28 urban transit agencies will operate throughout the state. **Figure 2-3** shows the locations of the urban transit agencies. **Table 2-4** presents the 17 small urban systems and the 11 large urban transit systems in Ohio.

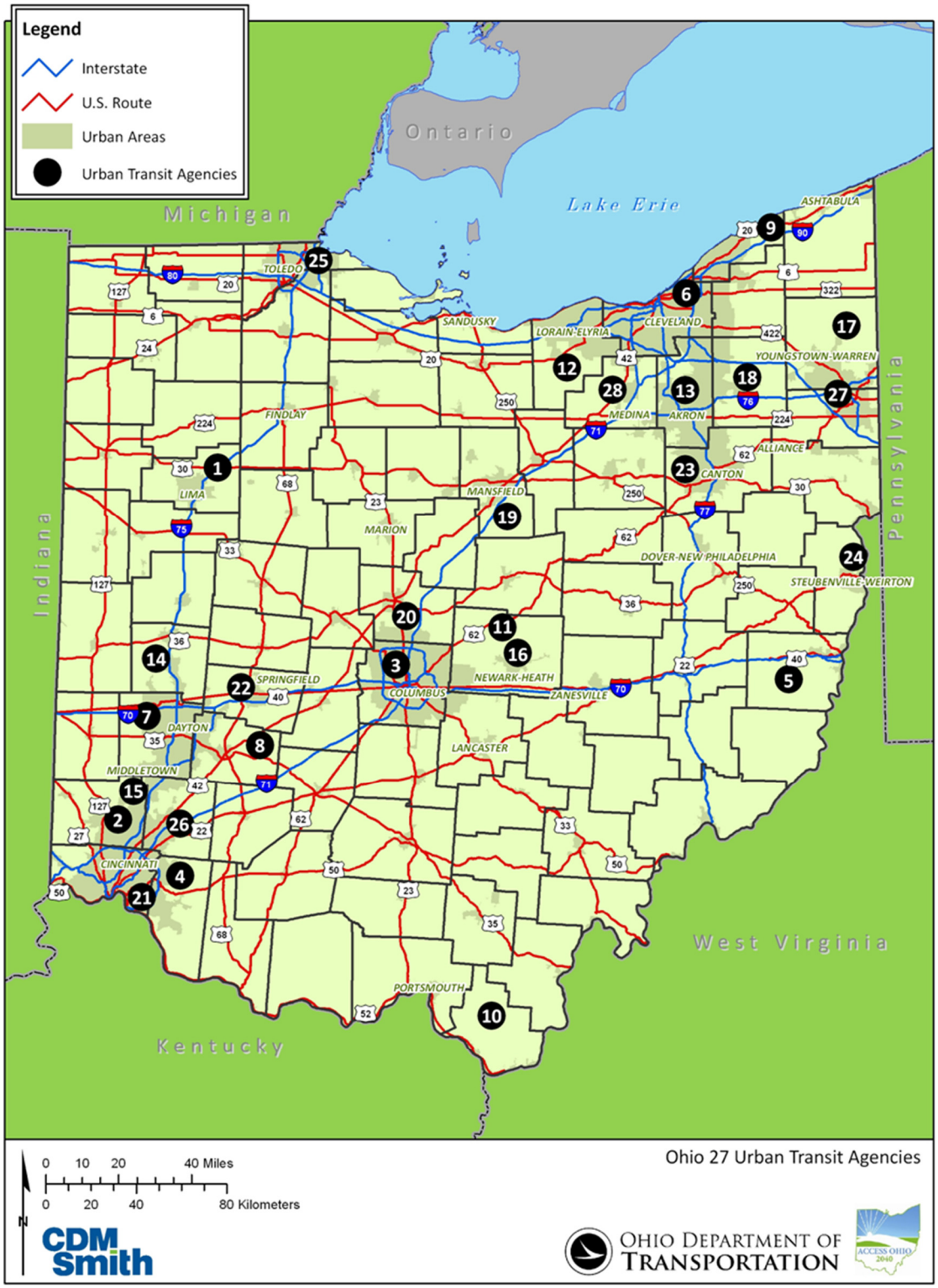
Table 2-4: Ohio Urban Transit Systems

Small Urban Transit Systems		Large Urban Transit Systems	
1*	Allen County Regional Transit Authority (ACRTA)	2	Butler County Regional Transit Authority (BCRTA)
4	Clermont Transportation Connection (CTC)	3	Central Ohio Transit Authority (COTA)
5	Eastern Ohio Regional Transit Authority (EORTA)	6	Greater Cleveland Regional Transit Authority (GCRTA)
8	Greene County Transit Board (Greene Cats)	7	Greater Dayton Regional Transit Authority (GDRTA)
10	Lawrence County Transit	9	Laketran
11	Licking County Transit Services	13	METRO Regional Transit Authority (Akron)
12	Lorain County Transit (LCT)	17	Niles Trumbull Transit System (NITTS)/Trumbull Transit System (TTS)
14	Miami County Transit System	21	Southwest Ohio Regional Transit Authority (SORTA)
15	Middletown Transit System	23	Stark Area Regional Transit Authority (SARTA)
16	Newark-Heath Earthworks Transit	25	Toledo Area Regional Transit Authority (TARTA)
18	Portage Area Regional Transportation Authority (PARTA)	27	Western Reserve Transit Authority (WRTA)
19	Richland County Transit (RCT)		
20	Delaware Area Transit Agency (DATA)		
22	Springfield City Area Transit (SCAT)		
24	Steel Valley Regional Transit Authority (SVRTA)		
26	Warren County Transit Service		
28	Medina County Transit		

Source: ODOT Status of Public Transit, 2012.
**NOTE: Number assigned to agency corresponds to map on the following page.*

Urban transit systems in Ohio consist predominantly of fixed-route bus service. One urban rail system exists in the greater Cleveland area with heavy and light rail services. Heavy rail is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating alone or in multi-car trains on fixed rails, separate rights-of-way (ROW) from which all other vehicular and foot traffic are excluded, sophisticated signaling, and high platform loading. Light rail transit service is typically an electric railway with a light volume traffic capacity compared to heavy rail. It is characterized by passenger rail cars operating alone (or in short, usually two car trains) on fixed rails in shared or exclusive ROW, low or high platform loading, and vehicle power drawn from an overhead electric line via a trolley or a pantograph.

Figure 2-3: Urban Transit Agency Locations



Source: ODOT Status of Public Transit, 2012.

GCRTA is the largest transit agency in Ohio, providing over 46 million trips to residents and visitors of the Cleveland area in 2011. GCRTA owns and operates the RTA Rapid Transit rail system (better known as "The Rapid"), which consists of one heavy rail line (the Red Line) and two interurban light rail lines (the Blue, Green, and light-rail Waterfront extension line).

GCRTA Light Rail Vehicle

Since October 2008, GCRTA has also operated a bus rapid transit line, originally referred to as "Silver Line", running along Euclid Avenue, providing a direct route between Cleveland's primary tourist attractions from Downtown Cleveland through Midtown Cleveland and University Circle to East Cleveland. Naming rights for the BRT were bought by The Cleveland Clinic and University Hospitals, and the line was named the HealthLine.

Approximately 75 percent of urban transit system ridership within Ohio, including bus and rail, occurs in the more densely populated cities of Cleveland, Columbus, and Cincinnati. The urban transit systems receive FTA Section 5307 program funds, which are directly collected from the FTA. The large urban systems rely primarily on local funding sources, as well as fare box and contract revenues to cover operating expenses. Small urban systems depend on Federal operating assistance, fare box, and contract revenues for support of their programs. Large urban systems are more likely to have dedicated local funding streams through either county sales tax or property tax. Most small urban systems lack this type of dedicated funding stream, and the state does not provide any local match due to restrictions on the state gas tax revenue.

Funding apportionment trends for the FTA 5307 funds by area are shown in **Table 2-5**. As reflected in the table, funding increased for most areas until FY2010 and FY2011.

Table 2-6, Table 2-7, and **Table 2-8** present the FY2011 statistics for the large and small urban systems.

Table 2-5: Urbanized Area Funding Formula Program

Area	2006	2007	2008	2009	2010	2011
1M+ Population	**52,470,554**	**55,635,328**	**58,782,833**	**61,209,354**	**59,658,331**	**58,456,255**
Cincinnati, OH--KY--IN	16,462,854	17,033,068	18,161,896	18,916,749	18,732,058	18,029,904
Cleveland, OH	25,584,797	27,673,490	29,071,296	30,073,102	28,569,002	27,556,074
Columbus, OH	10,422,903	10,928,770	11,549,641	12,219,503	12,357,271	12,870,277
200K-999,999K Population	**31,516,897**	**32,519,855**	**34,892,343**	**36,313,243**	**35,783,613**	**35,417,698**
Akron, OH	5,924,071	6,012,478	6,229,946	6,619,111	6,561,010	6,762,735
Canton, OH	3,280,524	3,462,625	3,724,977	3,884,604	3,818,376	3,634,052
Dayton, OH	13,469,037	13,892,841	15,152,973	15,662,602	15,103,536	14,462,385
Toledo, OH--MI	5,731,970	5,842,150	6,314,733	6,649,282	6,634,280	6,611,773
Youngstown, OH--PA	3,111,295	3,309,761	3,469,714	3,497,644	3,666,411	3,946,753
Less than 200K Population	**9,002,063**	**9,376,620**	**10,155,085**	**10,551,310**	**10,547,336**	**10,528,973**
Huntington, WV--KY--OH	348,036	365,291	396,483	421,804	420,651	421,789
Lima, OH	746,162	783,147	850,016	904,304	901,850	904,286
Lorain--Elyria, OH	2,524,302	2,613,598	2,825,683	2,739,422	2,731,851	2,739,248
Mansfield, OH	797,202	836,717	908,159	966,161	963,543	966,144
Middletown, OH	1,040,812	1,092,416	1,185,703	1,261,424	1,257,961	1,261,364
Newark, OH	1,038,556	1,054,173	1,133,075	1,219,836	1,241,426	1,197,898
Parkersburg, WV--OH	244,902	257,045	278,996	296,814	295,994	296,796
Sandusky, OH	528,210	554,395	601,733	640,163	638,418	640,143
Springfield, OH	1,008,338	1,058,335	1,148,714	1,222,071	1,218,709	1,222,006
Weirton, WV--Steubenville, OH--PA	420,524	441,368	479,055	509,651	508,268	509,640
Wheeling, WV--OH	305,019	320,135	347,468	369,660	368,665	369,659
Total	**$92,989,514**	**$97,531,803**	**$103,830,261**	**$108,073,907**	**$105,989,280**	**$104,402,926**

Source: http://fta.dot.gov/grants/12853_88.html

Table 2-6: 2011 Ridership, Large and Small Urban Systems

	Transit Authority	System Area Description	FR Ridership	DR Ridership	Total Ridership
1	Allen County Regional Transit Authority (ACRTA)	Lima Urbanized Area	197,180	20,680	217,860
2	Butler County Regional Transit Authority (BCRTA)	Butler County and Limited Stops in adjacent Counties	n/a	53,131	53,131
3	Central Ohio Transit Authority (COTA)	Franklin County, portions of Licking, Fairfield, and Delaware Counties	18,764,047	259,888	19,023,935
4	Clermont Transportation Connection (CTC)	Clermont County and Parts of Hamilton County / City of Cincinnati	78,898	83,048	161,946
5	Eastern Ohio Regional Transit Authority (EORTA)	Jefferson and Belmont Counties and portions of Pease and Colerain Twps	113,887	1,814	115,701
6	Greater Cleveland Regional Transit Authority (GCRTA)	Cuyahoga County and portions of Lake, Summit, Medina, and Lorain Counties	45,631,759	578,211	46,209,970
7	Greater Dayton Regional Transit Authority (GDRTA)	Montgomery County and limited destinations in Greene County	10,168,868	248,390	10,417,258
8	Greene County Transit Board (Greene Cats)	Greene County, with limited service to Montgomery County	n/a	159,149	159,149
9	Laketran	Lake County; Commuter Express to Cleveland	491,298	191,708	683,006
10	Lawrence County Transit	Lawrence County Ohio with service to WV and KY.	22,528	668	23,196
11	Licking County Transit Services	Licking County (less Newark and Heath)	n/a	126,287	126,287
12	Lorain County Transit (LCT)	Lorain County including parts of Vermillion	79,225	9,697	88,922
13	METRO Regional Transit Authority (Akron)	Summit County	5,044,830	243,159	5,287,989
14	Miami County Transit System	Miami County	n/a	52,438	52,438
15	Middletown Transit System	City of Middletown	212,285	7,311	219,596
16	Newark–Heath Earthworks Transit	Newark–Heath Urbanized Area	n/a	47,792	47,792
17	Niles Trumbull Transit System (NITTS)/Trumbull Transit System (TTS)	Trumbull County	n/a	59,248	59,248
18	Portage Area Regional Transportation Authority (PARTA)	Portage County	1,445,646	117,546	1,563,192
19	Richland County Transit (RCT)	City of Mansfield and Portions of City of Ontario	249,912	27,052	276,964
20	Sandusky Transit System/Erie County (STS)	City of Sandusky and Huron, Perkins and Huron Townships	n/a	145,369	145,369
21	Southwest Ohio Regional Transit Authority (SORTA)	Hamilton County and a portion of Clermont, Butler and Warren Counties	16,690,018	172,963	16,862,981
22	Springfield City Area Transit (SCAT)	City of Springfield, Clark State Community College, Upper Valley Mall, Prime Ohio and Nextedge Tech Park	296,341	10,925	307,266
23	Stark Area Regional Transit Authority (SARTA)	Stark County	2,309,207	117,193	2,426,400
24	Steel Valley Regional Transit Authority (SVRTA)	City of Steubenville and Village of Mingo Junction	217,307	2,534	219,841
25	Toledo Area Regional Transit Authority (TARTA)	Toledo Urbanized Area	3,087,907	269,796	3,357,703
26	Washington County/Community Action Bus Lines (CABL)	Washington County and City of Marietta	20,118	3,649	23,767
27	Western Reserve Transit Authority (WRTA)	WRTA provides County-wide service to Mahoning County and parts of Trumbull County. In Trumbull County, they provide service to Liberty Township, the Cities of Girard, Niles, and Warren.	1,290,911	38,214	1,329,125
	Ohio Urban Total		**106,412,172**	**3,047,860**	**109,460,032**

NOTE: FR = Fixed-Route; DR = Demand Response

Table 2-7: 2011 Vehicle Hours and Miles, Large and Small Urban Systems

	Transit Authority	FR Veh Hours	DR Veh Hours	FR Veh Miles	DR Veh Miles
1	Allen County Regional Transit Authority (ACRTA)	14,580	5,281	194,906	64,501
2	Butler County Regional Transit Authority (BCRTA)	n/a	32,311	n/a	596,804
3	Central Ohio Transit Authority (COTA)	835,880	141,779	11,518,844	2,829,784
4	Clermont Transportation Connection (CTC)	5,102	61,665	145,499	1,099,249
5	Eastern Ohio Regional Transit Authority (EORTA)	22,157	1,007	248,929	12,992
6	Greater Cleveland Regional Transit Authority (GCRTA)	1,220,047	286,078	14,867,344	4,521,339
7	Greater Dayton Regional Transit Authority (GDRTA)	403,611	155,249	5,901,542	2,348,220
8	Greene County Transit Board (Greene Cats)	n/a	52,770	n/a	1,036,240
9	Laketran	43,215	84,553	756,988	1,592,586
10	Lawrence County Transit	6,804	4,080	130,048	43,794
11	Licking County Transit Services	n/a	50,827	n/a	1,100,175
12	Lorain County Transit (LCT)	6,463	8,842	94,905	73,225
13	METRO Regional Transit Authority (Akron)	276,028	112,593	3,478,287	1,301,259
14	Miami County Transit System	n/a	22,604	n/a	445,903
15	Middletown Transit System	13,944	3,385	206,022	42,557
16	Newark–Heath Earthworks Transit	n/a	20,061	n/a	230,346
17	Niles Trumbull Transit System (NITTS)/Trumbull Transit System (TTS)	n/a	35,443	n/a	748,443
18	Portage Area Regional Transportation Authority (PARTA)	61,946	41,200	840,069	762,820
19	Richland County Transit (RCT)	18,987	8,950	259,485	102,011
20	Sandusky Transit System/Erie County (STS)	n/a	31,990	n/a	362,211
21	Southwest Ohio Regional Transit Authority (SORTA)	702,613	77,724	9,149,980	1,531,529
22	Springfield City Area Transit (SCAT)	19,274	2,634	271,027	35,242
23	Stark Area Regional Transit Authority (SARTA)	125,576	64,580	2,016,852	1,013,232
24	Steel Valley Regional Transit Authority (SVRTA)	12,544	2,016	195,432	15,425
25	Toledo Area Regional Transit Authority (TARTA)	274,910	123,616	3,363,192	1,889,484
26	Washington County/Community Action Bus Lines (CABL)	6,119	2,268	96,508	13,978
27	Western Reserve Transit Authority (WRTA)	80,871	21,521	1,069,399	411,573
	Ohio Urban Total	**4,150,671**	**1,455,027**	**54,805,258**	**24,224,922**

NOTE: FR = Fixed-Route; DR = Demand Response

Table 2-8: 2011 Operating and Administrative Budget, Large and Small Urban Systems

	Transit Authority	FR Operating/ Admin Budget	DR Operating/ Admin Budget	Total Operating/ Admin Budget
1	Allen County Regional Transit Authority (ACRTA)	$1,251,359	$457,492	$1,708,851
2	Butler County Regional Transit Authority (BCRTA)	n/a	$1,907,739	$1,907,739
3	Central Ohio Transit Authority (COTA)	$84,288,570	$8,833,814	$93,122,384
4	Clermont Transportation Connection (CTC)	$627,511	$2,014,638	$2,642,149
5	Eastern Ohio Regional Transit Authority (EORTA)	$1,206,956	$123,265	$1,330,221
6	Greater Cleveland Regional Transit Authority (GCRTA)	$ 223,698,264	$21,949,088	$245,647,352
7	Greater Dayton Regional Transit Authority (GDRTA)	$52,612,567	$15,312,366	$67,924,933
8	Greene County Transit Board (Greene Cats)	n/a	$2,759,564	$2,759,564
9	Laketran	$5,351,072	$5,929,931	$11,281,003
10	Lawrence County Transit	$737,410	$317,909	$1,055,319
11	Licking County Transit Services	n/a	$2,428,515	$2,428,515
12	Lorain County Transit (LCT)	$706,817	$779,240	$1,486,057
13	METRO Regional Transit Authority (Akron)	$31,981,044	$6,813,198	$38,794,242
14	Miami County Transit System	n/a	$971,997	$971,997
15	Middletown Transit System	$1,116,558	$164,314	$1,280,872
16	Newark–Heath Earthworks Transit	n/a	$1,011,616	$1,011,616
17	Niles Trumbull Transit System (NITTS)/Trumbull Transit System (TTS)	n/a	$1,697,612	$1,697,612
18	Portage Area Regional Transportation Authority (PARTA)	$4,257,197	$3,775,249	$8,032,446
19	Richland County Transit (RCT)	$1,266,907	$453,795	$1,720,702
20	Sandusky Transit System/Erie County (STS)	n/a	$1,538,241	$1,538,241
21	Southwest Ohio Regional Transit Authority (SORTA)	$76,428,535	$6,509,866	$82,938,401
22	Springfield City Area Transit (SCAT)	$1,390,729	$297,122	$1,687,851
23	Stark Area Regional Transit Authority (SARTA)	$9,545,845	$7,266,897	$16,812,742
24	Steel Valley Regional Transit Authority (SVRTA)	$1,144,745	$142,215	$1,286,960
25	Toledo Area Regional Transit Authority (TARTA)	$24,359,970	$7,468,696	$31,828,666
26	Washington County/Community Action Bus Lines (CABL)	$351,488	$69,314	$420,802
27	Western Reserve Transit Authority (WRTA)	$7,323,781	$1,105,919	$8,429,700
	Ohio Urban Total	**$ 529,647,325**	**$102,099,613**	**$631,746,937**

NOTE: FR = Fixed-Route; DR = Demand Response

2.5 Rural General Public Transit Systems

The ODOT's Office of Transit administers the FTA's 5311 Rural Transit Program, which provides both capital and operating assistance to public transportation systems in rural areas with population under 50,000. The Census Bureau, based on low population density and clusters, classifies much of Ohio as rural. In FY2011, a network of 35 transit agencies provided rural transit service funded by the 5311 Program. These rural transit agencies provide service to 36 of the 88 Ohio counties. **Figure 2-4** shows the locations of the rural transit agencies in Ohio for FY2013. **Table 2-9** presents the Ohio funding trends for the 5311 program, which indicate a 20.3 percent increase over the six years. Until FY2010 and FY2011, funding increased for the 5311 program each year.

Table 2-9: Nonurbanized Area Formula Program

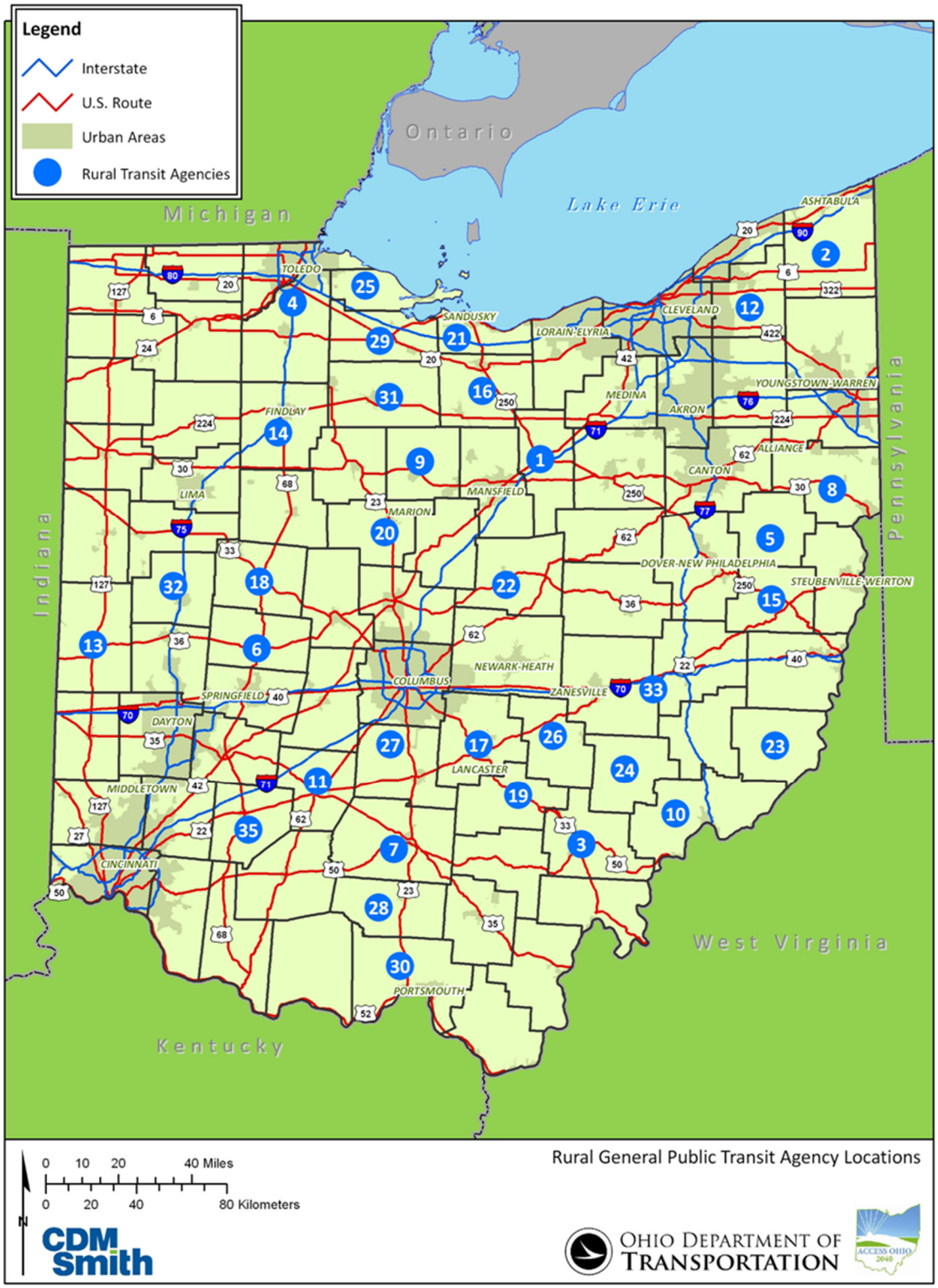
FTA 5311 Annual Apportionments Trends (Nonurbanized Area Formula Program)						
Area	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Ohio	16,634,473	17,519,593	18,888,065	19,939,254	19,936,027	20,009,523

Source: http://fta.dot.gov/grants/12853_88.html

The primary type of service offered by the rural providers is demand response or flexible services, with three agencies also providing fixed-route service: Chillicothe Transit System based out of Chillicothe, OH, South East Area Transit, based out of Zanesville and Cambridge, OH, and Delaware Area Transit Agency in Delaware, OH. The traditional demand-response rural services typically rely on a 24-hour advance reservation. The number of passenger trips for the rural services varies from approximately 12,000 passenger trips per year for Logan Transit System, based out of Logan, OH, to approximately 194,000 annual trips for Chillicothe Transit System. Approximately 2.2 million passenger trips were provided in 2011 by the 35 rural transit agencies, with approximately 695,000 annual service hours and 11.2 million service miles. Agency data for ridership, service levels, and costs of the rural systems are shown in **Tables 2-10** and **2-11**; and **Table 2-12** presents FY 2011 FTA Section 5311 rural agency performance data.

Huron County Transit Service

Figure 2-4: Rural General Public Transit Agency Locations



Source: ODOT Status of Public Transit, 2012.

Table 2-10: 2011 Ridership, 5311 Rural Agencies

	Transit Authority	System Area Description	FR Ridership	DR Ridership	Total Ridership
1	Ashland Public Transit	City of Ashland with some service outside of the city for city residents	n/a	34,012	34,012
2	Ashtabula County Transportation System (ACTS)	Ashtabula County	n/a	89,821	89,821
3	Athens Transit	City of Athens	n/a	68,700	68,700
4	Bowling Green Transit	City of Bowling Green	n/a	36,211	36,211
5	Carroll County Transit System	Carroll County	n/a	29,357	29,357
6	Champaign Transit System	Champaign County	n/a	27,106	27,106
7	Chillicothe Transit System	City of Chillicothe	124,472	54,400	178,872
8	Columbiana County/Community Action Rural Transit System (CARTS)	Columbiana County	n/a	73,802	73,802
9	Crawford County Transportation Program	Crawford County	n/a	32,749	32,749
10	Delaware Area Transit Agency (DATA)	Delaware County	n/a	64,701	64,701
11	Fayette County Transportation Program	Fayette County	n/a	24,394	24,394
12	Geauga County Transit	Geauga County	n/a	46,366	46,366
13	Greenville Transit System	Darke County, City of Greenville, and selected locations in Dayton and Miami County	n/a	46,069	46,069
14	Hancock Area Transportation Services (HATS)	Hancock County	n/a	41,912	41,912
15	Harrison County Rural Transit (HCRT)	Harrison County	n/a	17,873	17,873
16	Huron County Transit	Huron County	n/a	19,760	19,760
17	Lancaster Public Transit System	Fairfield County	n/a	81,984	81,984
18	Logan County/Transportation for Logan County (TLC)	Logan County	n/a	20,087	20,087
19	Logan Transit System (City of Logan)	City of Logan	n/a	13,618	13,618
20	Marion Area Transit (MAT)	City of Marion	n/a	192,580	192,580
21	Medina County Transit	Medina County	n/a	102,034	102,034
22	KNOX Area Transit/formerly Mid-Ohio Transit Authority (MOTA)	Knox County	n/a	131,539	131,539
23	Monroe County Public Transportation	Monroe County	n/a	40,100	40,100
24	Morgan County Transit	Morgan County	n/a	39,100	39,100
25	Ottawa County Transportation Agency (OCTA)	Ottawa County	n/a	99,339	99,339
26	Perry County Transit (PCT)	Perry County	n/a	47,624	47,624
27	Pickaway Area Rural Transit	Pickaway County	n/a	71,731	71,731
28	Pike County/Community Action Transit System (CATS)	Pike County	n/a	39,953	39,953
29	Transportation Resources for Independent People of Sandusky County (TRIPS)	Sandusky County	n/a	32,966	32,966
30	Scioto County/Access Scioto County (ASC)	Scioto County	n/a	41,512	41,512
31	Seneca County Agency Transportation (SCAT)	Seneca County	n/a	60,993	60,993
32	Shelby Public Transit	Shelby County and City of Sidney	n/a	37,912	37,912
33	South East Area Transit (SEAT)	Muskingum County and Guernsey County	77,238	54,617	131,855
34	Warren County Transit Service	Warren County	n/a	51,829	51,829
35	Wilmington Transit System	City of Wilmington	n/a	136,490	136,490
	Rural 5311 Program Totals		**201,710**	**2,003,241**	**2,204,951**

NOTE: FR = Fixed-Route; DR = Demand Response

Table 2-11: 2011 Vehicle Hours and Miles, 5311 Rural Agencies

	Transit Authority	FR Veh Hours	DR Veh Hours	FR Veh Miles	DR Veh Miles
1	Ashland Public Transit	n/a	12,980	n/a	138,830
2	Ashtabula County Transportation System (ACTS)	n/a	19,396	n/a	293,783
3	Athens Transit	n/a	8,290	n/a	110,732
4	Bowling Green Transit	n/a	7,329	n/a	133,576
5	Carroll County Transit System	n/a	8,446	n/a	188,657
6	Champaign Transit System	n/a	13,864	n/a	173,298
7	Chillicothe Transit System	16,238	17,494	392,267	77,248
8	Columbiana County/Community Action Rural Transit System (CARTS)	n/a	36,162	n/a	681,770
9	Crawford County Transportation Program	n/a	13,990	n/a	172,165
10	Delaware Area Transit Agency (DATA)	n/a	26,777	n/a	450,222
11	Fayette County Transportation Program	n/a	11,549	n/a	167,497
12	Geauga County Transit	n/a	18,684	n/a	344,910
13	Greenville Transit System	n/a	12,021	n/a	133,263
14	Hancock Area Transportation Services (HATS)	n/a	21,234	n/a	293,019
15	Harrison County Rural Transit (HCRT)	n/a	14,739	n/a	292,969
16	Huron County Transit	n/a	10,354	n/a	195,552
17	Lancaster Public Transit System	n/a	30,706	n/a	498,454
18	Logan County/Transportation for Logan County (TLC)	n/a	10,984	n/a	209,379
19	Logan Transit System (City of Logan)	n/a	4,510	n/a	55,382
20	Marion Area Transit (MAT)	n/a	19,879	n/a	199,629
21	Medina County Transit	n/a	34,808	n/a	534,087
22	KNOX Area Transit/formerly Mid-Ohio Transit Authority (MOTA)	n/a	47,368	n/a	650,814
23	Monroe County Public Transportation	n/a	11,548	n/a	198,746
24	Morgan County Transit	n/a	14,191	n/a	299,046
25	Ottawa County Transportation Agency (OCTA)	n/a	37,910	n/a	733,593
26	Perry County Transit (PCT)	n/a	27,970	n/a	654,230
27	Pickaway Area Rural Transit	n/a	16,760	n/a	292,850
28	Pike County/Community Action Transit System (CATS)	n/a	10,143	n/a	156,244
29	Transportation Resources for Independent People of Sandusky County (TRIPS)	n/a	17,875	n/a	284,381
30	Scioto County/Access Scioto County (ASC)	n/a	13,101	n/a	185,603
31	Seneca County Agency Transportation (SCAT)	n/a	17,906	n/a	437,255
32	Shelby Public Transit	n/a	11,168	n/a	175,167
33	South East Area Transit (SEAT)	8,995	23,370	124,986	314,255
34	Warren County Transit Service	n/a	31,215	n/a	511,097
35	Wilmington Transit System	n/a	35,360	n/a	491,495
	Rural 5311 Program Totals	**25,233**	**670,081**	**517,253**	**10,729,198**

