
BERKSHIRE
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Regional Goals & Recommendations


RTP
2024

Goal 1

Maintain a State of Good Repair

The maintenance of our existing transportation infrastructure and services is a core function of our local government. Properly maintained infrastructure leads to a reliable transportation system where all people can get around with safety, predictability and dignity. It is also important to remember that a state of good repair is not synonymous with perfection. Any system with limited resources will have to prioritize needs and desires, and some projects may be deferred while others are carried out. The long-range planning process works to identify the objective factors for programming and prioritizing transportation maintenance funds.

Objectives:

a. Maintain Pavement Conditions
b. Maintain Bridge Conditions
c. Maintain Culvert and Stream Crossing Conditions

Graphic by Baboons Icon for the Noun Project

1a. Maintain Pavement Conditions

Background

There are over 1,900 miles of accepted roads and streets throughout Berkshire County. Together, they create a backbone and circulatory system for travel around, into, and out of, the region. Approximately 1,589 miles are under local jurisdiction, with the remaining being under state ownership. Of the total 1,900 miles, approximately 1450 are asphalt paved. The remainder are gravel-surface.

As motor vehicles became the predominant mode for travel and shipping, roads throughout the United States were improved with asphalt pavement. This mix of bitumen and aggregate forms a resilient wearing surface for wheels to roll on, a significant upgrade from gravel and natural-surface roads. The routine and capital maintenance needs for these improved surfaces is a full-time job for town highway departments.

In the generations since the first improved roads were constructed in Berkshire County, the costs of maintaining a state of good repair for the region's road network has grown. Costs of asphalt, aggregate, equipment and labor steadily increase, while town populations and tax bases have largely been flat or declining. Further support will be needed to maintain the quality of roads in Berkshire County.

Existing Conditions

How pavement conditions are evaluated

Taken as a whole, a town's road network is likely its single most valuable asset, in terms of cost of installation and maintenance. Different parts of the network are evaluated and maintained in different ways, depending on the ownership of the road, its function, and its method of construction. Regardless of these factors, an objective way of tracking pavement condition and creating maintenance plans is the best way to preserve the useful lives of these assets.

Roadways can be evaluated by electronic instruments or visual inspection. Specialized vehicles equipped with accelerometers and ground-penetrating radar (GPR) can drive over road surfaces to measure the roughness of the ride and the conditions of the ground below the surface to help planners determine what a road's maintenance needs are. Based on these factors, planners can then give a road a score on the International Roughness Index (IRI) or the Present Serviceability Index (PSR). Comparing IRI or PSR scores across a network helps maintenance crews to plan out maintenance activities for a construction season. Visual inspections performed while driving can also help planners determine what a road's maintenance needs are. The Pavement Asphalt Surface Evaluation and Rating (PASER) system helps planners to evaluate roads based on visual cracking, rutting, deformation, potholes, and other factors. These visual cues indicate the degree of aging for a certain road, from which a maintenance activity can be recommended.

Most instrument-based pavement evaluations require a high upfront cost. These inspections are most often performed by MassDOT on state-owned roadways, or may be contracted out to a third party to perform inspections of town-owned roads. Visual inspections are less costly and can be performed by local or regional crews with proper training. The Berkshire Regional Planning Commission is able to perform visual PASER inspections for any town in the county, and provide the results to town Highway departments for maintenance activity and capital investment planning. Contact the Transportation Planning Program at BRPC to request a proposal for evaluation of town-owned pavement and gravel roads.

Performance Monitoring

The federal FAST Act, and the subsequent Bipartisan Infrastructure Law (BIL) call for performance-based planning of transportation projects. In other words, investments should be decided by measurable data from our roadway system. This performance is tracked in Performance Measure 2 (PM2): Bridge and Pavement Performance Measures. The performance measures that Berkshire County has adopted are as follows:

Performance Measure	2-yr target	4-yr target
Bridges in good condition	16%	16%
Bridges in poor condition	12%	12%
Interstate in good cond.	70%	70%
Interstate in poor cond.	2%	2%
Non-Interstate in good cond.	30%	30%
Non-Interstate in poor cond.	5%	5%

Map 1a-1: Berkshire County Federal-Aid Pavement Conditions, 2023

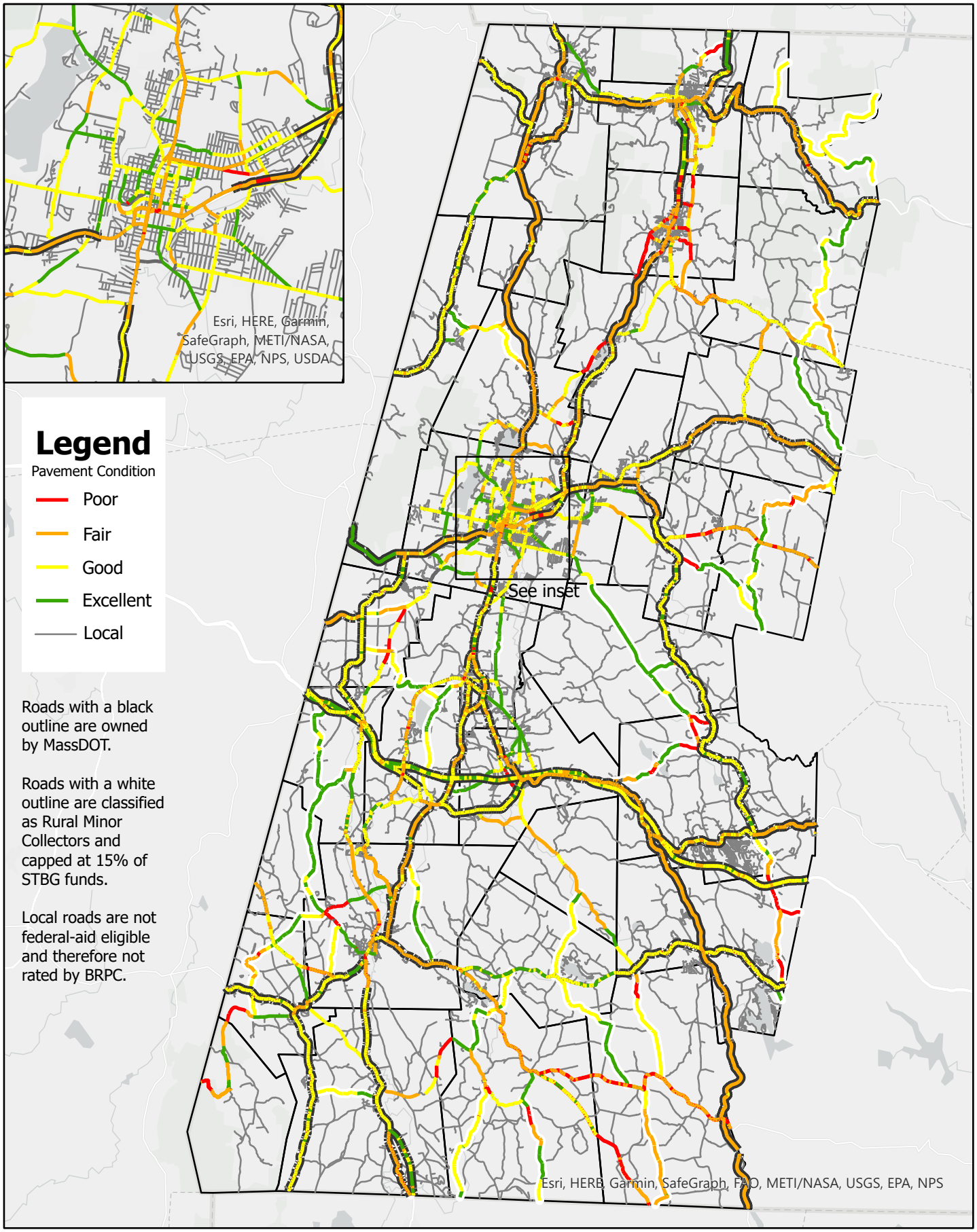


Figure 1a-1: Chapter 90 budgets for Berkshire towns: 2012 to 2023

Municipality	2012 Ch. 90 $	2023 Ch. 90 $
Adams	294,296	278,826
Alford	73,259	70,902
Becket	245,467	234,215
Cheshire	205,906	197,598
Clarksburg	75,720	73,711
Dalton	227,587	215,411
Egremont	155,054	150,125
Florida	164,804	159,840
Gt. Barrington	423,476	402,061
Hancock	69,975	66,838
Hinsdale	158,467	153,050
Lanesborough	230,160	213,403
Lee	299,746	278,340
Lenox	291,694	273,424
Monterey	199,722	195,902
Mt. Washington	71,657	68,908
New Ashford	44,120	42,519
New Marlborough	349,782	338,424
North Adams	454,636	417,377
Otis	181,454	177,398
Peru	147,465	142,768
Pittsfield	1,399,765	1,328,745
Richmond	170,726	162,728
Sandisfield	334,548	322,909
Savoy	201,598	195,510
Sheffield	370,201	354,014
Stockbridge	203,584	192,390
Tyringham	104,517	102,453
Washington	170,913	167,904
W. Stockbridge	154,023	150,753
Williamstown	308,387	291,902
Windsor	256,275	248,197
Total	**8,038,984**	**7,668,545**

State of Repair for Berkshire County Roads

Federal-aid roads are eligible for maintenance under the Transportation Improvement Program (TIP). Recognizing which roads currently have the greatest needs help planners to form annual maintenance requests under the TIP. ***Federal-aid roads*** include Interstate highways and roads with the functional classifications of Arterial, Urban Collector, and Rural Major Collector. Rural Minor Collector Roads and Local streets are not eligible for Federal-aid funding and inclusion on TIP projects. These roads are maintained through a town's annual budget or through Chapter 90 reimbursement (more information on Chapter 90 is in the next section).

BRPC conducted a PASER visual inspection of the federal-aid eligible roadways owned by municipalities in Berkshire County in the summer of 2022. Federal-aid roadways owned by MassDOT are inspected and reported on by that agency. The data gathered from the BRPC inspection and the data reported by MassDOT are combined and reported in **Map 1a-1**. Ratings are consolidated into four general categories of conditions: Excellent, Good, Fair, and Poor and colored on the map.

Level of Investment for Maintaining a State of Good Repair

The goal for any maintenance program is to keep its assets in a state of good repair. A "good" pavement condition, which translates to a PASER rating of at least 8 out of 10, is a reasonable benchmark to estimate investment needs with today's current state of repair. A road in "good" condition can have its service life extended with routine maintenance such as crack sealing.

The more a road's condition is deteriorated, the higher its maintenance costs will be to bring it to a state of good condition. Roads that are considered in "fair" condition will usually require more costly rehabilitation activities, such as mill-and-fill resurfacing, hot-in-place recycling or cold-in-place recycling. "Poor" condition roads often have a degraded base below the surface, which can cause rutting, sinkholes, washboarding, and eventually total failure of the road, making it impassible to average vehicles. These roads usually require full-depth reconstruction.

Based on the pavement conditions reported by MassDOT on state highways and as evaluated on local roads, a rough cost estimate for bringing

Berkshire County up to a good state of repair has been developed. This estimate assumes all roads would be repaired in their current conditions, without any further deterioration taking place. The goal is to provide an understanding of the level of investment needed in our road network to maintain adequate conditions. See **Figure 1a-1** for a breakdown of road mileage by condition and level of investment estimated. Unit cost estimates come from average prices per square yard (SY) of various pavement treatments from MassDOT's State Aid Reimbursable Price Estimation Tool (SARPET). The averages take into account different maintenance activities that could be performed for pavements falling with a certain PASER rating range (i.e., 8-10 or 3-5).

Pavement Maintenance Programs for Berkshire County

To maintain and improve the state of repair for roadways in Berkshire County, there are several planning and funding programs available. Roads may or many not be eligible for these programs based on their ownership, condition, or functional classification.

Municipal Pavement Program

This road maintenance program was created in 2021 by the transportation bond bill signed into law by former governor Baker. According to MassDOT, the goal of the MPP is:

"to improve the condition of municipally owned state numbered routes, with an emphasis on National Highway System (NHS) roadways, and to find opportunities to improve safety and accessibility for all modes."

The MPP is not a competitive grant program but rather a targeted investment in municipally-owned state-numbered routes. Examples of these roads include Route 41 in West Stockbridge, Route 23 in Monterey, Route 143 in Hinsdale, and Route 116 in Savoy among others. Many towns have numbered routes with some segments owned by the municipality, and other segments owned by MassDOT.

MassDOT selects road segments for improvements based on the current road condition, the proportion of poor-condition numbered routes a municipality, and geographic equity. Emphasis is placed on road segments that are part of National Highway System (NHS). Based on these criteria, the following projects were funded by the MPP in Berkshire County in FY 2022:

- Great Barrington: Route 71 from the Egremont town line to the intersection of Route 71, Route 23, and Route 41
- New Marlborough: Route 57 from the intersection of Stone Manor Drive to the Monterey town line
- Sandisfield: Route 57 from the intersection of New Hartford Road to east of Lower West Street at the bridge over Buck River; and Route 183 from the Connecticut state line to just south of Norfolk Road

For FY 2023, the following Berkshire County towns have been programmed into the MPP:

- Adams: Route 8, limits TBD
- Alford: Route 71 from mile marker 0 to 1.5
- Great Barrington: Route 23, limits TBD
- Hinsdale: Route 143 from mile marker 0.7 to 2.5
- Peru: Route 143 from mile marker 2.5 to 6.98

Chapter 90 Program

Direct state aid to municipalities for the purposes of road construction and maintenance is carried out through the "Chapter 90" program. This name comes from the authorization language for the program, spelled out in Chapter 90, Section 34 of the Massachusetts General Laws. This funding is reimbursement-based and only authorized for projects taking place on locally-owned roadways. Work performed on roads owned by MassDOT, other jurisdictions or privately-owned ways is not eligible for Chapter 90 reimbursement. Planning, design, construction and equipment and supplies purchases are eligible for reimbursement under the program. Funding is authorized annually as a lump sum by the state legislature and apportioned to each municipality in the Commonwealth by a funding formula, which takes into account population, locally-owned road mileage, and employment figures. The current authorized sum of $200,000,000 has been in place since 2015. See **Figure 1a-1** to the left for the funding allocations to Berkshire municipalities.

Municipalities with decreasing populations are put at a disadvantage with the current funding formula. According to an analysis by the office of the State Auditor, only 8 of the 32 Berkshire municipalities

Figure 1a-2: Population Change (%), FY11 to FY22

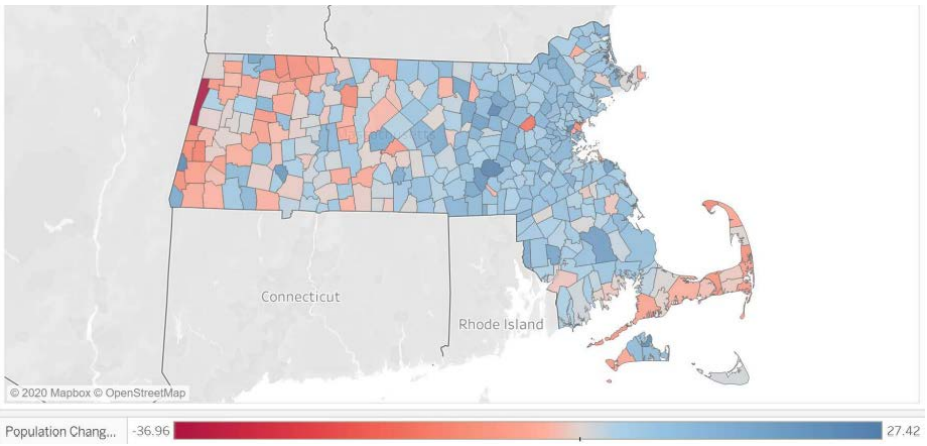
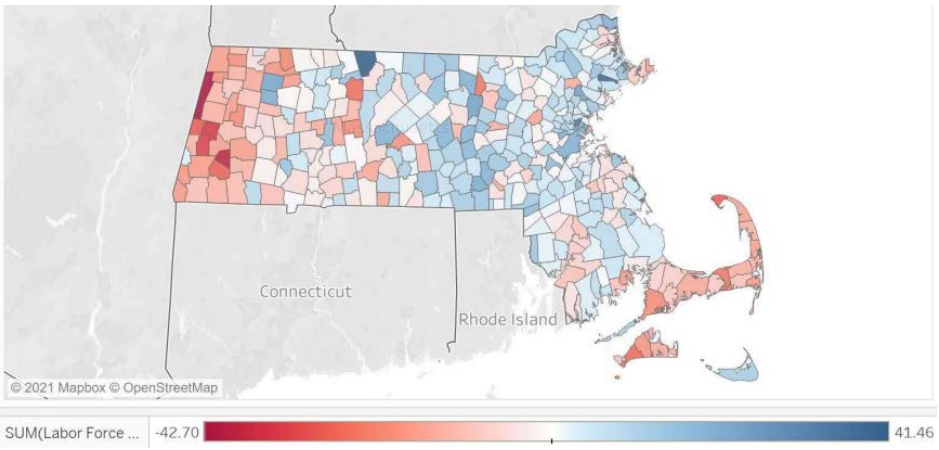


Figure 1a-3: Labor Force Rate of Change, 2010 to 2020



experienced population growth between 2011 and 2021 (see **Figure 1a-2**). The City of Pittsfield's Chapter 90 allotment has decreased over the past 10 years[1] from a high of $1,399,765 in 2012 to $1,328,745 in 2023. Meanwhile, the city has not erased any roads from its map. Costs of materials, equipment, and labor will fluctuate year over year, and have seen a trend of significant increase over the last several years. The end result is that public works dollars are needing to be stretched further and maintenance will be deferred. Over the past decade, the region has seen a collective loss of over $370,000 of road maintenance dollars. This figure is before the further weakening of purchasing power due to inflation and price increases.

A portion of the Chapter 90 apportionment formula also takes into account workforce numbers. According to the analysis conducted by the office of the State Auditor, 31 of the 32 municipalities in Berkshire County saw a reduction in the labor force between 2010 and 2020. This further erodes at Chapter 90 allotments without a subsequent reduction in maintenance responsibilities for locally-owned roads. **See Figure 1a-3**.

As two of the three metrics for calculating Chapter 90 decline for the Berkshire region, apportionments will also continue decline, and the region will fall further behind if a new balance is not struck.

The Chapter 90 program has proven to be a valuable benefit to the cities and towns of the Commonwealth. Every effort should be made to have the funds be available and expended in an expeditious manner to provide for the construction and rehabilitation of local roads.

Recommended Projects

- Pittsfield: Route 7 (First Street) between East Street and Tyler Street: Approx. 3,800 LF of road reconstruction, bike/ped and ADA improvements, signal replacements, and other safety improvements. Estimated cost: $6,000,000
- Adams: Bucklin Road from Cheshire town line to Walling Road; East Road from Walling Road to Upper E Hoosac Street: Approx 2.1 miles of road rehabilitation. Estimated cost: $1,100,000
- Adams: West Road from Reservoir Road to Gould Road: Approx. 2.1 miles of road rehabilitation. Estimated cost: $1,100,000
- Lanesborough: Summer Street from Old Cheshire Road to Old State Road: Approx 6,500 LF of road reconstruction. Estimated cost: $563,000
- Cheshire: Lanesboro Road from Lanesborough town line to Route 8: Approx 1.85 miles of road reconstruction. Estimated cost: $849,000
- Sheffield: County Road from Hickey Hill Road to New Marlborough town line: Approx. 1.5 miles of road reconstruction. Estimated cost: $893,120

1 Not including a one-time infusion by the legislature into the Chapter 90 fund in 2015.

1b. Maintain Bridge Conditions

Background

The landscape of the Berkshires is dotted with bridges that cross rivers, railroads, highways, and steep terrain. While most of us see bridges classified by type, such as arches, trusses, or suspension bridges, for instance, they also carry invisible classifications based on their span length, ownership, and type of road that they carry. While these classifications are relatively unimportant to everyday travelers, they help planners to understand what sources of funds are available to maintain or replace a bridge.

Span Length Classifications
Bridges that are 20 feet or longer in span are considered part of the National Bridge Inventory (NBI). MassDOT classifies bridges between 10 and 20 feet long as short-span bridges (BRI). Finally, crossings between 4 and 10 feet long are considered Culverts (CUL), regardless if the structure is a true culvert or a bridge. A culvert is a singular hollow structure that is typically made from concrete. They can be more difficult to identify as they may not have railings or an ascent leading up to them, as a typical bridge might.

Functional Classifications
NBI structures are eligible for federal-aid funding. If the bridge carries a road that is also eligible for federal-aid funding (i.e., Interstates, arterials, and urban collector roads), then the bridge is classified as On-System. If the bridge carries a road that is not eligible for federal-aid funding (such as local streets and rural collector roads), then it is classified as an Off-System bridge.

A bridge may be listed as "functionally obsolete." This designation is applied when a bridge's road deck does not meet modern design standards for the *functional* classification of the road (arterial, collector, or local). Often, this occurs when a bridge constructed many years ago is narrower than what would be standard today in terms of lane widths, shoulder clearance, or bicycle and pedestrian accommodation.

Condition Classifications
A bridge's state of repair is classified in several ways. Bridges that are owned by MassDOT or a municipality are inspected every two years as a part of compliance with the National Bridge Inspection Standards (NBIS). A bridge's condition will be generally reported as good, fair, or poor. Specific parts of a bridge, like the superstructure, substructure, or road deck may have different ratings. A bridge may also be classified as "structurally deficient." This indicates that the structure of the bridge is in such a condition that new weight restrictions may be imposed, or the bridge may be partially or completely closed.

Berkshire residents are familiar with bridge closures, which have always happened from time to time. Recent higher-profile bridge closures and restrictions include the Holmes Road bridge in Pittsfield and the Division Street bridge in Great Barrington. Temporary or permanent replacements to these bridges are currently in development at the time of writing.

Partial or full bridge closures have an impact that is close to home for many Berkshire residents. Detours are disruptive and cost residents more travel time. Emergency response times can also be impacted by poor bridge conditions, whether the corridor is restricted to one-lane travel or closed entirely. In a rural setting like Berkshire County, a bridge may be the only access point for certain neighborhoods. While more urbanized areas may have a redundant street grid to allow for other travel options, detours in rural areas due to bridge closures can result in much greater travel times. Well-maintained bridges is a high priority for many residents.

Berkshire County has over 700 bridges listed on the statewide inventory. These include structures owned locally and owned by MassDOT. The majority of bridges are qualified for the National Bridge Inventory (NBI), while about one-quarter of bridges have spans between 10 and 20 feet, which qualify as a short-span (BRI-classified) bridge. Fifty-five bridges are currently listed as structurally deficient in Berkshire County, which can result in weight limit postings, partial, or full closures. **Figure 1a-2** shows a list of all bridges that have been inventoried in Berkshire County, broken out by municipality.

Bridge Maintenance Resources

Rehabilitating or replacing bridges are costly infrastructure investments for municipalities to

undertake. Resources are available for assistance in performing maintenance, rehabilitation, or replacement for bridges depending on their size and classification. Bridge funding availability is determined at the statewide level, as part of the statewide bridge inventory. See **Figure 1a-3** for the projected yearly funding available for bridge maintenance statewide. It is anticipated that Berkshire County will receive a portion of funds for bridges in this region, but there is no set formula to determine funding amounts region by region.

Figure 1a-2: Bridge Ownership, Category, and Deficiencies in Berkshire County

Town	Total Bridges on Inventory	Owner			Category			Deficient
		DOT	Mun.	Oth.	NBI	BRI	Oth.	
Adams	40	7	31	2	23	8	9	1
Alford	8	1	7	0	4	0	4	2
Becket	52	32	20	0	26	17	9	3
Cheshire	12	6	5	1	5	5	2	0
Clarksburg	8	2	6	0	6	0	2	1
Dalton	8	0	8	0	5	2	1	0
Egremont	13	3	10	0	9	4	0	0
Florida	6	2	4	0	2	1	3	0
Great Barrington	22	11	11	0	17	3	2	2
Hancock	12	6	6	0	5	4	3	0
Hinsdale	21	7	14	0	12	3	6	1
Lanesborough	19	9	10	0	13	4	2	3
Lee	55	31	24	0	42	7	6	4
Lenox	15	3	12	0	6	5	4	0
Monterey	12	0	12	0	7	5	0	2
Mount Washington	2	0	2	0	1	1	0	0
New Ashford	9	6	3	0	4	3	2	0
New Marlborough	27	0	27	0	20	4	3	2
North Adams	30	15	15	0	22	3	5	2
Otis	26	18	8	0	10	10	6	4
Peru	4	0	4	0	0	2	2	0
Pittsfield	65	21	44	0	48	13	4	9
Richmond	12	6	6	0	3	5	4	1
Sandisfield	35	8	27	0	21	7	7	1
Savoy	19	0	17	0	14	1	4	1
Sheffield	37	10	27	0	20	12	5	5
Stockbridge	24	13	11	0	16	8	0	2
Tyringham	9	0	9	0	6	2	1	1
Washington	15	2	13	0	6	6	3	5
West Stockbridge	28	20	8	0	19	8	1	1
Williamstown	33	16	17	0	23	7	3	1
Windsor	27	8	19	0	14	11	2	1
TOTALS	705	263	437	3	429	171	105	55

Municipal Small Bridge Program

This funding source is managed by MassDOT, and was last authorized by the state 2021 Transportation Bond Bill with an apportionment of $70 million statewide. It is intended to support maintenance, rehabilitation, and replacement of bridges that are defined as BRI-type spans (between 10 and 20 feet in span). There are several methods of measurement for determining the span of a bridge for MSBP purposes. These methods are provided by the MassDOT Highway Division on their official Municipal Small Bridge Program website.

Next Generation Bridge Program

This statewide bond-funded maintenance program allocates $1.25 billion over five years between 2021 and 2025 to address major bridge projects across the Commonwealth. Future projects in Berkshire County may qualify under this program, but at the time of writing there are no known projects in development under this program in the region.

BIL Bridge Formula Program

The 2021 Infrastructure Investment and Jobs Act (IIJA), otherwise known as the Bipartisan Infrastructure Law or BIL, appropriated $5.5 billion for "bridge replacement, rehabilitation, preservation, protection, and construction." This apportionment is known as the Bridge Formula Program (BFP).

Funds in the BFP are to be obligated by states before the program lapses on September 30, 2025. The funds are dispersed by the FHWA, and are targeted toward federal-aid eligible roads with bridges that are in poor condition needing

replacement, or bridges in fair condition needing rehabilitation. 15% of the total funds are to be set aside for use on Off-System bridges in the state. See **Figure 1a-4** below for a breakout of funding amounts for Massachusetts.

Bridges mainly go unnoticed in our daily travels until an issue is uncovered. Inspecting, maintaining and prioritizing the hundreds of bridges in Berkshire County is no simple task. Bridge replacements are often the most costly single project a town will undertake for many years, and to some it will seem that progress is slow. Towns can also work proactively to extend the life of their bridges before the need for closure. Inspecting for rust or cracking periodically, repainting, and keeping the substructure clean, especially from winter salt, can all help keep bridges in good repair for a longer time.

UPWP Activities:

- Report yearly to MPO on changes in bridge condition
- Assist communities in obtaining up to date bridge data
- Coordinate with municipalities as needed in navigating bridge funding opportunities

Figure 1a-3: Estimated Statewide Bridge Funding

	Statewide Bridge Program (funding available to ALL MPOs)	
2024	$	183,898,219
2025	$	176,617,938
2026	$	183,898,219
2027	$	255,592,933
2028	$	282,726,401
First 5 years	**$**	**1,082,733,710**
2029	$	288,380,929
2030	$	294,148,548
2031	$	300,031,519
2032	$	306,032,149
2033	$	312,152,792
Second 5 years	**$**	**1,500,745,936**
2034	$	318,395,848
2035	$	324,763,765
2036	$	331,259,040
2037	$	337,884,221
2038	$	344,641,905
Third 5 years	**$**	**1,656,944,778**
2039	$	351,534,743
2040	$	358,565,438
2041	$	365,736,747
2042	$	373,051,482
2043	$	380,512,512
Fourth 5 years	**$**	**1,829,400,922**
2044	$	388,122,762
Fifth 5 years	**$**	**388,122,762**
TOTALS	**$**	**6,457,948,108**

Figure 1a-4: Estimated BFP funding for MA

State	Bridge Formula Program		
	Bridge (Main)	Off-system Bridges	Total
Mass.	$206,998,770	$36,529195	$243,527,965

1c. Maintain Culvert and Stream Crossing Conditions

Background

This Objective will address maintenance and inventory of culverts in Berkshire County. Adapting culverts to improve wildlife linkages and to address extreme weather events will be noted in ***Objective 6d - Mitigate Impacts on Natural Habitats****.*

Culverts are minor stream crossings that are between four and ten feet wide. The rule of thumb that differentiates culverts from bridges is that culverts are a single pre-fabricated structure, sometimes made from concrete off-site, or consisting of a large pipe made of plastic or corrugated metal (see **Figure 1c-1**). Culverts allow for roads to traverse minor streams without significantly interrupting their flow.

Identifying and creating an inventory for culverts in the region is a significant undertaking. While some culverts may be easy to spot from a road, some may be as simple as a plastic pipe buried below a mound. Blocked culverts can lead to upstream flooding, and rusted out culverts can lead to collapses or washouts in heavy rains, which are more likely to occur as the climate changes over the twenty-year planning horizon. With no formal management system, many communities lack a full inventory of their culvert locations, and often they only become known once a flood or washout occurs. Culverts that are clear of obstructions, in good physical condition, and right-sized for the volumes of water passing through are vital for maintaining uninterrupted travel around the region.

BRPC has collected culvert measurement and condition data as part of routine planning work. MassDOT also maintains an inventory of culverts that support state-owned roadways. Finally, the North Atlantic Aquatic Connectivity Collaborative (NAACC) works to collect data related to the wildlife connectivity elements of the region's culverts. According to the NAACC data gathered to date, there are over 2,200 known stream crossings in Berkshire County. An overview of the data gathered is shown in **Map 1c-2**. Half remain to be assessed, and the work will be ongoing.

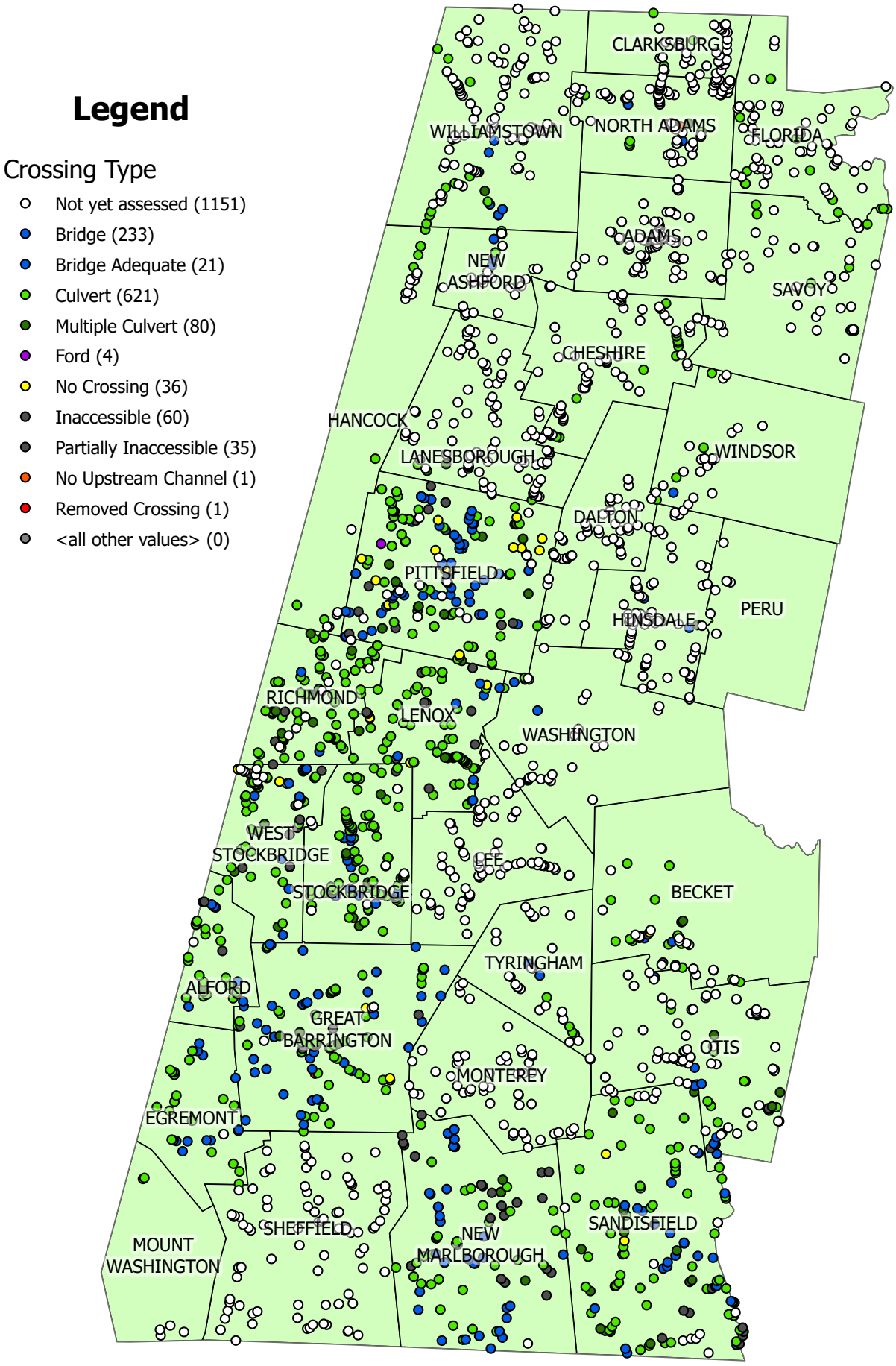
As culverts are assessed, routine repair and replacement should be prioritized by local highway departments. Dilapidated culverts present opportunities to fortify the stream crossings for future weather events and enhanced aquatic and wildlife connectivity.

UPWP Activities:

- Continue gathering data for culverts that have yet to be assessed
- Coordinate with local highway departments to prioritize culvert repairs or replacements, and find ways to streamline the process in concert with other road maintenance work
- Encourage more towns to assess their stream crossings through the Municipal Vulnerability Preparedness (MVP) program
- Research and share the latest culvert design standards that support adequate water flow and wildlife connectivity

Figure 1c-1: Culvert carrying a stream under a road in Cheshire

Map 1c-2: Known stream crossings in Berkshire County (via NAACC)




RTP2024

Goal 2

Foster Economic Development

Transportation is a key influencer of economic opportunity for residential, commercial, and industrial sectors. The hospitality and tourism industry relies on visitors taking trips to Berkshire County and patronizing attractions. Commercial and industrial operations rely on freight logistics to move both raw materials and finished products. Continued growth of online marketplaces has led to increased demand for at-home delivery. And of course, workers need reliable transportation to get to work. A robust transportation network helps to support the economic development indicators of job creation and tourism revenues.

Objectives:

a. Grow Economic Opportunity through Transportation
b. Develop Scenic Byways
c. Support Freight and Airport Operation

Graphic by Abulloh Fauzon for the Noun Project

2a. Grow Economic Opportunity through Transportation

Background

The regional economic development priorities for Berkshire County are generally laid out in the Comprehensive Economic Development Strategy, or CEDS. This document is a blueprint to communicate the region's economic vision and needs to federal decision makers, specifically the Economic Development Administration (EDA).

The CEDS was developed through the guidance of a CEDS committee and authored by the Berkshire Regional Planning Commission. One of the most important tasks within the CEDS is to develop an analysis of the region's economic strengths, weaknesses, opportunities and threats (SWOT). The SWOT analysis succinctly lays out the advantages and disadvantages the region faces in growing our economic output, job base, and prosperity.

Transportation-related factors play into the region's economic opportunities and setbacks. The CEDS committee see the following factors as aligning with transportation investments or needs in the region:

Strengths: Outdoor Recreation, Core Employers
Weaknesses: Public Transport, Regional Disconnect
Opportunities: Outdoor Recreation, Remote Work
Threats: High Energy Prices, Loss of Farmland

To address the trends revealed from the SWOT analysis, the CEDS recommends several goals, strategies, and objectives, not unlike this RTP. This section will highlight goals put forward by the CEDS that can be addressed, at least in part, by transportation planning, policy, and projects.

Goal: ***Healthy People***
Objective: Enhance accessibility and safety of downtown commercial districts.

Goal: ***Resilient Communities***
Objectives: Advocate for increased Chapter 90[1] funding; Invest in vibrant, safe, and walkable downtown commercial districts with a focus on vacant storefronts and facades.

Goal: ***Robust Infrastructure***
Objectives: Advocate for increased rail transportation to and from the region; Advocate for increased funding to support more robust BRTA services, including microtansit implementation.

The CEDS lists priority economic development projects that are determined to be regionally significant over the next five years. Two that address transportation include:

- Columbus Avenue/Summer Street Parking Garage (Pittsfield)
- Harriman & West Airport (North Adams)

Transportation Project Alignment with SWOT Factors

Supporting the transportation-related goals and objectives laid out by the CEDS can be accomplished by programming projects, studies, and staff time into future budgets. This section elaborates on how transportation resources can help to achieve the listed goals, and what projects and studies would be relevant for future budget inclusion.

Strengths: *Outdoor Recreation, Core Employers*
Our regional outdoor recreation assets are a major draw to encourage living in and visiting the Berkshires. Multi-modal connections to recreation sites that are in a state of good repair will bolster this strength. Examples of investments that can be made include the Berkshire Bike Path, Pavement Management studies and investments, bottleneck analyses with a focus on event spaces like the Greylock Glen and Tanglewood, and investments in mass transportation like circulators, shuttles, trolleys, buses, or rail.

Core employers in the region draw in new residents and keep families in the Berkshires. The CEDS acknowledges that there are few remaining opportunities to develop new large-scale industrial sites in Berkshire County, and existing sites must be preserved and enhanced. Getting employees to and from these workplaces, as well as getting raw and finished goods in and out are important considerations in preserving these sites. Strategies outlined in the 2023 Massachusetts Freight Plan (discussed in Chapter 2) will help to address these sites, and the Berkshires will work to align with these strategies as is practical.

1 Chapter 90 is the direct state-aid program in Massachusetts that provides towns and cities with maintenance funds for their local roads. See **Goal 1a**.

Weaknesses: Public Transport, Regional Disconnect
Enhancing our public transportation system is discussed in more detail in **Section 3a**. Public transportation in Berkshire County takes the forms of fixed-route buses, microtransit (currently in a pilot phase), coach buses, and passenger rail. Current funding levels are not able to support a transit system that is envisioned by many in the Berkshires. More frequent headways, expanded coverage, multi-modal options like regional and local rail and microtransit will require a prioritization of funds by our statewide partners and elected officials. In the short term, transit agencies can double down on what's working and look to leverage additional resources and funding where possible.

Regional disconnect is a familiar feeling due to the political and natural geography of the region. The tall and narrow Berkshire County is nearly 50 miles long north to south, but less than half that distance across, east to west. For example, the towns of Great Barrington and Williamstown are both considered important cultural and population centers in Berkshire County, but are situated an hour's drive apart from one another. The region is generally bounded geographically by hills and mountains that limit the number of connections to neighbors. Especially for northern and southern extremities of the county, travel to Boston and back is a full day's excursion. Wintry conditions can isolate neighborhoods in the hilltowns and make travel into and out of the region difficult. Projects like East-West Rail and Northern Tier Rail will help provide more multi-modal connections to the rest of the Commonwealth. The windows for higher-speed bypasses for driving though the region have opened and closed, and would likely be of a low benefit relative to the cost. Optimization of the region's most traveled routes will provide notable gains for increasing connections. Improvements to safety through proven countermeasures and improvements to travel times via intelligent transportation system (ITS) corridors will help to better connect the region.

Opportunities: Outdoor Recreation, Remote Work
As discussed in the Strengths section, the region has the opportunity to leverage natural environments, scenic views, and the host of all-season recreational opportunities to encourage living, working, and doing business in the Berkshires. Working to keep the roads, bridges, and paths that connect people to these resources will help to strengthen these assets.

Remote work presents another opportunity to infill gaps and disconnections that have formed in the wake of deindustrialization. The transportation planning and engineering professions should study and consider the effects that a remote or hybrid work schedule has on travel demand, rush hour patterns and volumes, and land-use practices. Office buildings that have become vacant could be adapted to prime central housing that could support work-from-home patterns and encourage more families to consider living in the Berkshires. This would strengthen the cohesion and walkability of town and city cores, with a 24-hour presence of people in downtown neighborhoods.

Threats: High Energy Prices, Loss of Farmland
The volatility of prices for energy that is derived from fossil fuels has become a fact of life. Reducing dependence on these resources, especially in the transportation sector will help make the local economy more resilient. This work will take on different forms. Conversion of vehicle fleets from internal combustion to electric and hydrogen is one component of this. Reducing the number of vehicle miles traveled and providing the options to replace driving trips with walking, cycling, and transit wherever possible are strategies that are just as important.

Farmland loss takes place due to many factors. One threat that should be mitigated is farmland converting to low-density sprawling residential development. These land-use decisions have an impact on the transportation system: inducing vehicle trips, disconnecting residents from transit lines, and requiring investments in infrastructure and upkeep. Zoning and subdivision bylaws should be examined by governments concerned about farmland loss, and they should develop strategies to keep land affordable and productive for agriculture.

Recommended Programs:

- Bottleneck analysis and pavement management activities related to development of the Greylock Glen site
- Intelligent Transportation System (ITS) feasibility study along Route 7 in central Pittsfield
- Trip generation and demand study for large-scale regional attractions and events
- Continued transition toward vehicle electrification and reducing VMTs through demand management and land use controls

2b. Develop Scenic Byways

Background

The Massachusetts Scenic Byway program supports roads that have outstanding scenic, historic, cultural, natural, recreational and archaeological qualities. In Berkshire County, there are four segments of state Scenic Byways that have been recognized by the Federal Highway Administration (FHWA). The Scenic Byways of western Massachusetts make important contributions to the economic vitality of the region, by drawing travelers to the area for the natural and historic scenery, who will in turn patronize local businesses.

Mohawk Trail Scenic Byway
This byway is the only route to receive National Scenic Byway status from the FHWA. It begins in the east in the town of Phillipston and follows Route MA-2 west through Franklin County and northern Berkshire County. The Byway terminates in the west at the rotary in Williamstown. One of the route's most distinctive features is the hairpin turn in Clarksburg, which provides sweeping views of the Hoosac River valley and Taconic Range. Whitcomb Summit in Florida also provides expansive vistas north into Vermont and down into the Deerfield River valley. Recently, there has been interest in re-assessing the name of the Mohawk Trail, as research uncovers that the area is associated less with the Mohawk Indian tribe than previously understood.

Jacob's Ladder Trail Scenic Byway
The Jacob's Ladder Trail (JLT) traces its modern origins to the early days of motoring, as one of the first four-season routes to connect Berkshire County to the Pioneer Valley (so named to appeal to motoring "pioneers" who were encouraged to drive for day trips into the Connecticut River Valley). The 35-mile JLT originates in the east in the town of Russell and terminates in the west in the town of Lee at the Lenox line. It follows the route of US-20 and passes through Lee and Becket within Berkshire County. The byway has many notable and historic features. A stone cairn was erected at the summit of the Jacob's Ladder climb in 1910 to celebrate the opening of the roadway (see **Figure 2b-1**). It can still be found today near the Sherwood Forest neighborhood in Becket. The historic village centers of Chester, Russell and Huntington, and the mill district of Woronoco provide a glimpse into the "hilltown" life of Western Massachusetts. Finally, the steep slopes of Tekoa Mountain in Russell provide an impressive backdrop to the descent into the Connecticut River Valley.

Route 116 Scenic Byway
The Route 116 Scenic Byway follows its namesake numbered state route, from downtown Adams in the west to the town of Deerfield in the east. In Berkshire County, it passes through the towns of Adams and Savoy. The route passes directly under the base of Sugarloaf Mountain, which rises hundreds of feet above the Connecticut River in Deerfield. As Route 116 follows the winding river valley through Conway and Ashfield, there are plenty of challenging curves to navigate. The village center of Savoy, through which Route 116 passes, is situated at a higher elevation than almost any town in Berkshire County, at around 1735 feet.

Mount Greylock Scenic Byway
The only Scenic Byway of the region to travel in a north-south direction, the Mount Greylock Scenic Byway connects visitors to the highest summit in Massachusetts. From the south in Lanesborough, the route follows Rockwell Road up the southern face of Mount Greylock, and descends to Williamstown on the north face via Notch Road. These roads are only open seasonally to motor vehicle traffic. Multiple trailheads for hiking and camping are accessible via the Byway, such as Wilbur's Clearing, Money Brook Falls, Jones' Nose, the Appalachian Trail, Sperry Road, Stony Ledge, and Rounds Rock. The Veterans War Memorial tower sits atop the 3,491-foot summit of Mount Greylock and can be seen from vantage points all around Berkshire County.

Figure 2b-1: Stone cairn at the summit of Jacob's Ladder

Byway Stewardship and Development

The Jacob's Ladder Trail Scenic Byway corridor is managed by a non-profit corporation whose mission is to carry forward stewardship of the trail, preserve its rural and historic character, and to advocate for resources to advance these goals. The JLTSB was incorporated in the early 1990s in order to pursue designation of the corridor as a Scenic Byway. With the successful designation as a state Scenic Byway, the committee has worked to implement projects to preserve and enhance the character of the corridor. Projects have included two full Corridor Management Plans developed in cooperation between the Berkshire Regional Planning Commission and the Pioneer Valley Planning Commission (PVPC). Five turnouts have been constructed along the route with informational signage, seating, and parking areas. Interpretive and wayfinding signage has been erected, along with two gateway signs at the route origins in Lee and Russell.

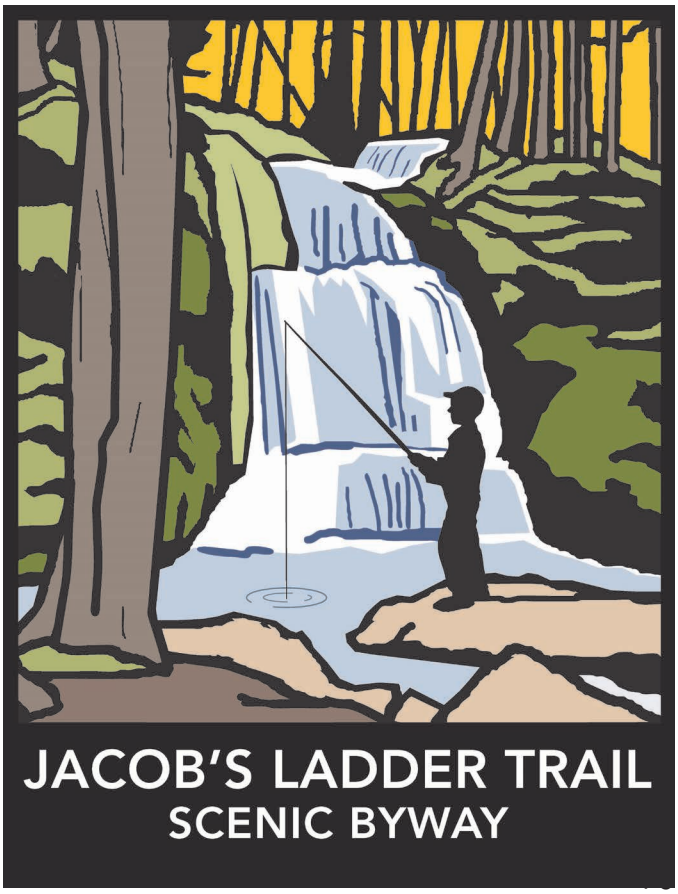
Marketing of the trail is an essential component of attracting interest and investment in the area. Along with the other Scenic Byways of western Massachusetts, Jacob's Ladder Trail is promoted with signature artwork (see **Figure 2b-2**) and a listing of points of interest on the bywayswestmass.com website. This marketing effort helped to bring a unique branding to the region's Scenic Byways, giving each an identity and draw for travelers.