NOTE: FR = Fixed-Route; DR = Demand Response

Table 2-12: 2011 Operating and Administrative Budget, 5311 Rural Agencies

	Transit Authority	FR Operating/ Admin Budget	DR Operating/ Admin Budget	Total Operating/ Admin Budget
1	Ashland Public Transit	n/a	$525,799	$525,799
2	Ashtabula County Transportation System (ACTS)	n/a	$988,471	$988,471
3	Athens Transit	n/a	$465,507	$465,507
4	Bowling Green Transit	n/a	$567,183	$567,183
5	Carroll County Transit System	n/a	$365,586	$365,586
6	Champaign Transit System	n/a	$368,444	$368,444
7	Chillicothe Transit System	$1,820,224	$607,518	$2,427,742
8	Columbiana County/Community Action Rural Transit System (CARTS)	n/a	$1,628,980	$1,628,980
9	Crawford County Transportation Program	n/a	$456,806	$456,806
10	Delaware Area Transit Agency (DATA)	n/a	$1,248,834	$1,248,834
11	Fayette County Transportation Program	n/a	$591,056	$591,056
12	Geauga County Transit	n/a	$1,126,583	$1,126,583
13	Greenville Transit System	n/a	$580,931	$580,931
14	Hancock Area Transportation Services (HATS)	n/a	$880,718	$880,718
15	Harrison County Rural Transit (HCRT)	n/a	$567,008	$567,008
16	Huron County Transit	n/a	$409,756	$409,756
17	Lancaster Public Transit System	n/a	$1,297,761	$1,297,761
18	Logan County/Transportation for Logan County (TLC)	n/a	$461,304	$461,304
19	Logan Transit System (City of Logan)	n/a	$217,119	$217,119
20	Marion Area Transit (MAT)	n/a	$823,156	$823,156
21	Medina County Transit	n/a	$1,753,114	$1,753,114
22	KNOX Area Transit/formerly Mid-Ohio Transit Authority (MOTA)	n/a	$1,216,493	$1,216,493
23	Monroe County Public Transportation	n/a	$245,883	$245,883
24	Morgan County Transit	n/a	$687,952	$687,952
25	Ottawa County Transportation Agency (OCTA)	n/a	$1,888,417	$1,888,417
26	Perry County Transit (PCT)	n/a	$1,003,513	$1,003,513
27	Pickaway Area Rural Transit	n/a	$649,170	$649,170
28	Pike County/Community Action Transit System (CATS)	n/a	$390,630	$390,630
29	Transportation Resources for Independent People of Sandusky County (TRIPS)	n/a	$741,124	$741,124
30	Scioto County/Access Scioto County (ASC)	n/a	$705,410	$705,410
31	Seneca County Agency Transportation (SCAT)	n/a	$742,501	$742,501
32	Shelby Public Transit	n/a	$653,755	$653,755
33	South East Area Transit (SEAT)	$633,458	$1,986,370	$2,619,828
34	Warren County Transit Service	n/a	$1,003,036	$1,003,036
35	Wilmington Transit System	n/a	$1,140,350	$1,140,350
	Rural 5311 Program Totals	**$2,453,682**	**$28,986,238**	**$31,439,920**

NOTE: FR = Fixed-Route; DR = Demand Response

2.6 Specialized Transportation Services

ODOT administers and contracts with a number of grantees that receive some degree of federal funding from the FTA Section 5310 Elderly and Persons with Disabilities Program. This program supports capital purchases, primarily for vehicles, and requires a 20 percent local match. Statewide funding trends for the Section 5310 program are shown in **Table 2-13**. Over the six years, a 22 percent increase in funding was observed.

Table 2-13: 5310 Statewide Funding Trends

FTA 5310 Annual Apportionments Trends (Elderly & Disabled Program)						
Area	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Ohio	4,207,327	4,457,215	4,854,264	5,213,282	5,134,456	5,111,022

Source: http://fta.dot.gov/grants/12853_88.html

The FTA 5310 program authorizes capital grants for the purpose of assisting organizations in providing transportation services to meet the special needs of elderly persons and persons with disabilities where existing transportation services are unavailable, insufficient, or inappropriate. Specialized Transportation Program applicants are private nonprofit corporations or public bodies, which serve as the lead agency in an Ohio Coordination Program project or which certify to ODOT that no private nonprofit corporations are readily available in their area to provide transportation services to elderly persons and persons with disabilities.

Goodwill Easter Seals Miami Valley

Funds from the FTA provide 80 percent of the cost of capital items; the remaining 20 percent must be provided from a local, nonfederal source. While ODOT administers the program for the entire state, certain responsibilities are assigned to the 17 Metropolitan Planning Organizations (MPOs). ODOT has established the eligibility requirements to be used for all applicants. Each MPO may establish additional eligibility requirements and deadlines to fit local needs, as long as the requirements and deadlines are not less restrictive than ODOT's. All Specialized Transportation Program projects must be derived from a locally developed Coordinated Public Transit Human Services Transportation Plan.

In 2011, 190 Specialized Transportation agencies provided approximately 16.9 million passengers trips for Ohio residents using approximately 568 vehicles.[11] ODOT assisted in the procurement of 119 new vehicles in 2011 from the FTA 5310 funding.

[11] Specific agency contact information is available in the Status of Public Transit Ohio 2012, Section 4.

2.7 GAPS and Future Needs

GCRTA Public Square, Cleveland. Photo by Gus Chan.

Currently, many customers in Ohio use public transportation because they have no other transportation options available. To address future mobility needs, transit must continue to serve the needs of the transit-dependent population, while offering a competitive alternative to the automobile for "choice" customers. This section provides the transit needs identified through this statewide planning process. Several outreach methods involving government agencies, Steering Committees, local staff, and the general public were involved in the development of this plan. The purpose of the outreach is to provide information about the study process and to receive feedback on local, regional, and statewide needs and concerns for the state transportation network.

In addition to feedback received through this planning process, the ODOT Transit Office continues to work with communities across the state to incorporate regional coordination and in the development of Transit Development Plans for the FTA urban area transit providers. These adopted plans included extensive public outreach and identified future needs as part of the local planning process. These needs are included in this report.

2.7.1 Population Changes Impacting Transportation

While the population of Ohio is still growing, it is not growing at as fast a rate as in the past. Slower population growth lessens the need to develop new infrastructure. However, statewide population growth is only one factor. Some areas of the state, such as Delaware County are still growing fast while other portions of the state are declining in population.

In addition, concentrations of populations with higher median age and higher amounts of zero-vehicle households typically indicate a higher need for public transportation to meet basic needs. Rural areas of Ohio, specifically southeast Ohio, have higher concentrations of zero-vehicle households and a higher median age population.[12]

National trends[13] impacting public transportation agencies include:

- Unemployment is high creating the need for the unemployed and the underemployed to identify other forms of mobility.

[12] AO40 Statewide Demographic Profile.
[13] National Resource Center for Human Service Transportation Coordination, April 2012.

- More people are in poverty than in recent years due to the economy resulting in more mobility needs for health care, employment, training, etc.
- A crisis in kidney disease and dialysis treatment has increased 900 percent. The '*3 x per week for 4 hours*' treatment will create enormous transportation challenges especially for the return trip.
- The nation's population of those 65 and older will double between 2000 and 2030, according to the U.S. Administration on Aging. That adds up to one out of every five Americans — 72.1 million people.

- Older Americans desire to "age in place" remaining in their homes:
    - 79 percent of seniors live in suburban (56%) or rural (23%) communities.
- By 2015, more than 15.5 million Americans 65 and older will live in communities where public transportation service is poor or non-existent. That number will grow rapidly as the baby boom generation "ages in place" in suburbs and exurbs with few mobility options for those who do not drive.
- AARP reports that older adults predominantly travel in their personal vehicles. However, transit use by people age 65+, as a share of all trips they take, has increased by a remarkable 40 percent between 2001 and 2009. In 2009, older adults took more than one billion trips on public transportation.
- Most Americans are going to live for a number of years after they cease driving, so the challenge to meet the special transportation needs of these frail older people (85+) continues.

The state of Ohio will realize these trends over the next 20+ years across the state. To help meet these future needs, the Public Transit Division will continue to strengthen the coordinated transportation infrastructure by supporting efforts from other agencies that maximize resources for transportation services.

2.7.2 Future Needs

Future needs for public transportation within the state of Ohio were prepared and aggregated by the following transportation categories:

- Large Urban Category I, Rail/Bus System - FTA 5307 program;
- Large Urban Category II, Large Bus Systems - FTA 5307 program;
- Large Urban Category III, Mid-sized Bus System - FTA 5307 program;
- Large Urban Category IV, Intermediate Bus System- FTA 5307 program;
- Small Urban Category V, Small Bus System - FTA 5307 program;
- Rural – FTA 5311 program; and
- Specialized Transportation Program.

The Ohio Department of Transportation Office of Transit has developed a system of classifying urban transit systems into five unique categories. The systems within each category share similar system characteristics such as total operating costs, annual passenger trips, vehicle miles and hours, and vehicle inventory. The categories are used to equitably distribute program resources and limit the negative impact of budget reductions on each category.

The classification of transit systems for ODOT is more detailed than the FTA defined large urban, small urban and rural programs. As discussed previously, communities with a population over 200,000 consider the transit agency a large urban transit system. For communities with 50,000 to 200,000 residents, the transit agencies are considered small urban transit systems. Communities with less than 50,000 population have rural transit systems. **Table 2-14** presents the Ohio DOT urban category designations by agency for large and small urban systems.

Table 2-14: Ohio Transit Needs by Category

Category	Designation	Systems
I	Rail/Bus Systems	Greater Cleveland RTA
II	Large Bus Systems	Southwest Ohio RTA Central Ohio Transit Authority Greater Dayton RTA
III	Mid-Sized Bus System	Metro RTA (Akron) Toledo Area RTA
IV	Intermediate Bus Systems	Butler County Niles Trumbull Transit System Laketran Stark Area RTA Western Reserve Transit Authority
V	Small Bus Systems	Allen County RTA Clermont Transportation Connection Delaware Area Transit Agency (DATA) Eastern Ohio RTA Greene CATS Lawrence County Transit Services Licking County Transit Services Lorain County Transit Medina County Transit Miami County Transit System Middletown Transit System Newark-Health Earthworks Transit Portage Area RTA Richland County Transit Springfield City Area Transit Steel Valley RTA Warren County Transit Service

The following provides information used to calculate the overall statewide needs to maintain existing public transportation services and to enhance public transit services in the future for the transportation categories. Intercity bus needs are addressed in a separate report.

2.7.2.1 *Baseline Data*

The primary source of documents used to establish the baseline and existing public transportation information was data reported to ODOT annually from each individual transportation agency. These data sources were compiled within the Existing Conditions section of this final report. The following list includes the primary sources of data.

- Status of Public Transit in Ohio 2007 through 2012;
- Vehicle data reported by agency;
- Office of Transit Overview;
- 2011 Urban and Rural Data for TGIS;
- Intercity Bus Study Final, 2007; and
- 5310 Jan –December 2011 Vehicle reports.

The next steps in Access Ohio included calculating the public transportation future needs. The needs were summarized into two scenarios:

1. **Maintain existing services; and**
2. **Enhanced services.**

2.7.3 Maintain Existing Services

The long-range transit operating and capital costs to maintain existing services were prepared as follows:

- **Operating Costs:** To calculate the long-term needs for maintaining existing services, a 2011 constant dollar for operating expenses was applied to each of the 62 transit agencies for the life of this plan to 2040, for a total of 27 years.
- **Capital Costs:** To calculate the capital costs for maintaining existing services, two separate categories were used.

    1. Cost for replacing the existing vehicle fleet, and
    2. Non-vehicle capital cost.

Fleet data by agency, including the approximate value of each vehicle upon arrival to the transit agency, were used as the base data. These values were used to estimate the average cost to replace the entire fleet. In addition, the average age of the fleet per agency was prepared. Based upon the average age and vehicle types used at the agency, the number of times the vehicles would be replaced in 27 years was determined. The calculations also factored in the FTA-defined life-cycle of a vehicle; for example, four years for small body on chassis vehicles or 12 years for heavy duty vehicles.

The non-vehicle capital cost for maintaining existing services was also calculated. These costs may include facility maintenance, bus stop improvements, stations, administration buildings, fare equipment, computer hardware, etc. Unfortunately, very little existing data by agency are available for rural or specialized programs for non-vehicle expenses. We used the following to develop the baseline assumptions:

- **Rural Transit Agencies** - One percent of the agency operating budget per year is assumed for the non-vehicle capital expenses.
- **Small and Large Urban Agencies** – National Transit Database (NTD) information was extracted for 2008, 2009, 2010 from the Capital Applied Expenses. A three-year average was calculated. This average was multiplied by 27 years for the life of the plan.

Table 2-15, summarizes the operating, administration, and capital costs to maintain the existing services to 2040. Annual costs and total cost are also presented. **Appendix G** provides the detailed information for each agency by DOT Category.

Table 2-15: Costs to Maintain Existing Services, 2014-2040, in Millions

Program Category		Maintain Services (annual)	Maintain 2040 Total (27yrs) 2014-2040	Maintain Services (annual)	Maintain 2040 Total (27yrs) 2014-2040	Maintain 2040 Total (27yrs) 2014-2040
		Oper/Admin	Oper/Admin	Capital	Capital	Oper/Admin/Cap
I	Rail/Bus	$245,647	$6,632,479	$93,325	$2,519,788	$9,152,266
II	Large Bus	$243,986	$6,587,614	$57,330	$1,547,921	$8,135,535
III	Mid-sized Bus	$70,623	$1,906,819	$20,426	$551,500	$2,458,319
IV	Intermediate Bus	$40,129	$1,083,477	$12,910	$348,569	$1,432,046
V	Small Bus	$33,408	$902,019	$8,761	$236,553	$1,138,572
5311	Rural	$29,394	$793,637	$4,110	$110,963	$904,601
5310	Specialized Transportation Program	n/a	n/a	$6,711	$181,192	$181,192
	Total	**$663,187**	**$17,906,045**	**$203,574**	**$5,496,486**	**$23,402,531**

Source: ODOT Public Transit Status Report, CDM Smith, 2012.

The needs summarized in Table 2-15 explain the needs by transit agency, but this doesn't equate to financial responsibility. These needs will be met with a combination of federal, state, and local funds. Access Ohio is utilizing historical trends for federal and state funding. Historically, federal revenue has been used for 80% of all capital costs. Operating expenses have followed a different trend. Operating costs are eligible for a 50% federal match, however historically federal match has only accounted for 20% of total operating costs. This makes 80% of operating costs the responsibility of local transit agencies. These trends result in the $23 billion in needs presented in Table 7-2 being split between $8 billion for ODOT (federal and state funding) and $15 billion for local transit agencies.

2.7.4 Enhanced Services

The second scenario for estimating future public transportation needs is Enhanced Services, which simply implies a higher level of service or more service alternatives for residents of Ohio than exists today. The data sources for obtaining future transit needs are shown in the following:

- State of Ohio Human Services Coordination Plans;
- MPO Long Range Transportation Plans;
- Transit Development Plans for urban areas;
- Intercity Bus Needs Assessment;

- Statewide Demographic Profile;
- ODOT Strategic Plan;
- Access Ohio 2040, Customer Preference Survey;
- Access Ohio 2040, Draft Goals and Objectives;
- Access Ohio 2040, Draft Finance Technical Memo;
- Feedback from Access Ohio 2040 Regional Steering Committee and Executive Management Team;
- Coordination with Greyhound Public Affairs representatives; and
- Access Ohio 2040 public comments from website and ODOT information outposts.

The aforementioned planning documents were the primary resources used to identify future transit needs for the small and large urban systems, and rural and specialized programs. For some areas of the state, typically in the urban areas, more detailed future cost and project information were available. In other areas, projects were identified and shown as needed, but the plans did not include cost estimates for the service or project. In these cases, the average transit performance measures were used to determine a cost for the project or recent estimates for similar projects completed by the consultant team.

If specific agency future transit needs were not available, a 25 percent increase in operating costs was used to identify enhanced service needs for the 27 year life of the plan. The conservative, but realistic 25 percent represents a five percent growth for each full five-year time period. These estimates were prevalent in calculating the rural area enhanced services for operating and capital needs. Many needs for expanded rural and urban services were identified from recent public outreach efforts, within the above adopted plans, and also in nearly all of the Human Services Coordination Plans. The needs included more frequent service, evening, weekend, employment services, and rural transit connections to major activity locations.

Table 2-16 shows a summary of the operating, administration, and capital costs for enhanced transit services through 2040. **Appendix H** provides the detailed information for each agency by ODOT category.

Table 2-16: Costs for Enhanced Transit Services, 2014-2040, in Millions

Program Category		Enhance Services	Enhance Services	2040 Total (27yrs) 2014-2040 Enhance Services TOTAL
Category		Oper/Admin	Capital	Oper/Admin/Cap
I	Rail/Bus	$1,658,120	$115,700	$1,773,820
II	Large Bus	$1,174,288	$727,739	$1,902,027
III	Mid-sized Bus	$359,443	$367,105	$726,548
IV	Intermediate Bus	$250,660	$106,631	$357,291
V	Small Bus	$163,991	$51,189	$215,180
5311	Rural	$226,567	$38,877	$265,444
5310	Special Services	n/a	$45,298	$45,298
	Total	**$3,833,070**	**$1,452,539**	**$5,285,608**

Using historical trends to assign financial responsibility leaves ODOT (federal and state funding) with $2 billion of the $5 billion in needs for enhanced services. The locals are responsible for the remaining $3 billion.

2.8 Summary of Ohio Transit Needs

To summarize, the total public transportation needs to maintain existing transit services and for enhanced transit services is shown on the following page in **Table 2-17**.

The Ohio transit network consists of a wide variety of services. Both general public transit services and specialized transportation for the elderly and disabled are important components of the state's transportation network. Ohio's urbanized areas are planning for a future that includes increased levels of transit services, expansion of bus and rapid transit services, and development of multimodal facilities, intercity bus services, and future high speed rail. Regions with major activity centers are focusing on maintaining and providing enhanced transit services and transportation options for employees who often commute long distances. Both rural and urbanized transit systems are planning for the projected increased demand in services for the elderly and disabled.

Although ODOT has responsibility for multimodal transportation planning, most of the authority over funding of transit services either lies with transit agencies or the private sector. ODOT coordinates with these entities, but one of the biggest challenges over the next decade and beyond will be securing additional transit operating funds to address growing transit needs. It is difficult to estimate the annual available funds since this is dependent upon the economy and legislative actions.

Table 2-17: Total Costs to Maintain and for Enhanced Transit Services, 2014-2040, in Millions

Program Category		Maintain Services (annual)	Maintain 2040 Total (27yrs) 2014-2040	Maintain Services (annual)	Maintain 2040 Total (27yrs) 2014-2040	Maintain 2040 Total (27yrs) 2014-2040	Enhance Services	Enhance Services	Enhance Services TOTAL	2040 Total (27yrs) 2014-2040 Maintain + Enhanced
		Oper/Admin	Oper/Admin	Capital	Capital	Oper/Admin/Cap	Oper/Admin	Capital	Oper/Admin/Cap	Oper/Admin/Cap
I	Rail/Bus	$245,647	$6,632,479	$93,325	$2,519,788	$9,152,266	$1,658,120	$115,700	$1,773,820	$10,926,086
II	Large Bus	$243,986	$6,587,614	$57,330	$1,547,921	$8,135,535	$1,174,288	$727,739	$1,902,027	$10,037,562
III	Mid-sized Bus	$70,623	$1,906,819	$20,426	$551,500	$2,458,319	$359,443	$367,105	$726,548	$3,184,867
IV	Intermediate Bus	$40,129	$1,083,477	$12,910	$348,569	$1,432,046	$250,660	$106,631	$357,291	$1,789,337
V	Small Bus	$33,408	$902,019	$8,761	$236,553	$1,138,572	$163,991	$51,189	$215,180	$1,353,752
5311	Rural	$29,394	$793,637	$4,110	$110,963	$904,601	$226,567	$38,877	$265,444	$1,170,045
5310	Specialized Transportation Program	n/a	n/a	$6,711	$181,192	$181,192	n/a	$45,298	$45,298	$226,490
	Total	**$663,187**	**$17,906,045**	**$203,574**	**$5,496,486**	**$23,402,531**	**$3,833,070**	**$1,452,539**	**$5,285,608**	**$28,688,139**

Source: ODOT Public Transit Status Report, CDM Smith, 2012

3. INTER CITY BUS

The 2040 Access Ohio Long Range Transportation Plan is a multi-year strategic plan that sets forth the direction for future transportation projects for the State of Ohio, including intercity bus services. This report includes information regarding future transit needs to connect communities across the state. The following two types of intercity bus services are available in Ohio and include:

- Ohio Rural Intercity Bus Program (Federal Transit Administration, Section 5311(f), currently known as GoBus
- Intercity bus service by private providers

3.1 Ohio Rural Intercity Bus Program (Federal Transit Administration, Section 5311(f))

The Ohio Rural Intercity Bus Program (Federal Transit Administration (FTA), Section 5311(f)) is designed to address the statewide intercity bus transportation needs by supporting projects that provide transportation connections between non-urbanized areas and urbanized areas. ODOT and local partners in Athens began intercity bus service, known as GoBus, in November 2010 using the FTA 5311(f) program funds.

The purpose of the FTA Section 5311(f) funding is to provide supplemental financial support to transit operators and to facilitate the most efficient and effective use of available federal funds in support of intercity bus service in rural areas. Section 5311(f) specifies eligible intercity bus activities to include "planning and marketing for intercity bus transportation, capital grants for intercity bus shelters, joint-use stops and depots, operating grants through purchase-of-service agreements, user-side subsidies and demonstration projects, and coordination of rural connections between small public transportation operations and intercity bus carriers." Capital assistance may be provided to purchase vehicles or vehicle related equipment, such as wheelchair lifts for use in intercity service. Charter and tour services are not eligible for assistance under the FTA 5311(f) program.

3.2 Private Provider Intercity Bus Service

The following three private providers operate intercity bus service across the state of Ohio:

- Greyhound Lines;
- Lakefront Lines; and
- Megabus.

3.3 Overview of Existing Services

As mentioned previously, two different types of intercity bus services are available to Ohio residents -- the federally-funded GoBus service and the private provider service.

3.3.1 FTA Intercity Bus Program 5311(f)

ODOT conducted a needs assessment in 2007 to determine if a rural intercity bus service would benefit the rural communities of Ohio. This study identified several areas, including the City of Athens, which had a need for an intercity service and also had the infrastructure in place to accommodate such a service.

In 2010, ODOT awarded the City of Athens funding for two rural intercity bus routes: Athens to Columbus and Athens to Cincinnati. In order to make this program possible, ODOT and the City of Athens partnered with a variety of groups and organizations. The City of Athens asked Hocking Athens Perry Community Action Program (HAPCAP), a non-profit corporation dedicated to the needs of the region, to administer the project on the City's behalf. Lakefront Lines was selected as the service operator, while Greyhound Lines provided in-kind match, including use of their terminal and ticketing system.

The new service, dubbed GoBus, began operation in November 2010. GoBus and its $10 tickets caught on quickly - especially with students at Ohio University. In February 2012, a new route from Athens to Marietta and Parkersburg was added, further increasing the rural to intercity connections and enhancing access to job opportunities, healthcare, and education.

HAPCAP markets GoBus as a fun, safe, convenient, and affordable way to travel. Through the use of social media, creative marketing, and word of mouth, the popularity of the service continues to grow. In 2012, an average of 4,042 riders used the service every month. While the need for such transportation is well documented, no one expected the level of success this program has achieved. GoBus is part of a nationwide strategy to connect urban and rural centers. Federal stimulus money was received to purchase three new deluxe motor coaches to operate along these routes.

GoBus Intercity Bus Service

The bus routes connect residents of southeastern Ohio with Greyhound's nationwide system and Port Columbus International Airport. Each route is run twice daily.

ODOT, through the FTA Section 5311(f) program, provides 100 percent federal subsidy for the GoBus service between Marietta, Athens, and Columbus; and Marietta, Athens and Cincinnati. The routes are 100 percent funded, after subtracting the farebox revenues. ODOT has a contract with HAPCAP, which

reimburses expenses paid to Lakefront Lines for service provision and for HAPCAP's administrative expenses.

In 2011, statewide operational and administrative costs for GoBus were $1.65 million. The 2012 budget is approximately $1.97 million, which includes the new route serving Marietta, Athens, and Cincinnati which began in February 2012. **Table 3-1** presents the overall ridership by stop since inception for GoBus. Average GoBus ridership on both routes has increased overall to approximately 4,400 passengers per month. In 2011, the first full year of service, ridership was approximately 30,000 annual trips. If the service continues its current trend, 2012 ridership should exceed 50,000 annual trips, which is a 70 percent increase.

3.3.2 Intercity Bus Service – Private Providers

Currently, there are approximately 40 urban areas in Ohio with Intercity Bus service (ICB). **Greyhound Lines (GLI)** is the major intercity bus operator in Ohio, with services to destinations throughout the country. **Lakefront Lines (LFL)** also provides intercity bus service. The company reports a similar number of service locations in Ohio as Greyhound, most of which are commonly served by both companies at the present time (albeit along different, connecting routes), as shown in **Table 3-2.** Both operators are private for-profit companies. Greyhound is the national operator, and provides most of the legacy ICB services in Ohio. However, Greyhound has also recently introduced a new product, Greyhound Express using upgraded buses with free Wi-Fi, at-seat plug-ins, 3-point seatbelts and fewer, more comfortable seats. Lakefront is a regional intercity bus operator based in Toledo. Lakefront Lines operates a tour and charter business, but also provides scheduled ICB service as part of the nationwide system.

Greyhound Intercity Bus Service

In 2011, Greyhound served 704,426 inbound and outbound passengers to and from the State of Ohio. Greyhound projects a small one percent increase for 2012. The present level of Greyhound legacy and Greyhound Express services to, from, and through Ohio requires a fleet of approximately 40 buses. Greyhound is a subsidiary of FirstGroup America (FGA), whose North American headquarters are located in Cincinnati.

Lakefront Lines and its parent company, Coach America, are currently under Chapter 11 Bankruptcy proceedings, and the assets of Lakefront Lines are being purchased by CoachUSA, a US subsidiary of Stagecoach Group PLC. The continued operation of the current level and type of services by LFL in the future may be in question.

Table 3-1: GoBus Ridership

Columbus / Athens Route:	2010 Boardings		2011 Boardings		2012 Boardings	
	Nov/Dec only	Avg Mth		Avg Mth	Jan/Mar Only	Avg Mth
Stop Location:						
Columbus (Airport)	n/a		n/a		1,150	
Columbus (Greyhound Station)	17		4,779		2,323	
Columbus (Port Col. Airport)	675		3,368		n/a	
Lancaster (Dogwood Crossing)	324		304		116	
Logan (Old Dutch Restaurant)	198		324		107	
Nelsonville (Hocking College)	91		343		96	
Athens (Ohio University)	0		6,787		3,217	
Athens (Community Center)	1		2,678		619	
Coolville (Cool Spot)	n/a		n/a		3	
Marietta (Front Street)	n/a		n/a		21	
Marietta (Marietta College)	n/a		n/a		3	
Parkersburg (Transit Center)	n/a		n/a		115	
Subtotal	**1,306**	**653**	**18,583**	**1,549**	**7,770**	**2,590**
Cincinnati / Athens Route:	**2010 Boardings**		**2011 Boardings**		**2012 Boardings**	
	Nov/Dec only	Avg Mth		Avg Mth	Jan/Mar Only	Avg Mth
Stop Location:						
Cincinnati (University of Cincinnati)	0		439		694	
Cincinnati (Greyhound Station)	2		3,852		1,316	
Batavia (Snappy Tomato Pizza)	167		1,026		n/a	
Batavia (Clermont Sun)	n/a		n/a		639	
Mt. Orab (Old Kroger Parking Lot)	96		29		n/a	
Seaman (First Stop)	14		135		60	
Peeples (First Stop)	7		169		63	
Piketon (Shake Shoppe)	19		91		33	
Jackson (Mike's One Stop)	22		195		129	
Albany (Marathon)	0		-		-	
Athens (Ohio University)	2		4,482		2,208	
Athens (Community Center)	0		1,098		373	
Subtotal	**329**	**165**	**11,516**	**960**	**5,515**	**1,838**
GoBus Total	**1,635**	**818**	**30,099**	**2,508**	**13,285**	**4,428**

GoBus, 2012.

Table 3-2: Urban Areas Served by GLI and LFL

Urban Areas Served by Both Greyhound Lines (GLI) and Lakefront Lines (LFL)	
Akron	Logan
Athens	Mansfield
Batavia	Marietta
Cambridge	Marion
Canton	Mount Eaton
Chillicothe	Nelsonville
Cincinnati	New Philadelphia
Cleveland	Peebles
Columbus	Piketon
Coolville	Sandusky
Dayton	Springfield
Elyria	Toledo
Findlay	Van Wert
Jackson	West Salem
Kenton	Wooster
Lancaster	Youngstown
Lima	Zanesville
Additional Areas Served by Greyhound Lines	**Additional Areas Served by Lakefront Lines**
Ashtabula	Albany
Seaman Winchester	Conneaut
	Fairfield
	Newcomerstown
	Winchester

Source: Intercity Bus Needs Assessment for the State of Ohio, June 2007.