Berkshire Regional Planning Commission staff have served on the leadership board of JLTSB, Inc., traditionally in the role of Clerk for the body. PVPC discontinued representation on the board in the 2010s. BRPC continues to program staff resources for the JLTSB, Inc. board, both as Clerk and for technical assistance where needed. The travel and gathering restrictions of the COVID-19 pandemic put much of the board's work on hiatus for 2020 and 2021. There is interest from board leadership in resuming initiatives to advance the goals of the Jacob's Ladder Trail, including preservation, marketing, and enhancing economic vitality of the corridor. Potential future initiatives include a refresh of the vision and mission of the corporation, refurbishment of signage and rest areas, and updating of the Corridor Management Plan.

UPWP Activities:

- Continue staff support for JLTSB, Inc. activities such as board meetings and communication
- Perform duties as Clerk of the board including meeting minutes, annual report filing, and outreach as necessary
- Provide technical support where needed for transportation-related initiatives along the corridor
- Explore a re-connection with PVPC for initiatives that take place in Hampden County
- Monitor for funding opportunities that are within the capacity of the Scenic Byway team
- Maintain relationships with MassDOT and the Scenic Byways liaison
- Maintain relationships with Berkshire towns along the Byway to solicit monetary and in-kind contributions for Byway work efforts

Figure 2b-1: Jacob's Ladder Trail promotional artwork



2c. Support Freight and Airport Operation

Background

Access to freight and rail hubs is important for the economic health of the region. The Massachusetts State Freight Plan provides a framework for investments to be made around the Commonwealth. As noted in Chapter 2, the Freight Plan for 2023 contains several goals and performance measures for a more efficient, robust and safe freight transportation system. The Berkshire region will work to support those goals by all practical means. Many of the actions recommended under the plan fall within other regional goals such as safety and maintaining a state of good repair. This section will explore some specific freight and air operations for Berkshire County and make recommendations for future projects to enhance these systems.

Freight and Freight Rail Planning

Freight and Reliability Performance Monitoring

The federal FAST Act, and the subsequent Bipartisan Infrastructure Law (BIL) call for performance-based planning of transportation projects. In other words, investments should be decided by measurable data from our roadway system. This performance is tracked in Performance Measure 3 (PM3): Reliability, Congestion, and Emissions. Performance data is expressed in Level of Travel Time Reliability (LOTTR) and Truck Travel Time Reliability (TTTR). More information about these measures can be found in the **Appendix**. Performance targets through 2025 are as follows:

Performance Measure	2-yr target	4-yr target
Interstate LOTTR	74%	76%
Non-Interstate LOTTR	85%	87%
TTTR	1.80	1.75
Emissions Reductions: PM2.5	-	-
Emissions Reductions: NOx	0.000	0.000
Emissions Reductions: VOC	0.000	0.000
Emissions Reductions: PM110	-	-
Emissions Reductions: CO	0.354	0.354

Hubbard Avenue Rail Overpass Bottleneck

The Hubbard Avenue rail overpass has long been considered a bottleneck on the eastern side of the city of Pittsfield, both for passenger and freight traffic. Industrial traffic from the various business parks along Hubbard Ave mainly converge along this corridor. Destinations include the Federico and Downing Industrial Parks, County Concrete Corp., Covanta waste transfer station, Berkshire Crossing, BJ's Wholesale, Neenah Tecnhical Materials, and Ashuelot Park. These industrial trips also mix with commuter and retail traffic to and from Dalton and the retail complexes of Coltsville.

The Hubbard Ave rail overpass, constructed in 1912, is functionally obsolete for the traffic of 2024 and the 20-year planning horizon, and is beyond its useful lifespan. The road narrows on the approaches to the bridge, with minimal shy-distance from the stone abutments of the rail overpass. Vehicles often pause on approach if traffic is coming from the opposite direction, causing unexpected stops along the corridor. The underpass is partially sunken as the rail bed is not elevated high enough to allow traffic to pass underneath at ground level. This low point is often flooded during rain events, which will likely increase in intensity over the next twenty years. The 13'-6" clearance is lower than what many modern freight vehicles need to safety clear an overpass. See **Figure 2c-1** for a recent view of the rail overpass.

Figure 2c-1: Hubbard Avenue Rail overpass, seen approaching from the south.

This corridor presents a high priority for modernization. The rail overpass should be reconstructed so the travel lanes on Hubbard Ave remain at their standard width, which would allow traffic to flow freely. Reconstruction also presents an opportunity to build in pedestrian and bicycle facilities in a zone that currently presents a barrier to movement by foot and bicycle. A new overpass should be constructed at sufficient width to allow for a sidewalk or shared-use path, on the basis of Complete Streets principles (See page 118). Enhanced drainage and additional clearance for modern freight vehicles would be additional benefits stemming from reconstruction of the bridge.

The segment of rail that passes over Hubbard Ave is owned by CSX. It is a double-track layout and carries CSX freight cargo and twice-daily Amtrak passenger service. It is anticipated that partnerships between CSX, MassDOT, the City of Pittsfield and the town of Dalton will be required to help realize the project's completion.

Airport Planning

Berkshire County is home to three general aviation airports along with several unpaved landing strips. Commercial airports include Pittsfield Municipal Airport, Herriman-and-West Airport in North Adams, and Walter J. Kolazda Airport in Great Barrington. The municipalities that host these airports are continuing to leverage them as a resource for economic development and tourism potential.

Herriman-and-West Airport (KAQW)
This airport straddles the city line between North Adams and Williamstown, and is overseen by the North Adams Airport Commission. It features a single 4,300-foot tarmac runway and parking for several dozen small aircraft. As of 2021, the airport tarmac has a Pavement Condition Index (PCI) of 83 out of 100, which is a good condition. Recommended work from the MassDOT Aeronautics Division includes localized preventative maintenance through FY2025 with anticipated major rehabilitation of the runway between FY25 and 27.

The airport facilities are nearing completion of a renovation project which includes new pilot lounge facilities, facade improvements, and updated parking and circulation. The city is also seeking interested applicants to fill a restaurant space on the airport property. North Adams' Vision 2030 Comprehensive Plan lists the airport as an essential component of its economic development strategy.

The airport itself is set back a quarter-mile south from Route 2 and reached by an access road. The intersection of this access road with Route 2 could be further enhanced to complement the other retail and hospitality businesses in the immediate area. A sidewalk along the south side of Route 2 currently connects to a grocery store and urgent care facility, along with residential side streets, the Greylock Works mill complex, and the Appalachian Trail. A sidewalk on the northern side of Route 2 terminates in grass approximately 250 west of the Access Road intersection. Wayfinding guide signs for travelers going to and from the airport could help complement these nearby facilities. A sidepath along the airport access road would better integrate the sidewalk and bike lanes along Route 2 and better connect the TOURISTS hotel and trail system across the street. The city should consider extending the northern sidewalk to meet with the intersection and installing a pedestrian-actuated crosswalk at the signalized intersection of Route 2 and the airport access road, to make the area more pedestrian and bicycle friendly. This would also further enhance connections with the future North Adams Adventure Trail and these investments in economic development.

Pittsfield Municipal Airport (KPSF)
Pittsfield's airport is the largest general aviation facility in western Massachusetts between Springfield and Albany. It is situated about 4.5 miles southwest of downtown Pittsfield, and only accessible by local roads. The surrounding land is of low-density residential and warehousing use. Originally built in the 1940s, the airport supports two runways, and there are 9 hangars listed on the airport property, mainly for conventional aircraft storage.

The longer of the two runways (the primary runway) was extended by 1,000 feet in 2013. The primary runway is the only runway eligible for federal Airport Improvement Program (AIP) funding. According to the Federal Aviation Administration (FAA), the airport was entitled to $150,000 in apportionment funding through the AIP in FY2022.

The overall PCI score for the Pittsfield airport's tarmac is 72 out of 100, which is a generally good condition. Taxiways are generally in poor condition

and the MassDOT Aeronautics Division recommends major rehabilitation of the taxiway tarmac through FY2027.

Walter J. Koladza Airport (KGBR)
Koladza Airport is based in Great Barrington, and is privately owned by Berkshire Aviation Holdings, Inc. Its facilities consist of one 2,500-foot asphalt runway, along with maintenance hangars and an administrative building. The airport has been in operation for nearly 90 years. The current PCI rating from 2021 lists the runway tarmac at 31 out of 100, which is a generally poor condition. The work plan recommended by inspectors with the MassDOT Aeronautics Division would reconstruct the main runway tarmac.

The airport contributes to region's economy by providing aircraft service, sales, flight instruction, along with recreational and charter flights.

At the time of writing, the town of Great Barrington is undergoing a special permit review for the airport's continued operation and construction of an additional hangar, with conditions currently being considered that would provide for enhanced soil and water quality monitoring, flight school operations hours and general airport operations hours, among other things.

The airport is based about two miles southwest of the Great Barrington downtown business district, and is accessible via Egremont Plain Road. There are no other commercial, retail, or hospitality-based businesses in the immediate area surrounding the airport, and the abutting land is zoned residential.

Recommended Projects:

- Pittsfield: Reconstruction of Hubbard Avenue rail overpass. Estimated cost: $15-20 million
- Pittsfield Municipal Airport: Major rehabilitation of taxiways. Estimated cost: $11,000,000
- Walter J. Koladza Airport: Rehabilitation of runway. Estimated cost: $3,232,000.
- North Adams: Herriman-and-West Airport gateway enhancements including sidepath, sidewalk extension, crosswalk signaling, and wayfinding signage

Goal 3

Expand Public Transportation Services & Options

Mass transit is an essential component of any regional transportation system. It is an efficient way of moving many people between points of interest. There are challenges that come with implementing transit well in a rural area. The funding mechanisms by which transit agencies are largely supported do not cover the full needs of the region. Agencies like the Berkshire Regional Transit Authority (BRTA), Amtrak, and regional service providers are leveraging innovations of the 21st century to help make transit more competitive despite these challenges, and they are helping to reduce the transportation sector's greenhouse gas emissions and make Berkshire County accessible to all.

Objectives:

a. Enhance Public Transportation
b. Expand Passenger Rail
c. Coordinate Transportation Services

Graphics by Manaqib S, and i cons for the Noun Project

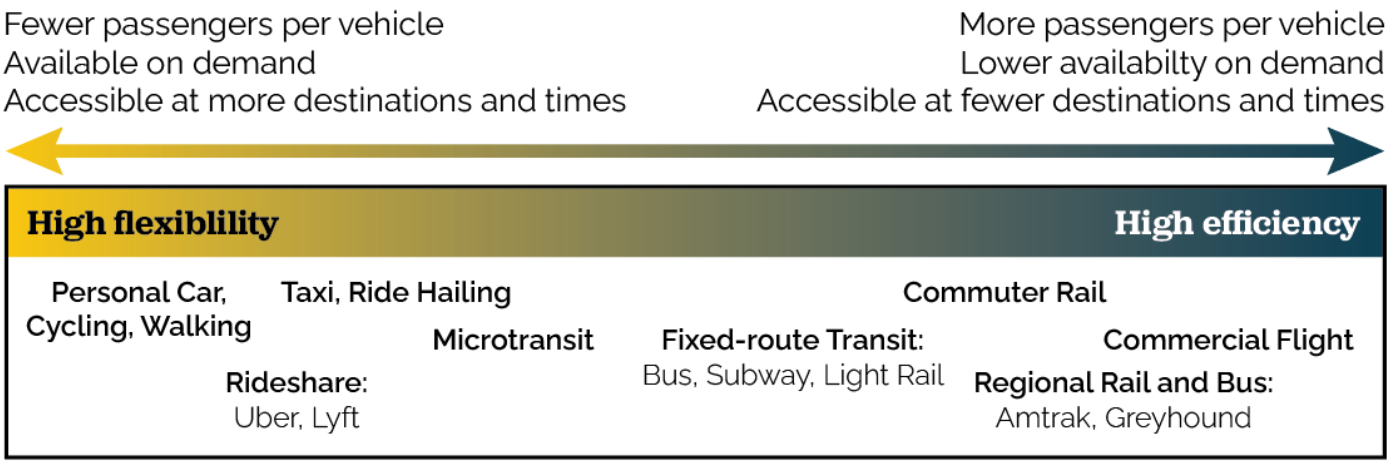
3a. Enhance Public Transportation

Background

Transportation services can be imagined along a spectrum, with one end of the spectrum being highly flexible service, and the other end being highly efficient service. Efficiency, for the purposes of this transportation plan, means moving the highest number of people using the smallest spatial or infrastructure footprint. Highly efficient transportation concentrates many passengers on fewer trips, such as commercial flights, commuter rail and intercity buses. Highly flexible transportation is available to use on demand and at many locations. Maximum flexibility comes in the form of personal automobiles, bicycles, and walking. While high flexibility is desirable for personal mobility, large investments in infrastructure are needed to provide maximum flexibility. Parking lots and structures, low-density land uses, limited-access roadways, and decentralized fueling infrastructure are required to maximize flexibility.

Efficient transportation trades high levels of personal flexibility for less impact on the environment and more flexibility in land use. A loss in flexibility looks like fewer times for departure and arrival at points of interest and fewer locations served by the infrastructure in question. **Figure 3a-1** illustrates where different transportation services theoretically would fall on the flexibility-efficiency spectrum. Efficient public transportation in a rural setting like Berkshire County can be challenging. This objective will consider several modes of mass transportation and recommend future programmatic and infrastructural investments.

Figure 3a-1: Transportation flexibility vs. efficiency



Transportation Network Companies (Rideshare)

Since 2017, the Massachusetts Department of Public Utilities (DPU) has gathered data from and reported on Transportation Network Companies, or TNCs. The most well-known examples of TNCs are Uber and Lyft, often called "ridesharing" companies. The DPU reports on the following TNC statistics:

- Number of rides in a calendar year
- Rideshare trips by city or town
- Year over year change in trips by city or town
- Number of rides started in, ended in, or staying within, a city or town
- Ride origin and destination locations
- Average speed, average distance, average travel time per ride
- Number of crashes involving a TNC operator

Selected statistics for Berkshire County have been extracted from the statewide database and summarized in Figure **3a-2**.

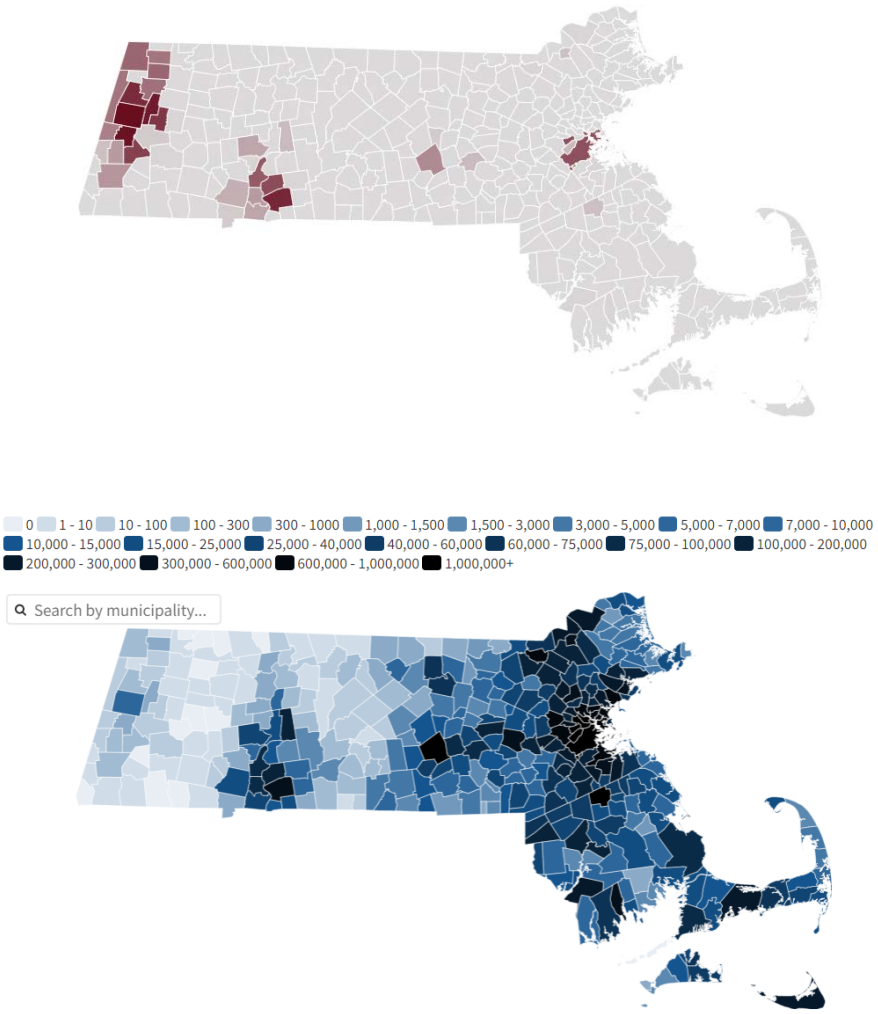
The majority of rideshare trip origins and destinations are in Pittsfield, where 73% and 66% of each, respectively, could be found in 2022. Of rides that originated in Pittsfield and ended elsewhere, Lenox was the most popular destination at 346 trips taken, followed by Dalton at 208 rides taken, and Springfield with 167 rides. **Map 3a-3** illustrates all destination towns recorded from rides originating in Pittsfield.

Figure 3a-2: Selected Berkshire County TNC data

Rides Started	11,227
Rides Ended	11,234
Total per-ride funds alloted to municipalities	$1,122.70
Crashes reported	1

Berkshire County's isolation within the greater web of connectivity in the Commonwealth can be seen clearly in **Map 3a-4**. Eastern and Central Mass constitute an interconnected region with relatively high numbers of rideshare trips. The Connecticut River Valley is a second self-contained area of rideshare trips around that region. It is unclear how many rideshare trips may have been taken across state lines to New York, Vermont or Connecticut.

Map 3a-3: 2022 Rideshare Destinations Originating in Pittsfield



KEY ACTION

Find and promote alternatives for long-distance TNC rides outside of Berkshire County that are more affordable to customers, where possible

Microtransit

Background

A new model of public transportation has emerged in the past decade as an alternative to fixed-route transit lines. Whereas buses, subways, and trains traditionally run on a predetermined route on a fixed schedule, microtransit breaks away from both of those ideas. Microtransit services will pick up passengers from locations requested through a smartphone app, website, or call center. The transit vehicle will then drop off the passenger at or near the requested destination, while also picking up or dropping off other passengers. This takes place within a designated service area.

It is important to distinguish *microtransit* services from *rideshare* services. While rideshare is operated by private enterprises, microtransit can either be provided by a regional transportation authority (RTA), or by a third party as a service. Microtransit and rideshare will often allow rides to be hailed "on-demand" on a smartphone app. A major divergence of microtransit from rideshare is that microtransit vehicles are often called to make intermediate stops during passengers' rides, either to pick up or drop off other passengers. This can create a range of unpredictability for pick up and drop off times.

Both modes of transit have advantages and drawbacks. For microtransit, it often has the advantage of much greater affordability than rideshare or taxi services. Microtransit operations are also locally accountable to the regional transit authority, rather than a national, venture capital-backed technology company. Ridesharing can offer a greater degree of reliability, with more accurate pick up

and drop off time estimations, and the ability to hire a wholly private vehicle rather than a shared vehicle. Rideshare services are generally much more costly to the end user, while offering little in benefits to operators such as sick leave and insurance, compared to employment with an RTA. Pick up and drop off windows for microtransit can vary depending on levels of demand and the route-drawing logic used for passenger pickup and drop off. While a certain microtransit route might be deemed most efficient by the computer controlling the route assignments, individual riders may observe longer travel times or indirect routing to their own destinations.

Great Barrington Pilot Survey

In the winter of 2021-2022, a survey was jointly conducted in southern Berkshire County regarding potential usage of a microtransit system, were it to be implemented. Of the 2,232 responses, a majority in each town indicated that they would use the service at least somewhat frequently. Over 63% of respondents in the town of Stockbridge indicated that they would likely use the service frequently (once per week or more).

Tri-Town Connector Pilot

On May 1, 2023, a microtransit pilot program launched in southern Berkshire County. Dubbed the Tri-Town Connector, the service provides coverage in most of the populated areas of Egremont, Great Barrington, and Stockbridge. Destinations such as the Berkshire Botanical Garden, Naumkeag, and the Norman Rockwell Museum, and

Figure 3a-5: Tri-Town Connector Microtransit pilot

Interlaken village in Stockbridge are now accessible by transit. Bard College at Simon's Rock, Walter J. Koladza Airport, and Butternut Ski Area are now accessible in Great Barrington. The village centers of North and South Egremont, along with Jug End State Reservation, are now accessible in Egremont. Branding for the initiative can be seen below in **Figure 3a-5.**

KEY ACTION

Track usage and feedback for the Tri-Town Connector microtransit pilot and consider implementation in other regions if successful.

Tri-Town Connector offers enhanced services for seniors living in the service area, such as transportation for medial appointments to Berkshire Medical Center in Pittsfield as well as bundled tickets available for a flat rate. The pilot is expected to run for a one-year time frame. After the first year, stakeholders will assess running the program a second year.

Berkshire Regional Transit Authority (BRTA) Bus Services

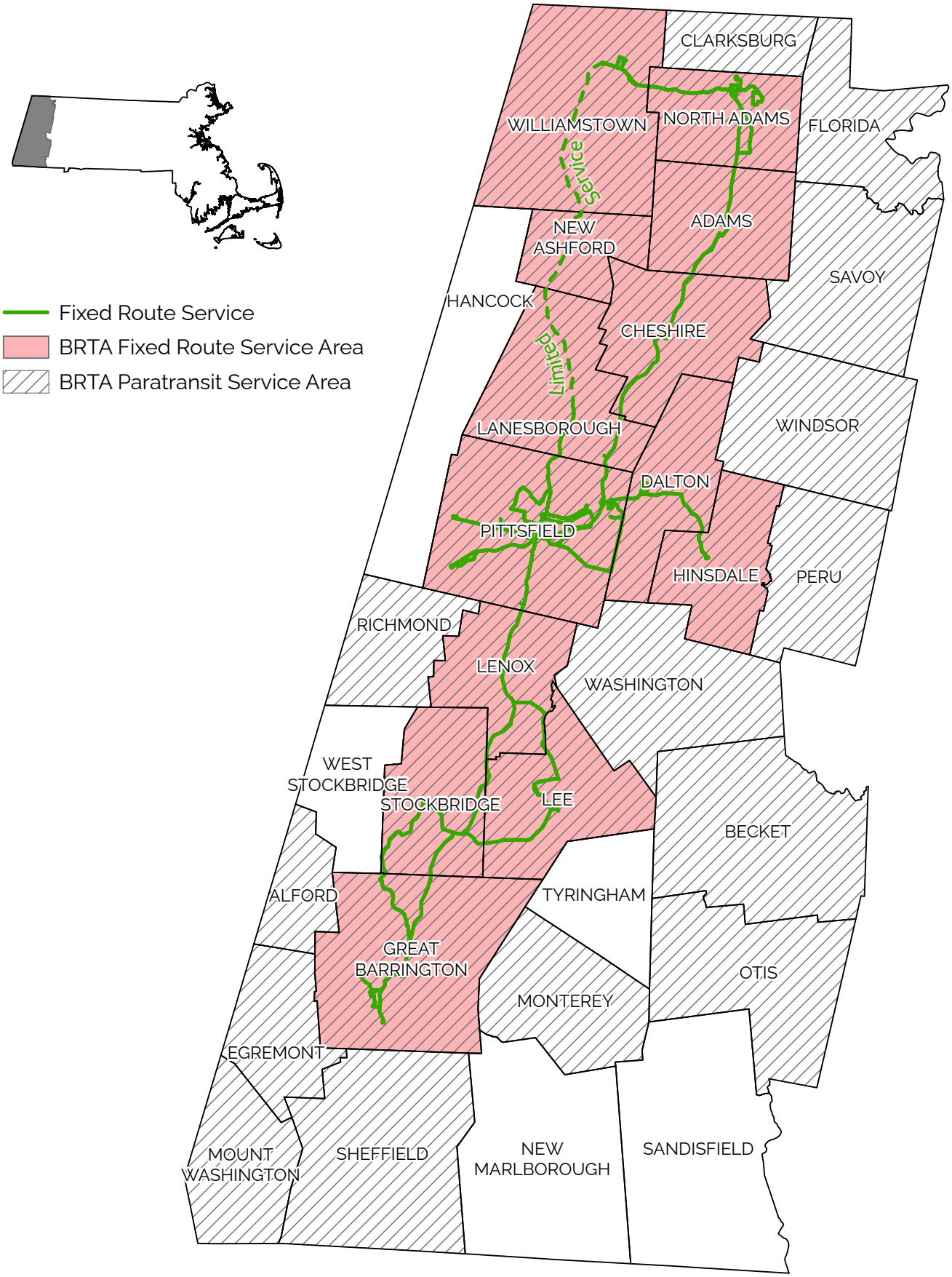
Berkshire County's public transit services are provided by the Berkshire Regional Transit Authority (BRTA). As of July 1, 2022, there are ten fixed routes around Berkshire County, plus one express route (21X), and one alternative branch that leaves and rejoins a line (5A and 5B). The majority of these routes serve the central area of the county, with both local and long-distance routes originating at the Intermodal Transportation Center (ITC) in downtown Pittsfield. There are two local loops that serve the North Adams-Williamstown area and a loop that serves the Lee-Stockbridge-Great Barrington southern Berkshire Area. Thirteen communities in total have fixed-route bus service passing through or terminating within their borders. Additional towns that do not have fixed-route service have paratransit services available for qualified passengers. System coverage can be seen in **Map 3a-6**.

MassDOT Performance Data Tracker

Annual data on the performance of all Regional Transit Authorities (RTAs) is published by MassDOT's Tracker. These data provide a snapshot each year about the conditions of transit providers around the Commonwealth, including BRTA.

Scheduled Trips Operated: This metric shows how reliably a transit operator runs its scheduled routes. BRTA reported between 95% and 100% of its scheduled trips operated between FY2018 and FY2022. **See Figure 3a-7.** For fixed-route service, BRTA also reported an on-time percentage of 81%, and for paratransit, an on-time percentage of 97%.

Map 3a-6: BRTA Service Area



This map was created by the Berkshire Regional Planning Commission and is intended for general planning purposes only. This map shall not be used for engineering, survey, legal, or regulatory purposes. MassGIS, MassDOT, or BRPC may have supplied portions of this data.

Figure 3a-7: BRTA Scheduled Trips Operated

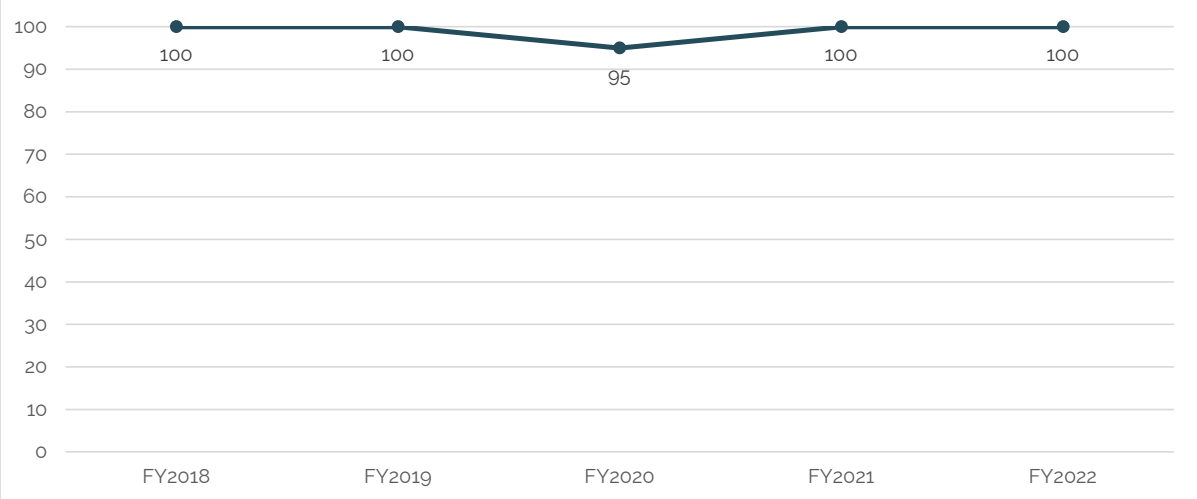
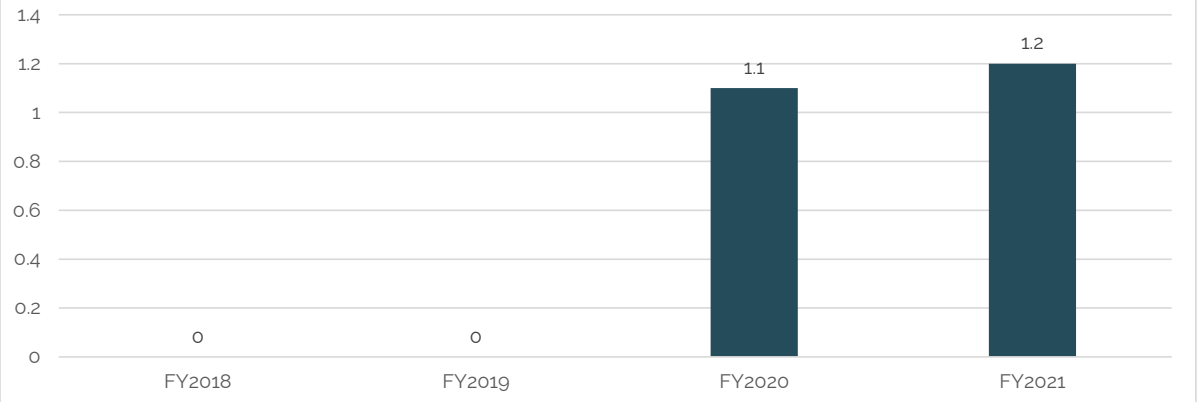


Figure 3a-8: BRTA System Injury Rates per million Vehicle Revenue Miles



Safety: System safety performance is tracked in injury rates or safety events per million vehicle revenue-miles (VRM). In FY2020, BRTA recorded 1.1 injuries attributed to the transit system per million VRM. In FY2021, there were 1.2 injuries per million VRM. No injuries were recored in FY2018 and FY 2019. See **Figure 3a-8**.

Vehicle Useful Life: According to MassDOT Tracker, FTA guidelines for useful life benchmarks for revenue vehicles are set at 12 years for articulated buses and regular buses, 10 years for minibuses, 7 years for cutaway buses, 4 years for minivans, and 13 for trolleybuses.

Each RTA sets a target for each type of its revenue vehicles that indicates the proportion of those vehicles that may be at or beyond their useful life benchmark. For example, an agency that operates both buses and vans in revenue service may have different targets for proportion of buses and vans that may be at or above the applicable useful life benchmarks. Berkshire Regional Transit Authority (BRTA) met its target for minivans, but missed its targets for buses (11% target, 27.3% performance) and cutaways (19% target, 19.40% performance).

Capital and Financial Performance: Operating expenses for RTAs is reported in MassDOT Tracker as cost per vehicle revenue-mile (VRM). This indicates the total cost for running a transit vehicle for every mile it is in service. This does not count miles traveled while vehicles are not in service, such as returning to the garage. In FY 2022, BRTA fixed-route transit had an operating expense of $6.95 per VRM. Historical operating expense data for fixed-route and paratransit can be found in **Figure 3a-9**.

Figure 3a-9: BRTA Operating Expense per Vehicle Revenue-Mile

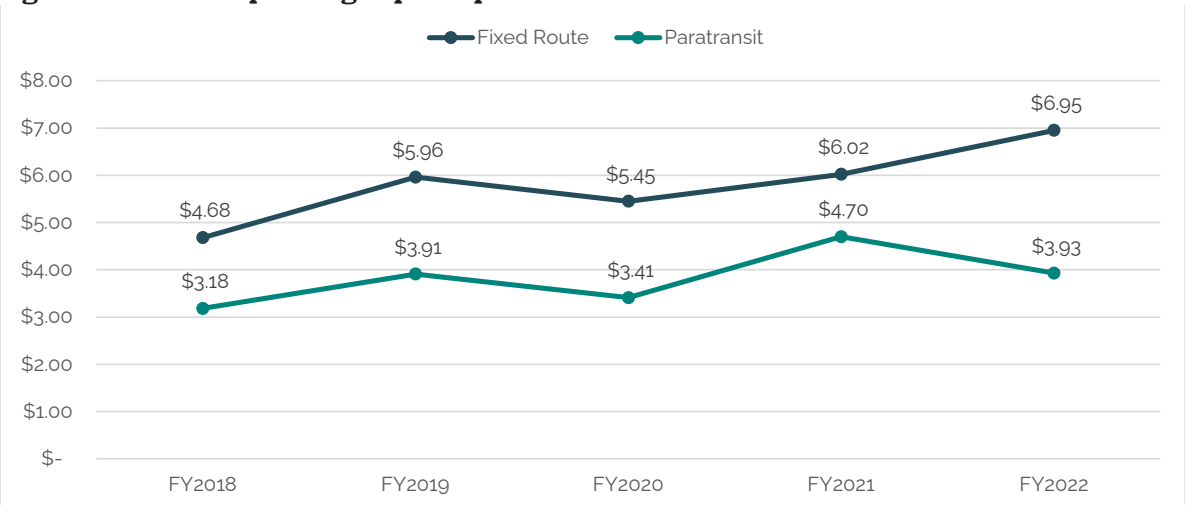
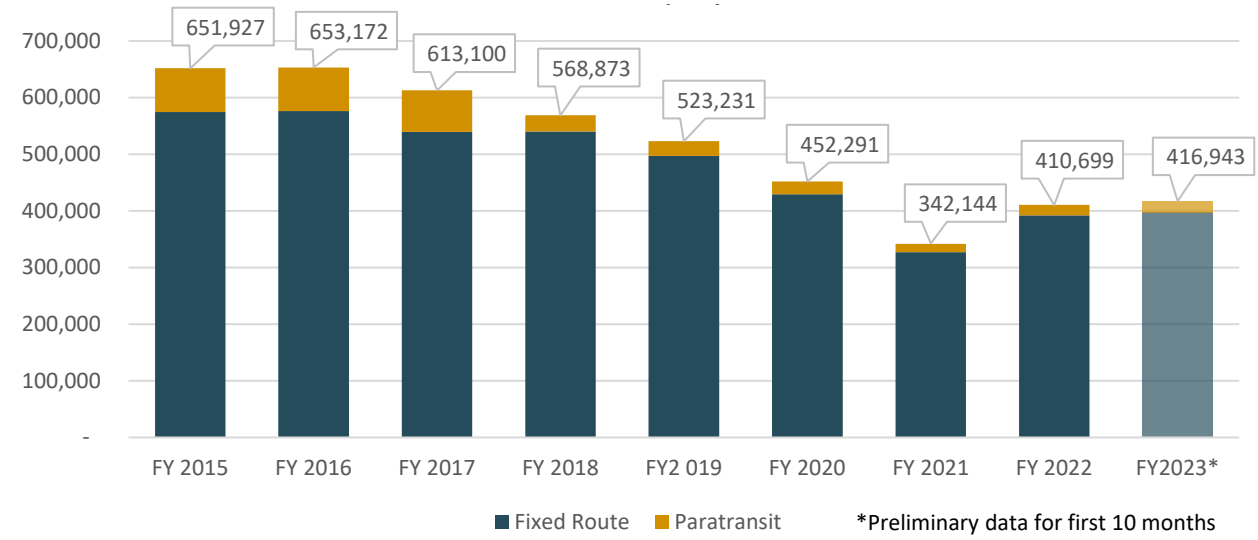


Figure 3a-10: BRTA Total Ridership by Fiscal Year



Ridership Trends and Coverage Area

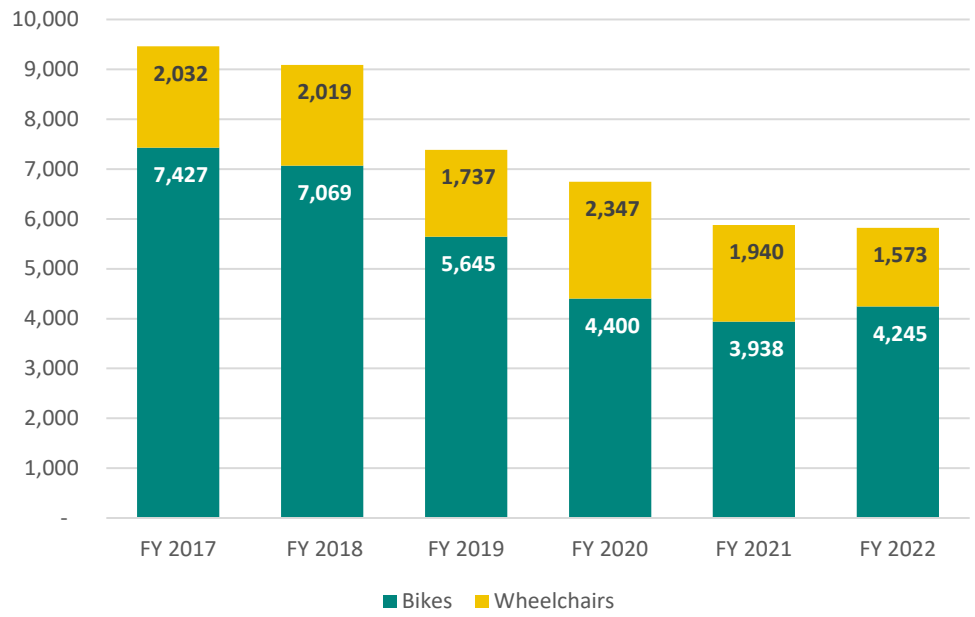
The BRTA provides annual reports on ridership for the full system, broken out into the fixed-route system and the paratransit system. In addition, the number of bicycles and wheelchairs transported on the fixed-route system has been tracked since 2017 (see **Figure 3a-11**). All BRTA buses are equipped with front-mounted bike racks that can hold two bicycles each.

For FY2022, there were 391,921 rides recorded on the fixed-route system and 18,778 rides recorded on the paratransit system. Of the fixed-route trips, 4,245 included transportation of a bicycle and 1,573 included transportation of a wheelchair user. See **Figure 3a-10** for more data about these trips.

Ridership has begun to rebound from the travel restrictions instituted early in the COVID-19 pandemic. The pandemic began in spring 2020, which was late in fiscal year (FY) 2020. The effects are more pronounced in fiscal year 2021, which ran from July 1, 2020 to June 30, 2021. At the time of writing, preliminary data available for the first 10 months of FY2023 indicate that ridership has already exceeded that of FY2022. It is hopeful that ridership will continue to grow as more travelers in the area opt to take transit to their destination.

Based on an analysis by BRPC using geographic information systems (GIS), approximately 56% of households in Berkshire County are within a 5-minute walk, or 1/4 mile, of a bus line. This rate comes from the 55,350 recorded households in Berkshire County. A 1/4-mile buffer was drawn around existing bus lines, and approximately 30,900 households were overlapped by this buffer. This represents a target audience to encourage ridership growth within the existing transit service area.

Figure 3a-11: BRTA Bike and Wheelchair Transport by Fiscal Year



Transit Asset Management Plan (TAM)
First enacted under the MAP-21 Federal infrastructure bill and continued under the FAST Act and BIL, transit agencies are required to create an inventory of assets and their conditions, and file a report to the FTA. The BRTA TAM completed in late 2016 prioritizes investments in future hybrid diesel/electric buses with charging stations, a satellite facility in North County, and increased service hours and frequency. The full TAM can be found in the **Appendix**.

Transit Initiatives in the Berkshires

Continuing the growth and effectiveness of public transit in Berkshire County cannot be accomplished by one single solution. This section explores initiatives that are currently in practice to expand transit in the Berkshire region. BRPC and the BRTA continue to advocate for sustained and increased resources to continue these initiatives, and to explore and develop new programs.

Transit Workforce Solutions
The BRTA is working to train the future transit workforce in Berkshire County through a collaborative effort with Masshire. Commercial drivers license (CDL) permit classes are offered through Masshire, and graduates of the class can continue on to testing for their CDL. There are also ongoing discussions with Berkshire Community College and the Berkshire Innovation Center on CDL training opportunities.

One challenge about CDL training in Berkshire County is the lack of a nearby testing facility. According to BRTA administration, license candidates must test either in Deerfield or Sturbridge, MA. Opening a testing facility in Berkshire County would allow local candidates to more easily attain a CDL.

Opportunities for Rider Involvement
Hearing from and supporting the riders that utilize public transportation in Berkshire County helps the system continue its growth and effectiveness. The best way to gather data is directly from the riders themselves. The BRTA and other transportation service providers should continue soliciting rider feedback and look for opportunities to grow involvement.

The BRTA has a precedent of seeking feedback from its riders via periodic customer surveys. It is recommended for this practice to continue and expand as practicable. The most effective surveys are conducted on the vehicles, talking with customers while they are riding. A passive feedback station that asks the same questions could also be set up at the Intermodal Transportation Center. Results of customer feedback have been provided in agency annual reports and separate publications when necessary. Annual reports can be found on the BRTA's Open Government page on www.berkshirerta.org.

Gathering customer data in a repeatable way over consistent intervals helps measure performance of the transit system. Semi-annual or quarterly survey deployments could help capture how ridership adapts to different seasons and daylight conditions. Part-time ambassadors or community navigators who are trained in conducting the intercept surveys would be deployed on this schedule to gather feedback and build the response database. If responsiveness is low among customers, an incentive could be considered such as a gift card or preloaded Charlie Card. Partnership with the Downtown Pittsfield, Inc. (DPI) Ambassador program as part of the Berkshire Flyer helped to gather ridership feedback and data during the

first season of operation. An expanded partnership with BRTA fixed-route services could also provide more insights.

Other lines of community involvement and feedback can also be considered, such as a ridership association comprised of customers who regularly utilize public transit and paratransit for mobility. The BRTA Travel Training program is another important rider-involvement resource for passengers to learn how to take full advantage of the transit system.

Transit Fares

As public transit continues to evolve during the 21st century in North America, the topic of fares is frequently brought forward. There is a diverse range of opinions about the efficacy of charging fares on transit in the present day.

KEY ACTION

Build a road map for allocating resources toward the initiatives that the BRTA considers beneficial to its mission and vision

Arguments for keeping a fare on public transit include its importance as a source of revenue for many agencies, and its means of providing a sense of ownership and investment to customers who utilize the service. Arguments for eliminating fares include the reduction of barriers to the most marginalized in our communities, the potential to reduce conflicts brought about by fare charges or fare evasion, reduction in infrastructure costs for collecting fares, and more efficient boarding procedures.

The BRTA, along with all transit agencies in Massachusetts, participated in a fare holiday program at the end of the 2022 calendar year. The "Try Transit" initiative offered by MassDOT allowed all RTAs in the Commonwealth to offset their farebox revenues with a grant for a fixed period. The agencies could, therefore, offer free rides between Thanksgiving and New Year's Eve in 2022, approximately six weeks. BRTA noted an increase in ridership for the month, though fell just short of the projected goal of 55,000 riders during the month.[1]

A single-digit farebox recovery percentage (9% in the case of BRTA) is not unique. Farebox recovery refers to the proportion of an agency's revenue that is funded by fare collection. According to MassDOT Tracker, 9 of the 15 transit agencies across the Commonwealth reported their most recent farebox recovery ratio for fixed-route transit being in the single digits. Three of the 15 agencies have eliminated their fare collections since the beginning of the COVID-19 pandemic:

- Franklin Regional Transit Authority
- MetroWest Regional Transit Authority
- Worcester Regional Transit Authority

A further study on the benefits, drawbacks, impacts, and opportunities if BRTA were to eliminate fares should be conducted to determine what the best route forward may be for the transit agency. It may not be a black-and-white solution. Reduction of fares to $1, for example, could continue to offer a source of revenue while also providing relief to transit customers and more efficient interactions with fareboxes that are unable to make change.

Expansion to New Communities and Regions

One of the most consistent pieces of public feedback in Berkshire County is a desire to expand coverage of transit service. Feasibility studies of providing fixed-route service to additional towns who have not yet joined as a BRTA Member Community should be considered. With the recent addition of Hancock as a BRTA member, there are now 28 municipalities in Berkshire County contributing to the public transit system, either for fixed route service, paratransit service, or both.

Service expansion to neighboring regions was also cited frequently in the Transportation Community Survey and BRTA's latest customer feedback survey. Service that interfaces with CDTA lines in the Albany area, or PVTA lines in the Springfield area could help bridge the gap of alternative transportation options to these population and employment centers. There has been preliminary consideration of extending a BRTA service line eastward along Route 9 from Windsor to Cummington, where it would meet with a PVTA route that extends westward from Williamsburg through Goshen. It is recommended to explore further collaboration and study opportunities to determine the feasibility a regional connection in this manner or on another route.

1 https://www.iberkshires.com/story/70526/BRTA-s-Fare-Free-Month-Well-Received-by-Community.html

Alternative Fuel Vehicles

Pursuit of the Commonwealth's Carbon Reduction Plan (CRP), along with a need for vehicle longevity and sustainable energy sourcing points toward transit vehicles powered by alternative energies. These can include diesel-electric hybrid, battery-electric vehicles (BEV), and hydrogen fuel-cell technology. Hydrogen could prove to be a good fit for the Berkshire region. Long bus routes through remote areas may not be conducive to battery quick-charging technology without costly power infrastructure upgrades. The smaller form factors of many BRTA apparatus (buses under 30 feet in length, for example) could make it challenging to carry batteries with enough range to meet the needs of some routes.

The energy density of hydrogen fuel cells, coupled with a sustainable sourcing of the hydrogen fuel, could make for a compelling option to suit the BRTA's needs. A feasibility study should be commissioned to lay out the full costs, labor, suitability, and environmental impacts of alternative-fuel buses for the Berkshire region. Combinations of FTA formula funding and future CRP fund sub-allocations could assist in these efforts.

From a big picture perspective, getting more travelers to opt for a trip by bus over a single-occupancy vehicle is a benefit to the environment, regardless of the fuel source for the bus. Fleet adaptation to zero-emissions vehicles should not be undertaken at the expense of bus service.

Transit Hub and Stop Planning

Creating efficient transit hubs and stops in the densely-populated areas of northern, central, and southern Berkshire County can enhance the rider experience. Flag stop zones along more rural segments of routes are a good way to support ridership in more Berkshire County towns. Placement of discrete bus stops within more built-up areas can also enhance ridership by creating a more predictable and reliable ride. The BRTA has begun placing route stop signs along select corridors in Pittsfield. These also have the added benefit of increasing awareness of public transit for nearby destinations and foot traffic.