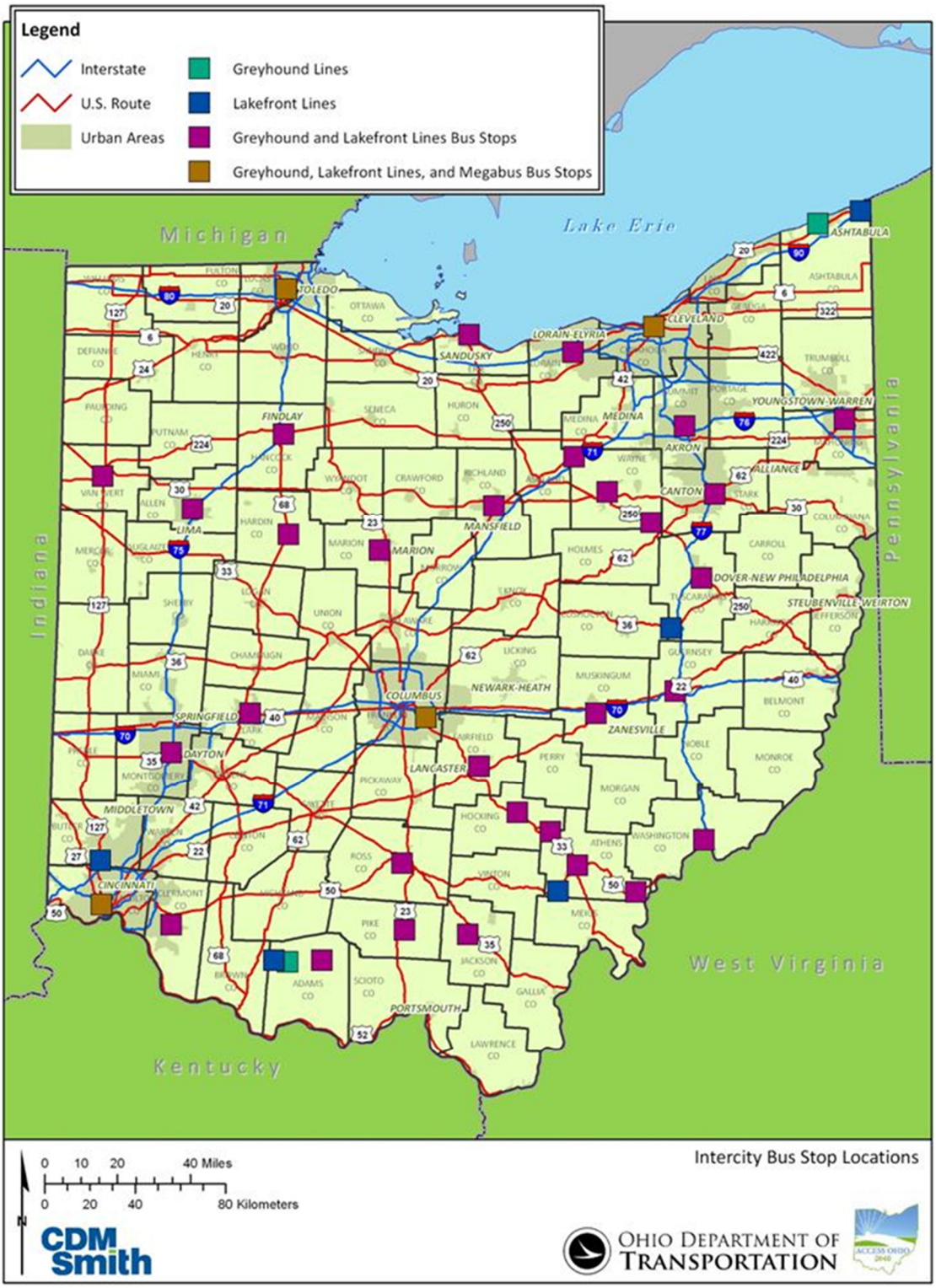
Greyhound Connect service, which is defined as local and regional intercity bus routes connecting to major cities, does not operate in Ohio, leaving Lakefront Lines to serve as a connector to the Greyhound stations in the urban areas. The schedules of both intercity bus lines are integrated and single trips may be booked with segments served by different lines.

One additional intercity provider is **Megabus,** with stops in Cincinnati, Columbus, Toledo, and Cleveland. The for-profit service began in 2006 and is well-known for its low-cost, online reservation bookings for $1.00. The agency reports 18 million passengers across the United States since inception. Vehicles are typically single or double deck intercity coach buses with free Wi-Fi, at-seat plug-ins, and panoramic windows**. Figure 3-1** illustrates the current intercity bus stops.

Intercity bus service and public transportation, an essential part of our transportation network, play an important role in the county's economic, environmental, and social health by:

- Providing both commuter and lifeline services for citizens;
- Providing transportation to jobs, schools, personal business, and community activities;

Figure 3-1: Existing Intercity Bus Stops in Ohio



- Reducing congestion on local roads allowing private automobiles and freight to travel more efficiently;
- Helping seniors and people with disabilities remain independent;
- Protecting the environment by moving people efficiently and reducing air pollution, gas consumption, and harmful emissions contributing to global warming; and
- Acting as an engaged community partner and a responsible public steward.

In order to improve the Ohio statewide network connectivity and to address the various issues that have arisen from intercity bus service cutbacks, ODOT is looking to ensure that intercity bus services are included as part of the Access Ohio.

Lakefront Lines/GoBus coordinated services

A particular transit challenge that ODOT is facing is the provision of intercity bus services to improve regional mobility for Ohio residents. Over the last few years, private carriers, such as Greyhound, have reduced service in the rural areas of Ohio and across the United States, in attempt to improve profitability. This cutback left many residents and communities with few or no intercity transportation options, leading to substantial personal, economic, and sociological impacts. The abandonment of intercity bus routes also results in critical service gaps in the interconnectivity of the statewide multimodal network.

To address the service gaps, ODOT assisted in the implementation of GoBus service and is considering expanding and subsidizing additional intercity bus service along other key corridors. In a related effort, ODOT encourages the existing public transit agencies and specialized services to improve integration with the existing and future intercity bus service.

Intercity bus service plays a vital role in the provision of regional mobility. It is particularly important in rural and nonurbanized areas, where transportation connections are often needed to access the more diverse economic, education level, health care facilities, and other services than in larger urban areas. Moreover, it often provides the only means of travel for those who cannot, or choose not, to drive or fly for long-distance travel.

Intercity bus routes operate in a statewide transportation network, and its performance is likely to depend on the other parts of the transit network or even other modes. Thus, it is important to analyze any given intercity bus route from a statewide perspective. Analyses that focus only on the corridor where the bus route is to be implemented may be short-sighted.

3.4 Gaps and Future Needs

This section of the report presents ICB future needs for the FTA-funded and for the private provider intercity services. The ICB needs were identified through the Access Ohio statewide planning process. Several outreach methods involving the government agencies, Steering and Advisory Committees, local staff, and the general public were involved in the development of this plan. The purpose of the outreach is to provide information about the study process and to receive feedback on local, regional, and statewide needs and concerns for the state transportation network.

3.4.1 Future Needs

Future ICB service needs in Ohio were prepared and aggregated for the FTA-funded 5311(f) program. Because ODOT does not provide specific regulation, or access to operational funding data, for the private provider intercity bus companies, those calculations are not included in this study.

The following sections provide information used to calculate the overall statewide needs to maintain existing ICB services and to enhance ICB services in the future for the categories above.

3.4.1.1 Baseline Data

The primary source of data used to establish the baseline and existing ICB information includes the following:

- Status of Public Transit in Ohio 2007 through 2012;
- Vehicle data reported by agency;
- Office of Transit Overview; and
- Intercity Bus Needs Assessment, Final, 2007.

The next steps in Access Ohio included calculating the ICB future needs section. The needs were summarized into the following two scenarios:

1. Maintain existing services; and
2. Enhanced services.

3.4.1.2 Maintain Existing Services

The long-range transit operating and capital costs to **Maintain Existing Services** were prepared only for GoBus, due to limited data available for the private providers.

Operating Costs: To calculate the long-term needs to maintain existing services, a 2011 constant dollar for operating expenses was applied to the GoBus budget for the life of this plan to 2040, a time period of 27 years.

Capital Costs: To calculate the capital costs to maintain existing services, the following two categories were used.

3. Cost for replacing the existing vehicle fleet; and
4. Non-vehicle capital cost.

Fleet information for GoBus was used as the base data to estimate and develop the average cost to replace the entire fleet. In addition, the average fleet age per agency was estimated. Based upon the average age and vehicle types used at the agency, the number of times the vehicles would be replaced in 27 years was also estimated. The calculations also factored in the FTA-defined life-cycle of a vehicle.

The future non-vehicle capital cost for maintaining GoBus services was also estimated. These costs could include facility maintenance, bus stop improvements, computer hardware, etc. Non-vehicle capital expense data were not available; thus, five percent of the agency operating budget per year, which equates to approximately $100,000, was assumed for the non-vehicle capital expenses.

Table 3-3 summarizes the operating, administration, and capital costs to maintain the existing services through 2040.

Table 3-3: Costs to Maintain Existing Services through Year 2040

Program		Maintain Services (annual)	Maintain 2040 Total (27 yrs) 2014-2040	Maintain Services (annual)	Maintain 2040 Total (27 yrs) 2014-2040	Maintain 2040 Total (27 yrs) 2014-2040
		Oper/Admin	Oper/Admin	Capital	Capital	Oper/Admin/Cap
5311(f)	Intercity	$1,970,000	$53,190,000	$259,611	$7,009,500	$60,199,500
TOTAL		**$1,970,000**	**$53,190,000**	**$259,611**	**$7,009,500**	**$60,199,500**

Source: GoBus and CDM Smith, 2012.

3.4.1.3 Enhanced Services

The second scenario for estimating future ICB needs is Enhanced Services, which simply implies a higher level of service or more service alternatives for residents of Ohio than exists today. The following data sources were used to identify future ICB needs:

- State of Ohio MPO Long Range Transportation Plans;
- Transit Development Plans for urban areas;
- Intercity Bus Needs Assessment;
- Statewide Demographic Profile;
- ODOT Strategic Plan;
- Draft Finance Technical Memo, Access Ohio 2040 Plan;
- Feedback from Access Ohio 2040 Regional Steering Committee and Executive Management Team;
- Coordination with Greyhound Public Affairs representatives; and
- Public Comments from Access Ohio 2040 Website and ODOT Information Outposts.

The existing planning documents were the primary resources used to identify future ICB needs, along with the other public outreach methods. At the present time, ODOT does not subsidize any Greyhound or Megabus ICB services. These services are important to transportation within Ohio, but are not under the purview of ODOT. The Department is interested in any service changes made by the private providers. Current coordination among the agencies includes the private service provider for GoBus has an interlining agreement with Greyhound as part of their contract for services.

FTA-funded 5311(f) ICB service operating and capital future needs were derived from existing planning documents. Future needs were identified in the studies and costs were assigned for those future needs. From the 2007 Intercity Needs Study, ODOT selected four routes to pursue based upon needs across the state. Two of those routes, Route 1: Marietta, Athens, and Columbus; and Route 2: Marietta, Athens and Cincinnati, are in operation today and are included in the maintenance of existing services category.

A realistic future goal for ODOT, as presented in the 2007 Intercity Needs Study, is to fund Route 3, Knox County to Columbus, and Route 4, Warren to Zanesville. Other areas identified for services were noted and may be included in future planning. In addition, looking forward, it may be possible that the private providers, Megabus and Greyhound, could stop providing service due to lack of ridership on certain routes. At that point, priorities for selecting intercity bus routes will be reviewed and could change. At this time, ODOT identified the four bus routes as a priority for GoBus.

Table 3-4 shows the operating, administration, and capital costs for enhanced transit services through 2040.

Table 3-4: Costs for Enhanced Transit Services through Year 2040

Program		Enhanced Services		
		Oper/Admin	Capital	Total Oper/Admin/Cap
5311(f)	Intercity	$20,000,000	$7,692,308	$27,692,308
TOTAL		**$20,000,000**	**$7,692,308**	**$27,692,308**

Source: GoBus existing operating statistics and CDM Smith, 2012.

3.4.2 Summary of Ohio Intercity Bus Transit Needs

To summarize, the total needs to maintain existing intercity transit services and for enhanced services are shown in **Table 3-5**.

Table 3-5: Total Costs Transit Services through Year 2040

Program		Maintain Services (annual)	Maintain 2040 Total (27 yrs) 2014-2040	Maintain Services (annual)	Maintain 2040 Total (27 yrs) 2014-2040	Maintain 2040 Total (27 yrs) 2014-2040	Enhance Services			2040 Total (27 yrs) 2014-2040 Maintain + Enhanced
		Oper/Admin	Oper/Admin	Capital	Capital	Oper/Admin/Cap	Oper/Admin	Capital	Total Oper/Admin/Cap	Oper/Admin/Cap
5311(f)	Intercity	$1,970,000	$53,190,000	$259,611	$7,009,500	$60,199,500	$20,000,000	$7,692,308	$27,692,308	$87,891,808
TOTAL		**$1,970,000**	**$53,190,000**	**$259,611**	**$7,009,500**	**$60,199,500**	**$20,000,000**	**$7,692,308**	**$27,692,308**	**$87,891,808**

Source: GoBus and CDM Smith, 2012.

4. BICYCLE/PEDESTRIAN

ODOT and its partners have long recognized the need for creating a complete and connected multi-modal transportation system that adheres to the needs of its residents when coupled with proper land use development. Sidewalk and bicycle accommodations have the potential to improve the current safety, environment, fiscal, and health conditions for the residents and communities of Ohio. The many benefits of bicycling and pedestrian infrastructure include improved safety for pedestrians, bicyclists, and mobility challenged users of all ages when using the most current and acceptable design standards. Investing in these facilities will provide improved connectivity for bicycling, walking, and transit trip generation to and from employment and retail centers along with community, education, and public facilities.

In 2005, ODOT adopted a Bike and Pedestrian Routine Accommodation Policy that sought to address how bicycle and pedestrian travel could be accommodated on roadways that are owned and maintained by the state. Since that time, ODOT has worked on several projects that have identified the need to create better pedestrian, bicycle, and transit connections for all users of the transportation system. This is evident with the recent increase in transit and bicycle ridership seen throughout Ohio, especially with our younger generation. ODOT also recognizes the following current conditions facing the state to date:

- Between 2006-2010, there have been 13,438 serious injury and fatal pedestrian and bicycle related crashes in Ohio (ODOT Office of Safety).
- By 2030, 26% of Ohio's population will be age 60 or older (Ohio Department of Aging).
- In 2011, 29.6% of Ohioans were obese (U.S. Centers for Disease Control).
- As of July 2012, 34 Counties in Ohio have unacceptable levels of air quality (US EPA).

4.1 Economic Benefits of Bicycle and Pedestrian Accommodation

The increasing age of our population and shift in travel mode choice with our younger generations are creating a market demand for more walkable and bikeable communities in Ohio. A 2011 University of Cincinnati University Research Council study indicates housing values increase the closer a resident lives in proximity to a trail system. The study concluded that for the average home, homeowners were willing to pay a $9,000 premium to be located one thousand feet closer to a 12-mile southern segment of the Little Miami Scenic trail running through the Cincinnati metropolitan region.

In addition to the potential increase in property tax revenue, long trips for bicycling have been shown to draw in tourism dollars from out of state visitors. Bicycle tourism is a growing industry in North America and has contributed $47 billion a year to the economies of the communities that have provided for such facilities for tourists (League of American Bicyclists). Statewide, several organized rides such as Peletonia, Tour of the Scioto River Valley (TOSRV), and Great Ohio Bicycle Adventure (GOBA) as well as nationally recognized corridors like the Little Miami Scenic Trail and the Ohio to Erie Trail have been shown to attract tourists from outside of the state and country. For example, the Little Miami Scenic

Trail is estimated to generate $15 million in annual economic impact for the Dayton, Ohio region (2009 Trail User Survey Report, MVRPC).

4.2 ODOT Support for Bicycling and Walking

ODOT's bicycling and walking policies, programs, and projects encourage and support these modes where feasible. Support includes legislation that considers bicycles as vehicles which are allowed to operate on all public roadways (with the exception of interstates and certain roadways that operate similar to an interstate), the *ADA/504 Transition Plan* to bring ODOT's fully into compliance with the Americans with Disabilities Act, the Policy on Accommodating Bicycle and Pedestrian Travel on ODOT Owned or Maintained Facilities, and the provision of detailed design guidance for pedestrian and bicycle facilities in its roadway design and engineering documents.

Reconstruction or new alignment projects on ODOT owned and maintained facilities occurring within US Census Designated urban areas must examine whether bicycle and pedestrian accommodations are needed. This is important because Ohio's major cities within MPO areas have a larger mode share for walking, biking, and transit than other areas of the state. Recently Cincinnati reported 6.1% of trips made by walking, and Toledo 4.5%. The statewide percentage of commuters walking to work is 2.3% percent and the bicycle commute rate is 0.3% percent (2010 American Community Survey).

While most biking and walking trips to work occur within our MPO areas, the ODOT Bicycle and Pedestrian Program also encourages the use of non-motorized transportation outside of larger urban areas. Considerations for transportation purposes on bicycle include commuter work trips, travel to and through recreation areas, and other related uses. Many Ohio cities, villages, and hamlets are along a US or State Route and have historic downtowns with nearby residential parcels developed on a grid system, making many of these areas conducive for bicycling and walking. Many of the residents in these communities are populations that choose not to drive or cannot afford to own a car. Special care and attention must be made to ensure these populations are provided access to their places of employment, schools, or destinations that allow them to maintain a healthy quality of life.

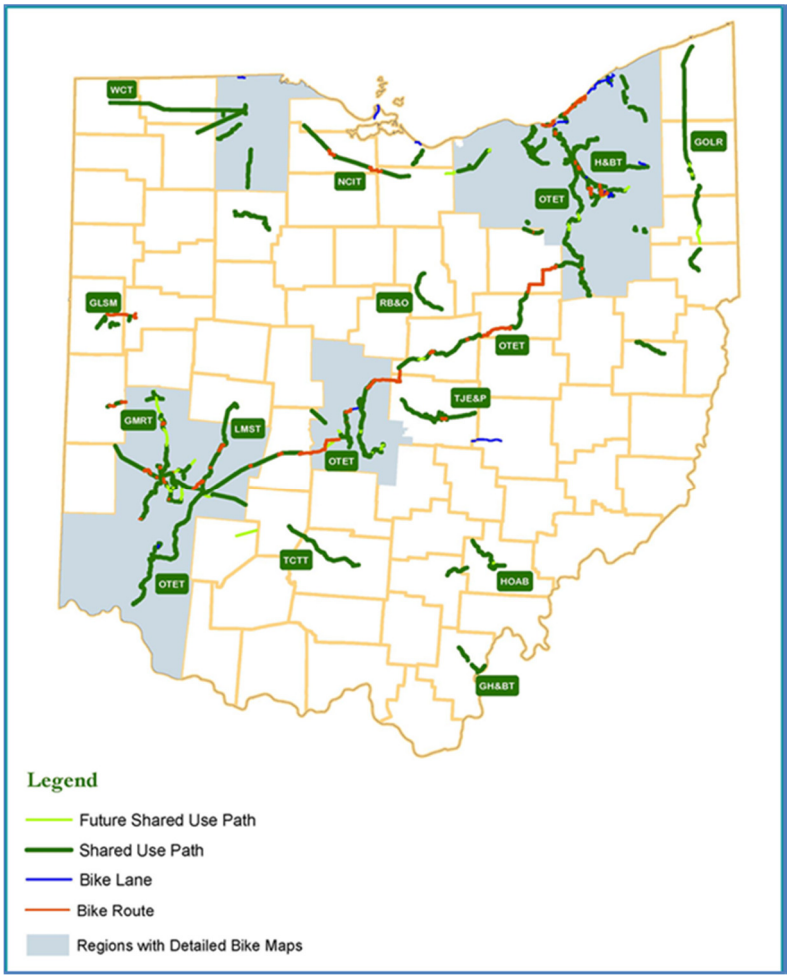
Up to this point, discussion has only focused on shorter walking and biking trips. However, longer distance walking and biking trip needs are also being considered at ODOT. Many off road facilities such as rails to trails corridors are over 20 miles in length and connect many large city centers. Abandoned rail lines, utility easements, and right of way outside of clear zones create the potential for a connected and comprehensive long distance bicycle and pedestrian network that could serve as Ohio's "bicycle interstate system". Existing roadways with low ADT, low truck traffic, flat topography, and good pavement conditions can also serve long distance bicycle travel well.

ODOT collaborates with many of its partners to advance walking and bicycling in Ohio at the local, regional, and state levels. The needs of the locals in larger areas are best served by their metropolitan planning agencies while ODOT's focus is to advance short and long trips in areas outside of MPOs keeping in mind state fiscal constraints. When planned and designed properly, bicycle and pedestrian accommodation provides access to a statewide transportation network that serves all of the residents of our state regardless of geographic area or mode.

4.3 Existing Conditions and Planning Documents

This section provides an overview of existing conditions of bicycle facilities in the state of Ohio. As part of this section, bike lanes, bike routes, shared use paths, and sidewalks will be discussed. **Figure 4-1** shows existing bicycle corridors greater than 20 miles in length, existing bike lanes, and future off road facility connections that are scheduled to be constructed within the next five years. This information is current as of 2012. Areas shaded in grey indicate MPOs that produce more detailed mapping for the general public.

Figure 4-1: Ohio Bicycle Facilities



4.3.1 Bikeway Facility Types

Bikeway information was gathered from MPOs and various park districts and compiled into one database currently maintained by the Office of Statewide Planning and Research. Local municipalities and park districts are the primary owners of these facilities. However, there are segments of shared use path, bike lanes, and bike routes located within the ODOT right of way.

4.3.1.1 Bike Lanes

A bike lane, as defined by AASHTO, is a portion of the roadway that has been designated for preferential or exclusive use by bicyclists via pavement markings and, if used, signs. Bike lanes are intended for one-way travel, usually in the same direction as the adjacent traffic lane, unless designated as a contra-flow lane. The width of the lane varies from four to six feet and can be buffered with special pavement markings if placed on a high speed roadway. **Table 4-1** shows the bike lane mileage within the MPO areas.

Bike Lanes in Columbus on W. Broad Street

Table 4-1: Bike Lane Mileage

MPO Area	Number of Centerline Miles	Number of Lane Miles
AMATS	19.58	39.16
BEL O MAR (Ohio only)	1.51	3.02
BHJTS(Ohio only)	0	0
CCSTS	0	0
EASTGATE	3.16	6.32
ERPC	1.99	3.98
LACRPC	0	0
LCATS	1.10	2.2
MORPC	36.46	72.92
MVRPC	5.20	10.40
NOACA	54.90	109.80
OKI (Ohio Only)	11.70	23.4
RCRPC	0	0
SCATS	0	0
TMACOG (Ohio only)	10.03	20.06
WWW IPC (Ohio Only)	0	0
Outside MPO	22.65	45.30
Total	**168.28**	**336.56**

Source: ODOT and MPO GIS Bicycle Inventories

4.3.1.2 Bike Routes

A bike route is defined by a given jurisdiction or agency as a roadway or bikeway, either with a unique route designation or with Bike Route signs, along which bicycle guide signs may provide directional and distance information. Signs that provide directional, distance, and destination information for bicyclists do not necessarily establish a bike route. Routes must carefully balance the need for safe bicycling conditions with the need for direct access to destinations. Routes can be established at the national, statewide, regional, and local levels. Criteria used by ODOT for roadway bike route designations include an examination of the type of roadway, surface condition, ADT, truck traffic percentages, and the presence of geometric deficiencies, shoulders, and rumble stripes. Looped routes for recreational riding are not considered. The numbers of centerline and lane miles is the same because the rider should be riding in the furthest right travel lane, regardless of number of lanes on a roadway. **Table 4-2** provides the bike route mileage.

Table 4-2: Bike Route Mileage

MPO Area	Number of Centerline Miles	Number of Lane Miles
AMATS	11.36	11.36
BEL O MAR (Ohio only)	0	0
BHJTS(Ohio only)	0	0
CCSTS	2.3	2.3
EASTGATE	0.77	0.77
ERPC	0	0
LACRPC	0.93	0.93
LCATS	0	0
MORPC	57	57
MVRPC	6.54	6.54
NOACA	21.18	21.18
OKI (Ohio Only)	27.8	27.8
RCRPC	0	0
SCATS	0.11	0.11
TMACOG (Ohio only)	8.75	8.75
WWW IPC (Ohio Only)	0	0
Outside MPO	79.3	79.3
Total	**216.04**	**216.04**

Source: ODOT and MPO GIS Bicycle Inventories

4.3.2 Shared Use Path Mileage

A shared use path bikeway facility is physically separated from motor vehicle traffic by an open space or barriers and is either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. Most shared use paths are designed for two-way travel. They must be a minimum of eight feet in width and must have a start and end point. Closed loop systems are not considered transportation facilities. See **Table 4-3** and **Table 4-4** for shared used mileage and total mileage.

Table 4-3: Shared Use Mileage

MPO Area	Number of Centerline Miles	Number of Lane Miles
AMATS	105.06	210.12
BEL O MAR (Ohio only)	2.6	5.2
BHJTS(Ohio only)	0	0
CCSTS	30.73	61.46
EASTGATE	54.1	108.2
ERPC	6.22	12.44
LACRPC	7.59	15.18
LCATS	48.58	97.16
MORPC	329	658
MVRPC	230	460
NOACA	259.6	519.2
OKI (Ohio Only)	170.9	245
RCRPC	18.3	36.6
SCATS	69.99	139.98
TMACOG (Ohio only)	167.71	335.42
WWW IPC (Ohio Only)	3.28	6.56
Outside MPO	371.89	743.78
Total	**1827.15**	**3654.3**

Source: ODOT and MPO GIS Bicycle Inventories

Table 4-4: Total Mileage

Bikeway Type	Number of Centerline Miles	Number of Lane Miles
Bike Lanes	166.77	333.54
Bike Routes	216.04	216.04
Shared Use Paths	1827.15	3654.3
Total	**2211.47**	**4206.9**

Source: ODOT and MPO GIS Bicycle Inventories

4.3.3 Sidewalk Facilities

Currently there is 2,043 miles of sidewalk on US and State Routes. Sidewalk information was gathered by the Office of Technical Services. ODOT's roadway inventory team has identified sidewalks on US and State routes and given them a condition rating of good, fair, and poor.

4.3.4 Statewide GIS Inventory

ODOT, ODNR, MPOs, counties, cities, etc. presently collect bicycle and pedestrian data differently across the state. Many park districts do not have the capability or staffing to collect information. ODOT has historically only provided static mapping of the statewide bicycle network which is not useful for statewide planning efforts. Starting in 2011, the ODOT Bicycle and Pedestrian Program staff solicited

digitized information from as many entities as possible to consolidate this information into one GIS database.

Measurements, classification, and ratings are some of the differences in data collection as observed from the attribute tables within the data received. Therefore, ODOT produced a Bicycle Specification Document that gives guidance to other agencies and entities on how data can be collected in a consistent manner statewide. This effort is the first step in being able to perform statewide planning analysis for prioritization purposes.

4.3.5 National and Statewide Bicycle Trunk Routes

In 2008, AASHTO established a national corridor plan for US Bicycle Routes to facilitate travel between states over routes which have been identified as being suitable for cycling. The corridor plan has designated five routes through Ohio, with three running west - east and two running north - south. The corridors are listed below.

- West – East
  - US BR 30: Detroit, MI to Toledo to Cleveland to Buffalo, NY
  - US BR 40: Ft Wayne, IN to Cleveland to Erie, PA
  - US BR 50: Richmond, IN to Dayton to Columbus to Pittsburgh
- North – South
  - US BR 21: Lexington, KY to Cincinnati to Columbus to Cleveland
  - US BR 25: Louisville, KY to Cincinnati to Dayton to Toledo to Detroit, MI

State DOTs are charged with advancing these routes in each of their states and they have a 50 mile bandwidth from which to identify the best road or off road facility. ODOT is using off road existing trails of statewide significance wherever possible and then identifying the safest on road routing to complete the corridor. See **Section 4.3.6** for discussion on trails of statewide significance. On road routing includes choosing a roadway with criteria such as low volume, low truck traffic, flat topography, paved shoulders, and good pavement conditions. This routing will be located on ODOT and locally owned and maintained facilities depending on which roadway is safer for bicycle travel. Local jurisdictions must support the project by obtaining a signed resolution of support from their commissioners, trustees, or council. Facility construction or upgrade is not required for the national and state routing exercises.

Statewide trunk routes for cross state bike travel are currently being developed in conjunction with the AASHTO national routes. These state routes will connect population centers greater than 50,000. The same type of criteria for off road and on road selection is being used. Coordination with MPOs will occur when the routing enters into their respective planning area.

Signage will not be required for the routes, but if a local decides to post them, specific signs for the national AASHTO US Bike Routes and the Ohio cross state bike routes from the OMUTCD will be required (**Figure 4-2**). The U.S. Bicycle Route sign, M1-9, shall contain the routes designation as assigned by AASHTO and shall have the black legend and border with a retroreflectorized white background. The Bicycle Route (M1-8) sign, used for cross state routes, shall contain a route designation and shall have a green background with a retroreflectorized white legend and border. The Bicycle Route (M1-8a) sign can also be used for cross state bike routes and shall contain the same information as the M1-8 sign and in

addition shall include a pictograph or words that are associated with the route or with the agency that has jurisdiction over the route.

Figure 4-2: OMUTCD Bicycle Route Signage

4.3.6 Statewide Trails of Significance

Off road facilities are considered to be statewide trails of significance if they are currently 20 miles or greater in length. Regional and local partners create their own plans and funding scenarios and work to connect into these statewide facilities. There are currently 14 off road facilities greater than 20 miles and a description of each is provided below.

GH&BT: Gallia Hike & Bike Trail

The Gallia County Hike and Bike Trail is currently an eight mile trail envisioned as a 28-mile trail along a former CSX railroad right-of-way. The trail currently has two segments; the first being a 4.5-mile paved section from Mill Creek Road in Gallipolis north to the US 35 freeway underpass at Spring Valley and a 3.3 crushed limestone section north of Kerr to Bidwell. For more information, visit the O.O. McIntyre Park District website at: http://oomcintyreparkdistrict.org/hike-bike/

GLSM: Grand Lake St. Marys

Close to 600 acres of parkland surround Grand Lake St. Marys and although not contiguous, there are close to 21 miles of bicycle facilities surrounding the lake. The Celina to Coldwater trail is a 4.5 mile paved trail that runs between Celina and Coldwater on a rail bed on the western side of the lake. The south end of the trail ends at Vine and Fourth Streets in Coldwater. The northern end of the trail spills into the City of Celina where local roads can be taken to access the SR 703 bike route that has marked wide shoulders and runs along the north side of the lake for nine miles. This is not a separated trail and rules of the road should be applied when riding with traffic. East Bank Path is a two mile paved stretch located along the east bank of Grand Lake St. Marys and can be accessed on Parkway Drive near SR 364. The south side of the lake contains 5.5 miles of separated sidepaths known as the Franklin Township Greenway Trail which runs alongside SR 219 and ends in Montezuma. It passes through a 100-acre wildlife preservation area with an observation deck overlooking two wetlands and traverses two covered bridges. The West Bank Trail is a 1.3 mile paved trail, accessible on the west bank of Grand Lake St. Marys south of the State Boat Docks on West Bank Rd. in Celina. This trail meanders along the lake and into a wooded area. For more information and detailed maps visit the following websites at http://seemore.org/where-to-play/hiking-biking and http://www.grandlake.ohiotrail.com/biketrail.htm.