Regional transit hubs in northern and southern Berkshire County would enhance the ridership experience, including transfers. A fully-enclosed building or covered staging area better shelters riders from the elements. A northern Berkshire hub would help consolidate the three routes that serve the area (1, 3, and 34). Creating a central hub would also reduce the need for a second transfer to take transit to Williamstown. The town of Williamstown is the only area of BRTA service that requires two transfers when traveling to or from the ITC in Pittsfield. Consolidating the three northern Berkshire routes at a hub would make this trip shorter.

If further microtransit service is provided around the region, transit hubs would make for an efficient point for customers to interface between this service and the fixed-route vehicles. Dedicated space to load and unload from microtransit could free up curb and road space for other uses in a downtown setting.

Recommended Projects:

- Implement a microtransit service in additional areas of Berkshire County. Estimated cost: $4,200,000
- North and South County transit hub locations, including vehicle storage and staging. Estimated cost: $1,150,000 per hub
- Run fixed-route services at 30-minute headways for daytime hours. Estimated cost: $24,000,000

Recommended Programs:

- Explore updated transit fare structure including free or reduced general fare
- Pursue increasing BRTA Member Communities to towns in the region who have yet to join
- Explore fixed-route services to more towns in the region and connections to neighboring transit systems, such as via Route 143, Route 9, or Route 116 east to Franklin and Hampshire County.
- Develop a feasibility roadmap for fleet replacement using alternative-fuel vehicles as opportunities arise

3b. Expand Passenger Rail

Background

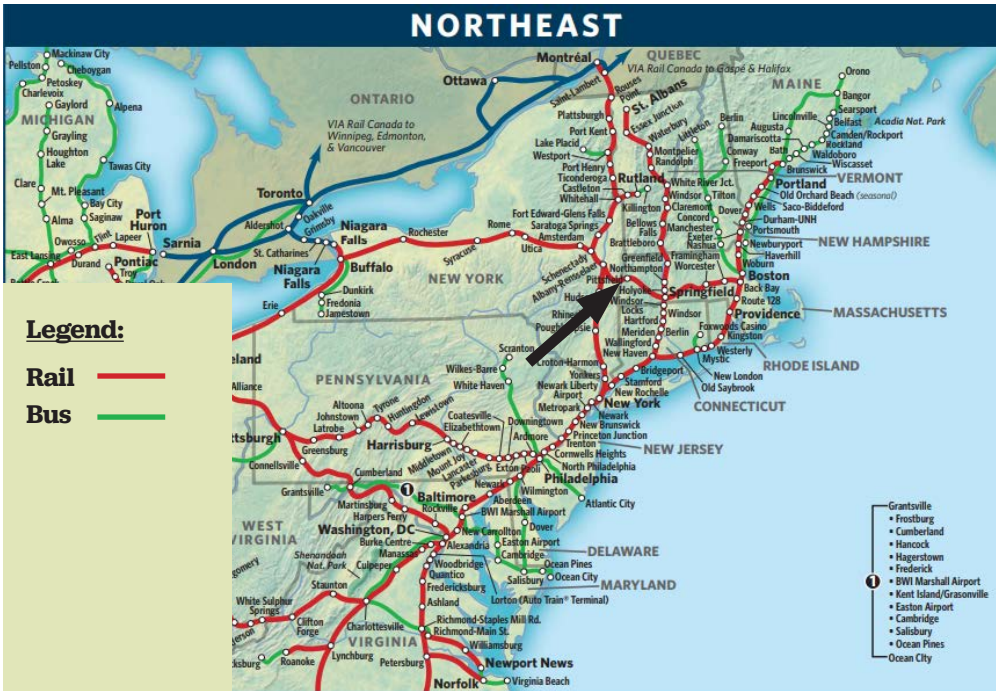
The New England region is the one of the densest corridors for rail travel in North America. Intercity and commuter passenger services link nearly every major metropolitan area from Portland, ME to Newport News, VA. The Northeast Corridor is consistently the most profitable area of operation for Amtrak, the national passenger service provider. Commuter and regional rail serve the areas around Boston, New York, Philadelphia, Baltimore, and Washington, DC, creating a nearly complete fabric of coverage through the northeast. Lines of rail service also reach into the interior, such as service to Chicago, upstate New York, Canada, Connecticut, and Vermont. The Berkshires are tantalizingly close to connecting deeper into this vast rail network.

Currently, the only passenger rail service location in Berkshire County is the Joseph Sclesi Intermodal Transportation Center (ITC) in downtown Pittsfield. This center is served twice daily by Amtrak's Lake Shore Limited train between Chicago and Boston. This is the only rail link for western Massachusetts to its state capital. While there are many daily rail departures from Boston's terminal stations, they radiate south and north toward Rhode Island and Maine, via Northeast Corridor and Downeaster service, respectively. Higher-speed Acela trains also travel between Boston and Washington, DC several times daily.

Berkshire County is nestled almost equidistantly between two extremely busy rail hubs. **Map 3b-1** provides an illustration of where Pittsfield lies geographically relative to rail lines in the northeast. The city of Springfield, MA has become a major node for rail travel in the past decade. With the introduction of the CT Rail Hartford Line in 2018, Springfield is served by four different rail lines: the Lake Shore Limited, the Vermonter, the Valley Flyer, and the Hartford Line. To the west of Berkshire County by nearly the same distance is the Albany-Rensselaer rail station. Serving the capital of New York State, this station also hosts several rail lines: the Lake Shore Limited, Empire Service, Adirondack, Ethan Allen Express, and Maple Leaf Service.

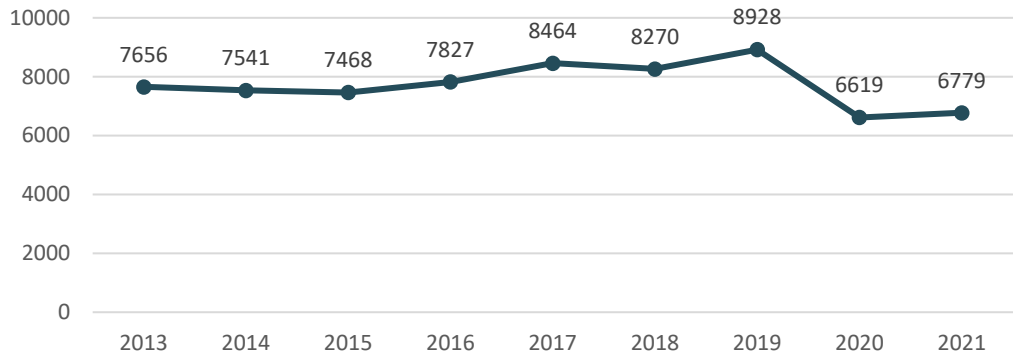
With only one connection in each direction per day, there is little chance for passengers to tap into the large number of connections available at these nearby rail hubs. Driving is most often the convenient choice for travel to Boston, New York City, or upstate New York.

Map 3b-1: Detail of northeast passenger rail and bus service (published by Amtrak) (Pittsfield marked with black arrow)



According to the Rail Passengers Association, in 2021 there were 6,779 boardings and alightings in Pittsfield on the Lake Shore Limited Amtrak Line. This represents a 24.4% decrease from 8,928 in 2019, prior to COVID-19 travel restrictions. From 2020 to 2021, ridership increased 2% from 6,619 to 6,779 passengers. See **Figure 3b-2** for ridership over the past decade. Of passengers that had a trip originating or ending in Pittsfield, 92% were traveling 200 miles or less, according to the RPA. It is unclear if this includes New York City, which falls within a 200-mile radius of Pittsfield, but a train trip connecting via Albany-Rensselaer is approximately 205 miles using the Lake Shore Limited line and connecting to the Maple Leaf or Empire Service.

Figure 3b-2: Amtrak ridership through Pittsfield by year (MA State Rail Plan/Amtrak)



Rail Initiatives in the Berkshires

Berkshire Flyer

In the summers of 2022 and 2023, Amtrak is operating a pilot train service between Moynihan Train Hall at Penn Station and Pittsfield's Intermodal Transportation Center (ITC). This is the first direct train service from New York City to the Berkshires in over 50 years. The service consists of one northbound trip originating in New York City's Moynihan Train Hall on Friday afternoons and one southbound return trip originating at Pittsfield's ITC on Sunday afternoons. Besides originating at Moynihan Train Hall and Terminating in Pittsfield, the Berkshire Flyer serves the following stations in New York State: Yonkers, Croton-Harmon, Poughkeepsie, Rhinecliff, Hudson, and Albany-Rensselaer.

According to the MassDOT Rail and Transit Division, the Berkshire Flyer recorded 819 tickets sold in total over the nine weekends of 2022 pilot service. There were 418 arrivals in Pittsfield and 401 departures from Pittsfield, with several dozen more boardings and alightings from Albany-Rensselaer and other stations.

After the conclusion of the second pilot period in the fall of 2023, future development of the rail corridor could take several directions. The pilot as operated could become a permanently established line, with one outbound trip from New York on Fridays and one return trip from Pittsfield on Sundays. This service could be expanded to operate year-round or continue to be a summer program. Expanding the Berkshire Flyer schedule couild include more departures on Fridays and Sundays, or expanding to more days of the week, up to daily service.

Local feedback received as part of the 2022 service and through the RTP Transportation Community Survey indicated a desire for more frequent departures from Pittsfield to help the service become a more practical option for local residents. There has also been interest in exploring an alternative departure from New York on Thursdays or an alternative return from Pittsfield on Mondays. Either option would allow visitors to spend an extra day in the Berkshire County region.

Northern Tier Rail

MassDOT is currently conducting a study to determine the feasibility and costs for operating a passenger rail line between Boston North Station and North Adams. As of January 2023, the Northern Tier Rail Study has presented analysis of two main alternatives: "Lower Investment" and "Higher Investment." The major differences between the two alternatives is the extent of track and infrastructure improvements along the existing rail line. Early planning-phase cost estimates are broken out by the study as follows:

- Lower Investment: $1,044,850,000
- Higher Investment: $2,187,350,000

Local stakeholders and planning staff will continue to follow the study process as it continues and advocate for the Berkshire region's needs.

Massachusetts East-West Rail

The East-West Rail initiative is currently under development to extend more frequent passenger rail service across the Commonwealth.[1] Alternatives for East-West rail include more frequent service, track upgrades to enable higher speeds in select segments, upgrades to double-track for the length of the East-West Corridor, or a fully re-imagined corridor with a new rail right-of-way separate from the existing CSX freight line. In total, six alternatives were considered during the study process conducted by MassDOT between 2018 and 2021. Variables considered between the alternatives included:

1 https://www.mass.gov/east-west-passenger-rail-study

HISTORIC BERKSHIRE TRAIN SERVICE

Through the 1950s, regular train service ran from Grand Central Terminal in New York City to several stops in the Berkshires that were well-known for skiing, including Ski Butternut and Beartown State Forest. Each stop was serviced by "convenient and economical transportation between the station and skiing areas... as well as hot food and drinks." Other service included the *Berkshire Hills Express*, which ran from New York City to North Adams until 1953. *photo source: The Berkshire Edge*

The New York Times

THURSDAY, DECEMBER 12, 1946

SNOW TRAINS SCHEDULED

New Haven to Start Operation of Excursions Jan. 5

With weather and snow conditions permitting, the New Haven Railroad's popular Snow trains will run for the first time this season on Sunday, Jan. 5, when the Snow Clipper and Snow Express leave Grand Central Terminal for a one-day excursion into the Berkshire Hills.

Scheduled stops are Great Barrington, South Lee and Snow Train Station, Pittsfield, Mass. For the first time in the New Haven's history, Snow trains will be run on Saturday as well as Sunday to the Berkshires, with the initial Saturday trip listed for Jan. 11.

Present plans call for the Snow Express to be operated every Saturday and Sunday and the Snow Clipper each Sunday, weather permitting. At the three stations provisions have been made to accommodate skiers and winter sports fans. Convenient and economical transportation between the railroad station and skiing areas is available, as well as hot food and drinks and warming stations in canteens and inns at the skiing sites.

- Trip departure frequency
- Travel speed
- Vehicle type (all-rail vs. bus-rail connection)
- Cost

The cost range for the preferred alternatives is between $2.4 billion to $4.6 billion. The next steps for the program to proceed include the establishment of a rail authority that would be responsible for facilitating the construction, capital, and operating costs of the East-West rail corridor. Passenger Train Access Principles will need to be negotiated with CSX, the owner of the railroad corridor from the New York state line in the west to downtown Worcester in the east. Unless an entirely new corridor is constructed, the operator of the rail service would likely be Amtrak. There are many variables still to be considered, such as governance structure, staffing, operations, and dispatching, acquiring rolling stock, layover and storage facilities, maintenance, safety, and fare collection practices.

The Berkshire region strongly endorses a full rail connection from Pittsfield to Springfield and beyond to Boston. In addition, the Albany-Rensselaer station would make a logical western terminus with its additional transfers available for services to points south, north, and west. Pittsfield should serve as an intermediary station with service originating in Boston or Albany. With Berkshire Flyer service operating through Albany-Rensselaer as well, the potential exists to combine it with East-West rail into one service between Boston, Albany, and New York.

Housatonic Rail

The Housatonic Railroad line runs in a north-south direction from Pittsfield, MA to Danbury, CT. In the Berkshires, the line passes through the towns of Lenox, Lee, Stockbridge, Great Barrington, and Sheffield. Currently, the line exclusively carries freight, with trips terminating at the CSX Pittsfield yard. Initial interest in the Housatonic line included running passenger service south to Danbury, CT, where passengers could transfer to MTA rail service to New York City. The state of Connecticut has expressed less of an interest in exploring passenger rail service, and as such, the focus of study has mainly shifted to be within Berkshire County only.
Efforts to promote and study the possibility of restoring passenger service along the line have bloomed over the past decade. A "Bring Back the Trains" campaign has been organized in southern Berkshire County. During the 2020s, there has been more heavily shifted focus onto the East-West passenger service paradigm from Boston to Springfield, Pittsfield, and/or Albany. Additional rail services such as the Berkshire Flyer and East-West rail would allow for logical connection in Pittsfield to local service along the Housatonic Line or vice-versa. Passengers arriving from Boston or Springfield, for instance, could transfer to a local Housatonic rail car to continue their journey into southern Berkshire County. Expanded passenger facilities such as an additional siding for layover and boarding and a level-boarding platform would enhance this travel experience.

Travelers going east to Boston would likely be target audience of Housatonic line improvements. If potential New York City-bound passengers were to use the Housatonic to connect to the Berkshire Flyer or other westbound service to Albany, it would require significant doubling-back northbound to Pittsfield, then further north to Albany, before turning south for Penn Station. This 223-mile journey would not be a reasonable choice for most travelers from Great Barrington, when offered a trip option of 100 fewer miles by going to Wassaic Station in upstate New York, either by car or shuttle, and taking the Metro-North Railroad's Harlem Valley line to Grand Central Station.

Potential still exists for the Housatonic Line to serve passengers in the Berkshires. Envisioning a future of expanded rail service operating in Pittsfield, local service to Lenox, Lee, Stockbridge, and Great Barrington logically follows. Research and study has been conducted by BRPC planning staff to determine initial feasibility of running passenger service on the Housatonic line. This includes site selection of passenger stations in Berkshire towns. One option that may fit the Berkshires is a passenger-rail-as-a-service scheme called Pop-Up Metro. According to Pop-Up Metro's founder, "A lightly-used branch line or short line railroad could co-exist with transit by running freight at night and passenger service during the day... Smaller communities and transit agencies, or larger agencies looking to extend service to less-populated areas, are candidates for Pop Up Metro."

Vivarail, the UK-based company that was developing and supplying the rolling stock and battery technology used by Pop-Up Metro, declared insolvency in early 2022, so the future of the technology and operations is unclear. A large passenger service provider like Amtrak, MBTA, or MTA would likely not operate on a local short line like the Housatonic. An independent operation or one governed by a local agency would be the most feasible option, along with diesel multi-unit (DMU) or electric multi-unit (EMU) rolling stock.

Recommended Projects:

- Continued operation of the Berkshire Flyer service, with potential assimilation into East-West Rail service west of Pittsfield. Estimated cost: $750,000 per year
- East-West passenger rail connection through Berkshire County. Estimated cost: $2.4-4.6 billion statewide
- Expanded passenger facilities at the Intermodal Transportation Center including 1000-ft track siding and level boarding platform. Estimated cost: $6,000,000
- Explore a pilot program of passenger rail service along the Housatonic Line from Pittsfield to Great Barrington. Estimated cost: $62,400,000

UPWP Activities:

- Continue to participate in efforts to assess the feasibility of Northern Tier passenger rail to North Adams
- Study last-mile solutions to bring passengers to and from the ITC for rail transportation

3c. Coordinate Transportation Services

Background

There are many transportation services around Berkshire County that provide rides to senior and disabled passengers. The individual providers and types of services vary between towns. Coordinating between the many different providers can become a logistical challenge in a rural area where travel may span across several towns. As of December 2022, there are 49 different transportation providers that operate within Berkshire County. These include mass transit providers like BRTA and Amtrak, as well as Councils on Aging (see **Figure 3c-1**), human services organizations, taxis, limos, and coach buses. It is in the best interest of Berkshire County residents to have a highly coordinated, easy to access, ride services system that can reach healthcare, social, and recreational destinations, in order to live with a high quality of life.

Berkshire County ride services currently appear in a 2-1-1 hotline system, administered by the United Way. Among the many forms of assistance and support provided by Massachusetts 2-1-1, callers can also request information about booking transportation services for elderly and disabled consumers.

For many residents who are older, disabled, or low-income, it can be especially challenging to navigate the transportation services available. In a more rural region like Berkshire County, mobility can be extremely restricted by the lack of a personal automobile. The goal of enhanced transportation service coordination is to make travel more streamlined and intuitive for those who have additional needs in getting around.

Regional Coordinating Councils

Starting at the end of 2013, Regional Coordinating Councils (RCCs) were formed across the Commonwealth. Their formation was based off of a recommendation by the Community, Social Service, and Paratransit Transportation Commission.[1] The goal of RCCs is to convene representatives of human service agencies, state agencies, transit authorities, regional planning agencies, consumers, advocates, and other stakeholders to discuss transportation needs in the community. RCCs are specifically focused on older adults, people with disabilities, and low-income commuters. Berkshire County is served by the Berkshire Regional Coordinating Committee on Transportation (BRCCOT).

Coordinated Human Services Transportation Plan (CHST)

Transportation coordination efforts in Berkshire County are generally guided by the CHST. This document is updated periodically as the need arises or demographic changes take place, such as with the 2020 Census update. Updates are guided, in part, by members of BRCCOT.

The 2023 update to the Berkshire CHST offers fourteen priorities, some of which intersect with other regional initiatives. In general, the priorities call for expanded access to major employment centers via transit, expansion of options for weekend and third-shift workers, expanding services to underserved communities and

Figure 3c-1: Council on Aging (COA) vans provide mobility services for seniors living within the town served by the COA.

1 https://www.mass.gov/doc/executive-order-530-final-report-1/download

discounted fares for healthcare travel, acquiring new transit vehicles, providing language and interpretation service, and exploring microtransit and bikeshare options for the region.

The CHST provides a means for the region to leverage "Section 5310" federal transportation funding. This funding is intended to enhance mobility options for senior and disabled residents. Funding can provide special programming for residents beyond traditional fixed-route and paratransit services. Eligible activities include acquiring buses and vans, procuring wheelchair lifts, ramps, and securements, transit-related information technology like call systems, mobility management programs, and contracts for transportation services.

Other innovative projects that could be funded by Section 5310 include travel and driver training, building accessible paths, improving signage, door-to-door transport services, and purchasing new accessible taxi or rideshare vehicles. Once completed, the full CHST plan should be shared with and used as a guide by all transportation providers in the region as a best-practice.

Mobility Management

Mobility management is the practice of connecting transportation providers to get people where they need to go. For residents who lack a personal vehicle or cannot drive due to age or disability, a mobility manager can assist with getting the resources they need. A manager may be associated with a council on aging, a regional transit authority, disability center, or veteran's organization to name several examples. Mobility managers are knowledgeable about the variety of transportation services in the area, will help individuals plan trips and arrange rides, as well as coordinate with and between transportation providers to get people where they need to go.

Given the size of the region and relatively long distances that some must travel for services and appointments, a regional mobility manager or team would provide a benefit to those who may need assistance coordinating travel. This may take the form of a one-stop call center where customers or caregivers could call and arrange a ride or learn the options available to them. It is recommended to further explore the current conditions and possibilities for expansion of mobility management and transportation coordination in Berkshire County.

Age and Dementia-Friendly Accessibility Considerations

In 2022, the Massachusetts Advisory Council on Alzheimer's Disease and All Other Dementias[2] published a report on recommendations for age-friendly and dementia-friendly design of infrastructure.

Based on projections by UMDI, adults over the age of 65 will comprise 28.5% of the region's population by 2040. Fostering an age-friendly and dementia-friendly transportation network should be considered a regional priority.

The MAC report lays out several recommendations to improve transportation and wayfinding for those living with Alzheimer's disease or dementia.

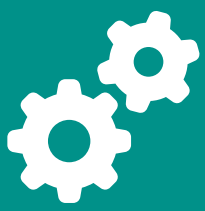
- Transit stops are conveniently located whenever possible, safe and accessible to people with mobility disabilities.
- When stations can't be conveniently located or limited, voluntary transportation service to stations is provided.
- Clearly marked signage at bus and train stops.
- Consider marking bus and train stops by using both icons and words, and making signs large enough to notice and read at eye level.
- Consider street signs at strategic locations to direct people to transportation hubs.
- Consider using a non-glare surface for signs and contrast between letters and the surface

UPWP Activities:

- Implement recommendations of the CHST 2023 updates as resources become available
- Develop a dementia-friendly Berkshires framework for guiding public works projects and transportation improvements
- Explore the benefits of a regional mobility manager who could centralize mobility services for Berkshire constituents
- Continue convening the Berkshire Regional Coordinating Council on Transportation (BRCCOT) to assess accessibility needs in the region
- Pursue opportunities to leverage the MassDOT Community Transit Grant Program

2 https://www.mass.gov/orgs/massachusetts-advisory-council-on-alzheimers-disease-and-all-other-dementias

Goal 4



Increase Safety and Security

For the past decade, traffic fatalities and serious injuries have been rising in the United States, after dropping dramatically beginning in the 1970s. As other industrialized nations worldwide have been continuing to reduce their traffic casualties, North America has frustratingly moved in the opposite direction. The factors contributing to this trend are complex. What has shown to be effective, however, is when a country implements a **Safe Systems** approach to its transportation network, with the goal of reducing traffic fatalities and serious injuries to zero.

Objectives:

a. Adopt the Safe Systems approach
b. Continue roadway safety audits and countermeasures
c. Standardize crash data

Graphic by Gregor Cresnar for the Noun Project

4a. Adopt the Safe Systems Approach

Background

The trend of declining road fatalities in the United States has reversed in the past ten years. 2021 was the deadliest year on American roads since 2005.[1] The National Highway Traffic Safety Administration (NHTSA) reports that 42,939 people have died in traffic crashes in 2021, up 10% since 2020. This marks the highest year-over-year increase in the history of fatality record keeping. NHTSA projects 2022 fatalities to decrease marginally by -0.3%, to 42,795.[2] Final fatality statistics are still being processed for 2022.

Massachusetts saw an increase of fatalities of over 20% between 2020 and 2022, from 343 to 413, then to 439. Berkshire County fatalities have fluctuated from 2020 to 2022, from 15 to 10 to 12.[3] See **Map 4a-2** for a map of all road fatalities in Berkshire County between 2015 and 2022.

While Berkshire fatalities have fluctuated in the past several years, there has been a noticeable rise statewide in fatal single-vehicle and roadway-departure crashes. Both statistics saw all-time highs in 2020, the latest year of complete data from NHTSA FARS (see **Figure 4a-3**).

Motorcyclist-related fatalities also reached a high of 7 in 2020, while dropping to 4 and 2 in 2021 and 2022 respectively, according to MassDOT IMPACT data. According to the IMPACT geolocation data, the majority of fatal motorcycle crashes occur on rural roadways, with only four of the 13 mapped fatalities taking place in an urban or built-up environment.