GMRT: Great Miami River Trail
The Great Miami River Trail extends more than 75 miles from Piqua through Dayton, and it ends in Franklin while running alongside the Great Miami River over nearly the entire route. On road connections must be taken in Troy and in Franklin. For more information, visit the Miami Valley Trails website at: http://www.miamivalleytrails.org/great-miami-river-trail.

GOLR: Great Ohio Lake to River Greenway
The Great Ohio Lake to River Greenway is an approximately 110-mile long corridor connecting Lake Erie at Ashtabula Harbor with the Ohio River near East Liverpool through Ashtabula, Trumbull, Mahoning, and Columbiana Counties. Individual components of this greenway system are being protected and developed by an array of park districts, local communities and private organizations. Approximately 68 miles of the trail have been built to date. Some individual segments of the greenway are referred to as the Western Reserve Greenway (Ashtabula and Trumbull Counties), the Mill Creek Metroparks Bikeway (Mahoning County) and the Little Beaver Creek Greenway Trail (Columbiana County). The following websites have more detailed information: http://www.ashtabulacountymetroparks.org/trail.htm, http://www.metroparks.co.trumbull.oh.us/Parks/WRG.htm, http://www.millcreekmetroparks.org/ParksFacilities/MetroParksBikeway/tabid/1475/Default.aspx, http://www.bicycletrail.com/Greenway.htm

H&BT: Hike and Bike Trails
This 45 mile bikeway is a combination of 34 miles of trail and 11 miles of on road connections in Summit and Portage Counties. The northwestern end of the bikeway ties into the Ohio to Erie Trail at the Towpath Trails Park. The trail follows the course of the old Akron, Bedford & Cleveland (ABC) Railroad on the eastern edge of the Cuyahoga Valley National Park. It traverses through Darrowville on the northern loop and Silver Lake and Munroe Falls on the southern loop, merging in Kent and traversing on to Ravenna. The trail is paved in Summit County and made of crushed stone in Portage County. More information can be found here:
http://www.summitmetroparks.org/parksandtrails/BikeAndHikeTrail.aspx and
http://www.portageparkdistrict.org/portage.htm

HOAB: Hockhocking Adena Bikeway
The 21-mile paved Hockhocking Adena Bikeway follows the Old Columbus and Hocking Valley Railroad and connects the cities of Nelsonville and Athens, linking Ohio University in Athens and Hocking College in Nelsonville. The urban section surrounds the City of Athens and provides access to Ohio University, uptown Athens, Athens Parks and Recreation facilities, and east side shopping areas and malls. Between Athens and Nelsonville the trail passes near Wayne National Forest which is rural and predominately forested. The trail terminates in Nelsonville at Farrow Avenue. More information can be found at:
http://www.seorf.ohiou.edu/~xx088/

LMST: Little Miami Scenic Trail
The Little Miami Scenic Trail begins in Milford, in Hamilton County, and travels approximately 75 miles to the northeast to Springfield, in Clark County. Portions of the Little Miami Scenic Trail parallel the river for which it's named, winding serenely through the beautiful countryside of Southwestern Ohio. This paved trail is also part of the statewide Buckeye Trail, the North Country National Scenic Trail and the

statewide Ohio-to-Erie Trail, traversing through four counties. For more information visit the Miami Valley Trails website at: http://www.miamivalleytrails.org/little-miami-scenic-trail

NCIT: North Coast Inland Trail

The North Coast Inland Trail is a paved trail that traverses through Ottawa, Sandusky, Huron, and Lorain Counties built over the abandoned Toledo, Norwalk and Cleveland Railroad. When completed, the trail will run for 65 miles from Elyria to Toledo. There are currently 50 miles of trail and bike routes completed and open for use with the first 37 mile segment starting in Elmore and running through the following municipalities: Lindsey, Fremont, Clyde, Bellevue, Monroeville, and Norwalk. Currently, the trail ends in Norwalk and picks back up again in Kipton. It continues for 13 miles through Oberlin and ends in Elryia. On road bike route connectors must be taken through Fremont, Bellevue, and Monroeville. For more information visit the following websites: http://www.metroparks.cc/reservation-north-coast-inland-trail.php and http://www.lovemyparks.com/parks/north_coast_inland_trail

OTET: Ohio to Erie Trail

The Ohio to Erie Trail is a 453 mile network of trails being built diagonally across the state from Cincinnati to Columbus to Cleveland, using lands formerly occupied by railroads and canals. Of that planned network, 75% is complete and in daily use. Much of the network encompasses local trails and utilizes some on road routing. The topography is generally flat in the middle of the state and rolling on the ends and is divided into three separate sections:

- Northern leg: Cleveland to Clinton
- Heart of Ohio: Clinton to Mount Vernon
- Southern leg: Mount Vernon to Cincinnati

For more information visit the Ohio to Erie Trail Fund website at: http://www.ohiotoerietrail.org/

RB&O: Richland B&O Trail

The Richland B & O Trail is a converted rail trail that runs through rural portions of Richland County. It starts in the southeastern part of the City of Mansfield and runs through the Villages of Lexington and Bellville and ends in the Village of Butler. The length of the trail is approximately 19 miles. For more information, visit: http://www.gormannaturecenter.org/GNC_Bike.html

TCTT: Tri-County Triangle Trails

The Tri-County Triangle Trail is proposed to be a 52 mile rail to trail project that will eventually connect Washington Court House, Chillicothe, Frankfort and Greenfield, Ohio. It will pass through Fayette, Highland, and Ross Counties. Currently, the trail measures 33 miles in length, starting in Washington Court House and running southeast to Frankfort and Chillicothe. Trail surfaces are a combination of asphalt and crushed stone. More information can be found here: http://www.tricountytriangletrail.org/index.html

TJE&P: TJ Evans and Panhandle Bike Paths

The TJ Evans and Panhandle Bike Paths are located in the center of Licking County starting in Johnstown, traveling through Granville, Newark, and Marne, ending east of Hanover. The trails total 40 miles of bikeway throughout Licking County, with approximately two miles being the Newark on road connector

tying the TJ Evans and Panhandle trails together. More information can be found here: http://www.lickingparkdistrict.com/bikepaths.html

WCT: Wabash Cannonball Trail

The Wabash Cannonball Trail is a 63-mile shared use path in Northwest Ohio traversing through four counties and comprised of two segments. It is managed by several organizations and municipalities. The 46-mile "North Fork" segment travels through Montpelier, West Unity, and Wauseon to the western edge of Maumee near N. Jerome Road. It then intersects with the 17 mile "South Fork" segment which runs southwest through Whitehouse and ends in Liberty Center. The trail provides non-motorized access to hikers, bikers, equestrians, and cross-country skiers. It is 12 feet wide and its trail surface varies within the different jurisdictions, from asphalt to hard packed cinder ballast. The hard packed cinder ballast sections are not suitable for on road touring bicycles. The entire trail system has 13 bridges. When Trail development is fully completed, the Trail will be surfaced with finely crushed stone in the rural areas and asphalt through the more populated areas. For more information and detailed maps visit the Wabash Cannonball Trail website at: http://wabashcannonballtrail.org

The Toledo, Akron, Canton, Cleveland, Columbus, Dayton, Springfield, and Cincinnati metropolitan areas all have more detailed information on bikeways in their region. Below are the links for more information:

- Toledo: http://www.tmacog.org/Bike_Ped.htm
- Akron: http://switching-gears.org/
- Canton: http://www.starkparks.com/trail_list.asp
- Cleveland: http://www.noaca.org/multimodalplanning.html
- Columbus: http://morpc.org/transportation/bicycle_pedestrian/main.asp
- Dayton: http://www.mvrpc.org/transportation/bikeways-pedestrians
- Springfield: http://www.clarktcc.com/biketrails.htm
- Cincinnati: http://www.oki.org/transportation/bike/index.html

4.3.7 Existing Plans

4.3.7.1 Statewide Pedestrian Accessibility Plan

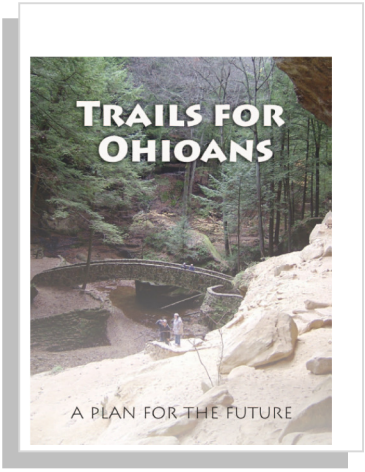
The Americans with Disabilities Act of 1990 required public agencies of over 50 employees to complete an ADA transition plan by January 6, 1995. To remain eligible for federal funding, FHWA required a completed ADA Transition Plan by December 2012.[14] An ADA transition plan is an inventory of facilities that do not meet ADA standards, and a plan for addressing those identified deficiencies. ODOT's ADA Transition Plan was updated in February 2012 as the ADA504 Self Evaluation and ADA504 Strategic Plan.

4.3.7.2 Strategic Highway Safety Plan

The Office of Safety has a Strategic Highway Safety Plan[15] committee that works to implement the Strategic Highway Safety Plan. The plan identifies five emphasis areas, one of which pertains to bicycle and pedestrian traffic which targets motorcycle and bicycle riders, and pedestrians and commercial vehicles, which are more likely to be involved in serious crashes.

[14] http://www.nircc.com/ada.htm
[15] http://www.dot.state.oh.us/Divisions/Planning/SPPM/MajorPrograms/Safety/Pages/StateSafetyPlan.aspx

4.3.7.3 ODNR Trails for Ohioans Statewide Trails Plan



The Ohio Department of Natural Resources developed the Statewide Trails Plan in 2005 which is currently being updated. The plan includes the identification of Ohio trails for recreational purposes and identifies potential future corridors for development. Currently, 22 Ohio state parks offer a total of 170 miles of biking trails managed by ODNR. Only trails serving as transportation corridors are included in ODOT's statewide bicycle facility database. More information on ODNR trail information can be found here: http://ohiodnr.com/tabid/9583/Default.aspx.

4.3.7.4 MPO Bicycle and Pedestrian Plans

Metropolitan transportation plans include existing and proposed transportation facilities (including major roadways, transit, multimodal and intermodal facilities, pedestrian walkways and bicycle facilities, and intermodal connectors that should function as an integrated metropolitan transportation system. These plans include a discussion on how the safety and security for motorized and non-motorized users can be increased, and how the plan will protect and enhance the environment, promote energy conservation, and improve the quality of life which includes accessible pedestrian walkways and bicycle transportation facilities.

Several MPOs have an adopted Bicycle and Pedestrian Plan and/or include a Bicycle/Pedestrian Chapter within their long range transportation plan (**Table 4-5**). Existing on road and off road facilities are identified as well as future corridors for development.

Table 4-5: MPO Bicycle Plans

MPO Area	Standalone Document
AMATS	Y
BEL O MAR	N
BHJTS	Y
CCSTS	Y
EASTGATE	Y
ERPC	Y
LACRPC	N
LCATS	N
MORPC	Y
MVRPC	Y
NOACA	Y
OKI (Ohio Only)	Y
RCRPC	N
SCATS	Y
TMACOG	Y
WWW IPC (Ohio Only)	Y

4.4 Policy and Programs

4.4.1 ODOT Policy

ODOT's Policy No. 20-004(P), Policy on Accommodating Bicycle and Pedestrian Travel on ODOT Owned or Maintained Facilities (Effective April 26, 2005), states that bicycle and pedestrian accommodations shall be considered for inclusion in new alignment or reconstruction roadway projects on state-owned and maintained roads occurring in areas within MPOs. In rural areas, four feet shoulders should be considered if the roadway has or is expected to carry more than 1,000 vehicles per day. Inclusion will be determined based on safety, feasibility, and local desire. Each transportation project accommodation will be evaluated on a case by case basis and will be documented in the appropriate planning stages of the Project Development Process. Transportation projects on local roadways should look to their corresponding local government or Metropolitan Planning Organization (MPO) to address how bicycle and pedestrian travel will be accommodated on non-ODOT facilities.

4.4.2 Data Collection

4.4.2.1 Count Data

There are many demand projection techniques available for walking and bicycling that when utilized, aid state, regional, or local planners with bicycle and pedestrian planning. Many of these demand projection techniques need, or would benefit from, count data. Bike and pedestrian counts can be used for the following:

- To identify corridors where current use and potential for increased use is high.
- To understand patterns of usage both before and after a facility is installed.
- To forecast bicycle and walking travel demand to and from colleges, universities, schools, parks, and employment centers.
- To track community-wide bicycle and pedestrian use over time, on particular corridors, as part of multimodal trips, or in response to specific factors, such as increasing density of facilities.
- To project increases in use in future years.

Currently, the collection of bicycle and pedestrian count data is not required under FHWA regulation; however, the FHWA Traffic Monitoring Guide is being updated and will include a bicycle and pedestrian chapter. Some Ohio MPOs and park districts have historically been collecting bicycle and pedestrian count data at the roadway and trail usage level for a number of years. MORPC has conducted volunteer-based bicycle and pedestrian counts twice a year since 2005, and NOACA has done the same since 2011. By conducting counts over several years, event-specific spikes will be less likely to skew results and help identify seasonal fluctuation, if any, as well as peak hour period identification. Eighty seven locations of counts have been conducted within the State of Ohio on various shared use paths. These counts have been conducted differently by each agency. The following bicycle and pedestrian count time periods include 2 hour, 15-hour, 24 hour, 2 day, 24 hour/365 days, and 34-74 days/24 hour. The volunteer manual counts usually follow the National Bicycle and Pedestrian Documentation Project model which

provides a method for local agencies to follow when conducting volunteer counts while the machine counters use the directions provided by the manufacturer.

4.4.2.2 Crash Data

Crash data is collected by ODOT's Office of Systems Planning and Program Management.

4.4.3 Education & Outreach

Chapter 4511 of the Ohio Revised Code contains the laws that govern operation of vehicles on Ohio roads. Most driving laws apply to cyclists as well as motorists. There are also a few laws that apply specifically to cyclists. ODOT published a guide to safely riding a bicycle on Ohio's roadways. The first edition, called Ohio Bicycling Street Smarts, was published in 2002 and supported by Transportation Enhancement funds. In 2012, the Ohio Department of Transportation's Cycling Smarter Guide replaced the Street Smarts guide, and was funded by proceeds from Ohio's "Share the Road" license plates. The update was developed by the ODOT Division of Planning.

4.4.4 Design Guidance

An abundance of nationally targeted guidebooks to assist in the planning and engineering of bicycle and pedestrian facilities have been published by various governmental and professional organizations. The guides that ODOT has adopted are listed below.

- Bicycle Facilities
  - AASHTO Guide for the Development of Bicycle Facilities, Fourth Edition, 2012 (AASHTO)
- Pedestrian Facilities
  - ADA Standards for Accessible Design, 2010 (U.S. Department of Justice)
    - 28 CRF part 35.151
    - 2004 ADAAG
  - Draft PROWAG 2011: Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (United States Access Board)
  - Designing Sidewalks and Trails for Access, Part 2 (FHWA)
- Highway Capacity Manual, 2010 (Transportation Research Board)

4.4.5 Relevant ODOT Departments

There are three primary offices that engage in bicycle and pedestrian activities housed within the Division of Planning: Local Programs, Systems Planning & Program Management, and Statewide Planning & Research. ODOT's Offices of Local Programs and Systems Planning & Program Management administer funding for the provisions of bicycle and pedestrian infrastructure projects in partnership with the federal and local communities. All of these offices provide technical and/or financial assistance to our ODOT Districts, MPOs, and local municipalities; improve safety and performance of existing bicycle and pedestrian infrastructure; ensure effective utilization of state and federal investment in

bicycle and pedestrian infrastructure; and ensure compliance with all pertinent state and federal laws, rules, and regulations.

4.4.5.1 ODOT Bicycle & Pedestrian Program

The Office of Statewide Planning & Research's **Bicycle & Pedestrian Program** is focused on advancing bicycle and pedestrian transport throughout Ohio by the following methods.

- providing bicycle and pedestrian transport support and education and planning, program, and project level technical assistance;
- promoting implementation of ODOT's Bicycle and Pedestrian Accommodations Policy; and
- complementing the Ohio MPOs' regional bicycle planning programs.

ODOT's Bike & Pedestrian Planner manages this program. This position has been required by FHWA (ISTEA, Section 1033) since 1992.

4.4.5.2 Other Relevant ODOT Departments

Many other ODOT departments also assist in the planning, funding, design, and oversight of bicycle and pedestrian accommodations.

The **Safe Routes to School** (SRTS) Program provides assistance to communities in developing a school travel plan, and distributes FHWA funds to eligible infrastructure and non-infrastructure projects. A school travel plan is required to apply for the FHWA SRTS funds. The Safe Routes to School Program under section 1404 of the SAFETEA-LU allows for the following eligible projects:

A. Infrastructure-related projects.-planning, design, and construction of infrastructure-related projects on any public road or any bicycle or pedestrian pathway or trail in the vicinity of schools that will substantially improve the ability of students to walk and bicycle to school, including sidewalk improvements, traffic calming and speed reduction improvements, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, secure bicycle parking facilities, and traffic diversion improvements in the vicinity of schools.

B. Non-infrastructure-related activities to encourage walking and bicycling to school, including public awareness campaigns and outreach to press and community leaders, traffic education and enforcement in the vicinity of schools, student sessions on bicycle and pedestrian safety, health, and environment, and funding for training, volunteers, and managers of safe routes to school programs.

C. Safe Routes to School coordinator.

The Office of Local Programs (formerly the Office of Local Projects) has Metro Parks and Transportation Alternative (formerly Transportation Enhancement) programs that distribute funds to bicycle and pedestrian related projects, and also developed ODOT's supplemental bicycle facility design guides. The Metro Parks Program provides state funds for roadways within or leading into county parks. These funds, however, cannot be used for separate off road trail facility construction. The Transportation

Alternatives Program provides funds for a variety of projects. Listed below are the eligible bicycle and pedestrian project types:

A. Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990.

B. Construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs.

C. Conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other nonmotorized transportation users. Many TE projects do not impact the human or natural environment and are considered exempt from further NEPA review, per ODOT's Programmatic Categorical Exclusion Agreement (Agreement No. 16400). This categorical exclusion agreement applies to many pedestrian and bicycle infrastructure improvements funded by other programs as well.

The Office of Systems Planning & Program Management develops the Statewide Transportation Improvement Program (STIP), which is used to distribute available funds for transportation projects. The STIP is a compilation of the Transportation Improvement Programs (TIP) that are developed by MPOs, and ODOT adds projects in rural areas that are not within MPO boundaries. A complete listing of ODOT's services is detailed in the Program Resource Guide[16].

4.5 Funding

On July 6, 2012, a new surface transportation funding bill was signed into law. The Moving Ahead for Progress in the 21st Century Act (MAP-21) apportions $105 billion for surface transportation programs during fiscal years 2013 and 2014. In contrast to the many short-term extensions of the previous surface transportation bill (SAFETEA-LU) that was passed in 2005, MAP-21 brings some changes to the organization and funding levels of surface transportation funding programs.

4.5.1 Transportation Alternatives Funding Program

For bicycle and pedestrian projects, the major change is the consolidation of Transportation Enhancements, Safe Routes to School, and Recreational Trails Programs into one program called Transportation Alternatives (TA). ODOT and MPOs will administer TA and Safe Routes to School funds and ODNR will continue to administer the Recreational Trails Program. MAP-21 effectively reduces funding for Transportation Alternatives by 28 percent on average compared to the previous SAFETEA-LU transportation bill. The percent decrease varies by state with a minimum of 18 percent and a maximum of 52 percent. In Ohio, funding is reduced to $37.5 million in FY 2012, to $27.6 million in FY 2013, and to $28 million in FY 2014. Fifty percent of a State's TA apportionment (after deducting the set-aside for the

16 http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/Documents/ODOT%20Program%20Resource%20Guide.pdf

Recreational Trails Program, if applicable) is suballocated to areas based on their relative share of the total State population with the remaining 50 percent available for use in any area of the State. In addition, states have the option of moving the second half of TA funds to other surface transportation programs.

Fifty percent of Transportation Alternative funds are distributed to areas based on population (suballocated), similar to the MAP-21 Surface Transportation Program (STP). States and MPOs for urbanized areas with more than 200,000 people will conduct a competitive application process for use of the suballocated funds. Eligible applicants include tribal governments, local governments, transit agencies, and school districts. MAP-21 provides options to allow States flexibility in the use of these funds.

The ODOT Office of Systems Planning & Program Management and the Office of Local Projects administer programs that allow local governments to apply for the construction of bicycle and pedestrian projects, the Safe Routes to School, and the Transportation Enhancement programs respectively. The Safe Routes to School Program dedicates roughly $4 million annually for engineering, encouragement, education, and enforcement activities that improve safety for children in grades K-8 who walk or bicycle. Since 2005, the Safe Routes to School Program has awarded $48 million to communities in 75 out of 88 Ohio counties.

The Transportation Enhancement Program, which includes bicycle and pedestrian projects as an eligible project category, makes $11 million available to local governments outside of an MPO area annually for bicycle and pedestrian projects. Overall, bicycle and pedestrian projects have been the most commonly funded project type since the creation of the TE program in 1992. Bicycle and Pedestrian type projects, combined with rails-to-trails, have accounted for nearly half of the total projects at 49%.

Currently, twelve MPOs in Ohio administer their own Transportation Enhancement Programs. From 2002 - 2010, ODOT and MPOs have invested more than $118 million in bicycle-specific transportation projects, ranging from the creation of new bike paths and bike lanes to extending and modernizing existing bikeways. Both funding programs are available to local governments and non-profit organizations. As discussed previously, these programs will now be consolidated under the Transportation Alternatives Program.

4.5.2 Other Funding Sources

Aside from the Transportation Alternatives Program, there are other funding programs in Ohio that allow for bicycle and pedestrian infrastructure as part of an eligible component of the overall project. There are also state funded programs that allow for standalone bicycle and pedestrian projects like the Clean Ohio Trails Fund. Different statewide or regional agencies award, distribute, and manage these program funds. Most bicycle and pedestrian projects in Ohio are funded with a mix of state and federal funding programs including Transportation Alternatives (formerly Transportation Enhancements and Safe Routes to School), Clean Ohio Trails Fund, and Recreational Trails Program funds. See the more detailed list in **Table 4-6**.

Table 4-6: Detailed Project Funding

Funding Program	Issuing Agency	Description
Transportation Alternatives (formerly Transportation Enhancements and Safe Routes to School)	ODOT/MPO	Federal funds administered by ODOT and MPOs to advance bicycle and pedestrian projects that serve a transportation purpose.
Safety Program	ODOT	Federal funds administered by ODOT to reduce fatalities and injuries on Ohio roadways. This can include bicycle and pedestrian high crash areas.
Surface Transportation Program	ODOT/MPO/County Engineers Association of Ohio	Federal funds administered by ODOT, MPOs and CEAO to resurface, rehabilitate, and reconstruct a failing roadway. Bicycle and pedestrian facilities that are appurtenances to the roadway project are eligible.
Congestion Mitigation Air Quality	MPOs within US EPA designated air quality areas	Federal funds administered by MPOs for projects to reduce the amount of allowable vehicle tailpipe emissions. Several bicycle and pedestrian facility types are eligible.
State Capital Improvement Program/Local Capital Improvement Program	Ohio Public Works Commission	State funds administered by OPWC for roadway, sewer, and stormwater projects. Bike and Pedestrian Facilities that are appurtenances to the roadway project itself may be eligible under some OPWC districts.
Clean Ohio Trails Fund	Ohio Department of Natural Resources	State funds administered by ODNR to fund land acquisition for a trail, trail development, trailhead facilities, and engineering & design.
County and Municipal Bridge Program	County Engineers Association of Ohio/ODOT	Federal funds administered by CEAO and ODOT for bridge projects. Bike and pedestrian facilities that are appurtenances to the bridge project itself are eligible.
Section 402 Federal, State, and Community Highway Safety Funds	Ohio Department of Public Safety	Funds are administered by ODPS and are to be used for short-term highway safety support. Public outreach related to bicycle and pedestrian safety is an eligible project type.
Federal Transit Administration	FTA/ODOT	Certain formula grants administered by ODOT have programs that allow for bike and pedestrian facilities if they are appurtenances to the transit project itself.
Community Development Block Grant	Housing and Urban Development	Federal funds administered by the Ohio HUD office that can include some bicycle and pedestrian facilities for the purpose of enhancing the development of an entitlement city or county project.

4.6 Developing State and National Bicycle Routes

As part of Access Ohio 2040, ODOT is developing a network of statewide bicycle routes. These routes, taking advantage of existing bikeways and roadways wherever possible, connect all urban areas in Ohio with a population over 50,000 as well as many smaller towns. Also, AASHTO is developing a national bicycle route system, and several of these routes pass through Ohio. This effort will also identify potential segments within Ohio for these national routes.

A thorough process was used to develop the bicycle routes. This process involved selecting key destinations in the state's largest cities followed by determining routes between each of these

destinations. The routes were then reviewed, and additional routes were added to increase coverage across the state.

4.6.1 Destinations

First, a list of destinations was developed. The statewide bicycle routes connect all Ohio urbanized areas with a population over 50,000. Within each of these urban areas, one landmark point within the urban area's largest city was selected to be the exact destination point for bicycle routes. If the urban area's primary city is in a neighboring state, the urban area's largest city in Ohio was used. To facilitate connectivity, endpoints were chosen for each route that are at or near major landmarks or amenities for bicyclists in these cities. If the city has a bicycle station with amenities, it was selected as the destination point. A complete list of destination addresses can be found in **Appendix I**.

4.6.2 Routing and Analysis

To determine optimal routes connecting all of the destinations, a bicycle routing using GIS processes was developed. First a network was developed; including all roads in ODOT's state and local roadway inventories, and the existing statewide bicycle facility inventory. This includes all state, county, and township maintained routes, as well as major roads within cities. Interstates and urban freeways (functional class 1, 11, and 12) were removed, since bicycles are legally prohibited from using these roads. The bicycle inventory includes shared-use paths, on-street bike lanes, and other signed bike routes. This routing process then applied the bicycle level of service (BLOS) model to all of the roadway segments, producing BLOS scores which were then translated to BLOS grades between A and F. The BLOS scores are based on a variety of factors including car and truck traffic volumes, lane width, shoulder width, pavement conditions, and speed limits. Assumptions were made for missing attributes. Off-road facilities were given BLOS grades of P (for path) and on-road designated facilities were given a BLOS grade of R.

4.6.2.1 Bicycle Level of Service Formula Background

A level of service analysis provides a score which reflects bicyclists' safety and comfort while riding on a particular roadway section. The level of service scale ranges from A to F, with A representing the best bicycle conditions and F the worst conditions.

The score is most sensitive to the bicyclists' interaction with motor vehicles and was calculated using roadway data from all segments in the ODOT roadway system. The BLOS model chosen was developed through a Florida Department of Transportation (FDOT) research project and was based on surveys that bicyclists completed after riding on a wide variety of roadways. These specific roadways were selected to test for specific characteristics that would affect bicyclists' perceptions of safety and comfort.

The bicycle level of service model was chosen because it is designed for planning level analysis and it uses many simplifying assumptions. If complete data was not available for a roadway segment, a few assumptions and model adaptations were made to calculate the BLOS. Some key variables in the BLOS model include:

- **Posted Speed -** One of the key factors affecting bicyclists' comfort is the speed of adjacent motorized traffic. The effect of motor vehicle speed is greatly increased by the amount of truck

traffic. As the number of trucks increase, the BLOS worsens since fast-moving trucks need significantly more space than fast-moving automobiles.

- **Shoulder Width -** Bicyclists' input in developing the BLOS model showed a clear preference for riding on a shoulder or lane separated by stripe from the motor vehicle traffic. The model accounts for this by giving better BLOS to roadways with shoulders wide enough to safely ride a bicycle without entering the car travel lanes.
- **Traffic Volume -** High car and truck traffic volumes on a roadway segment leave less room for safe bicycle travel. Therefore, higher traffic volumes lead to worse BLOS.
- **Pavement Condition -** As road bicycle tires are typically about an inch wide, bicycles are more susceptible to cracks and imperfections in pavement than an automobile. Therefore, pavement condition is an important component of cyclist's safety.

Please see **Appendix J** for the complete bicycle level of service formula and further descriptions of its inputs**.**

4.6.2.2 Calculating Bicycle Level of Service

The BLOS analysis was automated for over 200,000 roadway segments. The results of this automated analysis provided a numerical bicycle LOS score for each roadway segment. These BLOS scores were then converted to a letter grade ranging from A to F. Off-road bikeways, bike lanes, and other specific bicycle facilities in ODOT's bicycle facility inventory were not given BLOS scores, but were given BLOS grades to match the roadway segments' descriptions. Off-road bikeways and roads with clearly designated and striped bicycle lanes were given a LOS grade of P. LOS R includes locally-designated bike routes, and roads with exceptionally wide shoulders as designated by the statewide bicycle inventory. Some of these roads with BLOS R have signs or pavement markings to indicate that bicyclists often use these roads. Short connections between roadways and off-road bikeways, local roads not in the state roadway inventory, and committed, but not yet complete, bikeways were given a BLOS grade of O. Examples of short connection segments include driveways and parking lots connecting a shared-use path to a public road.

Next, impedances were established for each individual roadway and off-road segment. The impedance for an individual segment equals the segment distance multiplied by a weighting factor. These weighting factors are lower for segments with good level of service, and very high for segments with a poor level of service. Due to the varied nature of facilities with an unknown bicycle level of service, they have been given the same impedance factor as a roadway with BLOS C. BLOS C is approximately the midpoint of the bicycle level of service scale. See **Table 4-7** for further details.

Table 4-7: Bicycle Level of Service Descriptions

BLOS	Weighting Factor	Description
A	1	Typically roads with lower posted speed limits and very low car and truck traffic volume
B	2	BLOS B roads typically have slightly higher traffic volumes, and lanes may be a bit narrower
C	10	These roadways typically have average to slightly below average traffic volumes and reasonable lane widths.
D	30	Average lane widths and traffic volumes, and relatively low truck percentage
E	40	Higher car and truck traffic volumes
F	55	Highest traffic roads with narrow lanes and high speed vehicular traffic
P	0.5	Off-road paths, designated bike lanes
R	1	Designated on-road bike routes, wide shoulder roads from bike inventory
O	10	Unknown Bicycle Level of Service

The routing algorithm was then run based upon the impedance values. The route between two of the destination cities was based upon the shortest impedance total between two of the destinations. This produced an initial set of routes connecting all 17 destinations (**Appendix K**).

4.6.3 Initial Review and Adjustment

The initial routing process provided a total of 136 unique routes, with one route from each origin to each destination. Routes that could reasonably pass through another city were deleted which resulted in 48 routes. For example, the routing between Canton and Cleveland passed directly through Akron. Therefore, the Canton to Cleveland routing was removed in favor of using the Canton to Akron and Akron to Cleveland routings. Routes with segments that directly paralleled each other also were consolidated onto one road or path where possible.

Due to problems combining the roadway network with the bikeway network, and missing data for the LOS formula, the routing algorithm produced some routes that did not make sense geographically. Therefore, the routes were reviewed and then adjusted manually where needed to minimize the distance and take better advantage of off-road facilities.

Some of the adjustments made included moving routes off of any limited-access roads not removed from the roadway network in the initial filtering. Routes were moved to nearby dedicated bicycle facilities wherever possible. Loops which added significant distance to routes were removed or reduced wherever possible. The BLOS formula does not consider topography; therefore some routes have been moved to roadways with worse BLOS to reduce the number of hills along the route.

4.6.4 AASHTO Corridors Integration

After the routes connecting the major Ohio cities were completed, potential routes for AASHTO corridor segments were manually identified to link to neighboring states. This included routes west from Dayton, Toledo, and Lima to the Indiana line and from Cleveland to the Pennsylvania line. Additional connections to neighboring states exist at urban areas along the state borders, including Toledo and Cincinnati. Statewide bicycle routes within Ohio that could potentially carry an AASHTO national bike route were labeled appropriately.

4.6.5 Additional Routes and Changes

Next, several routes were further modified based upon suggestions from local stakeholders such as MPOs, cities, and park districts. Additional and alternative routes were also suggested beyond those connecting urban areas to provide better statewide coverage. This included alternate scenic routes and access to smaller towns.

4.7 Proposed Routes

This process resulted in five numbered national bike routes, and 17 numbered state bike routes connecting the state's largest urban areas as well as many smaller towns. A numbering scheme was developed; this numbering system is based upon Shawn Richardson's "Bike Route Numbering System for Ohio's Bike Paths." North-south bicycle routes are given odd numbers, while east-west bicycle routes are given even numbers. Generally, lower number routes start in the southern and western part of the state. Route segments belonging to an AASHTO national bike route are given the AASHTO route number, regardless of where it may fit within the state numbering system. See **Figure 4-3** for further detail, and bike route maps of different regions of the state are available in **Appendix L**.

4.7.1 Route Descriptions

The over 3,000 miles of national and statewide bike routes in Ohio cross varied types of terrain and areas. Please note that most of these routes have not been field verified, and to officially become part of a national route a resolution is required from the jurisdiction the route passes through. Routes may change slightly during the field verification process.

4.7.1.1 National Bike Routes

The Ohio segments of five national bike routes are over 1,400 miles long and pass through many of Ohio's largest cities while providing bicycle connections to the rest of the country.

National Bike Route 21 enters the state in Cincinnati after passing through Lexington, Kentucky, and follows the Ohio to Erie trail over its entire length. It passes through Cincinnati, Columbus, Massillon, and Akron before ending in Cleveland. Over 75% of this route is currently on an off-street shared use path.

National Bike Route 25 enters the state from the Louisville, Kentucky area before passing through Cincinnati, Dayton, Lima, and Toledo on the way to Detroit, Michigan. It parallels Interstate 75 along much of the route. This route runs along segments of the Little Miami Scenic trail and Great Miami River Trail.

National Bike Route 30 begins in Detroit and then passes through Toledo and Cleveland going towards Erie, Pennsylvania. Much of this route in North Central Ohio is along the North Coast Inland Trail. A scenic alternative, 30A, follows the shore of Lake Erie and passes through Sandusky and Lorain before rejoining 30 just west of Cleveland.

Figure 4-3: Proposed National and Statewide Bicycle Routes

National Bike Route 40 begins in Fort Wayne, Indiana. It then passes through Lima, Bucyrus, and Mansfield before passing through the Canton area. It proceeds east to Youngstown before turning north towards Ashtabula. The next major city along this route is Erie, Pennsylvania. The official AASHTO proposal for this route has this route running farther to the north; therefore, route 40A has been designated from the Indiana state line through the Toledo area. Much of route 40A follows the Wabash Cannonball Trail.

National Bike Route 50 enters Ohio just east of Richmond, Indiana, before entering the Dayton area. It then follows Route 21 on the way to Columbus before continuing east through Newark. It then traverses the hills of east central Ohio before leaving the state in Steubenville on the way to Pittsburgh, Pennsylvania. This route also has a scenic alternative in the Columbus and Newark area. As of April 2013, this route has been field-verified and resolutions of support have been received from areas from the Indiana state line east through Newark and Licking County, and it is likely that it will be the first route sent to AASHTO for formal designation.

4.7.1.2 Statewide Bike Routes

The statewide bike routes provide additional connectivity between large cities and small towns. These routes total approximately 1,600 miles.

State Bike Route 10 runs along the Ohio River from Cincinnati to Ironton, passing through Portsmouth.

State Bike Route 20 begins in Xenia at an intersection with national routes 21, 25, and 50. It then travels east through Washington Court House, Chillicothe, and Athens before ending in Marietta.

State Bike Route 23 travels northward from Xenia through Springfield. It then turns northwest where it intersects with national route 25 near Sidney.

State Bike Route 28 runs east from Springfield along US Highway 40 before ending at national bicycle routes 21 and 50 just west of London. This provides a more direct connection between Springfield and points to the east.

State Bike Route 32 travels through the southeastern part of the Columbus area before ending at route 65 east of Lancaster.

State Bike Route 39 branches off from routes 21 and 50 west of Columbus. It then travels through Columbus' far northwestern suburbs, Delaware, and Upper Sandusky before turning west and ending in Findlay at an intersection with national route 25.

State Bike Route 42 branches off from route 77 in rural eastern Ohio to provide a connection between Marietta and Wheeling, WV.

State Bike Route 47 begins in Portsmouth at an intersection with bike route 10 before following the Scioto River valley through Chillicothe and Circleville north to Columbus. It then follows the Olentangy bikeway in the Columbus area before turning west to its intersection with bike route 39 just northwest of Columbus. This is the same route used by the Tour of the Scioto River Valley from Portsmouth to Columbus.

State Bike Route 52 connects the Delaware area with major routes east of the city, including national bike route 21 and statewide bike route 65. It also helps form a bypass around Columbus for bikers traveling across the state.

State Bike Route 62 begins at route 21 in Massillon and then travels southeast to the Steubenville area. It follows the completed section of the Towpath Trail before turning east in southern Stark County.

State Bike Route 65 traverses nearly the entire length of the state. It begins in Ironton and travels north to Newark. It then turns slightly west before turning north again to reach Mansfield. From Mansfield, the route reaches Lake Erie in Sandusky.

State Bike Route 68 provides a route through the Akron area to connect route 21 with the eastern portion of route 40. This route also can be used to connect Akron to route 50.

State Bike Route 70 connects Akron with Youngstown before reaching the Pennsylvania state line east of Youngstown.

State Bike Route 71 branches off from route 40 east of Ashland before passing through Medina on the way to Cleveland. This route provides a key link from the Cleveland area to Mansfield and points southwest.

State Bike Route 80 passes through the eastern suburbs of Cleveland before turning southeast to reach Youngstown.

State Bike Route 92 serves as a spur into Sandusky off of national bicycle route 30, and it shares much of its route with route 30A.

State Bike Route 95 connects major destinations in the far eastern part of the state, including Wheeling, WV, Steubenville, and Youngstown.

4.8 Gaps

Although the BLOS calculations and manual adjustments provided suitable routes in most areas, a few gaps still exist along many routes. These include areas with BLOS E or F. Also, a few routes have bikeway segments that will be constructed in the next few years. Some areas with poor BLOS are unavoidable; this includes some bridges and areas where the only roadway has high traffic. The BLOS formula does not consider topography; therefore, some routes have been moved to roadways with worse BLOS to reduce the number of hills along the route. **Figure 4-4** illustrates the gaps in the bicycle route network.

Figure 4-4: National and Statewide Bicycle Routes by BLOS Grade

In total, 12% of the bike routes have a BLOS E or F. These gaps are primarily in rural areas, although there are also several gaps in suburban areas with higher automobile traffic. **Table 4-8** provides a breakdown of the bicycle route mileage by BLOS grade.

Table 4-8: Bicycle Route Distance by Bicycle Level of Service Grade

BLOS	Mileage	Percentage	Combined
A	343.9	11.2%	22.9%
B	359.0	11.7%	
C	462.3	15.1%	31.3%
D	498.1	16.2%	
E	231.7	7.6%	12.1%
F	140.2	4.6%	
R	141.0	4.6%	4.6%
P	814.0	26.5%	26.5%
O	78.5	2.6%	2.6%

Some of the areas with BLOS O (unknown bicycle level of service) may also be considered gaps. Many of the local roads used likely have acceptable BLOS; however there is not enough data available to accurately determine this.

4.9 Future Steps

So that these bicycle routes can be used by Ohio bicyclists and tourists in the future, several steps will need to be undertaken. First, routes will need to be formally designated by local jurisdictions.

4.9.1 Route Review and Designation

The AASHTO National Bike routes will need to be formally designated by each jurisdiction the route passes through. This step includes field review with local stakeholders and experts to finalize the route. This ensures that the BLOS scores have accurately determined whether a road is suitable for bicycling. Also, many of the areas with unknown BLOS will be evaluated during field review to determine their BLOS. Field review and in-depth discussion with local stakeholders also can help determine if alternate routes are needed or a gap will be filled by a future local project.

Once the route has been finalized in conjunction with local stakeholders, a signed approval resolution is then required from each jurisdiction the route passes through. This includes villages, cities, and counties. This process has already been completed for several of the counties that National Bike Route 50 passes through in western and central Ohio.

4.9.2 Filling Gaps

Some of the gaps along the bike routes may be filled in the future using a variety of techniques. In many of the state's urban areas, these gaps may be filled by trails planned for the future. Some of the roads with poor BLOS may have other projects in upcoming years that improve shoulder width or other key roadway features, thereby improving conditions for cyclists. In other areas, the gaps may be reduced by simply relocating the bicycle route to local roads better suited for bicycling.

4.9.3 Integration with Other Plans and Programs

The national and statewide bicycle routes can also play a role in future MPO and other local plans. MPOs can identify other local bikeways within their areas to connect to statewide and national bicycle routes to link the routes to key local attractions and businesses.

Signage will not be required but if a local decides to post them, specific signs for the national AASHTO US Bike Routes and the Ohio cross state bike routes from the OMUTCD will be required, as described previously in **Section 4.3.5**.

4.10 Conclusion

The national and statewide bicycle routes help support the state's multimodal transportation system. By proposing routes on existing bikeways and roadways, the existing transportation infrastructure is used more effectively in an era of limited budgets. The bicycle level of service model and analysis provided a good way of measuring bicycle route suitability without extensive field work, but more work will be required before these routes are fully designated.

5. AVIATION

This section presents the existing airport system in the state of Ohio, along with Cincinnati/Northern Kentucky International Airport (CVG), which is located in Covington, Kentucky, across the Ohio River from Cincinnati. It also includes a discussion of the current Ohio Statewide Airport Focus Study.

5.1 Infrastructure

5.1.1 Number of Airports

The existing Ohio Airport System consists of 104 airports, of which eight are commercial service[17] and the remainder are general aviation airports as classified by the Federal Aviation Administration (FAA). This analysis also includes Kentucky's CVG which serves the Cincinnati market. The eight commercial service airports analyzed are Akron-Canton Regional (CAK), Dayton International (DAY), Port Columbus International (CMH), Cleveland-Hopkins International (CLE), Rickenbacker International (LCK), Toledo Express (TOL), Youngstown-Warren Regional (YNG), and the Cincinnati/Northern Kentucky International (CVG). According to the National Plan of Integrated Airport Systems (NPIAS), 12 general aviation airports are classified as general aviation reliever airports, which are intended to alleviate congestion at busy commercial service airports nearby. Six of these system airports are not included in the NPIAS. Airports included in the NPIAS are eligible for federal funding. **Figure 5-1** illustrates the location of each airport within the Ohio Airport System and the CVG.

5.1.2 Runway Lengths

The primary designated runway (the most frequently used runway at airports with more than one runway) at airports included in this study varies in length depending on the type of airport and the nature of the aviation activities that the airport serves. Runway length dictates the size and landing speed of an aircraft that an airport can safely accommodate. The longest runway in the Ohio Airport System is over 12,100 feet in length, while the shortest runway is around 1,800 feet in length. Of the 105 airports examined, the majority of airports (31) have primary runways between 3,000 and 3,999 feet in length. Primary runways ranging in length from 4,000 to 4,999 feet are the second most common in the system (27). **Table 5-1** lists the runway length ranges and the number of primary runways among the 105 study airports that fall within each range.

Table 5-1: Primary Runway Length Range Count

Runway Length Range (feet)	Number of Airports
1,800-2,999	5
3,000-3,999	31
4,000-4,999	27
5,000-5,999	26
6,000-6,999	5
7,000-7,999	1
8,000-8,999	0
9,000-9,999	5
10,000-12,200	5
Grand Total	**105**

Source: FAA 5010 Forms

[17] Cincinnati/Northern Kentucky International Airport is located outside of Ohio in the Commonwealth of Kentucky.

Figure 5-1: Ohio Airport System, 2012

Source: CDM Smith

5.1.3 Air Traffic Control

Air traffic control is a service provided by the FAA or contracted controllers who direct aircraft movements on the ground and in the air. The purpose of air traffic control is to separate aircraft to prevent collisions as well as organize and expedite the flow of traffic. There are 15 airports in the Ohio Airport System with air traffic control towers. FAA controllers also manage the enroute airspace beyond the immediate environment of those 15 air traffic control towers. In addition to air traffic control towers, navigational aids exist at airports to enable the safe operation of aircraft departing, arriving, and operating at an airport. Many types of navigational aids exist including both ground based equipment and satellites that provide pilots information through avionics equipment inside the cockpit.

5.2 Demand

5.2.1 Air Carriers

Passenger airline service at the eight commercial service airports included in this study is provided by 10 different commercial airlines, primarily domestic legacy carriers. However, several low-cost carriers such as Allegiant, Southwest/AirTran, and Frontier also operate at a number of these commercial service airports. Legacy carriers are those airlines that had established interstate routes by the time of the Airline Deregulation Act of 1978 and are distinguished from the relatively newly established low-cost carriers that compete with the legacy carriers. **Table 5-2** lists the number of air carriers operating out of the commercial service airports examined. Several of these airports also serve an important role in the movement of air cargo. DHL operates a hub out of CVG which serves as one of the three super global hubs for the cargo carrier. Rickenbacker International caters to international freight airlines from Asia. More information on this topic is discussed in the freight chapter.

Table 5-2: Air Carriers Operating in the Ohio Airport System

ID	City	Airport	Nonstop Destinations	Number of Air Carriers
CAK	Akron-Canton	Akron-Canton Regional	13	5
DAY	Dayton	Dayton International	18	8
CMH	Columbus	Port Columbus International	33	8
CLE	Cleveland	Cleveland-Hopkins International	70	8
LCK	Columbus	Rickenbacker International	1	1
TOL	Toledo	Toledo Express	5	4
YNG	Youngstown	Youngstown-Warren Regional	3	1
CVG	Covington	Cincinnati/Northern Kentucky International	53	7

Source: JobsOhio - Ohio Commercial Service Airports Economic Impact Study, CDM Smith 2012

US Airways, Delta Airlines, United Airlines, and American Airlines and their affiliates serve five of the eight commercial airports and low-cost carriers serve several of Ohio's commercial airports. At smaller airports, such as Youngstown, flights are typically to seasonal tourist destinations. A number of these airports serve as hubs for airlines. Cleveland-Hopkins International is a hub airport for United Airlines. Delta Air Lines, despite a drawdown in flights, uses CVG for hubbing operations.

5.2.2 Passenger Enplanements

Between 2000 and 2010, passenger enplanements at Ohio's commercial service airports have declined as a whole. Statewide, enplanements have decreased at an average annual rate of 1.7 percent, due largely to an annual loss of enplanements at both Port Columbus International and Cleveland-Hopkins International. When enplanements from CVG are included in the total, enplanements have fallen at an average annual rate of 4.7 percent. From 2000 to 2010, enplanements increased at four of the seven Ohio commercial airports. **Table 5-3** shows the total enplanements for Ohio's commercial service airports and CVG from 2000 to 2010.

Table 5-3: Historic Enplanements, 2000-2010

Year	CAK	DAY	CMH	CLE	LCK	TOL	YNG	CVG
2000	388,940	1,144,918	3,447,628	6,364,790	770	249,165	34,463	11,156,305
2001	361,107	1,128,865	3,412,384	5,982,377	197	338,508	26,377	9,047,648
2002	414,643	1,076,388	3,204,770	5,223,503	756	325,452	13,466	9,930,857
2003	536,589	1,269,718	3,149,103	4,996,766	5,485	290,385	7,196	10,447,887
2004	652,477	1,444,236	3,021,583	5,268,160	92,738	313,781	20,647	10,758,562
2005	706,664	1,253,502	3,263,061	5,553,860	42,163	258,391	8,175	11,578,681
2006	720,827	1,275,069	3,274,398	5,436,824	6,491	200,277	9,613	8,509,283
2007	683,007	1,392,789	3,725,782	5,537,153	3,587	170,027	17,680	7,802,758
2008	709,338	1,440,170	3,493,739	5,485,860	5,318	139,793	18,109	6,923,015
2009	717,212	1,302,298	3,102,363	4,731,869	5,494	97,731	16,418	5,448,191
2010	757,805	1,221,235	3,125,149	4,606,419	4,692	87,177	24,279	4,207,006
AAGR (2000-2010)	**6.9%**	**0.6%**	**-1.0%**	**-3.2%**	**19.8%**	**-10.0%**	**-3.4%**	**-9.3%**

Source: FAA TAF issued January 2012

Another way to measure aviation activity at an airport is the number of aircraft take offs and landings that occur in a year. Collectively called operations, this measure includes any take offs or landings by passenger airlines, and air cargo aircraft. Total air carrier operations at Ohio's commercial service airports declined at an average annual growth rate of 7.4 percent from 2000 to 2010. When air carrier operations at CVG are taken into account, operations for the eight commercial service airports fell at an average annual rate of 8.1 percent over the 10-year period. **Table 5-4** lists air carrier operations at each commercial service airport between 2000 and 2010 which includes both freight and passenger operations. The only commercial service airports in Ohio to experience a growth in air carrier operations from 2000 to 2010 were Rickenbacker International and Akron-Canton Regional.

The decline and slow growth of both enplanements and air carrier operations over the past decade are not unique to Ohio and can be, at least partially, attributed to three events: the terrorist attacks of September 11, 2001; the global financial crisis of 2008; and the subsequent rising cost of fuel.

Table 5-4: Historic Air Carrier Operations, 2000-2010

Year	CAK	DAY	CMH	CLE	LCK	TOL	YNG	CVG
2000	6,242	64,949	77,322	172,317	1,562	20,589	1,664	185,762
2001	5,725	50,722	69,366	174,726	736	17,090	1,101	162,162
2002	2,755	35,765	58,333	149,078	736	17,361	386	150,943
2003	7,146	28,060	47,138	143,398	736	12,268	286	144,821
2004	11,758	27,676	44,123	83,349	1,750	13,764	567	168,312
2005	15,006	31,409	50,135	82,967	4,921	13,215	51	179,207
2006	21,641	30,186	49,262	75,870	4,160	10,144	33	100,916
2007	21,597	20,409	50,294	72,014	4,482	9,724	39	92,112
2008	23,085	20,399	59,638	69,323	4,740	10,080	437	83,176
2009	21,981	19,648	55,690	61,473	4,785	9,143	346	69,130
2010	22,363	20,157	49,579	53,482	4,830	9,629	554	67,112
AAGR (2000-2010)	**13.6%**	**-11.0%**	**-4.3%**	**-11.0%**	**12.0%**	**-7.3%**	**-10.4%**	**-9.7%**

Source: FAA TAF issued January 2012

5.2.3 Based Aircraft

Like enplanement and operation levels, the number of based aircraft at all system airports has also decreased over the historic period of 2000 to 2010. As shown in **Table 5-5**, aircraft based at Ohio system airports decreased at an average annual rate of 1.5 percent from 2000 to 2010.

Table 5-5: Historic Based Aircraft, 2000-2010

Year	Ohio Based Aircraft
2000	5,124
2001	5,256
2002	5,347
2003	5,521
2004	5,605
2005	5,756
2006	5,404
2007	5,511
2008	4,696
2009	4,746
2010	4,395
AAGR (2000-2010)	**-1.5%**

Source: FAA TAF issued January 2012

5.3 Passenger Aviation Needs

Ohio's system of airports provides a valuable transportation and economic asset to the people and businesses of Ohio. In August 2012, ODOT in partnership with the Federal Aviation Administration (FAA) initiated the Ohio Statewide Airport Focus Study. This 24 month comprehensive analysis of Ohio's airport system will aid the FAA and ODOT in identifying capacity shortfalls and overlaps and help allocate resources so that the system can continue to function in a safe and efficient manner. While this analysis will include the state's air carrier airports, the primary focus is on general aviation airports and activities.

The Ohio Focus Study includes two major components, a comprehensive aviation system plan and an economic impact study. A robust public outreach program is being initiated to ensure accurate dissemination of data and to include input from a wide range of interests. The aviation system plan will examine airport capacity and facility needs for the state on a region-by-region basis. Airport market areas will be assessed using GIS to clearly identify overlaps and shortfalls. Any shortfalls or oversaturation in airport capacity, or compliance issues, will be addressed in the recommendations section of the study. Additionally, the costs to develop the system will be estimated and compared to available anticipated FAA and ODOT funding streams.

The economic impact study will quantitatively assess each airport's economic contribution to the state's economy on an annual basis. Additionally, the study will undertake several supplemental analyses, including aviation's contribution to Ohio's tax base and an estimate of the replacement cost of the Ohio airport system. Specialized case studies will provide detailed anecdotal evidence of how aviation benefits the people of Ohio.

An extensive public outreach effort is an integral part of the study. From the very beginning, public involvement will be a key component for purposes of communicating with the public, both in terms of how the study is progressing and getting public input for the process. In addition to input from a project advisory committee, three sessions of statewide outreach meetings will take place during the study. A number of survey efforts will be completed to get feedback from airport sponsors, airport tenants, economic development agencies, and the traveling public. The study has a two-year timeline and is expected to conclude in 2014.

6. RAIL

This section discusses the existing and future rail system in the state of Ohio. It includes the existing passenger rail service, ridership data, and needs.

6.1 Existing Passenger Rail Service in Ohio

6.1.1 Existing Intercity Passenger Rail System Routes

Intercity passenger rail travel is provided by the National Railroad Passenger Corporation, also known as Amtrak, to a limited number of cities across Ohio's northern and southern regions. Amtrak's passenger services in Ohio are discussed in the following sections.

6.1.1.1 Cardinal

The *Cardinal* route operates between New York City and Chicago and consists of one round-trip three days a week. The *Hoosier State* route joins the Cardinal route in Indianapolis providing a daily route to Chicago. The *Cardinal* route only makes one station stop in Ohio at Union Terminal in Cincinnati. Other stops include Philadelphia, Baltimore, Washington DC, and Charleston, WV. In the westbound direction the *Cardinal* leaves New York's Penn Station at 6:45 AM and arrives in Chicago at 10:05 AM the following day[18]. In the eastbound direction, the train leaves Chicago at 5:45 PM and reaches New York City at 9:56 PM the next day. Station stops in Cincinnati are made at 1:13 AM (westbound) and 3:17 AM (eastbound). **Table 6-1** shows the distances between some of the major stops.

Table 6-1: *Cardinal* Service Segments and Mileage between Stations

Beginning & End Points	Distance
New York – Cincinnati	828 miles
Cincinnati – Indianapolis	123 miles
Indianapolis – Chicago (Cardinal & Hoosier Lines)	196 miles
Total	**1147 miles (45 miles within Ohio)**

6.1.1.2 Capitol Limited

The *Capitol Limited* route operates between Washington DC to Chicago. The service consists of one round-trip daily, stopping at Alliance, Cleveland, Elyria, Sandusky, and Toledo in Ohio. Intermediate stops outside of Ohio include Pittsburgh and South Bend, IN. In the westbound direction, the train leaves Washington DC at 4:05 PM and arrives in Chicago at 8:45 AM the following day. In the eastbound direction, the train leaves Chicago at 6:10 PM and reaches Washington DC at 12:40 PM the following day. Stops are made in Ohio from 1:35 AM to 5:08 AM (westbound) and 10:56 PM to 2:07 AM (eastbound). **Table 6-2** shows the distances between some of the major stops along this route.

[18] Amtrak System Timetable, Spring and Summer, 2012.

Table 6-2: *Capitol Limited* Service Segments and Mileage between Stations

Beginning & End Points	Distance
Washington DC – Cleveland	439 miles
Cleveland – Toledo	107 miles
Toledo – Chicago	234 miles
Total	**780 miles (260 miles within Ohio)**

6.1.1.3 Lake Shore Limited

The *Lake Shore Limited* route operates between Boston and New York City (the two sections connecting in Albany, NY) and Chicago. The service consists of one round-trip per day, stopping at Cleveland, Elyria, Sandusky, Toledo, and Bryan in Ohio. Intermediate stops outside of Ohio include Syracuse, NY, Erie, PA, and South Bend, IN. In the westbound direction, trains leave New York City at 3:45 PM and Boston at 11:55 AM and arrives in Chicago at 9:45 AM the next day. West of Cleveland, the *Lake Shore Limited* travels the same route as the *Capitol Limited*. Stops in Ohio occur between 3:27 AM and 7:05 AM. In the eastbound direction, the train leaves Chicago at 9:30 PM and arrives in Boston at 9:10 PM and New York at 6:35 PM the next day. Stops in Ohio occur between 1:40 AM and 5:35 AM. **Table 6-3** shows distances between some of the route's major stops.

Table 6-3: *Lake Shore Limited* Segments and Mileage between Stations

Beginning & End Points	Distance
New York City – Cleveland	618 miles
Boston – Cleveland	676 miles
Cleveland –Toledo	107 miles
Toledo– Chicago	234 miles
Total	**959 (New York line) 1017 (Boston line) miles (245 miles within Ohio)**

The three Amtrak intercity rail routes in Ohio are shown in **Figure 6-1**.

6.1.1.4 Thruway Motorcoach Connections

The *Capitol Limited* and *Lake Shore Limited* intercity rail services are supplemented by daily Amtrak Thruway Motorcoach service in Toledo. A Thruway bus departs Toledo for East Lansing (Detroit) at 6:30 AM and arrives at East Lansing at 10:05 AM. In the southbound direction, a bus departs East Lansing at 6:55 PM and arrives in Toledo at 10:30 PM, providing sufficient time for riders to make train connections.

6.1.2 Existing Intercity Passenger Rail System Stations

As shown in the **Table 6-4**, there are seven Amtrak stations in Ohio. Of these, two are platforms and one is a platform with a shelter house-type waiting area. The other four are depot buildings with seating areas. Also shown in this table are the stations ownership, routes that serve them, and any current intermodal connections they offer.

Figure 6-1: Current Amtrak Service Routes in Ohio

Source: Amtrak

Table 6-4: Amtrak-Served Stations in Ohio

Station	Owner	Route(s)	Intermodal Connections
Cincinnati	City of Cincinnati	*Cardinal / Hoosier State*	Metro
Cleveland	Amtrak	*Capitol Limited; Lake Shore Limited*	RTA Rapid Transit
Toledo	Toledo-Lucas County Port Authority	*Capitol Limited; Lake Shore Limited*	Amtrak Thruway Motorcoach
Sandusky	City of Sandusky	*Capitol Limited; Lake Shore Limited*	None
Elyria	Amtrak	*Capitol Limited; Lake Shore Limited*	None
Bryan	City of Bryan	*Lake Shore Limited*	None
Alliance	Amtrak	*Capitol Limited*	None

Union Terminal in Cincinnati, OH: This station is an enclosed building generally open from 11:00 PM through 6:30 AM. A ticketing office and checked baggage service are available during these hours. The Route 1 bus on Cincinnati's Metro system also stops outside the terminal.

Cleveland Lakefront Station in Cleveland, OH: This station is an enclosed building located just north of downtown Cleveland on Lake Erie. The station is open from 9:30 PM through 1:00 PM and offers ticketing and baggage services during these hours. The station provides connections to the Blue and Green Lines of Cleveland's RTA system.

Martin Luther King, Jr. Plaza in Toledo, OH: This station, originally called Central Union Terminal, is an enclosed building that is open from 9:00 PM through 12:30 PM. A ticketing office and baggage services are also available during these hours.

Sandusky, OH: This station is an uncovered platform with a small shelter and waiting room. There are no fixed hours for this location, no ticketing office, and no baggage services. The City of Sandusky also offers an on-demand transit system, Sandusky Transit System, so passengers can call to schedule service to/from the station.

Elyria, OH: This station was originally the Amtrak Cleveland Lakefront Station, which was moved to Elyria upon completion of the new station in Cleveland. The station is open from 2:00 AM to 6:00 AM and does not have a ticketing office or baggage services.

Bryan, OH: This station is an enclosed building with no fixed open hours, no ticketing office, and no baggage services.

Alliance, OH: This station is an uncovered platform with a bus stop-style shelter. There are no fixed hours for this location, no ticketing office, and no baggage services.