The Commonwealth is making safety progress in several areas of performance. Since reporting began under the federal FAST Act in 2018, and is now continued under the Bipartisan Infrastructure Law (BIL), Massachusetts has seen year-over-year declines through 2021 in the 5-year averages for annual fatalities, serious injuries, serious injuries per 100 million VMT, and non-motorized (i.e. bicycle and pedestrian) combined fatalities and serious injuries.

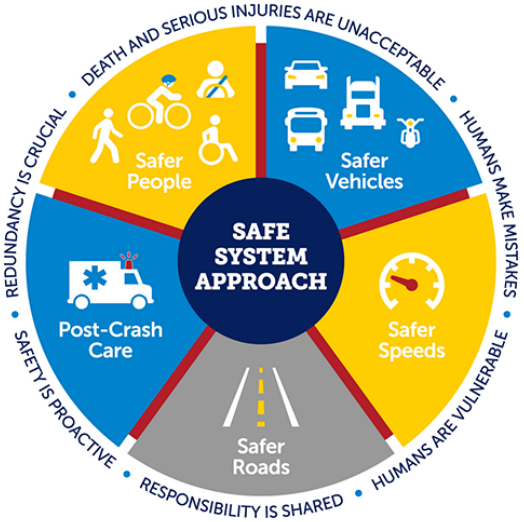
What is the Safe Systems approach?

Keeping users safe in a complex system like our transportation network requires systems-level thinking. Rather than relying on interventions which are mainly focused on correcting human behavior (i.e. traffic stops, public service announcements), a safe system paradigm takes a different approach. The system adopted by the U.S. Department of Transportation (USDOT) and MassDOT follows six overarching principles to guide transportation policymaking:

1. **Death and serious injuries are unacceptable**
2. **Humans make mistakes**
3. **Humans are vulnerable**
4. **Responsibility is shared**
5. **Safety is proactive**
6. **Redundancy is crucial**

In the Safe System, the ultimate measure of performance is zero fatalities and serious injuries. As long as there are fatalities and injuries occurring, there is work and improvement to be made. The Safe System

Figure 4a-1: Principles of the Safe System Approach (from USDOT)



1 National Center for Statistics and Analysis. (2022, April). Early estimate of motor vehicle traffic fatalities in 2021 (Crash•Stats Brief Statistical Summary. Report No. DOT HS 813 283). National Highway Traffic Safety Administration

2 National Center for Statistics and Analysis. (2023, April). Early estimate of motor vehicle traffic fatalities in 2022 (Crash•Stats Brief Statistical Summary. Report No. DOT HS 813 428). National Highway Traffic Safety Administration.

3 MassDOT IMPACT Dashboard https://apps.impact.dot.state.ma.us/

relies on overlapping, redundant strategies to reach the goal of zero fatalities. These include:

- Behavioral interventions (Safer people)
- Roadway countermeasures (Safer roads)
- Laws, policies, and enforcement (Safer speeds)
- Vehicle safety features and performance (Safer vehicles)
- Emergency Medical care (Post-crash care)

Mass. 2023 SHSP

In January 2023, MassDOT released the 2023 Strategic Highway Safety Plan (SHSP). This plan will be in effect for five years until 2028. The previous SHSP was released in 2018, and is now phased out as the new SHSP is adopted.

As part of the federal Highway Safety Improvement Program (HSIP), this plan is to be updated at least every five years. Fourteen common crash types and conditions have been identified by the SHSP to be addressed by countermeasures. MassDOT notes that the Safe Systems Approach now provides a framework for selecting and prioritizing countermeasures based on the five principles previously identified in **Figure 4a-1**.

The SHSP calls for six initiatives to be carried out over the next 5 years:

- Implement speed management to realize safer speeds
- Address top-risk locations and populations
- Take an active role to affect change in vehicle design,

Map 4a-2: Fatal crashes by victim type in Berkshire County, 2015-2022

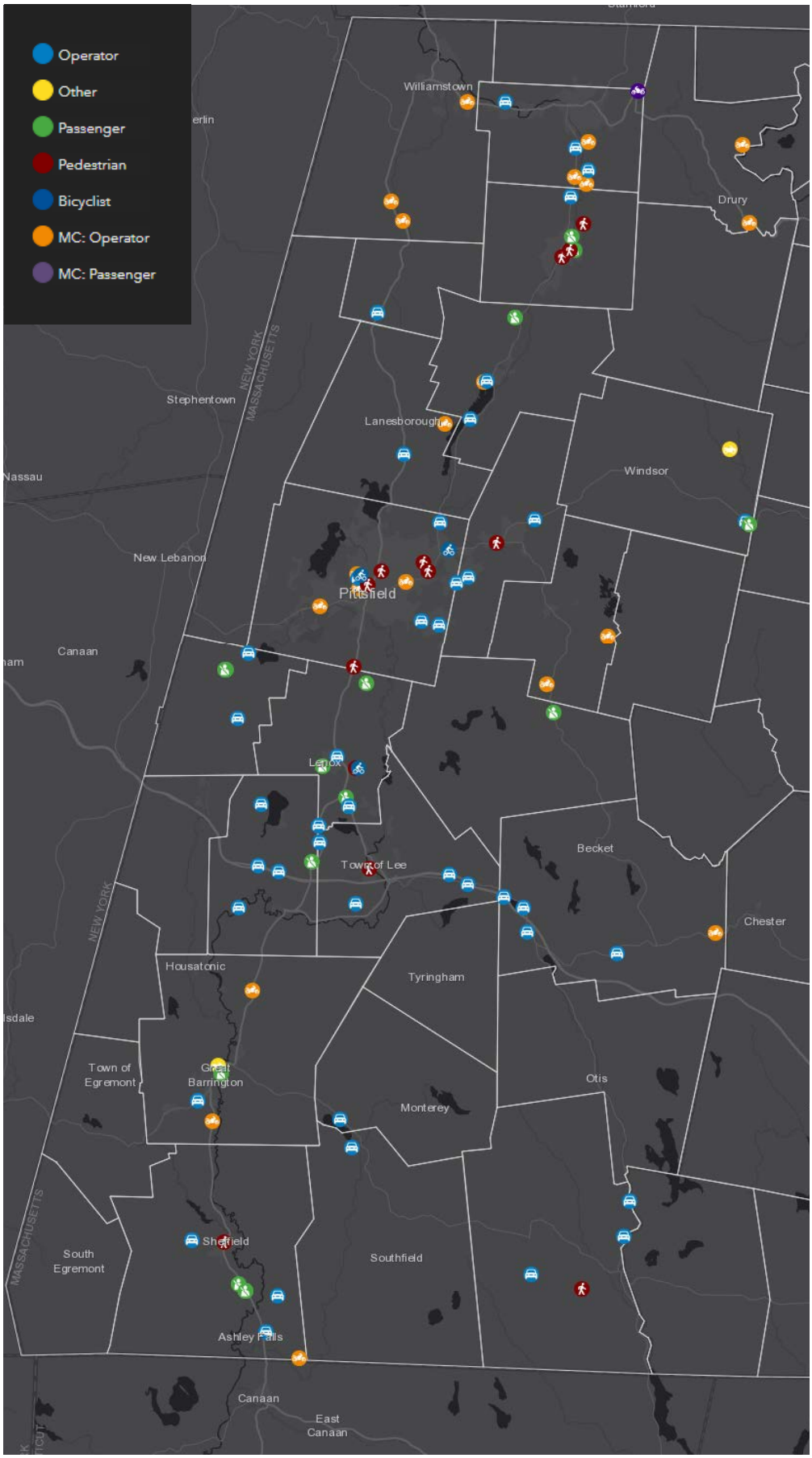


Figure 4a-3: Berkshire Fatality Analysis and Reporting System (FARS) statistics

Fatality Type	Fatalities					Fatalities Per 100,000 Population				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Total Fatalities (All Crashes)*	12	11	16	13	15	9.44	8.69	12.68	10.38	12.04
(1) Alcohol-Impaired Driving (BAC=.08+) Fatalities	2	2	5	4	3	1.57	1.58	3.96	3.19	2.41
(2) Single Vehicle Crash Fatalities	7	5	8	6	11	5.50	3.95	6.34	4.79	8.83
(3) Large Truck Involved Crash Fatalities	3	1	2	0	1	2.36	0.79	1.59	0.00	0.80
(4) Speeding Involved Crash Fatalities	4	2	1	3	5	3.15	1.58	0.79	2.40	4.01
(5) Rollover Involved Crash Fatalities	3	2	3	2	2	2.36	1.58	2.38	1.60	1.61
(6) Roadway Departure Involved Crash Fatalities	5	6	10	8	12	3.93	4.74	7.93	6.39	9.63
(7) Intersection (or Intersection Related) Crash Fatalities	6	3	5	7	2	4.72	2.37	3.96	5.59	1.61
Passenger Car Occupant Fatalities	4	5	7	4	5	3.15	3.95	5.55	3.19	4.01
Light Truck Occupant Fatalities	5	2	1	4	1	3.93	1.58	0.79	3.19	0.80
Motorcyclist Fatalities	0	1	5	2	7	0.00	0.79	3.96	1.60	5.62
Pedestrian Fatalities	3	1	3	3	0	2.36	0.79	2.38	2.40	0.00
Bicyclist (or Other Cyclist) Fatalities	0	1	0	0	0	0.00	0.79	0.00	0.00	0.00

features, and use

- Accelerate research and adoption of technology
- Double down on what works
- Implement new approaches to public education and awareness

BRPC planning staff will be working with state and local partners to align with these initiatives in Berkshire County wherever possible.

Safety Performance Measures

Initiated under the FAST Act, and carried through the BIL, performance-based planning must be carried out by state DOTs and local partners. Performance Measure 1 (PM1) deals with improving safety on our roads by reducing deaths and serious injuries. Performance is measured by the following data points:

- 5-year rolling average fatalities
- 5-year rolling fatality rate per 100 million VMT
- 5-year rolling average serious injuries
- 5-year serious injury rate per 100 million VMT
- 5-year average combined injuries and fatalities

TARGET

Attain a trend of reduction year-over-year in the three FAST Act safety Performance Measures: fatalities, injuries, and bike/ped combined.

for bicyclists and pedestrians

Berkshire MPO has been tracking these statistics within the county using publicly available data. As part of the performance-based planning process, targets are to be set for each data point for the two subsequent years following the current year. Targets must demonstrate continuous improvement on the Performance Measures. Based on the data available for Berkshire County, **Figure 4a-4** shows historic and projected data for the PM1 data points listed above. Note that the gaps in data for the 2017-2021 periods represent the time lag for fully reporting the data for 2021, which was still in progress at the time of writing.

For the last full 5-year analysis period of crashes (2016-2020), there were an average of 13.4 fatalities per year, or 0.92 fatalities per 100 million VMT. This marks the third year of increase since the lowest average reached in 2017. Serious injuries in the past five years averaged to 53.8 per year in Berkshire County, or 3.71 per 100 million VMT. This trend has shown an overall decrease and is targeted to continue.

Bicycle and pedestrian fatalities and injuries have fluctuated over the analysis period between an average of 9 to 11 per year. They are currently projected to remain level given the historic trends to work with, though reduction remains the overall goal.

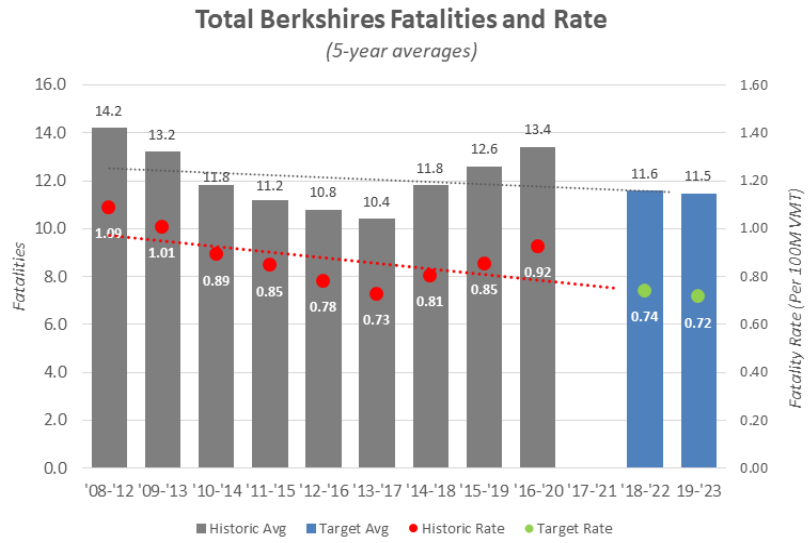
Transit Safety Performance Targets

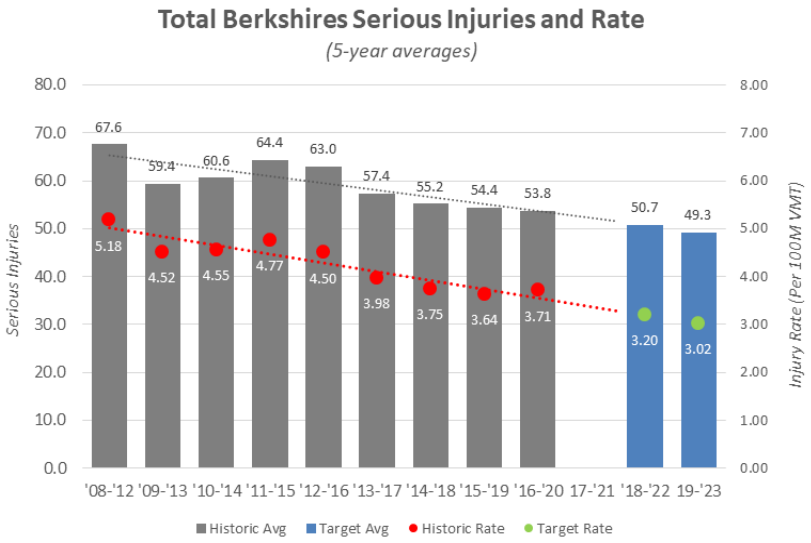
The Berkshire Regional Transit Authority (BRTA) is required to file a Public Transit Agency Safety Plan (PTASP) periodically with the FTA. The most recent targets include: Fatalities: 0; Injuries: 4; Safety Events: 3. The full report can be found in the **Appendix**.

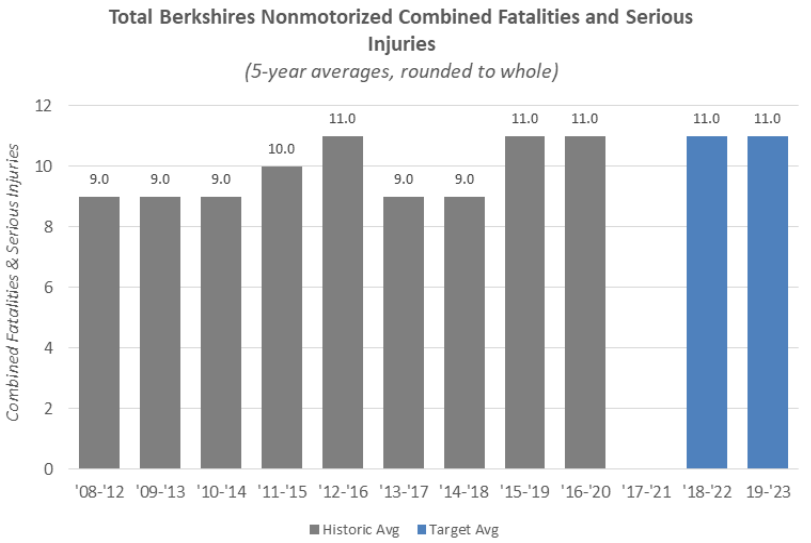
Comprehensive Safety Action Plan

As a part of turning the Safe Systems Approach into action, Berkshire County will be crafting and implementing a Comprehensive Safety Action Plan (CSAP) as part of the FHWA's Safe Streets and Roads for All grant program. Berkshire County has the unfortunate distinction of the highest road

Figure 4a-4: Berkshire County PM1 Data as of 2023







fatality rate per 100,000 residents in the state (10.3), more than twice the overall state average (4.9). This statistic may be partially attributed to the small populations of some Berkshire towns.

Berkshire Regional Planning Commission (BRPC), which also serves as the metropolitan planning organization (MPO), will manage the development of the Comprehensive Safety Action Plan. BRPC intends to involve a broad range of partnerships. An advisory committee of elected and non-elected town officials will oversee the plan development. Diverse stakeholders including public works departments, law enforcement and first response personnel, and community, minority, and neighborhood groups will be sought. Digital data and consultation will also be purchased to assist our planning efforts.

Highly cost-effective projects can achieve safety benefits over this expansive, predominantly rural, geographic area. The Action Plan intends to study where proven safety countermeasures to risky activities, like distracted and impaired driving, speeding, and lane departures, can be implemented systematically through the course of road improvement projects and further Implementation Grant opportunities. Projects that may seek further Implementation funding will be identified through the evidence and data gathered over the course of the CSAP's development.

The CSAP is the first phase in the Safe Streets and Roads for All process; it will in turn open the door for future funding opportunities for implementation projects identified within the plan. Projects should be targeted at reducing deaths and serious injuries on Berkshire roads.

The remainder of this section highlights several recommended focus areas for the CSAP to explore which are especially relevant to Berkshire County. Countermeasures are not limited to these options but the examples shared could be especially effective at addressing several of the emphasis areas listed in the Massachusetts SHSP.

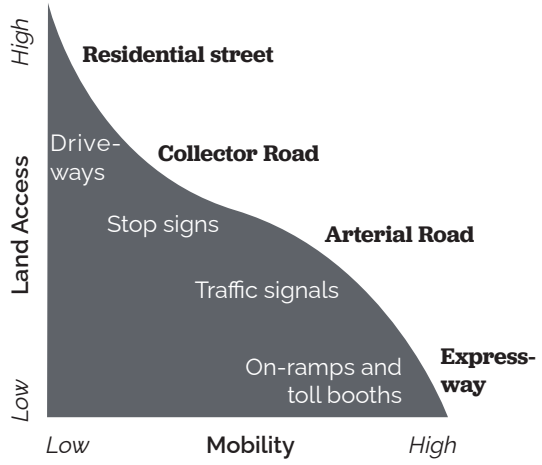
Access Management (Safer Roads)

One crucial component of making safer roads is access control. In order for travelers to get on and off a road, they need a point of access. These access points could be driveways, other streets, or on-ramps and off-ramps on a highway. Planning where the points of access are, how many of them there are, and what traffic control components they use (i.e., stop signs, roundabouts, traffic lights), are the core tenets of access management.

The Massachusetts Turnpike, for example, is highly access-controlled, with entrances and exits spaced miles apart. This allows for travel speeds of 65 miles per hour, high volumes of traffic throughput, and long, uninterrupted, periods of travel. A residential street, in contrast, has low levels of access control. Every house has a driveway that directly accesses the street, with no traffic control. Traffic speeds and volumes are usually low. In between these extremes are the arterial roads that span between towns and often carry higher volumes of regional traffic. See **Figure 4a-5** for a visual representation of how mobility and access are related. Speed limits on these roads are lower than those for highways, though the roads are often designed to highway standards. High speeds and volumes are not problematic on their own, as expressways demonstrate. However, regional arterial roads in Berkshire County have historically been designed with low levels of access control. Driveways for businesses are frequent (with some having two curb-cuts on one parcel), and left turns across high-speed traffic are permitted with two-way left-turn-lanes. This combination of high speeds, high volumes, and low access control have made suburban arterials the most dangerous stretches of road in the country.

High levels of land access and high levels of vehicular mobility cannot safely co-exist in the same corridor. Designers have tried to create this balance with multi-lane arterial roads that utilize complex traffic signals, high speed limits (40-50mph), and two-way left-turn lanes. Examples of these types of roads in the Berkshires include Stockbridge Road in Great Barrington, parts of Merrill Road, Dalton Avenue, and Hubbard Avenue in Pittsfield, Howland Avenue in Adams, and Pittsfield Road in Lenox. These roads also lack all the most basic pedestrian, bicycle, and transit amenities, further exacerbating the high levels of vehicular volumes to businesses and services in these corridors.

Figure 4a-5: Mobility vs Access for Road Classifications



There are several solutions available to remedy existing arterial designs, with either standalone or combined implementation possible:

Curb cut closures
Parcels that front the road would have any redundant curb cuts or driveways closed, and only one point of access should be provided to the lot. This would reduce the number of locations for conflicting directions of traffic to meet.

Right-in-right-out (RIRO) driveways
Driveways that connect to the arterial road would be channelized so that drivers can only make a right turn into the property and a right turn out of the property onto the road. This eliminates left-turn movements across traffic, which reduces the chances for a collision to occur.

Median closure
The median of the road would be closed and built-up with a barrier to eliminate the possibilities of left turns across travel lanes. Drivers would need to use the nearest traffic light or other purpose-built area (such as a "jughandle" intersection) to execute a U-turn, or proceed onto an access road.

KEY ACTION

Work with relevant jurisdictions to explore Access Management improvements on high-volume corridors to be determined

Separate access lanes and through-lanes
An arterial would have fully separate through-lanes for travelers that are passing through the area and not wishing to access adjacent businesses. These lanes would be akin to "express" lanes on a highway, and would not have any adjacent access to land parcels. Access roads would run parallel to the through-lanes and be separated by medians or barriers. The access roads would have a low speed limit (25-35mph) and full access to driveways. Drivers could choose to turn onto the access roads at signalized intersections at the beginning of the corridor. Drivers wishing to access land on the other side of the road would need to proceed to the other end of the corridor and execute a U-turn. One example of this type of design is around the Latham Circle area near Albany, NY. Travelers who are not accessing the businesses adjacent to the road are able to travel more quickly and efficiently in the central lanes past the intersections and driveways.

Traffic Calming (Safer Speeds)

Traffic calming refers to the use of road design principles to slow the speeds of drivers naturally, without the need for regular enforcement. There are many aspects of road design that can be adjusted to lower the speeds of traffic. More than simply changing the number on a speed limit sign, good traffic calming measures are physical indications to drivers that they should lower their speed. These measures are intended where speed of traffic has been seen as a safety and quality of life issue, especially in thickly settled areas, school zones, and other areas highlighted by local stakeholders. Traffic calming measures derive their effectiveness by changing different parts of how a street or road is built.

Traffic calming is a more sustainable means of achieving a desired travel speed than law enforcement or automated enforcement alone. Physical changes to the roadway will convey immediate feedback to motorists as to whether they are traveling the proper speed for a given context.
There are many examples worldwide of how physical changes to the road signal a change in travel speed for drivers. **Figure 4a-2** illustrates an example from the Netherlands of an artificial bend in the road that causes drivers to slow down as they enter a residential area. Traffic calming measures should be explored around Berkshire County as a means of creating safer and slower town centers where the most thickly settled neighborhoods are found, along with more people traveling on foot, bicycle, and transit.