6.1.3 Intercity Passenger Rail System Performance

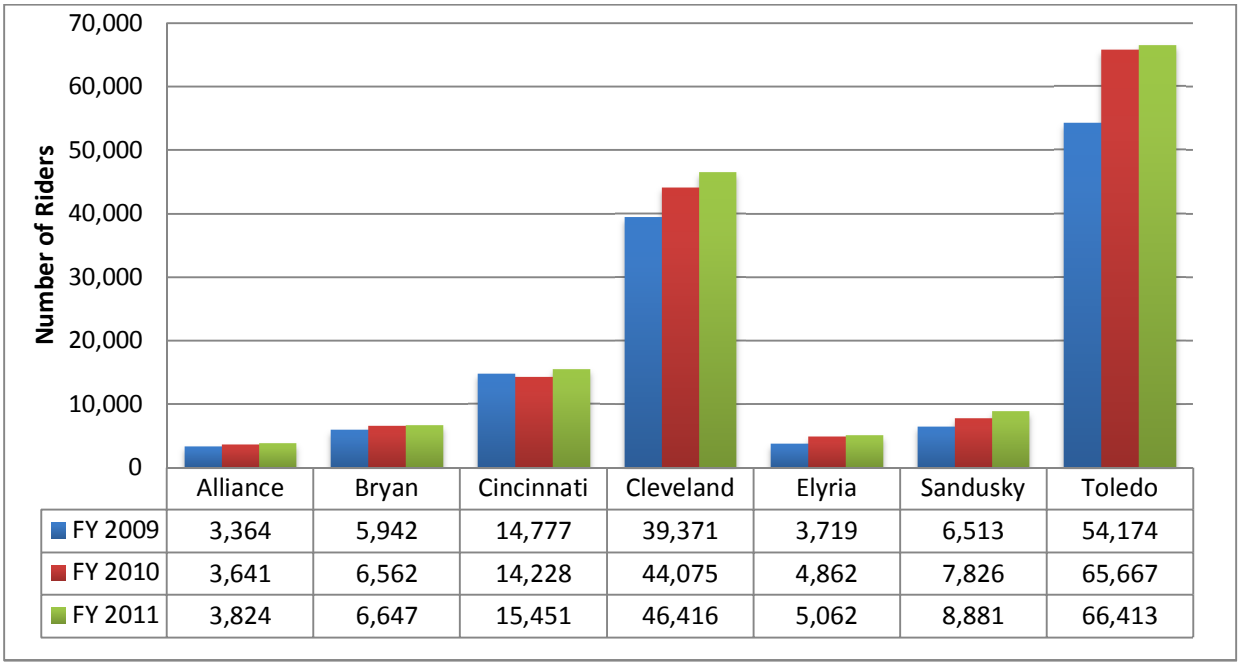
6.1.3.1 Ridership

In FY 2011, Amtrak carried 30.2 million passengers in the United States, the highest passenger total in its 40-year history. In Ohio, ridership on the Amtrak system exceeded 152,000 passengers in its fiscal year (FY) 2011.[19]

6.1.3.2 Annual Ridership Trends

The total Ohio Amtrak ridership for its FY 2011 increased 19 percent from FY 2009 and four percent from FY 2010 to FY 2011. There was an increase seen at all seven station locations across the state over the three years FY 2009-2011. Toledo consistently had the highest passenger volume with boardings and alightings topping 66,000 in 2011. The smallest figures were reported for the Alliance station. **Figure 6-2** shows the ridership at each station over the three year period.

Figure 6-2: Amtrak Riders in Ohio from FY 2009 to FY 2011



	Alliance	Bryan	Cincinnati	Cleveland	Elyria	Sandusky	Toledo
FY 2009	3,364	5,942	14,777	39,371	3,719	6,513	54,174
FY 2010	3,641	6,562	14,228	44,075	4,862	7,826	65,667
FY 2011	3,824	6,647	15,451	46,416	5,062	8,881	66,413

Source: Amtrak: Ohio Fact Sheet and Great American Stations; press release from Ohio Rail Development Commission, October 25, 2010.

6.1.3.3 On-Time Performance (OTP)

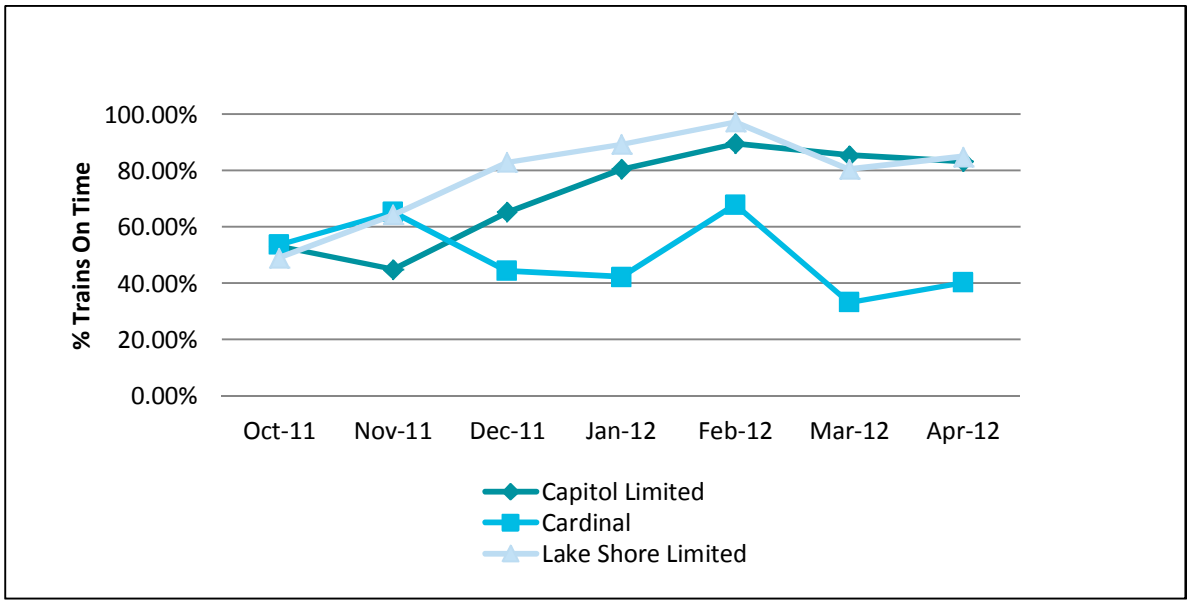
Amtrak defines On-Time Performance as the total number of trains arriving on-time at a station divided by the total number of trains operated on that route. A train is considered on-time if it arrives at the final destination within an allowed number of minutes, or tolerance, of its scheduled arrival time. Trains are allowed a certain tolerance based on how far they travel.[20]

[19] Amtrak's fiscal year begins October 1 which coincides with the federal fiscal year.
[20] www.Amtrak.com

6.1.3.4 OTP Annual Trend

The overall OTP for all Amtrak routes in FY 2011 was 47.9 percent. The *Capitol Limited* has averaged 49.3 percent OTP over the past year while the *Lake Shore Limited* has averaged 55.5 percent OTP. The *Cardinal* had an average OTP of 38.8 percent over the past year. The chart below shows the OTP percentages since October 2011 (the first month of FY 2012) for each of the three routes that travel through Ohio. As shown in **Figure 6-3**, the *Capitol Limited* and the *Lake Short Limited* have seen solid improvements; however, the *Cardinal* has not.

Figure 6-3: Amtrak OTP for Routes Travelling through Ohio FY 2012



Source: Amtrak: Monthly Performance Reports for October 2011 through April 2012.

6.1.3.5 Causes of OTP Delays

Causes for Amtrak train delays can be attributed to a number of reasons including the host railroad, Amtrak itself, or other factors such border crossings, customs clearance, and adverse weather. **Table 6-5** shows the major causes of delay in April 2012 on the routes that run through Ohio.

Table 6-5: Major Causes of OTP Delay in April 2012

Route	Source of Delay	Share Of Responsibility	Major Causes Of Delay
Cardinal	Host	75.5%	Freight train interference, slow orders
	Amtrak	20.8%	Passenger-related
	Other	3.7%	
Capitol Limited	Host	67.7%	Freight train interference
	Amtrak	14.7%	Passenger-related
	Other	17.6%	
Lake Shore Limited	Host	67.3%	Freight and passenger train interference, slow orders
	Amtrak	24.6%	Passenger-related, crew-related
	Other	8.1%	

Source: Amtrak: percentages derived from total minutes of delay reported in Monthly Performance Report for April 2012.

Host Railroad-Caused Delays: The host railroads in Ohio are CSX Transportation (CSX) and Norfolk Southern Railway (NS). The majority of the delays experienced on the routes that serve Ohio were attributed to the host railroads. Specific causes vary by the segment of the route examined.

Amtrak-Caused Delays: Amtrak delays only accounted for about 21 percent delays experienced on the routes serving Ohio in FY 2011. Most of these delays were passengers-related. However, the *Lakeshore Limited* also experienced higher crew-related delays relative to the other trains.

Other Causes of OTP Delays: Other causes of delay were relatively minimal as Ohio routes do not cross international borders or have to go through customs inspections. The *Capitol Limited* and *Lake Shore Limited* trains did experience more delay in this category than the *Cardinal* trains.

6.1.4 Intercity Passenger and Local Transit Connections

Currently, multimodal passenger transportation connections in Ohio exist at the Amtrak stations in Cincinnati, Cleveland, and Toledo. Cincinnati's Metro Silver, Red, and Green bus lines stop at Union Terminal. Connections to the Orange and Gold Lines can be made at the Fountain Square transit hub.

Cleveland Lakefront Station provides connection to the Blue and Green Lines of the city's RTA Rapid Transit system. These light rail transit (LRT) services connect Lakefront Station to the University Heights/Beechwood area (Green Line) and to Shaker Heights (Blue Line). They also share three stations with the Red Line LRT between Tower City and East 55th Street. Martin Luther King, Jr. Plaza in Toledo offers a connection to the Amtrak Thruway Motorcoach system.

6.2 Ohio Passenger Rail Designations

6.2.1 Intercity High Speed Rail Planning

6.2.1.1 Ohio Corridors Receive Federal Designation

The Intermodal Surface Transportation Efficiency Act of 1991 established a special federal program to fund safety improvements at highway-rail grade crossings on corridors designated as high speed intercity passenger rail corridors based on their potential for future development.

In Ohio, there are two federally designated high speed rail corridors: one running east-west between Cleveland and Toledo and on to Chicago; and the other running north-south between Cincinnati, Dayton, Columbus, and Cleveland. Cincinnati is also linked to Chicago by one other high speed rail corridor via Indiana.

6.3 Passenger Rail Needs

Amtrak's 2009 Report on Accessibility and Compliance with Americans and Disabilities Act of 1990, identified $12.9 million of needs to address ADA compliance and state of good preservation at Amtrak stations in Ohio. Almost $8 million or 62 percent of the needs are for the Cleveland and Toledo Amtrak stations, which are the two busiest Ohio Amtrak stations in terms of boardings and alightings. One of the passenger rail needs identified in Amtrak's 2009 report included a new passenger shelter along with lighting and platform upgrades at the Alliance Station. Based on the Amtrak Fact Sheet, Fiscal Year 2011, State of Ohio, this improvement was completed and the total passenger rail needs in Ohio total $12 million.

APPENDIX A: CORRELATION BETWEEN PAVEMENT CONDITION AND INTERNATIONAL ROUGHNESS INDEX

The International Roughness Index (IRI) is completely independent of PCR. IRI is calculated by measuring the longitudinal profile of the pavement in each wheel path and applying that profile to an algorithm to simulate the response of the suspension of a typical vehicle traveling at 50 mph. The resulting accumulated vertical bounce of the vehicle is the IRI, reported as inches per mile. IRI measures are on an inverse scale, meaning a lower score is better. A score below 60 inches/mile is considered very good by FHWA and AASHTO standards. Scores above 250 inches/mile are considered very poor. IRI has been used to describe the pavement condition in this report and is a part of the projection and needs estimation for Access Ohio 2040 because HERS-ST software uses it and is unable to use PCR.

Therefore an effort to convert PCR to IRI was undertaken in order to determine input values for HERS-ST. **Table A-1** is the result of this effort. IRI is shown in meters per kilometer because this is the unit input HERS-ST requires. Pavement Serviceability Rating (PSR) is also shown just as a reference point since established formulas exist between IRI and PSR.

Table A-1: Conversion of PCR to IRI

Pavement Condition	ODOT PCR	Equivalent for HERS-ST	
	Value	IRI (m/km)	PSR
Excellent	100	0	5.0
Good		0.95	3.3
Acceptable (P)	65	1.15	3.0
Acceptable (G)	60	1.33	2.8
Acceptable (U)	55	2.21	1.9
Very Poor		3.75	1.0
Failed	0	9.99	0.1

Levels for acceptable pavement on each category level (Priority, Urban, and General) were interpreted by comparing the known acceptable percentages in PCR and comparing this to the similar miles via IRI and PSR. These breakpoints were assessed and used to develop the translation between pavement condition units.

Table A-2 shows the threshold levels used in this analysis for acceptable pavement. This is the same table as presented in Table 2-5. These values were determined by comparing values in the HPMS to those shown in the ODOT *Mission, Vision, Guiding Principles & Critical Success Factors* report. Values for 'Good' are based on the FHWA levels for acceptable pavement as used in the annual *Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance* report. The remaining values were established by comparing the existing ratings and standards as published by ODOT for PCR ratings and comparing them to the IRI values in the HPMS data. This comparison can be used as target thresholds for identifying pavement needs.

Table A-2: Pavement Condition Thresholds for IRI (in/mi)

Condition	Priority	General
Good	< 60	< 60
Acceptable	<= 115	<= 133
Not Acceptable	> 115	> 133

APPENDIX B: TECHNICAL ASPECTS OF ROADWAY ANALYSIS

ROADWAY NEED CATEGORIES

The roadway needs are presented in terms of three categories:

- **Preservation** – the improvement of pavement only - actions that do not change roadway geometry;
- **Modernization** – includes improvements to pavement that change the roadway characteristics and/or the structural integrity of the pavement base; and
- **Expansion** – capacity increasing projects, which add lane(s) and change the roadway characteristics for existing lanes along the same segment.

HERS-ST defines various types of roadway improvements. For summary purposes, these improvements have been grouped into the three construction categories of Preservation, Modernization, and Expansion, as shown in **Table B-1**.

Table B-1: Roadway Improvement Types

HERS-ST Improvement Types	Categories
Reconstruction with High-Cost Lanes	Expansion
Reconstruction with Normal-Cost Lanes	Expansion
Reconstruction with Wider Lanes	Modernization
Reconstruction	Modernization
Resurface with High-Cost Lanes	Expansion
Resurface with Normal-Cost Lanes	Expansion
Resurface with Wider Lanes	Modernization
Resurface with Shoulder Improvements	Modernization
Resurface	Preservation

The improvement types within HERS-ST refer to actions or combinations of actions to improve roadways. All improvements involve resurfacing or reconstruction of the existing roadway in some capacity. However, other actions can be taken along with the initial improvement based on need. For example, “Reconstruction with High-Cost Lanes” means some of the existing roadway is being reconstructed, but more importantly that lanes are being added. The groupings are based on the dominate action being taken. As lanes are being added this is primarily a capacity adding project and so would be classified as an Expansion project. Similarly, “Resurfacing with Wider Lanes” is a modernization effort because the lanes are increasing in width while being resurfaced and changing the performance and safety of the roadway.

The difference between a Normal Cost action and a High Cost action does account for a difference in unit cost, but has more to do as a deterrent based on a benefit/cost ratio. Widening Feasibility is a coded attribute in the HPMS data. Widening Feasibility for a roadway dictates the maximum number of lanes a given segment is allowed to add. HERS-ST has a similar policy parameter within the software which is based on the functional classification. The feasibility coded within the HPMS dataset is compared to the policy values within the model software. If either match or the HPMS feasibility is lower, then the added lanes are allowed at normal costs. If the HPMS value is higher than the model value, then any expansion of lanes beyond the policy value is added at the high cost value. Additionally, the software allows the user to dictate a maximum number of lanes on each functional classification as a

policy parameter. If the existing facility has a number of lanes beyond the maximum allowed in the policy value, any additional lanes will be added at a high cost.

Roadway maintenance needs are not considered as capital construction needs and are not included in the roadway needs described herein. Roadway maintenance needs include:

- General roadway maintenance such as mowing or traffic control; and
- Routine pavement maintenance such as patching.

For unpaved roads, maintenance costs represent the annualized rehabilitation and reconstruction costs (re-gravelling for example), as well as routine maintenance. Resurfacing is considered a construction need, not a maintenance need.

ROADWAY IMPROVEMENT COSTS

HERS-ST uses unit cost tables to determine a planning level cost estimate for the improvements determined within the model. These costs are shown by category, roadway classification, and size of urban setting or terrain type. **Table B-2** shows the rural roads unit cost table by terrain type and **Table B-3** shows the unit cost for urban roadways by size of the urbanized area. Both tables were established for Access Ohio 2040 by using cost data provided by ODOT. Methodology and sample data used to determine the costs are provided in **Annex A** to this Appendix. The dollar amounts are in 2011 dollars on a per lane mile basis.

Table B-2: Rural Unit Costs, in Thousands

2011 Improvement Costs ($Thousands per Lane Mile)		Reconstruction		Resurface	Shoulder Improve-ments	Add Lanes		New Alignment	
		Lane Widening	Pavement	Pavement		Normal Cost	High Cost	Normal Cost	High Cost
Interstate	Flat	$1,670	$1,670	$176	$33	$1,670	$2,315	$5,179	$5,179
	Rolling	$1,810	$1,810	$188	$54	$1,810	$2,930	$6,555	$6,555
Principal Arterials	Flat	$1,167	$1,167	$184	$27	$1,167	$1,670	$2,345	$2,345
	Rolling	$1,250	$1,250	$197	$45	$1,250	$2,017	$2,831	$2,831
Minor Arterials	Flat	$1,071	$1,071	$131	$29	$1,071	$1,504	$2,133	$2,133
	Rolling	$1,228	$1,228	$141	$53	$1,228	$1,937	$2,747	$2,747
Major Collectors	Flat	$940	$940	$105	$22	$ 940	$1,269	$1,916	$1,916
	Rolling	$960	$960	$112	$29	$ 960	$1,562	$2,358	$2,358

Table B-3: Urban Unit Costs, in Thousands

2011 Improvement Costs ($Thousands per Lane Mile)		Reconstruction		Resurface	Shoulder Improve-ments	Add Lanes		New Alignment	
		Lane Widening	Pavement	Pavement		Normal Cost	High Cost	Normal Cost	High Cost
Interstates/ Expressways	Small Urban	$3,073	$3,073	$482	$88	$3,736	$12,231	$5,035	$17,190
	Small Urbanized	$3,100	$3,100	$570	$117	$4,082	$13,413	$6,787	$23,172
	Large Urbanized	$3,100	$3,100	$570	$117	$4,082	$13,413	$6,787	$23,172
Principal Arterials	Small Urban	$2,778	$2,778	$178	$39	$1,896	$6,193	$2,370	$8,089
	Small Urbanized	$2,812	$2,812	$210	$53	$2,054	$6,735	$2,924	$9,980
	Large Urbanized	$2,812	$2,812	$210	$53	$2,054	$6,735	$2,924	$9,980
Arterials/ Collectors	Small Urban	$1,012	$1,012	$190	$42	$1,136	$3,681	$1,388	$4,737
	Small Urbanized	$1,023	$1,023	$216	$51	$1,198	$3,890	$1,703	$5,812
	Large Urbanized	$1,023	$1,023	$216	$51	$1,198	$3,890	$1,703	$5,812

THRESHOLD CONDITIONS

Thresholds in HERS-ST refer to roadway characteristics based on the traffic level and terrain that fail to meet a standard level of acceptance. If the roadway is identified as deficient, then HERS-ST triggers an improvement action. The Threshold Conditions Table allows HERS-ST to define a "deficiency level" for pavement condition and other engineering and design variables, as shown below in the **Table B-4**. These threshold levels are a product of conversations with experts within ODOT and evaluating DOT design manuals. The values also reflect policy and practice decisions made by ODOT regarding their roadways. This influences the model to improve road segments in a fashion that mimics ODOT to the best of its ability. All values have been related back to the HERS-ST formatting.

Table B-4: Threshold Conditions for HERS-ST

		Pavement[5]	Surface Type[2]	V/C Ratio	Right Shoulder[1]	Shoulder Type[3]	Horizon Align[4]	Vertical Align[4]
Rural	Interstate	1.80	3	1.0	8	3	1	3
	Principal Arterials AADT > 6000	1.80	3	1.0	7	3	2	3
	Principal Arterials AADT < 6000	2.10	3	1.0	7	3	2	3
	Minor Arterials AADT > 2000	2.10	3	1.0	7	3	2	3
	Minor Arterials AADT < 2000	2.10	3	1.0	5	3	2	3
	Major Collectors AADT > 1000	2.10	3	1.0	3	3	2	3
	Major Collectors AADT > 400	2.10	3	1.0	3	3	2	3
	Major Collectors AADT < 400	2.10	3	1.0	1	3	2	3
Urban	Interstate	1.80	3	1.0	8	3	1	
	Expressway	1.80	3	1.0	8	3	1	
	Principal Arterial	1.80	3	1.0	7	3	1	
	Minor Arterial	3.50	3	1.0	7	3		
	Collector	3.50	3	1.0	1	3		

Notes:
(1) Widths are in feet
(2) Surface Type is 2 = High, 3 = Intermediate, 4 = Low, 5 = Unpaved
(3) Shoulder Type is 1 = Surfaced, 2 = Stabilized, 3 = Earth, 4 = Curbed
(4) Alignment (Curves/Grades) is 1 = All Appropriate, 2 = All Accepted, 3 = Some Reduced Speed, 4 = Some Unacceptable
(5) Pavement measured in IRI with units in m/km

PAVEMENT CONDITION MEASURES

ODOT has a pavement condition rating (PCR) scale that was developed internally for pavement analysis. HERS-ST cannot accept PCR as an input value. Therefore a translation from PCR to International Roughness Index (IRI) was required. This process is outlined in Appendix A. From this effort, the following threshold levels, as shown in **Table B-5**, were determined for Access Ohio.

Table B-5: Pavement Condition Thresholds for IRI (In/Mi)

Condition	Priority	General
Good	< 60	< 60
Acceptable	<= 115	<= 133
Not Acceptable	> 115	> 133

ANNEX A: HERS-ST Unit Costs

DERIVATION OF UNIT COSTS

The following is the methodology ODOT used in determining the unit costs for HERS ST, as shown in Table 1-1 for rural roads and Table 1-2 for urban roads.

Data Source

The Office of Estimating used historic ODOT bid data from 2012. The projects were selected to fit the defined scenarios. A summary of the projects per category that were used are shown in **Table Annex-1**.

Project Costs

ODOT included all costs associated with each project with exception of bridge costs. A bridge is defined as a structure over 10 feet in length. ODOT categorizes items of work as follows:

- Roadway
- Erosion Control
- Drainage
- Pavement
- Water Work
- Sanitary Sewer
- Lighting
- Traffic Surveillance
- Traffic Control
- Traffic Signals
- Landscaping
- Retaining Walls
- Building Demolition
- Noise Barriers
- Structures (Under 20')
- Structures (20' and Over)-Not Used
- Maintenance of Traffic, Incidentals

All costs are in-place, historical bid prices, which include material, labor, equipment, profit, and overhead.

Project Classifications/Categories

ODOT classified the projects into the following four categories:

- Reconstruction
- Resurfacing
- Add Lanes
- Alignment

Next, ODOT subdivided the projects into the following seven functional classifications:

- Rural Interstate
- Rural Principal Arterials
- Rural Minor Arterials
- Rural Major Collectors
- Urban Interstates/Expressways
- Urban Principal Arterials
- Urban Arterials/ Collectors

Table Annex-1: Number of Projects (Each) Per Category

FUNCTIONAL CLASSIFICATION		RECONSTRUCTION	RESURFACING	ADD LANES	ALIGNMENT
RURAL	INTERSTATE	2	6	1	4
	PRINCIPAL ARTERIALS	1	24	2	4
	MINOR ARTERIALS	1	24	2	2
	MAJOR COLLECTORS	3	72	3	2
URBAN	INTERSTATES/EXPRESSWAYS	4	13	1	1
	PRINCIPAL ARTERIALS	1	23	4	2
	ARTERIALS/ COLLECTORS	2	21	6	1

APPENDIX C: TRAC (EXPANSION) NEEDS

TRAC PROJECT NEEDS

The Transportation Review Advisory Council (TRAC) was established by the Ohio General Assembly in 1997, and charged with developing and overseeing a project selection process for major new transportation capacity projects (ORC 5512.02), or projects in what is now known as the "Major New Capacity Program." These are projects that cost more than $12 million or which add transportation capacity, and are critical to the mobility, economic development, and quality of life of the citizens of Ohio.

Expansion Needs

TRAC, synonymous with the Major New program, was used within the planning process to identify the expansion needs of our system. It is assumed that all the committed TRAC projects will be completed and open to traffic by year 2040.

Process

To calculate the needs, an ELLIS report was conducted against the Sept 1st 2012 Major New program list to identify all the committed TRAC projects. From this ELLIS report, the Brent Spence Bridge project was removed as this project's costs will be funded through innovative financing. Only the needs from years 2014 through 2040 were included. The total expansion needs are estimated to be $8,912 billion. **Table C-1** lists all the committed TRAC projects by year, county, project name and TRAC tier.

Table C-1: TRAC Project Needs, in Millions

Fiscal Year	County	Project Name	Tier 1	Tier 2	Tier 3	Grand Total
2014	MAR	MAR SR 309 19.59		$3.40		$3.40
	CLE	CLE IR 275 10.15/8.95	$1.80			$1.80
		CLE IR 275 8.90			$2.00	$2.00
		CLE SR 32 2.25			$10.00	$10.00
	CUY	CUY INNERBELT CCG2 EB Bridge	$320.10			$320.10
		CUY INNERBELT CCG3	$24.50			$24.50
		CUY OPPORTUNITY CORRIDOR		$11.00		$11.00
		CUY US 042 00.00	$7.34			$7.34
	ERI	ERI US 0250 00.00		$3.90		$3.90
	FRA	FRA IR 270 17.29		$15.00		$15.00
		FRA IR 70 13.54 (Project 4)	$6.50			$6.50
		FRA IR 70 14.48 (Phase 2D)	$5.50			$5.50
		FRA IR 71 17.14 (Project 3)	$13.25			$13.25
	GRE	GRE US 35 4.26		$7.60		$7.60
	HAM	HAM IR 75 10.10			$5.08	$5.08
		HAM IR 75 10.52			$1.04	$1.04
		HAM IR 75 11.02			$1.20	$1.20
		HAM IR 75 11.05			$1.49	$1.49
		HAM IR 75 3.85	$0.40			$0.40
		HAM IR 75 7.72	$3.57			$3.57
		HAM Uptown Study		$5.93		$5.93
		HAM/CLE Oasis Rail Corridor			$22.10	$22.10
		HAM/CLE SR 32F 2.50/0.00			$18.60	$18.60
	HAN	HAN/WOO IR 75 18.30/0.00		$2.00		$2.00
	JEF	JEF New Ohio River Bridge		$137.52		$137.52
	LIC	LIC SR 16 16.50 (Cherry Val Int)		$3.41		$3.41
	LOR	LOR US 0020 22.19		$3.38		$3.38

Fiscal Year	County	Project Name	Tier 1	Tier 2	Tier 3	Grand Total
	LUC	LUC IR 475/20 Interchg Upgrade		$11.00		$11.00
		LUC IR 475/23 Interchange Upgr		$18.00		$18.00
		LUC IR 75 3.99 intrchg Mod P2			$1.20	$1.20
		LUC IR 75 6.70 widening study		$1.00		$1.00
		LUC McCord Grade Separation	$2.75			$2.75
	MAH	MAH/TRU IR 0080 4.50/0.00		$1.33		$1.33
	MED	MED SR 0018 13.54		$3.57		$3.57
		MED US 0042 17.68		$8.70		$8.70
	SCI	SCI SR 823 6.67 PortsByPass Ph 1	$3.72			$3.72
	STA	STA US 0030 18.35		$6.45		$6.45
	SUM	SUM IR 0076 09.00		$27.15		$27.15
		SUM IR 0076 10.00 (Main/Brdway)		$8.00		$8.00
2014 Total			**$389.43**	**$278.34**	**$62.72**	**$730.48**
2015	MAR	MAR SR 309 19.59		$13.30		$13.30
	CLA	CLA IR 70 10.55/13.98, Ph. 2		$1.10		$1.10
	ERI	ERI US 0250 00.00		$12.00		$12.00
	FRA	FRA IR 270 17.29		$54.07		$54.07
		FRA IR 70 13.54 (Project 4)	$13.70			$13.70
		FRA IR 70 13.62 (Storm Sewer)	$8.00			$8.00
		FRA IR 70 15.29 (Project 5)	$1.20			$1.20
		FRA IR 70 16.170		$286.00		$286.00
	HAM	HAM GE Parkway			$11.36	$11.36
		HAM IR 75 10.10			$0.71	$0.71
		HAM IR 75 11.09			$23.20	$23.20
		HAM IR 75 7.85			$2.07	$2.07
		HAM SR 32F 0.00			$71.00	$71.00
		HAM Uptown Study		$2.40		$2.40
	HAN	HAN/WOO IR 75 18.30/0.00		$134.00		$134.00
	LAW	LAW Chesapeake Bypass Phase 2	$16.65			$16.65
	LIC	LIC SR 16 16.50 (Cherry Val Int)		$22.04		$22.04
	LOR	LOR SR 0057 19.42		$22.40		$22.40
	LUC	LUC IR 475/20 Interchg Upgrade		$44.00		$44.00
		LUC IR 75 3.99 intrchg Mod P2			$120.00	$120.00
	MAH	MAH/TRU IR 0080 4.50/0.00		$80.03		$80.03
	MED	MED US 0042 17.68		$18.70		$18.70
	SCI	SCI SR 823 10.13 PortsByPass Ph2	$210.58			$210.58
		SCI SR 823 6.67 PortsByPass Ph 1	$0.43			$0.43
2015 Total			**$250.56**	**$690.04**	**$228.34**	**$1,168.94**
2016	CLA	CLA IR 70 10.55/13.98, Ph. 2		$39.51		$39.51
		CLA IR 70 6.75/10.55, Ph. 1		$17.58		$17.58
	CLE	CLE IR 275 8.90 Phase 2A			$16.50	$16.50
		CLE SR 32 2.25			$44.00	$44.00
	CUY	CUY INNERBELT CCG2 EB Bridge	$316.10			$316.10
		CUY OPPORTUNITY CORRIDOR		$50.00		$50.00
	FRA	FRA IR 71 0.000		$70.20		$70.20
		FRA US 33 27.44 (Bixby Rd)	$6.11			$6.11
	GRE	GRE US 35 4.26		$98.42		$98.42
	HAM	HAM IR 75 10.10			$148.06	$148.06
		HAM IR 75 10.52			$65.20	$65.20
		HAM IR 75 11.02			$75.60	$75.60
		HAM IR 75 11.05			$95.70	$95.70
		HAM IR 75 12.60	$60.00			$60.00
		HAM IR 75 7.85			$0.08	$0.08

Fiscal Year	County	Project Name	Tier 1	Tier 2	Tier 3	Grand Total
		HAM SR 32F 0.00			$143.00	$143.00
		HAM SR 4/SR 561 2.66/7.01			$8.56	$8.56
		HAM/CLE SR 32F 2.50/0.00			$16.90	$16.90
	LAW	LAW Chesapeake Bypass Phase 2	$94.33			$94.33
	LOR	LOR US 0020 22.19		$23.00		$23.00
	LUC	LUC IR 475/23 Interchange Upgr		$148.00		$148.00
	MED	MED SR 0018 13.54		$18.27		$18.27
	MOT	MOT DAY REG Multi-Modal Rail		$9.20		$9.20
	SCI	SCI SR 823 6.67 PortsByPass Ph 1	$0.60			$0.60
	SUM	SUM IR 0076 09.00		$42.90		$42.90
2016 Total			**$477.14**	**$517.09**	**$613.60**	**$1,607.83**
2017	CUY	CUY INNERBELT CCG3	$395.00			$395.00
		CUY INNERBELT CCG4B CSX RR		$8.00		$8.00
	HAM	HAM Uptown Study		$61.60		$61.60
		HAM/CLE Oasis Rail Corridor			$591.80	$591.80
	SCI	SCI SR 823 6.67 PortsByPass Ph 1	$0.60			$0.60
	STA	STA US 0030 18.35		$70.00		$70.00
	SUM	SUM IR 0076 10.00 (Main/Brdway)		$110.41		$110.41
2017 Total			**$395.60**	**$250.01**	**$591.80**	**$1,237.41**
2018	CLE	CLE IR 275 8.90			$6.80	$6.80
	HAM	HAM IR 75 7.85			$113.73	$113.73
	SUM	SUM IR 0076 09.00		$225.00		$225.00
2018 Total				**$225.00**	**$120.53**	**$345.53**
2019	CLE	CLE IR 275 8.90			$32.30	$32.30
	CUY	CUY INNERBELT CCG4B CSX RR		$1.00		$1.00
		CUY INNERBELT CCG4C NS RR			$8.00	$8.00
		CUY INNERBELT CCG4E Curve			$8.00	$8.00
	HAM	HAM/CLE SR 32F 2.50/0.00			$320.50	$320.50
	LUC	LUC IR 75 6.70 widening study		$40.00		$40.00
2019 Total				**$41.00**	**$368.80**	**$409.80**
2020	CUY	CUY INNERBELT CCG4C NS RR			$1.00	$1.00
		CUY INNERBELT CCG6B Broadway			$10.00	$10.00
		CUY OPPORTUNITY CORRIDOR		$275.00		$275.00
	FRA	FRA IR 70 14.48 (Phase 2D)	$172.00			$172.00
	SCI	SCI SR 823 0.00 PortsByPass Ph 3	$192.13			$192.13
2020 Total			**$364.13**	**$275.00**	**$11.00**	**$650.13**
2021	CUY	CUY INNERBELT CCG4E Curve			$16.00	$16.00
2021 Total					**$16.00**	**$16.00**
2022	CUY	CUY INNERBELT CCG4D Overheads			$8.00	$8.00
2022 Total					**$8.00**	**$8.00**
2023	CUY	CUY INNERBELT CCG4D Overheads			$4.00	$4.00
		CUY INNERBELT CCG6B Broadway			$2.00	$2.00
	FRA	FRA IR 71 17.14 (Project 3)	$99.00			$99.00
	STA	STA Mahoning Rd. Ph2 Utilities	$1.50			$1.50
		STA Mahoning Rd. Utilities-Ph. 1	$1.25			$1.25
2023 Total			**$101.75**		**$6.00**	**$107.75**
2024	CUY	CUY INNERBELT CCG5B EB Pavement			$9.00	$9.00
		CUY INNERBELT CCG7 Jennings			$12.00	$12.00
	FRA	FRA IR 70 11.78 (Project 6)			$834.00	$834.00
	HAM	HAM IR 75 3.85	$130.90			$130.90
2024 Total			**$130.90**		**$855.00**	**$985.90**
2025	CUY	CUY INNERBELT CCG5A Overheads			$8.00	$8.00
		CUY INNERBELT CCG5C WB Pavement			$5.00	$5.00

Fiscal Year	County	Project Name	Tier 1	Tier 2	Tier 3	Grand Total
	FRA	FRA IR 270 21.670	$38.70			$38.70
	HAM	HAM IR 75 6.78	$21.73			$21.73
2025 Total			**$60.43**		**$13.00**	**$73.43**
2026	CUY	CUY INNERBELT CCG5A Overheads			$15.00	$15.00
		CUY INNERBELT CCG5B EB Pavement			$5.00	$5.00
		CUY INNERBELT CCG5C WB Pavement			$5.00	$5.00
	FRA	FRA IR 70 13.54 (Project 4)	$201.00			$201.00
2026 Total			**$201.00**		**$25.00**	**$226.00**
2027	FRA	FRA IR 270 22.850	$34.03			$34.03
	STA	STA SR 0153 00.80	$4.30			$4.30
		STA SR 0153 01.70	$8.09			$8.09
2027 Total			**$46.43**			**$46.43**
2028	CUY	CUY INNERBELT CCG4A Sewer			$2.00	$2.00
	FRA	FRA IR 70 15.29 (Project 5)	$86.00			$86.00
2028 Total			**$86.00**		**$2.00**	**$88.00**
2029	CUY	CUY INNERBELT CCG4A Sewer			$2.00	$2.00
		CUY IR 077 14.35 CCG6A	$27.35			$27.35
2029 Total			**$27.35**		**$2.00**	**$29.35**
2030	CUY	CUY INNERBELT CCG5B EB Pavement			$225.00	$225.00
	FRA	FRA US 33 27.44 (Bixby Rd)	$30.15			$30.15
2030 Total			**$30.15**		**$225.00**	**$255.15**
2031	CUY	CUY INNERBELT CCG4A Sewer			$10.00	$10.00
		CUY INNERBELT CCG4B CSX RR		$56.89		$56.89
		CUY INNERBELT CCG4C NS RR			$55.00	$55.00
		CUY INNERBELT CCG5C WB Pavement			$170.00	$170.00
2031 Total				**$56.89**	**$235.00**	**$291.89**
2034	CUY	CUY INNERBELT CCG4D Overheads			$50.00	$50.00
2034 Total					**$50.00**	**$50.00**
2035	CUY	CUY INNERBELT CCG6B Broadway			$60.00	$60.00
2035 Total					**$60.00**	**$60.00**
2036	CUY	CUY INNERBELT CCG4E Curve			$281.84	$281.84
2036 Total					**$281.84**	**$281.84**
2037	CUY	CUY INNERBELT CCG7 Jennings			$150.00	$150.00
2037 Total					**$150.00**	**$150.00**
2038	CUY	CUY INNERBELT CCG5A Overheads			$92.12	$92.12
2038 Total					**$92.12**	**$92.12**
Grand Total			**$2,561**	**$2,333**	**$4,018**	**$8,912**

APPENDIX D: TECHNICAL ASPECTS OF BRIDGE ANALYSIS

Bridge unit costs were used to determine the improvement cost total for each action taken (or potentially taken) by NBIAS. **Table D-1** contains user cost information required for the improvement models. These values include activities such as widening, raising, strengthening, and replacing a bridge. Values were determined through conversations with ODOT, review of federal averages, and summarization of STIP projects of similar types. An improvement cost within NBIAS is determined by multiplying the unit cost for the improvement type by the deck area that will be improved, considering the change in dimensions that may result from the improvement for widening or replacing a bridge. **Tables D-2** and **D-3** detail the parameters used for rural and urban bridges by functional class.

Table D-1: Unit Costs by Improvement Type

Unit Cost per Square Foot of Deck ($2011)				
Roadway Type	Replace	Widen	Raise	Strengthen
NHS	$464	$345	$173	$173
non-NHS	$377	$280	$140	$140

Table D-2: Rural Bridge Parameters (feet)

Functional Class	AADT Class	Deficiency					Design			
		Right		Left						
		Lane Width	Shlder Width	Lane Width	Shlder Width	Vert Clear	Lane Width	Shlder Width	Vert Clear	Swell
Rural Interstates	<= 400	11.0	8.0	11.0	8.0	14.5	12.0	10.0	16.5	1.2
	401-1000	11.0	8.0	11.0	8.0	14.5	12.0	10.0	16.5	1.2
	1001-2000	11.0	8.0	11.0	8.0	14.5	12.0	10.0	16.5	1.2
	2001-4000	11.0	8.0	11.0	8.0	14.5	12.0	10.0	16.5	1.2
	> 4000	11.0	8.0	11.0	8.0	14.5	12.0	10.0	16.5	1.2
Rural Principal Arterials	<= 400	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	401-1000	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	1001-2000	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	2001-4000	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	> 4000	11.0	3.0	11.0	3.0	14.5	12.0	6.0	16.5	1.2
Rural Minor Arterials	<= 400	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	401-1000	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	1001-2000	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	2001-4000	11.0	0.0	11.0	0.0	14.5	12.0	3.0	16.5	1.2
	> 4000	11.0	3.0	11.0	3.0	14.5	12.0	6.0	16.5	1.2
Rural Major Collectors	<= 400	10.0	0.0	10.0	0.0	14.5	11.0	2.0	16.5	1.2
	401-1000	10.0	0.0	10.0	0.0	14.5	11.0	2.0	16.5	1.2
	1001-2000	10.0	0.0	10.0	0.0	14.5	12.0	2.0	16.5	1.2
	2001-4000	10.0	0.0	10.0	0.0	14.5	12.0	3.0	16.5	1.2
	> 4000	11.0	3.0	11.0	3.0	14.5	12.0	6.0	16.5	1.2
Rural Minor Collectors	<= 400	10.0	0.0	10.0	0.0	14.5	11.0	2.0	15.5	1.2
	401-1000	10.0	0.0	10.0	0.0	14.5	11.0	2.0	15.5	1.2
	1001-2000	10.0	0.0	10.0	0.0	14.5	12.0	2.0	15.5	1.2
	2001-4000	10.0	0.0	10.0	0.0	14.5	12.0	3.0	15.5	1.2
	> 4000	11.0	3.0	11.0	3.0	14.5	12.0	6.0	15.5	1.2
Rural Local Roads	<= 400	10.0	0.0	10.0	0.0	14.5	11.0	2.0	15.5	1.2
	401-1000	10.0	0.0	10.0	0.0	14.5	11.0	2.0	15.5	1.2
	1001-2000	10.0	0.0	10.0	0.0	14.5	12.0	2.0	15.5	1.2
	2001-4000	10.0	0.0	10.0	0.0	14.5	12.0	3.0	15.5	1.2
	> 4000	10.0	0.0	10.0	0.0	14.5	12.0	6.0	15.5	1.2

Source: Ohio Department of Transportation

Table D-3: Urban Bridge Parameters (feet)

Functional Class	AADT Class	Deficiency					Design			
		Right		Left						
		Lane Width	Shlder Width	Lane Width	Shlder Width	Vert Clear	Lane Width	Shlder Width	Vert Clear	Swell
Urban Interstates	<= 400	11	8	11	8	14.5	12	10	16.5	1.2
	401-1000	11	8	11	8	14.5	12	10	16.5	1.2
	1001-2000	11	8	11	8	14.5	12	10	16.5	1.2
	2001-4000	11	8	11	8	14.5	12	10	16.5	1.2
	> 4000	11	8	11	8	14.5	12	10	16.5	1.2
Urban Freeway	<= 400	11	8	11	8	14.5	12	10	16.5	1.2
	401-1000	11	8	11	8	14.5	12	10	16.5	1.2
	1001-2000	11	8	11	8	14.5	12	10	16.5	1.2
	2001-4000	11	8	11	8	14.5	12	10	16.5	1.2
	> 4000	11	8	11	8	14.5	12	10	16.5	1.2
Urban Principal Arterials	<= 400	11	4	11	4	14.5	12	8	16.5	1.2
	401-1000	11	4	11	4	14.5	12	8	16.5	1.2
	1001-2000	11	4	11	4	14.5	12	8	16.5	1.2
	2001-4000	11	4	11	4	14.5	12	8	16.5	1.2
	> 4000	11	4	11	4	14.5	12	8	16.5	1.2
Urban Minor Arterials	<= 400	10	0	10	0	14.5	12	3	16.5	1.2
	401-1000	10	0	10	0	14.5	12	3	16.5	1.2
	1001-2000	10	0	10	0	14.5	12	3	16.5	1.2
	2001-4000	10	0	10	0	14.5	12	3	16.5	1.2
	> 4000	10	3	10	3	14.5	12	6	16.5	1.2
Urban Collectors	<= 400	10	0	10	0	14.5	11	2	15.5	1.2
	401-1000	10	0	10	0	14.5	11	2	15.5	1.2
	1001-2000	10	0	10	0	14.5	11	2	15.5	1.2
	2001-4000	10	0	10	0	14.5	11	3	15.5	1.2
	> 4000	10	3	10	3	14.5	11	6	15.5	1.2
Urban Local Roads	<= 400	10	0	10	0	14.5	11	2	15.5	1.2
	401-1000	10	0	10	0	14.5	11	2	15.5	1.2
	1001-2000	10	0	10	0	14.5	11	2	15.5	1.2
	2001-4000	10	0	10	0	14.5	11	3	15.5	1.2
	> 4000	10	3	10	3	14.5	11	6	15.5	1.2

Source: Ohio Department of Transportation

APPENDIX E: LOCAL GOVERNMENTS TRANSPORTATION NEEDS

Ohio Department of Transportation (ODOT) is responsible for 14 percent (17,270 centerline miles) of public roads in the state; leaving local governments responsible for the majority of the public roads at 86 percent (104,072 centerline miles). Local governments include Counties, Townships, and Municipalities. This appendix identifies Ohio's roadway needs for the local system both on and off the Federal-Aid System.

Roadway Miles

Ohio's roadways are functionally classified based on the general characteristics in which the roadway operates such as geography, population density, traffic volumes, roadway spacing, and distance and speed of travel. ODOT is tasked with determining the classification of each roadway. ODOT uses 12 functional classifications that align with the FHWA functional classification system. This is demonstrated in **Table E-1**. The functional classification system is used to determine roadways that are part of the Federal-Aid System. Roadways on the Federal-Aid System are eligible for Federal Funding. Ohio's functional classifications 1, 2, 6, 7, 11, 12, 14, 16, and 17 are part of the Federal-Aid System, while functional classifications 8, 9, and 19 are not part of the Federal-Aid System.

Table E-1: Functional Classification

Functional Classification		
FHWA	**ODOT**	**Functional Classification Description**
1	1	Principal Arterial - Interstate (Rural)
3	2	Principal Arterial - Other (Rural)
4	6	Minor Arterial (Rural)
5	7	Major Collector (Rural)
6	8*	Minor Collector (Rural)
7	9*	Local (Rural)
1	11	Principal Arterial - Interstate (Urban)
2	12	Principal Arterial - Other Freeway/Expressway (Urban)
3	14	Principal Arterial - Other (Urban)
4	16	Minor Arterial (Urban)
5	17	Collector (Urban)
7	19*	Local (Urban)

**Off the Federal-Aid System*

For the purpose of this analysis the needs for the locals have been broken down to those roadways on the Federal-Aid System and those off the Federal-Aid System. The majority of ODOT's roadways fall on the Federal-Aid System. The reverse is true for the local system where close to 75 percent of the local roadway system is off the Federal-Aid System.

ODOT's Office of Technical Services publishes total centerline miles per functional class for the state system and the local system. **Table E-2** shows the total centerline miles per functional class for the local system. The lane miles were computed by multiplying the centerline miles times the number of lanes for each roadway segment and aggregating the sum of each roadway to functional class.

Table E-2: Local Roadway Centerline Miles and Lane Miles by Functional Classification

FHWA	ODOT	County System		Township System		Municipal System	
FC	FC	Centerline	Lane Miles	Centerline	Lane Miles	Centerline	Lane Miles
1	1	0.000	0.000	0.000	0.000	0.000	0.000
3	2	0.997	1.994	0.205	0.820	5.028	17.136
4	6	11.530	23.480	0.010	0.020	8.030	17.166
5	7	3,149.932	6,364.412	90.991	182.838	160.733	349.750
6	8*	5,035.301	10,067.439	336.405	662.269	120.363	251.106
7	9*	17,499.275	34,832.320	33,054.859	60,305.158	2,975.018	5,978.734
1	11	0.000	0.000	0.000	0.000	0.000	0.000
2	12	2.850	11.400	0.000	0.000	2.690	10.300
3	14	45.298	154.484	0.139	0.278	1,502.462	5,143.560
4	16	682.621	1,647.804	40.380	87.830	2,609.402	7,683.307
5	17	1,329.173	2,779.704	245.542	513.178	2,790.661	7,108.279
7	19*	1,191.057	2,424.524	7,687.015	15,200.441	23,494.213	49,152.964
TOTAL		**28,948.034**	**58,307.561**	**41,455.546**	**76,952.832**	**33,668.600**	**75,712.302**

**Off the Federal-Aid System*

Needs Methodology

The needs are based on a unit cost per lane mile per service life for each functional class. All unit cost have an assumed service life that represents the cost to maintain the road over a given number of years, and is unique to the functional classification. The **Table E-3** identifies the unit cost and service life for each functional class for the county, township and municipal systems.

Table E-3: Unit Cost by Functional Classification

FHWA	ODOT	County System		Township System		Municipal System	
FC	FC	Unit Cost	Service Life	Unit Cost	Service Life	Unit Cost	Service Life
1	1	$0	12	$0	12	$0	12
3	2	$100,000	12	$100,000	12	$100,000	12
4	6	$100,000	12	$70,000	12	$70,000	12
5	7	$100,000	12	$70,000	12	$70,000	12
6	8	$75,000	15	$60,000	15	$60,000	15
7	9	$75,000	15	$50,000	15	$50,000	15
1	11	$0	12	$0	12	$0	12
2	12	$100,000	12	$700,000	12	$700,000	12
3	14	$100,000	12	$200,000	12	$200,000	12
4	16	$100,000	12	$200,000	12	$200,000	12
5	17	$100,000	12	$100,000	12	$100,000	12
7	19	$75,000	12	$100,000	12	$100,000	12

**Off the Federal-Aid System*

The unit cost was divided by the service life and then multiplied by the total lane miles to develop the needs per year. The annual needs were then multiplied by 27 to account for the years 2014 – 2040. All the needs are shown in constant 2011 dollars.

Unit Cost

ODOT consulted with the County Engineers Association of Ohio (CEAO) to develop unit costs which were based on historic averages. Township and municipal unit cost were derived from the Office of Technical Services by collecting a sample of cost from county and municipal engineers, validated against a generic cost model used by the Office of Technical Services. All unit costs are inclusive of all types of roadway work. This includes but is not limited to resurfacing, pavement widening, reconstruction, modification alignments, movement marking, guardrail, etc.

Projected Local Roadway Needs

Future needs on roads owned and maintained by local governments are estimated at $37 billion through the years 2014 to 2040. **Table E-4** demonstrates the total local needs categorized by county, township and municipal for both on and off the Federal-Aid System in constant 2011 dollars.

Table E-4: Total Local Roadway Needs, in Billions

System	County	Township	Municipal	
On the Federal-Aid	$2.47	$0.18	$7.45	
Off the Federal-Aid	$6.47	$8.92	$11.62	Grand Total
Total	**$8.94**	**$9.10**	**$19.07**	**$37.12**
Percent	24%	25%	51%	100%

Shown in billions of dollars

The Municipal System has 51 percent of the non-state system needs, even though it only has 33,669 centerline miles out of the 104,027 total for the three systems. The needs are larger due to the higher functional classifications of roadways present in the municipalities. The same is true for the County System as it contributes 24 percent of the total non-state system needs, yet only has 28,948 centerline miles. The Township System has 25 percent of the non-state system needs. Its system, while the largest at 41,455 centerline miles, mainly comprises local roads.

Projected Local Bridge Needs

Local bridge needs were determine through two methods. First, the Federal-aid Eligible bridges found in the NBI database were analyzed through NBIAS. Second, those bridges that are not eligible and not found in the NBI database (12,797 total) will have to be estimates according to a life-cycle analysis. This methodology, like the roadways under local responsibility, was provided by the County Engineers Association of Ohio.

There are 15,906 non-ODOT-maintained bridges that are eligible for Federal-aid for replacement, rehabilitation, and improvement. These bridges are on lower classification roads, such as Collectors and Local roads. They are maintained by non-state agencies, including counties and municipalities. Local bridge needs were derived using National Bridge Investment Analysis System (NBIAS). NBIAS is an

investment analysis tool used to analyze bridge repair, rehabilitation, and functional improvement investment needs. Local bridge needs are estimated at $3.1 billion through the years 2014 to 2040.

Of the $3.1 billion, as shown in **Table E-5**, almost two-thirds of needs are for replacement of bridges.

Table E-5: Locally Maintained Bridge Needs (Federal-Aid Eligible), 2014-2040, in Millions

Need Category	$M	Bridges
Maintenance	$807	N/A
Rehabilitation	$137	611
Replacement	$2,123	3,282
Total Needs	**$3,067**	**3,893**

Note: Expressed in base year 2011 Dollars.

Lastly, there are 12,797 bridges with a total deck area of 5,251,096 square feet that are not eligible for federal-aid that are owned and operated by non-state transportation agencies. NBIAS was not available to use for this needs estimation, so a general life-cycle analysis was implemented. The equation used is shown below:

$$\text{Annual Cost} = \left(\sum \text{Bridge Square Footage} \times \text{Unit Cost} \right) / \text{Life Expectancy of Asset}$$

Where:

- ∑ Bridge Square Footage – the sum of deck area for all bridges being analyzed, in square feet.
- Unit Cost – the combined average improvement cost, in dollars per square foot. For this analysis, items such as construction, preliminary engineering, right-of-way costs, and annual maintenance were used. The unit cost in this calculation was $181/sq. ft. Costs used represent the average for all counties, both rural and urban, and across all terrain types in Ohio.
- Life Expectancy of Asset – the average expectancy of the asset before it needs to be replaced again. For this calculation, a 50 year life span was used.

The annual total from this calculation was multiplied by 27 to determine the local needs from 2014 to 2040. Needs for these bridges are estimated at $513 Million.

As shown in **Table E-6**, total non-state bridge needs are estimated to be $3.6 billion.

Table E-6: Total Bridge Needs Off the Federal-Aid System, 2014-2040, in Millions

Federal-Aid Eligible	Non-Federal Aid Eligible	Total
$3,067	$513	$3,580

Total Local Needs

Local roadway and bridge needs total $40.7 billion dollars for 2014-2040. This total is inclusive of Counties, Townships, and Municipalities roadway and bridge needs.

APPENDIX F: BORDER BRIDGE CHARACTERISTICS

Structure Number	Bridge Type	Bridge Name	Primary State	Bridge Location		Route Carried	Deck Area (Sq ft)	Length (ft)	Paint Before 2040	Minor Rehab Before 2040	Major Rehab Before 2040	Bridge Replacement	Comments
				Lat	Long								
3102475	Through Truss	Clay Wade Bailey Bridge	Kentucky	39053400	84303500	US 42	101,614	1,060	Yes	Yes			
3117677	Steel Through Arch	Daniel Beard Bridge	Kentucky	39060100	84293800	I-471	79,200	1,440	Yes	Yes			
3117685	Steel Through Arch	Daniel Beard Bridge	Kentucky	39060000	84293900	I-471	68,847	1,299	Yes	Yes			
3117286	Steel Through Arch	Daniel Beard Bridge	Kentucky	39060100	84293800	I-471	71,445	1,299	Yes	Yes			
3107787	Double-Decker Cantilevered through truss bridge	Brent Spence Bridge	Kentucky	39052600	84312200	I-75/I-71	157,976	1,736	Yes			Yes	
3101584	Suspension Bridge	Roebling Suspension Bridge	Kentucky	39053400	84303500	Mehering Way	64,860	2,162	Yes			Yes	
	Cantilevered Warren through truss bridge	Ironton-Russell Bridge	Ohio						Yes			Yes	
	Through truss Bridge	Ohio River I-77 Bridge	Ohio						Yes	Yes			
	Suspension Bridge	Market Street Bridge	West Virginia						Yes				To be demo - replaced with Brilliant Bridge
	Network arch bridge	Blennerhassett Island Bridge	West Virginia						Yes	Yes			
7300026	Cable-stayed suspension bridge	new US Grant Cable Stayed Suspension Bridge	Ohio	38433055	82595253	US 23	137,856	2,154	Yes				major bridge only since ODOT 100%
5300916	Cable-stayed bridge	Pomeroy-Mason Bridge	Ohio	39004700	82023000	SR 833	75,595	1,163	Yes	Yes			
3101975	Warren through truss bridge	Taylor-Southgate Bridge	Kentucky	39054600	84300500	US 27	144,711	2,297	Yes	Yes			
7306830	Warren cantilevered through truss bridge	Carl D. Perkins Memorial Bridge	Kentucky	38433700	83010300	SR 852	152,541	2,991	Yes	Yes			
1502395	Stringer/Multi-beam or girder	US 30 (Jennings Randolph Memorial Bridge)	West Virginia	39053400	84303500	US 30	64,860	2,162	Yes	Yes			
0701823	Girder and floorbeam system	US 40 and 250 (National Road)		40042000	80441900	US 40/250	33,072	636	Yes	Yes			
4401255	Through Truss Bridge	ST RT 93C		38315500	82412000	SR 93C	60,000	2,400	Yes	Yes			
4400992	Through truss Bridge	US 52 Eastbound		38291100	82381869	US 52 EB	52,325	2,275	Yes	Yes			
4101960	Stringer/Multi-beam or girder	Veterans Memorial Bridge	West Virginia	40223246	80364651	US 22	27,231	313	Yes	Yes			
3117278	Through truss Bridge	I-275/Combs/HEHL	Kentucky	39032500	84255000	I-275	79,200	1,440	Yes	Yes			

Structure Number	Bridge Type	Bridge Name	Primary State	Bridge Location		Route Carried	Deck Area (Sq ft)	Length (ft)	Paint Before 2040	Minor Rehab Before 2040	Major Rehab Before 2040	Bridge Replacement	Comments
				Lat	Long								
0706396	Tied arch	I-470 (Vietnam Veterans Memorial Bridge)	WV/Ohio (Ohio Approach)	40025786	80435960	I-470	52,332	588	Yes	Yes			
0705950	Arch/Tied arch	SR 872 (Moundsville Bridge)	West Virginia	39545103	80453379	SR 872	56,640	885	Yes	Yes			
0703095	Stringer/Multi-beam or girder	I-70 (Fort Henry Bridge)	West Virginia	40041709	80442670	I-70	42,849	621	Yes	Yes			
018A183	Through truss Bridge	US 33 Ravenswood Bridge (William S. Ritchie, Jr. Bridge)	West Virginia	38561200	81451200	US 33	92,310	2,715	Yes	Yes			
52A007	Through truss Bridge	New Martinsville	West Virginia	39392400	80520600	WV 7	71,400	2,100	Yes	Yes			
4401174	Cantilevered Warren through truss bridge	West End Bridge (Nick Joe Rahal II Bridge)	West Virginia	38244963	82290634	US 52	81,036	2,251	Yes	Yes			
4404084	Cantilevered Warren through truss bridge	Robert C. Byrd Bridge	West Virginia	38251832	82270197	SR 527	147,280	2,104	Yes	Yes			
4400089	Concrete cable-stayed bridge	East Huntington Bridge (Frank 'Gunner' Gatski Bridge)	West Virginia	38262969	82223565	SR 775	36,822	1,083	Yes	Yes			
0801305	Cable-stayed bridge	William Harsha	Kentucky	38410052	83471199	US 62/68	130,626	2,419	Yes	Yes			
0800333	Steel suspension bridge with Warren deck trusses	Simon Kenton	Kentucky	38384676	83454330	BUS US 62/68	80,248	2,866	Yes	Yes			
	Warren cantilevered through truss bridge	Silver Memorial Bridge	West Virginia			US 35			Yes	Yes			

APPENDIX G: DETAILED AGENCY COSTS TO MAINTAIN EXISTING SERVICES

ODOT Category			Transit Authority	Total Operating/Admin Budget		Maintain Existing Services		
				Annual	Total (27yrs)	27yrs capital	27yrs non-vehicle capital	Total Capital
I	Rail/Bus	1	Greater Cleveland Regional Transit Authority (GCRTA)	***$245,647,352***	***$6,632,478,504***	***$705,360,565***	***$1,814,427,000***	***$2,519,787,565***
II	Large Bus	1	Central Ohio Transit Authority (COTA)	$93,122,384	$2,514,304,373	$262,006,267	$532,800,000	$794,806,267
		2	Greater Dayton Regional Transit Authority (GDRTA)	$67,924,933	$1,833,973,191	$245,132,936	$143,100,000	$388,232,936
		3	Southwest Ohio Regional Transit Authority (SORTA)	$82,938,401	$2,239,336,827	$253,569,601	$111,312,000	$364,881,601
				$243,985,718	***$6,587,614,391***	***$760,708,804***	***$787,212,000***	***$1,547,920,804***
III	Mid-sized Bus	1	METRO Regional Transit Authority (Akron)	$38,794,242	$1,047,444,531	$160,673,801	$219,618,000	$380,291,801
		2	Toledo Area Regional Transit Authority (TARTA)	$31,828,666	$859,373,987	$159,121,603	$12,087,000	$171,208,603
				$70,622,908	***$1,906,818,519***	***$319,795,404***	***$231,705,000***	***$551,500,404***
IV	Intermediate Bus	1	Butler County Regional Transit Authority (BCRTA)	$1,907,739	$51,508,953	$8,442,198	$3,626,100	$12,068,298
		2	Niles Trumbull Transit System (NITTS)/Trumbull Transit System (TTS)	$1,697,612	$45,835,524	$4,364,500	$458,355	$4,822,855
		3	Stark Area Regional Transit Authority (SARTA)	$16,812,742	$453,944,034	$102,535,937	$20,457,000	$122,992,937
		4	Laketran	$11,281,003	$304,587,081	$100,375,440	$32,121,000	$132,496,440
		5	Western Reserve Transit Authority (WRTA)	$8,429,700	$227,601,900	$48,110,769	$28,077,300	$76,188,069
				$40,128,796	***$1,083,477,492***	***$263,828,845***	***$84,739,755***	***$348,568,600***
V	Small Bus	1	Allen County Regional Transit Authority (ACRTA)	$1,708,851	$46,138,977	$11,102,256	$461,390	$11,563,646
		2	Clermont Transportation Connection (CTC)	$2,642,149	$71,338,023	$13,813,565	$2,970,000	$16,783,565
		3	Eastern Ohio Regional Transit Authority (EORTA)	$1,330,221	$35,915,967	$3,701,693	$359,160	$4,060,852
		4	Greene County Transit Board (Greene Cats)	$2,759,564	$74,508,228	$9,396,042	$320,400	$9,716,442
		5	Lawrence County Transit	$1,055,319	$28,493,613	$850,710	$5,602,500	$6,453,210
		6	Licking County Transit Services	$2,428,515	$65,569,905	$5,361,220	$337,500	$5,698,720
		7	Lorain County Transit (LCT)	$1,486,057	$40,123,539	$8,876,163	$44,553,132	$53,429,295
		8	Miami County Transit System	$971,997	$26,243,919	$4,283,850	$7,897,500	$12,181,350
		9	Middletown Transit System	$1,280,872	$34,583,544	$6,019,569	$2,268,000	$8,287,569
		10	Newark–Heath Earthworks Transit	$1,011,616	$27,313,632	$3,544,705	$273,136	$3,817,841
		11	Portage Area Regional Transportation Authority (PARTA)	$8,032,446	$216,876,042	$29,463,776	$35,433,000	$64,896,776
		12	Richland County Transit (RCT)	$1,720,702	$46,458,954	$8,431,426	$35,100	$8,466,526
		13	Delaware Area Transit Agency (DATA)	$1,248,834	$33,718,518	$5,294,360	$337,185	$5,631,545
		14	Warren County Transit Service	$1,753,114	$47,334,078	$5,159,919	$473,341	$5,633,260
		15	Medina County Transit	$1,003,036	$27,081,972	$2,732,911	$270,820	$3,003,730
		16	Springfield City Area Transit (SCAT)	$1,687,851	$45,571,977	$10,423,526	$1,574,100	$11,997,626
		17	Steel Valley Regional Transit Authority (SVRTA)	$1,286,960	$34,747,920	$4,583,479	$347,479	$4,930,958
				$33,408,104	**$902,018,808**	***$133,039,168***	***$103,513,743***	***$236,552,911***