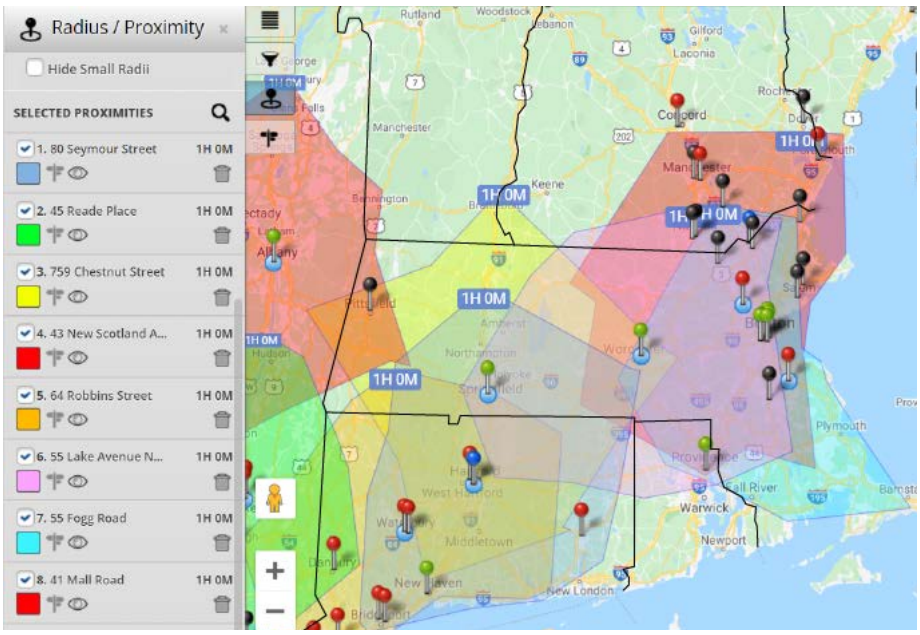
Figure 4a-2: Horizontal deflection traffic calming

Emergency Response (Post Crash Care)

When a crash does occur, first responders from law enforcement and emergency medical treatment will be called to the scene. Injured victims from a crash have a higher chance of survival and recovery if they are treated at an appropriate trauma center in an effective period of time. This can help prevent injuries from becoming more serious or fatal.

Responder access to a crash scene and a victim's access to rapid care should be taken into consideration when planning safety countermeasures and training first response personnel. Distance to appropriate trauma centers for injury treatment is an important consideration for improving roadway safety and reducing serious injuries and fatalities. Treating a crash victim within an hour of the event has been shown to increase their likelihood of survival. Trauma centers in the United States are ranked from 1-5 based on the availability of advanced equipment, surgical staff, and care facilities. The nearest Level I trauma centers that are best equipped to treat crash victims are located in Albany, NY and Springfield, MA. **Figure 4a-3** illustrates approximate 1-hour travel times to these and other Level I trauma centers. Some areas of Berkshire County are outside this travel radius. Road safety deficiencies in these areas (which include parts of Florida, North Adams,

Figure 4a-3: Trauma center access in Berkshire County



Sheffield, and Mount Washington) should be prioritized. Keeping roads and bridges in a state of good repair allows response crews to reach crash scenes as quickly as possible. Partial and full bridge closures should be addressed in terms of safety response if lengthy detours are required.

An Act to Reduce Traffic Fatalities (Safer People and Safer Vehicles)

A traffic safety bill that had been under consideration in legislative sessions since 2011 was signed into law on the last day of Governor Charlie Baker's administration in 2023. Among other provisions, the new law enacts several new regulations:

- 4-foot passing law: When a motor vehicle or truck driver desires to overtake a vulnerable road user (someone walking, cycling, using a scooter, wheelchair, or other low-powered mobility device), the driver must move aside to there is at least four feet of separation between the side of the vehicle and the vulnerable user. Crossing the centerline of the road is permitted when determined safe to do so.
- Truck safety enhancements: Any trucks or trailers purchased by the Commonwealth must be equipped with side-guard panels or skirts, additional mirrors, & back-up cameras.
- Speed limit modifications: Local jurisdictions may petition MassDOT for lowering speed limits on state-jurisdictional roads. MassDOT has 90 days to respond to the request, and, upon approval, will install new speed limit signage in the targeted areas.

This Act joins the transportation bond bill passed by the state legislature over the summer, which legally classified electric bicycles for the first time as either Class I or II in the Massachusetts General Laws. Classes are based on the level of assisting power provided by the electric motor, and whether the bike has a throttle control. This allows for more nuance when regulating their operation in certain areas, like multi-use paths. Together, these new acts represent new important steps in making the roads of the Commonwealth safer for all users.

Towns and cities in Berkshire County are encouraged to work with MassDOT to install newly-approved 4-foot-passing regulatory signs on key thoroughfares and gateways to remind the traveling public of the new regulations and to form safer driving, cycling, and walking behaviors. Signs and posts are supplied by MassDOT and installed on local rights-of-way by municipal highway crews. See **Figure 4a-3** for a sample of the sign.

Figure 4a-3: 4-foot passing regulatory sign

UPWP Activities:

- Implement a Berkshire County Comprehensive Safety Action Plan
- Report yearly to MPO on changes to crash cluster and HSIP data
- Report yearly on Performance Measure 1 (PM1) data to MPO and MassDOT
- Assist in developing low-cost, expandable traffic calming solutions
- Assist in developing bylaws and guidelines which promote effective access management

4b. Continue Roadway Safety Audits and Countermeasures

Background

The Highway Safety Improvement Program (HSIP) is an ongoing initiative by the FHWA to take a data-driven approach to improving safety for the traveling public on the nation's roadways. Despite having the word "highway" in the name, all types of roadways are eligible for safety improvements via the HSIP program, provided they fall within the selection criteria of the program. According to the Massachusetts HSIP program administered by MassDOT,

"The purpose of the Highway Safety Improvement Program (HSIP) is to reduce the number of fatal and serious injury crashes by targeting high crash locations and causes on all public roads. Projects, using HSIP funding, are required by FAST Act, the Federal Legislation Fixing America's Surface Transportation Act, to be a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance.

The overarching requirement is that HSIP funds be used for safety projects that are consistent with the State's strategic highway safety plan (SHSP) and that correct or improve a hazardous road location or feature or address a highway safety problem. FAST Act provides an example list of eligible activities, but HSIP projects are not limited to those on the list. Workforce development, training, and education activities are also an eligible use of HSIP funds."

There are fourteen safety strategy areas identified in the latest state SHSP that can be addressed by HSIP projects:

- Lane departure
- Impaired driving
- Occupant protection
- Speeding-related
- Intersection
- Older driver (65+)
- Pedestrian
- Motorcycle
- Young driver
- Truck-involved
- Distracted driving
- Bicycle
- Work Zone
- Grade crossing

HSIP Crash Cluster Selection

Spot safety improvements under HSIP (i.e. specific intersections or corridors) must be chosen in a data-driven manner to ensure effective use of limited funds. Locations are flagged using crash data and assigning aggregate scores based on crash severity. Locations where repeated crashes or high scores are recorded over time are referred to as **Crash clusters**. Crash clusters can be categorized into three groups: Intersection, Bicycle, and Pedestrian. Crash clusters identified in Berkshire County in the latest full analysis cycle (2018-2020) are shown in **Map 4b-1.** Intersection listings and rankings are shown in tabular form in **Table 4b-1.**

Clusters are given a score based on the severity of the collisions that occur within them. This measure is called "Equivalent Property Damage Only," or EPDO. When only vehicles or other property are damaged, the crash is assigned a value of one (1). When an injury or fatality occurs, the crash is given a value twenty-one (21). In this way, clusters can be ranked to determine where the most dangerous intersections within a region occur. Once ranked by EPDO score, the top 5% of crash clusters within a region are eligible for the HSIP pool of funding. These HSIP clusters represent the most dangerous intersections within a region based on the severity of the crashes that have occurred near them.

Crash clusters are also identified for bicycle and pedestrian related collisions. Because crashes involving non-motorized users are much less frequent and more spatially dispersed, a 100-meter radius is used for finding clusters or trends, and 10 years of crash data are analyzed to identify the clusters. The most recent pedestrian and cyclist crash cluster data for our region is from 2011-2020.

From 2015 to 2020 (two consecutive HSIP analysis periods), the most dangerous intersection for vehicles in our region was First Street and Fenn Street in Pittsfield. Over the three-year 2018-2020 period, there were 20 total crashes with 8 involving injuries.

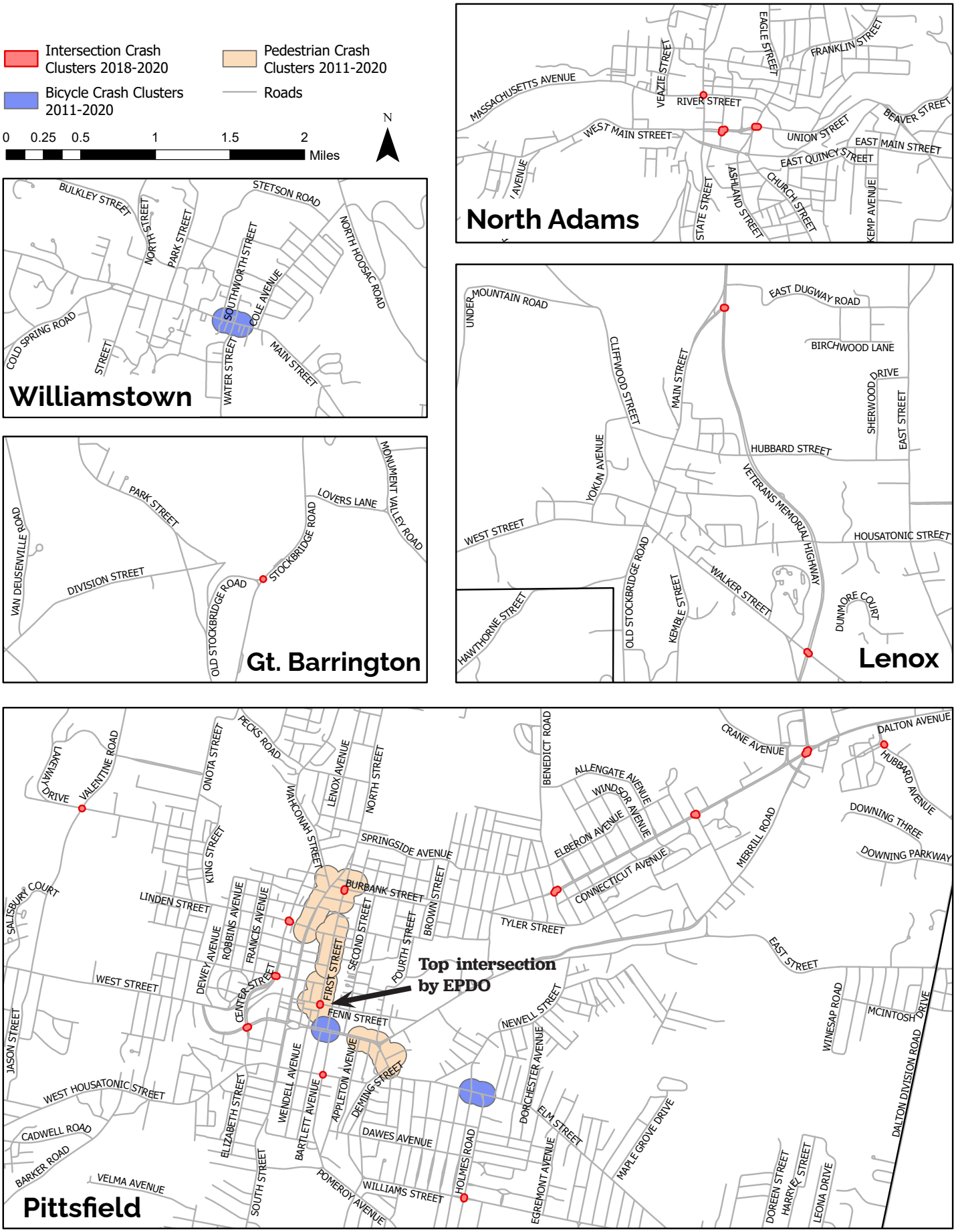

Intersection Crash Clusters 2018-2020
Pedestrian Crash Clusters 2011-2020
Bicycle Crash Clusters 2011-2020
Roads
0 0.25 0.5 1 1.5 2
Miles
N
North Adams
MASSACHUSETTS AVENUE
VEAZIE STREET
EAGLE STREET
FRANKLIN STREET
RIVER STREET
WEST MAIN STREET
UNION STREET
BEAVER STREET
EAST MAIN STREET
EAST QUINCY STREET
CHURCH STREET
ASHLAND STREET
STATE STREET
KEMP AVENUE
Williamstown
BULKLEY STREET
NORTH STREET
PARK STREET
STETSON ROAD
NORTH HOOSAC ROAD
SOUTHWORTH STREET
COLE AVENUE
COLD SPRING ROAD
WATER STREET
MAIN STREET
Gt. Barrington
PARK STREET
LOVERS LANE
MONUMENT VALLEY ROAD
VAN DEUSENVILLE ROAD
DIVISION STREET
STOCKBRIDGE ROAD
OLD STOCKBRIDGE ROAD
Lenox
UNDER MOUNTAIN ROAD
EAST DUGWAY ROAD
CLIFFWOOD STREET
MAIN STREET
BIRCHWOOD LANE
SHERWOOD DRIVE
EAST STREET
HUBBARD STREET
YOKUN AVENUE
VETERANS MEMORIAL HIGHWAY
WEST STREET
HOUSATONIC STREET
WALKER STREET
KEMBLE STREET
OLD STOCKBRIDGE ROAD
DUNMORE COURT
HAWTHORNE STREET
Pittsfield
LAKEWAY DRIVE
VALENTINE ROAD
ONOTA STREET
PECKS ROAD
WAHCONAH STREET
LENOX AVENUE
NORTH STREET
BENEDICT ROAD
CRANE AVENUE
DALTON AVENUE
HUBBARD AVENUE
ALLENGATE AVENUE
WINDSOR AVENUE
ELBERON AVENUE
DOWNING THREE
DOWNING PARKWAY
MERRILL ROAD
CONNECTICUT AVENUE
SPRINGSIDE AVENUE
KING STREET
SALISBURY COURT
LINDEN STREET
BURBANK STREET
BROWN STREET
TYLER STREET
ROBBINS AVENUE
FRANCIS AVENUE
SECOND STREET
FOURTH STREET
DEWEY AVENUE
WEST STREET
CENTER STREET
FIRST STREET
Top intersection by EPDO
FENN STREET
EAST STREET
NEWELL STREET
WINESAP ROAD
MCINTOSH DRIVE
JASON STREET
WEST HOUSATONIC STREET
WENDELL AVENUE
APPLETON AVENUE
DEMING STREET
DORCHESTER AVENUE
DALTON DIVISION ROAD
ELIZABETH STREET
BARTLETT AVENUE
ELM STREET
CADWELL ROAD
DAWES AVENUE
MAPLE GROVE DRIVE
BARKER ROAD
SOUTH STREET
HOLMES ROAD
VELMA AVENUE
POMEROY AVENUE
WILLIAMS STREET
EGREMONT AVENUE
DOREEN STREET
HARRY E. STREET
LEONA DRIVE

Figure 4b-1: HSIP-eligible Crash Clusters, 2018-2020

Top 5% Interesection Crash Clusters, 2018-2020								
Crash Count	City/Town	Fatal & Serious Injury Crashes	Non-Serious & Possible Injury Crashes	Non-Injury Crashes	Top 5% within Town	EPDO	Street 1	Street 2
20	PITTSFIELD	0	8	12	PITTSFIELD	**180**	Fenn Street	First Street
13	PITTSFIELD	0	7	6	PITTSFIELD	**153**	Plastics Ave	Dalton Ave
13	PITTSFIELD	1	6	6	PITTSFIELD	**153**	Dalton Ave	Benedict Road
28	NORTH ADAMS	1	5	22	NORTH ADAMS	**148**	Curran Mem. Hwy.	Hodges Cross Rd
21	PITTSFIELD	0	6	15	PITTSFIELD	**141**	Hubbard Ave	Berkshire Crossing
18	PITTSFIELD	1	5	12	PITTSFIELD	**138**	Linden Street	Seymour Street
12	PITTSFIELD	0	6	6	PITTSFIELD	**132**	Lakeway Dr	Valentine Rd
19	NORTH ADAMS	0	5	14	NORTH ADAMS	**119**	Union Street	Eagle Street
10	PITTSFIELD	0	5	5	PITTSFIELD	**110**	East Housatonic St	Pomeroy Ave
9	GT BARRINGTON	0	5	4	GT BARRINGTON	**109**	Stockbridge Rd (7)	Old Stockbridge Rd
8	PITTSFIELD	0	5	3	PITTSFIELD	**108**	Columbus Ave	Center St
20	PITTSFIELD	0	4	16	PITTSFIELD	**100**	Dalton Ave	Merrill Rd
14	PITTSFIELD	0	4	10	PITTSFIELD	**94**	Burbank Street	First Street
13	NORTH ADAMS	0	4	9	NORTH ADAMS	**93**	River Street	Houghton Street
12	NORTH ADAMS	0	4	8	No	**92**	Main St	Holden St
12	PITTSFIELD	1	3	8	No	**92**	West Street	Center St
10	LENOX	0	4	6	LENOX	**90**	Main St (7A)	Veterans Mem. Hwy.
10	LENOX	0	4	6	LENOX	**90**	Walker Street	Veterans Mem. Hwy.
9	PITTSFIELD	1	3	5	No	**89**	Williams St	Holmes Rd

Top 5% Pedestrian Crash Clusters, 2011-2020									
Crash Count	City/Town	Fatal & Serious Injury Crashes	Non-Serious & Possible Injury Crashes	Non-Injury Crashes	Top 5% within Town	EPDO	Street 1	Street 2	Street 3
37	PITTSFIELD	1	27	9	PITTSFIELD	**597**	North Street	Linden St	Tyler St
11	PITTSFIELD	1	9	1	PITTSFIELD	**211**	First Street	Melville St	Lincoln Street
11	PITTSFIELD	2	7	2	PITTSFIELD	**191**	East Street	Elm Street	High Street
12	PITTSFIELD	1	6	5	No	**152**	First Street	Fenn Street	Eagle Street

Top 5% Bicycle Crash Clusters, 2011-2020								
Crash Count	City/Town	Fatal & Serious Injury Crashes	Non-Serious & Possible Injury Crashes	Non-Injury Crashes	Top 5% within Town	EPDO	Street 1	Street 2
7	WILLIAMSTOWN	0	6	1	WILLIAMSTOWN	**127**	Main Street	Water Street
4	PITTSFIELD	0	4	0	PITTSFIELD	**84**	Elm Street	Holmes Road
4	PITTSFIELD	1	3	0	PITTSFIELD	**84**	East Street	Willis Street

Road Safety Audits (RSAs)

Crash clusters that are targeted for safety improvements under HSIP must first undergo a Road Safety Audit of current conditions. The RSA is intended to bring all stakeholders from local, regional, state, and federal authorities together on location to review the site, document deficiencies, and begin to develop countermeasures for a safety implementation project. Background materials are gathered and shared at a pre-audit meeting, which include traffic volumes, crash data, speed data, and other safety concerns related to the site visit. The audit team will then meet in the field to visually inspect the site and confirm the safety issues and the data previously gathered (see **Figure 4b-2**). A post-audit meeting will then be held to discuss findings and propose potential countermeasures. An RSA report is prepared and supplied to stakeholders. The document will be used as a basis for recommending future HSIP funding for implementing an improvement project in the Transportation Improvement Plan (TIP).

KEY ACTION

Conduct Roadway Safety Audits at the top EPDO intersections in Berkshire County with local, state, and federal partners

Road Safety Audits are recommended to be conducted at top crash clusters identified in **Figure 4b-1**, with priority given to the intersections with the highest EPDO score and working down. The intersections in the figure are listed in that descending order.

It is important to note that this listing does not include all Berkshire locations where a fatality or serious injury has taken place. These above locations have been shown to be perennial safety risks by accumulating a high EPDO score as well as contributing to at least one fatal or serious injury. Additional locations will continue to be prioritized by means such as the Comprehensive Safety Action Plan and other local efforts.

UPWP Activities:

- Coordinate with Berkshire County towns where HSIP-eligible crash clusters are located to program further study and implement countermeasures
- Coordinate with MassDOT on RSAs (Road Safety Audits) to be conducted at top crash locations in the region
- Prioritize future year HSIP projects
- Identification of other potential safety improvements at crash clusters
- Explore modernization and updates to a regional crash database

Figure 4b-2: Road Safety Audit conducted in Medford, MA (via Medford Patch)

4c. Standardize Crash Data

Background

The data that inform transportation decision making are gathered in many ways. It is important that all regions of the Commonwealth are represented equitably across the available data and statistics.

Geocoding is the process of translating location data, such as a street address, crossroads, or milepoint onto a visual map, usually by means of latitude and longitude. Crash location data (i.e. nearest address or cross street) are reported by responding authorities, usually local or state police departments. If sufficient location data is provided by responders when reporting the crash, the location of the crash can be automatically geocoded by the MassDOT Office of Traffic Safety. When auto-geocoding is not possible, human technicians will work to map the location.

A current disparity across the Commonwealth is the rate of geocoding of crashes. Of all crashes reported between 2017 and 2022, 87% are geocoded into the MassDOT database. Given this benchmark, the western end of Massachusetts, and Berkshire County in particular, fall well below the average. These rates are illustrated in **Map 4c-1**. The darkest blue shade represents an auto-geocoding rate of greater than 80%, while the tan shade represents an auto-geocoding rate below 20%.

Berkshire County will set the goal of coming up to parity with statewide geocoding performance over the next four years. Underreported crashes serve to mask the true needs of Berkshire County in terms of road safety. Assisting local authorities and emphasizing the importance of reporting and geocoding all crashes will help to ensure that Western Massachusetts remains on parity with the Commonwealth at large. Conducting outreach to towns that show a low rate of crash reporting and coordinating between them and the MassDOT Office of Traffic Safety and Registry of Motor Vehicles (RMV) will be an ongoing and important process.

The Berkshire region encourages further outreach and dialogue between OTS, RMV, and local jurisdictions regarding enhanced education and enforcement strategies, and data collection procedures, that police forces may be able to adopt.

UPWP Activities:

- Analyze the rates of crash reporting and geocoding for Berkshire municipalities
- Conduct ongoing outreach with the MassDOT Office of Traffic Safety (OTS) and RMV
- Conduct ongoing outreach to town police and first response units in partnership with OTS

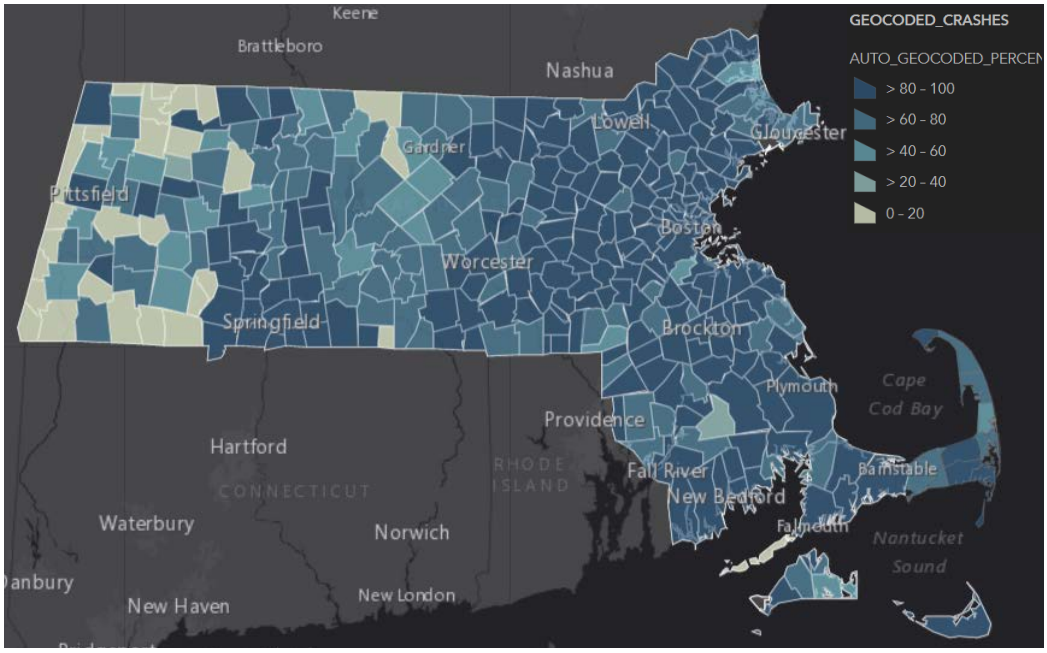
KEY ACTION

Conduct outreach and coordination with first response services in towns that are currently below state crash geocoding rate of 87%.