	Rural Transit Authority	Total Operating/ Admin Budget Annual	27yrs - Total Operating/ Admin Budget Annual	Capital - Fleet 27yrs	Capital - Non-vehicle - 27yrs (1)	Capital Total - 27yrs
1	Ashland Public Transit	$525,799	$14,196,573	$1,148,608	$141,966	$1,290,574
2	Ashtabula County Transportation System (ACTS)	$988,471	$26,688,717	$2,284,272	$266,887	$2,551,159
3	Athens Transit	$465,507	$12,568,689	$1,625,868	$125,687	$1,751,554
4	Bowling Green Transit	$567,183	$15,313,941	$926,196	$153,139	$1,079,336
5	Carroll County Transit System	$365,586	$9,870,822	$1,846,590	$98,708	$1,945,298
6	Champaign Transit System	$368,444	$9,947,988	$1,351,949	$99,480	$1,451,429
7	Chillicothe Transit System	$2,427,742	$65,549,034	$7,595,883	$655,490	$8,251,373
8	Columbiana County/Community Action Rural Transit System (CARTS)	$1,628,980	$43,982,460	$4,627,540	$439,825	$5,067,364
9	Crawford County Transportation Program	$456,806	$12,333,762	$2,139,585	$123,338	$2,262,923
10	Sandusky Transit System/Erie County (STS)	$1,538,241	$41,532,507	$3,323,760	$415,325	$3,739,085
11	Fayette County Transportation Program	$591,056	$15,958,512	$3,368,072	$159,585	$3,527,657
12	Geauga County Transit	$1,126,583	$30,417,741	$6,431,821	$304,177	$6,735,999
13	Greenville Transit System	$580,931	$15,685,137	$2,450,599	$156,851	$2,607,450
14	Hancock Area Transportation Services (HATS)	$880,718	$23,779,386	$3,378,273	$237,794	$3,616,067
15	Harrison County Rural Transit (HCRT)	$567,008	$15,309,216	$1,957,048	$153,092	$2,110,140
16	Huron County Transit	$409,756	$11,063,412	$1,057,887	$110,634	$1,168,521
17	Lancaster Public Transit System	$1,297,761	$35,039,547	$2,125,804	$350,395	$2,476,200
18	Logan County/Transportation for Logan County (TLC)	$461,304	$12,455,208	$2,555,323	$124,552	$2,679,875
19	Logan Transit System (City of Logan)	$217,119	$5,862,213	$948,654	$58,622	$1,007,276
20	Marion Area Transit (MAT)	$823,156	$22,225,212	$4,879,242	$222,252	$5,101,494
21	Washington County/Community Action Bus Lines (CABL)	$420,802	$11,361,654	$1,541,570	$113,617	$1,655,187
22	KNOX Area Transit/formerly Mid-Ohio Transit Authority (MOTA)	$1,216,493	$32,845,311	$4,211,020	$328,453	$4,539,474
23	Monroe County Public Transportation	$245,883	$6,638,841	$2,194,416	$66,388	$2,260,804
24	Morgan County Transit	$687,952	$18,574,704	$2,049,320	$185,747	$2,235,067
25	Ottawa County Transportation Agency (OCTA)	$1,888,417	$50,987,259	$6,565,711	$509,873	$7,075,584
26	Perry County Transit (PCT)	$1,003,513	$27,094,851	$3,318,674	$270,949	$3,589,623
27	Pickaway Area Rural Transit	$649,170	$17,527,590	$2,482,441	$175,276	$2,657,717
28	Pike County/Community Action Transit System (CATS)	$390,630	$10,547,010	$1,687,523	$105,470	$1,792,993
29	Transportation Resources for Independent People of Sandusky County (TRIPS)	$741,124	$20,010,348	$3,281,563	$200,103	$3,481,667
30	Scioto County/Access Scioto County (ASC)	$705,410	$19,046,070	$3,100,000	$190,461	$3,290,461
31	Seneca County Agency Transportation (SCAT)	$742,501	$20,047,527	$3,150,000	$200,475	$3,350,475
32	Shelby Public Transit	$653,755	$17,651,385	$2,500,000	$176,514	$2,676,514
33	South East Area Transit (SEAT)	$2,619,828	$70,735,356	$7,800,000	$707,354	$8,507,354
35	Wilmington Transit System	$1,140,350	$30,789,450	$3,121,744	$307,895	$3,429,639
	Rural 5311 Program Totals	**$29,393,979**	$793,637,433	**$103,026,954**	**$7,936,374**	**$110,963,329**
	5310 Special Transportation Program (2)			**$181,192,000**		**$181,192,000**

Notes:

(1) Non-vehicle Capital assumption: 1 percent of operating budget

(2) Capital Fleet Replacement assumptions: 568 vehicles, 5 yr avg vehicle life, avg replacement cost $55K; replaced 6x

APPENDIX H: DETAILED AGENCY COSTS TO ENHANCE SERVICES

Enhanced Transit Services

ODOT Category			Transit Authority	Operating Expansion – 27yrs	Capital Expansion – 27yrs	Total Enhanced Services-27yrs	Notes
I	Rail/Bus	1	Greater Cleveland Regional Transit Authority (GCRTA)	$1,658,119,626	$115,700,000	$1,773,819,626	NOACA LRP2030 for future capital needs, but no operating expansion costs; thus, estimate - 25% growth in 27 yrs
II	Large Bus	1	Central Ohio Transit Authority (COTA)	$628,576,093	$198,701,567	$827,277,660	estimate - 25% growth in 27 yrs; MORPC 2035 Plan discussed maintaining service, but no future costs/projects
		2	Greater Dayton Regional Transit Authority (GDRTA)	$437,736,809	$346,937,636	$784,674,445	MVRPC 2040, 2012
		3	Southwest Ohio Regional Transit Authority (SORTA)	$107,975,000	$182,100,000	$290,075,000	LRP 2035 Plan
				$1,174,287,902	$727,739,203	$1,902,027,105	
III	Mid-sized Bus	1	METRO Regional Transit Authority (Akron)	$138,600,000	$36,975,000	$175,575,000	AMATS Public Transportation Needs, 2030
		2	Toledo Area Regional Transit Authority (TARTA)	$220,843,497	$330,130,000	$550,973,497	TMACOG LRP2035 for future capital needs, but no operating expansion costs; thus, estimate - 25% growth in 27 yrs
				$359,443,497	$367,105,000	$726,548,497	
IV	Intermediate Bus	1	Butler County Regional Transit Authority (BCRTA)	$12,877,238	$1,300,000	$14,177,238	OKI LRP 2030 for future capital needs, but no operating expansion costs; thus, estimate - 25% growth in 27 yrs
		2	Niles Trumbull Transit System (NITTS)/Trumbull Transit System (TTS)	$11,458,881	$1,205,714	$12,664,595	estimate - 25% growth in 27 yrs; Eastgate COG TDP discussed long-range future needs, but no costs beyond 2017
		3	Stark Area Regional Transit Authority (SARTA)	$113,486,009	$30,748,234	$144,234,243	estimate - 25% growth in 27 yrs
		4	Laketran	$76,146,770	$33,124,110	$109,270,880	NOACA LRP2030 for future GCRTA capital needs. Existing for Laketran; thus, estimate - 25% growth in 27 yrs
		5	Western Reserve Transit Authority (WRTA)	$36,691,200	$40,252,750	$76,943,950	Eastgate LRTP2030; 7 rts 12 hrs 24yrs 7 veh replace 3x
				$250,660,098	$106,630,808	$357,290,906	
V	Small Bus	1	Allen County Regional Transit Authority (ACRTA)	$9,000,000	$600,000	$9,600,000	No data available. Future enhanced assumptions based upon avg of similar sized agencies in OH. LACRPC LRP2030: no future data
		2	Clermont Transportation Connection (CTC)	$16,598,400	$5,400,000	$21,998,400	2035 LRTP public comments; no costs available; estimates: 4 rts 12 hrs 19yrs; 4 veh replace 2x
		3	Eastern Ohio Regional Transit Authority (EORTA)	$8,852,480	$1,200,000	$10,052,480	BelOMar 2035 LRTP public comments; no costs available; estimates: 2 rts 12 hrs 20yrs; Sat service; 2 veh replace 2x
		4	Greene County Transit Board (Greene Cats)	$8,299,200	$1,200,000	$9,499,200	LRP public comments; no costs available; estimates: 2 rts 12 hrs 20yrs; Sat service; 2 veh replace 2x

ODOT Category			Transit Authority	Operating Expansion – 27yrs	Capital Expansion – 27yrs	Total Enhanced Services-27yrs	Notes
V	Small Bus	5	Lawrence County Transit	$7,123,403	$5,616,382	$12,739,785	LRP 2030 for capital needs, but no operating expansion costs; thus, estimate - 25% growth in 27 yrs
		6	Licking County Transit Services	$8,900,348	$1,130,774	$10,031,122	LCATS 2035, 2012
		7	Lorain County Transit (LCT)	$10,030,885	$1,500,000	$11,530,885	NOACA LRP2030 for future GCRTA capital needs. Existing for LCT; thus, estimate - 25% growth in 27 yrs
		8	Miami County Transit System	$8,299,200	$1,000,000	$9,299,200	LRP public comments; no costs available; estimates: 2 rts 12 hrs 20yrs; Sat service; 2 veh replace 2x
		9	Middletown Transit System	$8,645,886	$1,500,000	$10,145,886	No future enhanced costs; thus, estimate - 25% growth in 27 yrs
		10	Newark–Heath Earthworks Transit	$6,828,408	$1,000,000	$7,828,408	No future enhanced costs; thus, estimate - 25% growth in 27 yrs
		11	Portage Area Regional Transportation Authority (PARTA)	$18,270,000	$19,600,000	$37,870,000	AMATS Public Transportation Needs, 2030
		12	Richland County Transit (RCT)	$9,609,600	$1,374,500	$10,984,100	RCRPC TDP 2011 public comments; no costs available; estimates: 2 rts 12 hrs 20yrs; Sat service; 2 veh replace 2x
		13	Delaware Area Transit Agency (DATA)	$8,429,630	$1,407,886	$9,837,516	Estimate - 25% growth in 27 yrs
		14	Warren County Transit Service	$11,833,520	$1,408,315	$13,241,835	Estimate - 25% growth in 27 yrs
		15	Medina County Transit	$6,770,493	$750,933	$7,521,426	Estimate - 25% growth in 27 yrs
		16	Springfield City Area Transit (SCAT)	$8,500,000	$5,500,000	$14,000,000	Facility info from CCSTCC TDP 2006; no other data available. Future enhanced costs estimated from other OH similar-sized transit agencies
		17	Steel Valley Regional Transit Authority (SVRTA)	$8,000,000	$1,000,000	$9,000,000	No data available. Future enhanced assumptions based upon avg of similar sized agencies in OH. BHJ 2035 LRTP public comments; no costs available
				$163,991,452	$51,188,790	$215,180,242	

	Rural Transit Authority	Operating Expansion	Capital Expansion	Total Expansion
1	Ashland Public Transit	$3,549,143	$322,643	$3,871,787
2	Ashtabula County Transportation System (ACTS)	$6,672,179	$637,790	$7,309,969
3	Athens Transit	$3,142,172	$437,889	$3,580,061
4	Bowling Green Transit	$3,828,485	$269,834	$4,098,319
5	Carroll County Transit System	$2,467,706	$486,324	$2,954,030
6	Champaign Transit System	$2,486,997	$362,857	$2,849,854
7	Chillicothe Transit System	$16,387,259	$2,062,843	$18,450,102
8	Columbiana County/Community Action Rural Transit System (CARTS)	$10,995,615	$1,266,841	$12,262,456
9	Crawford County Transportation Program	$3,083,441	$565,731	$3,649,171
10	Sandusky Transit System/Erie County (STS)	$38,540,700	$7,054,000	$45,594,700
11	Fayette County Transportation Program	$3,989,628	$881,914	$4,871,542
12	Geauga County Transit	$7,604,435	$1,684,000	$9,288,435
13	Greenville Transit System	$3,921,284	$651,863	$4,573,147
14	Hancock Area Transportation Services (HATS)	$5,944,847	$904,017	$6,848,863
15	Harrison County Rural Transit (HCRT)	$3,827,304	$527,535	$4,354,839
16	Huron County Transit	$2,765,853	$292,130	$3,057,983
17	Lancaster Public Transit System	$8,759,887	$619,050	$9,378,937
18	Logan County/Transportation for Logan County (TLC)	$3,113,802	$669,969	$3,783,771
19	Logan Transit System (City of Logan)	$1,465,553	$251,819	$1,717,372
20	Marion Area Transit (MAT)	$5,556,303	$1,275,374	$6,831,677
21	Washington County/Community Action Bus Lines (CABL)	$2,840,414	$5,430,833	$8,271,247
22	KNOX Area Transit/formerly Mid-Ohio Transit Authority (MOTA)	$8,211,328	$1,134,868	$9,346,196
23	Monroe County Public Transportation	$1,659,710	$565,201	$2,224,911
24	Morgan County Transit	$4,643,676	$558,767	$5,202,443
25	Ottawa County Transportation Agency (OCTA)	$12,746,815	$1,768,896	$14,515,711
26	Perry County Transit (PCT)	$6,773,713	$897,406	$7,671,118
27	Pickaway Area Rural Transit	$4,381,898	$664,429	$5,046,327
28	Pike County/Community Action Transit System (CATS)	$2,636,753	$448,248	$3,085,001
29	Transportation Resources for Independent People of Sandusky County (TRIPS)	$5,002,587	$870,417	$5,873,004
30	Scioto County/Access Scioto County (ASC)	$4,761,518	$822,615	$5,584,133
31	Seneca County Agency Transportation (SCAT)	$5,011,882	$837,619	$5,849,501
32	Shelby Public Transit	$4,412,846	$669,128	$5,081,975
33	South East Area Transit (SEAT)	$17,683,839	$2,126,838	$19,810,677
35	Wilmington Transit System	$7,697,363	$857,410	$8,554,772
	Rural 5311 Program Totals	**$226,566,932**	**$38,877,097**	**$265,444,029**
	5310 Special Transportation Program (2)	**n/a**	**$45,298,000**	**$45,298,000**

Note: All FTA 5311 Rural and 5310 Specialized Services have expansion services based upon 25% growth in 27yrs

APPENDIX I: BICYCLE ROUTE DESTINATIONS

Urban Area	MPO	Destination Name	Approximate Address	City	Zip Code	Description
Cincinnati	OKI	Smale Riverfront Park	120 E Mehring Way	Cincinnati	45202	This riverfront park features a bike center with parking, and is next to sports stadiums. It is minutes away from downtown Cincinnati and other attractions such as the National Underground Railroad Freedom Center.
Huntington	KYOVA	Lawrence County Courthouse, Downtown Ironton	111 S Fourth St	Ironton	45638	The Lawrence County Courthouse sits in the center of Ironton, and is blocks away from the Ohio River
Toledo	TMACOG	Promenade Park , Downtown Toledo	200 Water St	Toledo	43604	This park in downtown Toledo is along the Maumee River, and close to the baseball stadium and Imagination Station science museum.
Newark	LCATS	Licking County Courthouse, Downtown Newark	20 S Second St	Newark	43055	The Licking County Courthouse is at the center of Newark. Shops and restaurants surround the courthouse square.
Sandusky	ERPC	Sandusky Ferry Terminal, Jackson Street Pier	233 E Shoreline Dr	Sandusky	44870	The Sandusky Ferry Terminal in close to downtown Sandusky, and provides ferry connections to the popular tourist destination of Kelley's Island
Springfield	CCSTCC	The Heritage Center of Clark County, Downtown Springfield	117 S Fountain Ave	Springfield	45502	This location is located in downtown Springfield, and is next to the Simon Kenton Trail.
Youngstown	EASTGATE	Youngstown State University	48 Lincoln Ave	Youngstown	44503	The Youngstown State University campus is a few blocks away from downtown Youngstown.
Parkersburg	WWW	East Muskingum Park, Marietta	300 Front St	Marietta	45750	This park is adjacent to historic downtown Marietta and half a mile from Marietta College. A bridge across the Ohio River is also nearby.
Weirton--Steubenville	BHJ	Historic Fort Steuben, Downtown Steubenville	120 S Third St	Steubenville	43952	This historic site is in downtown Steubenville, and is adjacent to the Market St Bridge which provides a connection across the Ohio River.
Wheeling	BELOMAR	Union Park, Downtown Bellaire	3400 Guernsey St	Bellaire	43906	This park in Bellaire is adjacent to the downtown area.
Akron	AMATS	Lock 3 Park, Akron	60 W State St	Akron	44308	This park in central Akron is adjacent to the Towpath Trail, and is less than a mile from the University of Akron.
Canton	SCATS	West Branch Park, Canton	1700 12th St NW	Canton	44708	This park is near area tourist attractions, and is a trailhead for the West Park Trail.

Urban Area	MPO	Destination Name	Approximate Address	City	Zip Code	Description
Cleveland	NOACA	The Bike Rack (Downtown Cleveland Bicycle Station)	2148 E 4th St	Cleveland	44115	The Bike Rack in downtown Cleveland is blocks away from downtown Cleveland landmarks. This location also offers additional services to cyclists, including lockers and repair services.
Columbus	MORPC	Ohio Statehouse, Downtown Columbus	1 E Broad St	Columbus	43215	The Ohio Statehouse is close to parks and other downtown Columbus attractions. Two blocks away, the Scioto Trail connects to the Olentangy Trail which passes by the Ohio State University.
Dayton	MVRPC	Riverscape Metro Park Bike Hub ,Downtown Dayton	111 E Monument Ave	Dayton	45402	Riverscape Metro Park Bike Hub offers several amenities to cyclists, including bike parking and rentals. It is adjacent to downtown Dayton, and less than three miles from the University of Dayton.
Lima	LACRPC	Town Square, Downtown Lima	128 W Market St	Lima	45801	The Lima Town Square is adjacent to the Lima Civic Center, and there are several restaurants nearby.
Mansfield	RCRPC	Central Park, Downtown Mansfield	2 N Main St	Mansfield	44902	Central Park is the focal point of downtown Mansfield. The Richland B&O trail is also nearby.

APPENDIX J: FLORIDA DOT BICYCLE LEVEL OF SERVICE EQUATION

The Bicycle LOS Model is based on the following equation:

$$BLOS = 0.507\ ln(Vol_{15}/L) + 0.199SP_t\ (1 + 10.38HV)^2 + 7.066(1/PR_5)^2 - 0.005(W_e)^2 + 0.760$$

Where:

BLOS	=	Bicycle level of service score
ln	=	Natural log
Vol_{15}	=	Volume of directional motorized vehicles in the peak 15 minute time period
L	=	Total number of directional thru lanes
SP_t	=	Effective speed factor = 1.1199 ln(SPp - 20) + 0.8103
SP_p	=	Posted speed limit (a surrogate for average running speed)
HV	=	percentage of heavy vehicles
PR_5	=	FHWA's five point pavement surface condition rating
W_e	=	Average effective width of outside thru lane (which incorporates the existence of a paved shoulder or bicycle lane if present)

Where:

$W_e = W_v$ - (10ft x %OSP)	Where $W_l = 0$
$W_e = W_v + W_l$ (1 - 2x %OSP)	Where $W_l > 0$ & $W_{ps} = 0$
$W_e = W_v + W_l$ - 2 (10 x %OSP)	Where $W_l > 0$ & $W_{ps} > 0$ and a bicycle lane exists

Where:

W_t	=	total width of outside lane (and shoulder) pavement
%OSP	=	percentage of segment with occupied on-street parking
W_l	=	width of paving between the outside lane stripe and the edge of pavement
W_{ps}	=	width of pavement striped for on-street parking
W_v	=	Effective width as a function of traffic volume

Where:

W_v =	W_t	if AADT > 4,000 veh/day
W_v =	W_t(2-(0.00025 x AADT))	if AADT < 4,000 veh/day, and if the street/road is undivided and unstriped

Table 2 – 1

Bicycle and Pedestrian LOS Categories

LOS	Score
A	≤ 1.5
B	> 1.5 and ≤ 2.5
C	> 2.5 and ≤ 3.5
D	> 3.5 and ≤ 4.5
E	> 4.5 and ≤ 5.5
F	> 5.5

2009 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK

Adapted from Bicycle Level of Service Model
(http://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/chapt13.cfm)

APPENDIX K: BICYCLE ROUTE DISTANCES

	Cincinnati	Ironton/ Huntington	Toledo	Newark	Sandusky	Springfield	Youngstown	Marietta/ Parkersburg	Steubenville	Wheeling	Akron	Canton	Cleveland	Columbus	Dayton	Lima	Mansfield
Cincinnati	NA	152	257	178	321	89	341	249	291	304	288	270	327	126	86	168	194
Ironton/ Huntington	152	NA	314	155	297	172	363	152	285	241	329	292	368	141	170	267	215
Toledo	257	314	NA	180	64	171	216	322	275	319	171	208	132	173	171	89	112
Newark	178	155	180	NA	143	102	197	138	113	126	110	73	148	52	132	135	68
Sandusky	321	297	64	143	NA	194	159	281	218	262	114	151	75	143	223	153	75
Springfield	89	172	171	102	194	NA	283	210	215	229	213	195	251	50	38	82	119
Youngstown	341	363	216	197	159	283	NA	211	84	128	49	71	84	233	313	240	125
Marietta/ Parkersburg	249	152	322	138	281	210	211	NA	118	89	177	140	216	149	207	273	206
Steubenville	291	285	275	113	218	215	84	118	NA	44	104	67	291	165	245	248	144
Wheeling	304	241	319	126	262	229	128	89	44	NA	148	111	187	178	258	261	194
Akron	288	329	171	110	114	213	49	177	104	148	NA	37	39	162	242	191	76
Canton	270	292	208	73	151	195	71	140	67	111	37	NA	75	145	224	196	81
Cleveland	327	368	132	148	75	251	84	216	291	187	39	75	NA	201	281	225	110
Columbus	126	141	173	52	143	50	233	149	165	178	162	145	201	NA	80	126	69
Dayton	86	170	171	132	223	38	313	207	245	258	242	224	281	80	NA	82	148
Lima	168	267	89	135	153	82	240	273	248	261	191	196	225	126	82	NA	115
Mansfield	194	215	112	68	75	119	125	206	144	194	76	81	110	69	148	115	NA

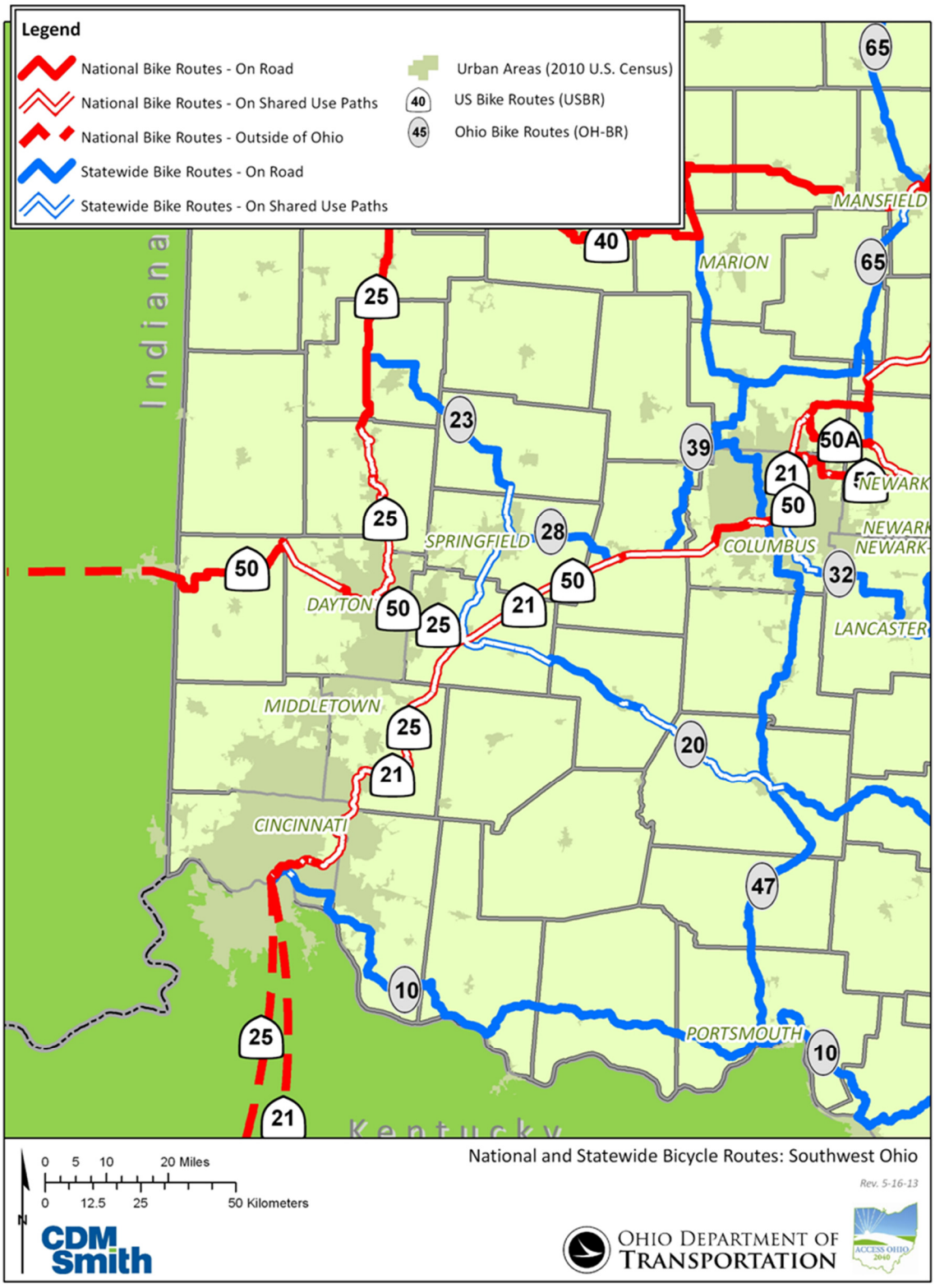
APPENDIX L: BICYCLE ROUTES BY REGION


Legend
National Bike Routes - On Road
National Bike Routes - On Shared Use Paths
National Bike Routes - Outside of Ohio
Statewide Bike Routes - On Road
Statewide Bike Routes - On Shared Use Paths
Urban Areas (2010 U.S. Census)
US Bike Routes (USBR)
Ohio Bike Routes (OH-BR)
LIMA
MARION
MANSFIELD
NEWARK-HEATH
ZANESVILLE
SPRINGFIELD
COLUMBUS
DAYTON
LANCASTER
0 5 10 20 Miles
0 10 20 40 Kilometers
N
National and Statewide Bicycle Routes: Central Ohio
Rev. 5-16-13
CDM Smith
OHIO DEPARTMENT OF TRANSPORTATION


Legend
National Bike Routes - On Road
National Bike Routes - On Shared Use Paths
National Bike Routes - Outside of Ohio
Statewide Bike Routes - On Road
Statewide Bike Routes - On Shared Use Paths
Urban Areas (2010 U.S. Census)
US Bike Routes (USBR)
Ohio Bike Routes (OH-BR)
Lake Erie
ASHTABULA
CLEVELAND
SANDUSKY
LORAIN-ELYRIA
MEDINA
AKRON
YOUNGSTOWN-WARREN
ALLIANCE
CANTON
MANSFIELD
DOVER-NEW PHILADELPHIA
STEUBENVILLE-WEIRTON
NEWARK-HEATH
COLUMBUS
Pennsylvania
0 5 10 20 Miles
0 12.5 25 50 Kilometers
N
National and Statewide Bicycle Routes: Northeast Ohio
Rev. 5-16-13
CDM Smith
OHIO DEPARTMENT OF TRANSPORTATION
ACCESS OHIO 2040


Legend
National Bike Routes - On Road
National Bike Routes - On Shared Use Paths
National Bike Routes - Outside of Ohio
Statewide Bike Routes - On Road
Statewide Bike Routes - On Shared Use Paths
Urban Areas (2010 U.S. Census)
US Bike Routes (USBR)
Ohio Bike Routes (OH-BR)
Michigan
Indiana
TOLEDO
SANDUSKY
FINDLAY
LIMA
MANSFIELD
MARION
COLUMBUS
30
40A
90
25
40
39
65
23
50A
0 5 10 20 Miles
0 10 20 40 Kilometers
N
CDM Smith
National and Statewide Bicycle Routes: Northwest Ohio
Rev. 5-16-13
OHIO DEPARTMENT OF TRANSPORTATION
ACCESS OHIO 2040


Legend
National Bike Routes - On Road
National Bike Routes - On Shared Use Paths
National Bike Routes - Outside of Ohio
Statewide Bike Routes - On Road
Statewide Bike Routes - On Shared Use Paths
Urban Areas (2010 U.S. Census)
US Bike Routes (USBR)
Ohio Bike Routes (OH-BR)
MANSFIELD
MARION
CANTON
ALLIANCE
YOUNGSTOWN-WA
DOVER-NEW PHILADELPHIA
STEUBENVILLE-W
NEWARK-HEATH
COLUMBUS
ZANESVILLE
LANCASTER
PORTSMOUTH
West Virgini
0 5 10 20 Miles
0 15 30 60 Kilometers
N
National and Statewide Bicycle Routes: Southeast Ohio
Rev. 5-16-13
CDM Smith
OHIO DEPARTMENT OF TRANSPORTATION
ACCESS OHIO 2040


Legend
National Bike Routes - On Road
National Bike Routes - On Shared Use Paths
National Bike Routes - Outside of Ohio
Statewide Bike Routes - On Road
Statewide Bike Routes - On Shared Use Paths
Urban Areas (2010 U.S. Census)
US Bike Routes (USBR)
Ohio Bike Routes (OH-BR)
Indiana
Kentucky
MANSFIELD
MARION
SPRINGFIELD
DAYTON
COLUMBUS
NEWARK
LANCASTER
MIDDLETOWN
CINCINNATI
PORTSMOUTH
0 5 10 20 Miles
0 12.5 25 50 Kilometers
N
National and Statewide Bicycle Routes: Southwest Ohio
Rev. 5-16-13
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ACCESS OHIO 2040

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