TARGET

Bring the crash geocoding rate of all towns in Berkshire County to a level of parity with the Commonwealth at large (87%) by 2028.

Map 4c-1: State Geocoding Performance by Municipality




RTP
2024

Goal 5

Promote Active Transportation

Active transportation is travel under one's own power; generally on foot or on a vehicle that weighs less than the occupant. For the purposes of this plan, the terms "active transportation," "micro-mobility," and "personal mobility devices" are interchangeable.

Active transportation is an important component of the sustainability of any transportation network. Infrastructure for active transportation is generally less costly than for heavy traffic. Transportation via active means produces less greenhouse gas emission than heavy modes. Finally, active transportation can build a greater degree of community and social cohesion and investment when implemented as a wide-reaching network.

Objectives:

a. Expand Bicycle infrastructure
b. Expand Pedestrian infrastructure
c. Expand Shared micromobility

5a. Expand Bicycle Infrastructure

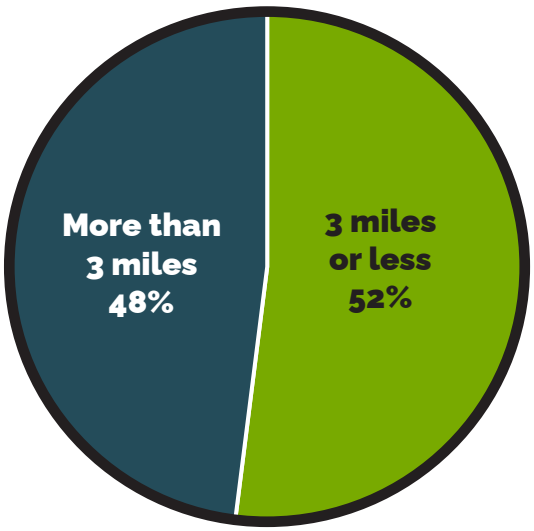
Background

Cycling in the Berkshires takes place in many forms: for recreation, exercise, transportation, survival. The bicycle as a machine is a low-cost, lightweight, efficient means of travel. Promoting and expanding cycling in the Berkshires is an important piece in the effort to create a more connected, resilient, healthier and sustainable community.

This section will discuss capital and programmatic strategies to continue the progress of expanding bicycle infrastructure in Berkshire County. As the Commonwealth continues its adoption of Complete Streets policies and the national conversation pursues zero roadway deaths, environmental justice, and tackling the climate crisis, bicycling must not be simply regarded as an "alternative" means of transportation. It must be holistically integrated into the transportation decisions made at the local and regional levels.

According to the latest National Household Travel Survey conducted in 2017, 52% of trips made in Massachusetts were a distance of 3 miles or less (see **Figure 5a-1**). According to the MassDOT Bicycle Transportation Plan, 80% of those trips were made by driving. These trips represent the low-hanging fruit for encouraging shifts to other modes, including cycling, walking, transit, and rideshare. On average, an able-bodied bicycle rider can make a three-mile trip in about fifteen minutes. The increasing market share of electric-assist bicycles (e-bikes) further lowers the barrier to entry. Pedal-assist e-bikes allow users with a greater spectrum of abilities and fitness to ride over more rolling terrain and for greater distances than previously possible.

Figure 5a-1: MA household trips by distance, 2017



Many dense and historic cores of Berkshire municipalities have a high potential for everyday cycling trips. This is according to a network screening statistical analysis conducted by MassDOT in 2022 which rated bicycling potential for every road in the Commonwealth. **Map 5a-2** illustrates road ratings for Berkshire County. Yellow-colored roads represent medium potential for everyday cycling (roads scoring in the top 60%-11%), and green represents high potential (roads scoring in the top 10%). Grey roads are considered to have low potential. More information for specific streets can be found on the MassDOT GeoDOT website.

A road's potential for cycling trips is scored from a formula that takes several factors into consideration. The most recent 2022 update to the scoring methodology uses StreetLight[1] data to analyze existing bike volumes on roads and all biking trips that are under six miles. Roads that are within a 10-minute ride from a transit stop receive a scoring boost as well. Finally, trip demographics from a social equity lens are included in the formula. This takes into account trip-chaining that may take place outside of a home or workplace, as well as the general demographics of origin and destination neighborhoods of cyclists.

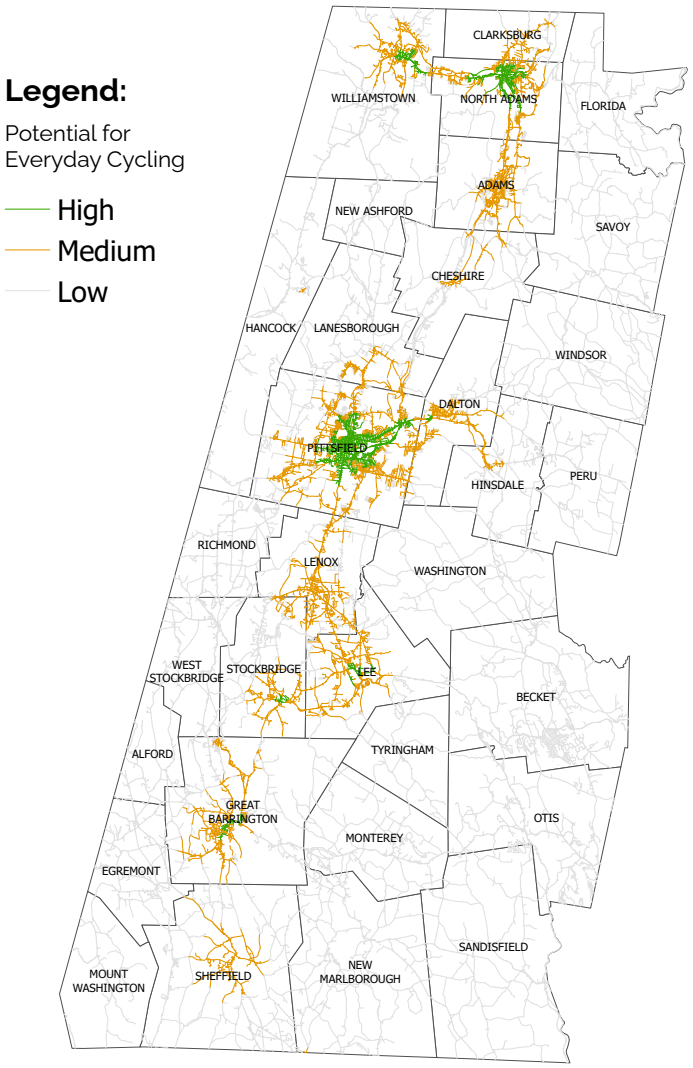
While many trips in the Berkshires will always need to be made by car, there is real potential for reducing the number of those trips, the distance of those trips, or the mode of those trips via a concerted planning effort. It is not an all-or-nothing scenario. Two-car households that are able to transition to owning one car and an e-bike, for example, represent real wins. Keeping in mind the proportion of household vehicle trips that were recorded at 3 miles or less, and the proportion of county households that reside on medium and high potential streets, these represent a sensible target audience for increasing the number of trips made by bicycle in Berkshire County.

1 StreetLight is a data aggregation company that supplies anonymized travel data from mobile device location data, such as cell phones and connected-vehicle equipment.

Regional Bicycle Infrastructure: The Berkshire Bike Path

The Berkshire Bike Path is the county's long-term vision for a regional bicycling and hiking route. The path route runs in a generally north-south direction through the center of the county, from the border of Connecticut in the south to the border of Vermont in the north. As currently envisioned, the Berkshire Bike Path consists of a mix of different infrastructure types, including on-road bike lanes and off-road multi-use paths. The Berkshire Bike Path would provide at least one high-comfort connection route between the high-potential areas for cycling. This in turn would create a "trunk" route with the branches into neighborhoods and other points of interest on the high- and medium-potential roads. Many low-scoring potential roads also make for attractive long-distance or recreational rides even though they may not connect many points of interest.

Map 5a-2: Potential for Everyday Cycling Trips



Ashuwillticook Rail Trail

The best-known feature of the Berkshire Bike Path is the Ashuwillticook Rail Trail, a multi-use path that runs along a portion of the former right-of-way for the Pittsfield & North Adams Railroad. The current paved length of the Ashuwillticook is 14.2 miles, and passes within the city of Pittsfield and the towns of Lanesborough, Cheshire and Adams. The trail is continuing to expand with several capital projects in design, conceptual, or early planning stages:

- Pittsfield southern extension - Crane Ave to Merrill Road (MassDOT project 609289)
- Adams northern extension - Lime Street to Hodges Cross Road (MassDOT project 606890)
- North Adams northern extension - Hodges Cross Road to Downtown (Project TBD)

Each of the above projects is intended to extend the shared-use-path character of the Ashuwillticook further through Berkshire County.

Usage of the Ashuwillticook has been tracked since July 2020 with two automated counters at popular southern and northern gateways to the trail. One counter is situated at the Berkshire Mall Road trailhead in Lanesborough and the other is at the Park Street entrance to the trail in downtown Adams. According to the statistics transmitted by the counters, there have been 173,411 users entering the trail at the Lanesborough trailhead and 148,393 users entering the trail at the Adams trailhead. In total, over 320,000 visitors have been recorded entering the rail trail since July 2020. It is important to note that these statistics do not consider users who entered the trail at other locations. For the most recent full calendar year of data, 2022, the most popular month at the Lanesborough trailhead was July, with nearly 11,000 visitors recorded entering. June 2022 was more popular with Adams, where just over 11,000 visitors were recorded. The wintry month of December 2022 recorded nearly 750 visitors in Lanesborough, and nearly 1,100 in Adams.

Williamstown Mohawk Bike-Hike Trail

This segment of shared-use path in the town of Williamstown was completed in the fall of 2022. The trail is approximately 2.3 miles long and runs along the outer edge of Williamstown's village center. The trail terminates on the southeastern

end at the Spruces park on Route 2, near the town line with North Adams. At the northwestern end, the trail terminates on Syndicate Road, just off Route 7. The other major entry point to the trail is on Cole Ave.

Other Local Segments

While the Berkshire Bike Path is not yet a complete bicycle network, there are other segments that have been implemented in Berkshire towns beyond those on the Ashuwillticook and Mohawk. As more segments of the Berkshire Bike Path are realized, these will be incorporated into the into the final alignment, either as-is, or further improved. Additional existing segments of the Berkshire Bike Path that will be joined together in the future include:

- Lee, Stockbridge: Route 102 bike lanes (4.5 miles)
- Pittsfield: Elm Street, East Street, North Street, Tyler Street (under construction) bike lanes (approx. 3.75 miles with short gaps)
- Great Barrington: Route 7 sidepath and Main Street bike lanes (approx. 1 mile total)
- Lenox: Walker Street bike lanes (1.5 miles)
- North Adams, Williamstown: Route 2 bike lanes (approx. 1.5 miles)

Completing the Berkshire Bike Path

A full north-south route through Berkshire County with a high level of comfort for most pedestrians and cyclists is the ultimate goal of the Berkshire Bike Path initiative. There are several projects that have received some level of study in recent history that would do well to continue forward on project development and stakeholder outreach:

Lee Bikeway: The current extent of the Lee Bikeway runs from the intersection of Route 102 and Tyringham Road to West Park Street in downtown Lee. A second phase of implementation should work to continue the bikeway northward to the Lenox town line. This would likely involve a mix of exclusive pathway and shared streets. Any shared facilities should take place only on low-speed low-volume streets with appropriate traffic calming measures and wayfinding.

Lenox Bike Path: From the town line with Lee, the bikeway would continue north into Lenox, through the village of Lenox Dale. The town conducted a feasibility and alternatives study in 2019, which provided several route alternatives. A full build-out would again involve a mix of dedicated path and shared low-volume streets. The entire Lenox bike path effort would take place over several phases, with logical termini at cross streets that would allow for full access to the completed phases. The preferred alternative would take the path along a former trolley line rail bed to New Lenox Road, from which the trail would continue north likely as a rail-with-trail segment into Pittsfield.

Pittsfield Bike Path: Connecting from Lenox into Pittsfield will take place in the area bounded by East New Lenox Road to the east and South Street (US-7) to the west. The most feasible corridor to provide a separated cycling facility would be in the vicinity of the city wastewater treatment plant and the Housatonic railroad line. The combination of city-owned land and a rail-with-trail corridor along a portion of the Housatonic line would present the most straightforward alternative. A utility right-of-way that extends from the rail line to Fred Garner River Park in Pittsfield could allow the trail to come to a logical terminus. Connecting through Pittsfield to the Ashuwillticook Rail Trail can be accomplished through several alternatives, including on-street via low volume side streets and high-quality bike lanes, or an off-road trail on utility rights-of-way if an agreement can be negotiated.

Proposed Sheffield-Gt. Barrington Multi-use Path: The southernmost segment of the Berkshire Bike Path would connect the center of Great Barrington with the center of Sheffield, and beyond to the Connecticut border via the Western New England Greenway on-road route (described below). A combination of sidepath and rail-with-trail alignments would create a separated pathway for cyclists and pedestrians through the town of Sheffield. Further feasibility studies are recommended to define pathway routes and cost estimates.

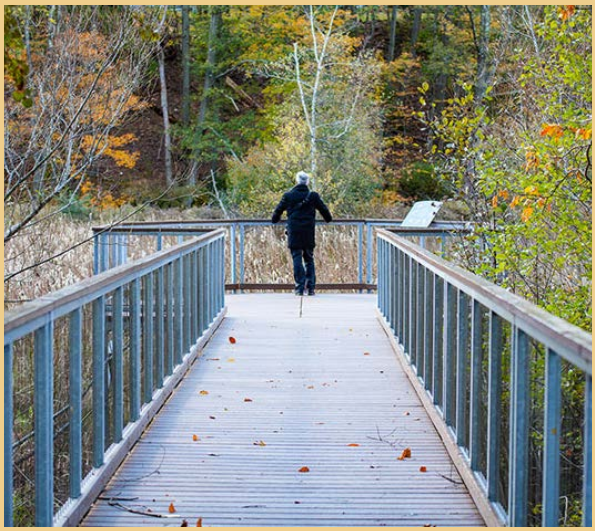
Western New England Greenway

Traversing three states from the Long Island Sound to the Canadian border, the Western New England Greenway (WNEG) is a federally-designated U.S. Bicycle Route, USBR 7. As the name implies, the WNEG closely parallels US Route 7, sometimes sharing the same right-of-way, but often utilizing lesser-traveled back roads as well as off-road routes when available. In Massachusetts, the Berkshire Bike Path serves as the through-route

MIDDLE RIVER PARK - WORCESTER, MA

The Blackstone Gateway Park and Middle River Park contain 1,100 linear feet of at-grade pathway and 1,400 linear feet of boardwalk and bridges to comprise roughly a half-mile of pathway along the Middle River in Worcester, MA. The project is constructed extensively within wetland resource areas and bordering areas subject to flooding. A boardwalk that is approximately 10 feet above the surface of wetlands, supported by helical steel piers, provides unique views of the Middle River area and is a key gateway to the Blackstone River Bikeway. The Bikeway is a 3.5-mile multi-use trail between the town of Millbury and City of Worcester, built in the early 2000s. This project could provide a good analogue for the "last mile" of the Ashuwillticook Rail Trail that links Hodges Cross Road and Downtown North Adams, which will need to traverse similar wetland resource areas.

Photo 1 (below): Bridge and boardwalk construction
Photo 2 (left): Portion of boardwalk in Middle River Park
Photo sources: (1) Google Earth, (2) Explore Central Mass



for the WNEG. Efforts are currently underway to procure and mount guide signs for the WNEG route. These signs include an AASHTO-compliant USBR-7 shield and directional arrows to help riders easily navigate the route. The signs also help raise awareness of the trail and indicate to travelers that there is an increased chance of encountering bicycles along the route. BRPC staff will be working with MassDOT to mount guide signs at appropriate points within the state highway ROW. On segments of the WNEG within town-owned ROWs, BRPC will be assisting with forming agreements with local highway departments to get signs mounted, via a memorandum of understanding (MOU). An example of a mounted sign assembly can be seen in **Figure 5a-3**.

Figure 5a-3: WNEG Guide Sign Assembly

KEY ACTION

Coordinate the installation of WNEG navigational signs with state and local entities.

Bicycle Safety and Education

Beginning in August 2021, stakeholders in Berkshire County have been promoting best practices for cyclists and motorists sharing the road. Outreach included a printed brochure, with guidelines for safe cycling practices on the front and a breakdown of different cycling infrastructure and regulations on the reverse.

The Berkshire Bike Path Council has worked with the statewide advocacy coalition Massbike on their Lights Bridgade campaign. Volunteers distribute battery-powered front and rear bike lights for cyclists needing them for nighttime travel. High-visibility jackets and vests have also been donated. Further expansion of Berkshire County's cycling infrastructure should include a sustained effort of education and outreach about safe and effective riding, both on the road and off. This can be accomplished through advocacy groups like Berkshire Bike Path Council and Massbike, driver's education curriculum and state entities like MassDOT and Safe Routes to School.

MassDOT Complete Streets Program

Since 2014, all municipalities in Massachusetts have been eligible to participate in the Complete Streets funding program through MassDOT. The goal of the Complete Streets program is to provide additional resources to communities who demonstrate interest and commitment to creating safer routes for walking, cycling, driving and taking transit.

The Complete Streets process has three phases, or Tiers: 1, 2, and 3. Becoming a Tier 1 community involves officially adopting a Complete Streets ordinance through the local legislative body. This opens the door for Tier 2 funding. At Tier 2, communities will craft a project list and ranking. This list includes, at minimum, fifteen capital improvement projects that accomplish one or more Complete Streets goals. A community may apply for up to $38,000 of technical assistance funding at 100% reimbursement. This funding may be used to retain consultation to assist with crafting the Tier 2 project list. When the Tier 2 project list is submitted and approved by MassDOT, the community enters Tier 3, which provides up to $500,000 per four-year period to implement proposed Tier 2

THE EMPIRE STATE TRAIL

In 2020, the state of New York officially opened the Empire State Trail (EST): a 750-mile cycling and hiking route that runs north-south between New York City and Plattsburgh, and east-west between Albany and Buffalo. The EST segments between New York City, Albany, and Buffalo are majority off-road multi-use paths. A major effort to link the cities of Albany and Hudson with a bicycling/hiking route was completed as part of the EST project. The Albany-Hudson Electric Trail utilizes a former trolley line that was adapted to an electric transmission corridor. This 37-mile route is entirely new construction and includes several stream crossings and sidepaths (see **Photo 1**). South of Hudson, a new gateway from the Rip van Winkle Bridge was constructed along NY-23, which included a protected two-way cycle path. The cycle path was created out of an extended shoulder formed from the NY-23 road bed, and a guard rail was mounted between the travel lane and extended shoulder to create full separation. See **Photo 2**.

Photo 1 (below): EST sidepath in Schodak, NY
Photo 2 (left): EST protected cycle track in Hudson, NY
Photo sources: Google Street View

projects. Funding from this Tier is 100% reimbursable for construction costs, with close parallels to the Chapter 90 program. Project design funding must be provided through other means.

At the time of writing, 20 of the 32 municipalities in Berkshire County have adopted a Complete Streets policy in their community. BRPC has provided Tier 2 technical assistance to 15 communities. Nearly $4.7 million in funding for Complete Streets capital projects has been awarded to Berkshire municipalities during the life of the program. Communities in Berkshire County are encouraged to continue pursuing funding for projects on their Tier 2 listings, and to update their Tier 2 list as necessary, as projects are completed and new priorities emerge. Examples of completed municipal projects include sidewalk replacements and extensions, crosswalk improvements, new bike racks and bike repair stations, shoulder widening and new bike lanes.

In addition to town projects, regional connections on arterials such as Routes 2, 7, 8, and 9 should be focus areas for complete streets efforts on a state level. Experienced cyclists and those with no alternative options will use shoulder space on these roads, but others may not feel welcomed on this kind of infrastructure.

As segments of these regional roads are due for rehabilitation, a design which includes a separated sidepath should be considered as a preferred alternative. Design treatments like those implemented by NYSDOT on the Empire State Trail (see left) can take advantage of the wider rights-of-way that state routes often utilize. Existing pavement width may also be able to be utilized if shoulder and lane widths are reduced in the redesign process. One example would be Route 7 as it continues south out of Great Barrington and through Sheffield. On some segments, shoulders my be 10 or more feet wide on either side, or travel lanes are 12 more feet wide. Such a segment could be re-imagined as a narrowed road bed with 11-foot travel lanes, 4-foot shoulders, and a separated 10-foot sidepath.

The following list of recommendations represents an ambitious roadmap of bicycle projects over the 20-year planning horizon. The projects have been listed in a descending order in terms of priority and feasibility as viewed from the time of writing.

Recommended Projects:

- Ashuwillticook Rail Trail extension: Hodges Cross Rd to Western Gateway Heritage State Park. Estimated cost: $10,000,000
- North Adams: Adventure Trail from Williamstown town line to Western Gateway Heritage State Park. Estimated cost: $15,000,000
- Great Barrington-Sheffield multi-use path. Estimated cost: $16,000,000
- Williamstown Bike/Hike Path northern extension: Syndicate Road to VT state line. Estimated cost: $3,200,000
- Lenox Bikeway Phase 1: Lee town line to Willow Creek Road. Estimated cost: $3,500,000
- Lenox Bikeway Phase 2: Willow Creek Road to New Lenox road. Estimated cost: $7,000,000
- Lenox/Pittsfield Connector Bikeway: New Lenox Road to Holmes Road. Estimated cost: $4,000,000
- Lee Bikeway Phase 2: Downtown Lee to Lenox town line. Estimated cost: $5,000,000

UPWP Activities:

- Continue to provide support to communities on Berkshire Bike Path implementation.
- Continue to provide technical support to Berkshire Bike Path Council (BBPC) and Bike North Berkshires including the provision of GIS-related services.
- Identify gaps in bicycle networks and develop a quality of service/bikability index
- Coordinate with MassDOT on U.S. Bike Route 7 signage installation
- Continue identifying priority areas for of on-road cycling improvements and pedestrian enhancements, including best practices based on land use context
- Participate in Bay State Bike Week and Western New England Greenway initiatives
- Continue to support communities on general Complete Streets planning and implementation, including sidewalk inventories and walkability/bikability assessments
- Coordinate with MassDOT and municipalities on implementation of state Pedestrian and Bike Plans
- Maintain and report on an inventory of bicycle facilities in the region

5b. Expand Pedestrian Infrastructure

Background

The act of walking is the most fundamental form of transportation for the human race. It is said that everyone starts and ends their trip as a pedestrian, regardless of what travel mode is used in between. For thousands of years, all roads were pedestrian infrastructure, and were shared by carts, chariots and animals alike. Along the time frame of recorded civilization (approximately 12,000 years), the current system of rigorously separating the modes of transportation within the right-of-way is an aberration that has only occurred in the past 100 years, or 0.0083%, of recorded history.

While walking long distances may not be a practical option for everyday travel, trips to visit neighbors, local parks, shops, schools, and offices can be practically accomplished by foot in Berkshire town and city centers, if barriers are removed. Major sidewalk expansion can often be costly and time-consuming, but adding enhancements and upgrades to existing sidewalk and crosswalk infrastructure also provides a large benefit to communities.

Enhance Uncontrolled Crosswalks

A painted crosswalk that is not accompanied by a traffic signal is considered uncontrolled. Perhaps the most dangerous types of crosswalks are "multiple-threat" crossings, which are defined as uncontrolled crosswalks spanning three or more lanes of traffic with no central median. The "multiple threat" originates from the person crossing needing to coordinate multiple lanes at once. Safety threats mainly come from blind spots created by stopped vehicles and driver inattention and confusion. It can be unclear for drivers what the best or lawful practice is for yielding at a multiple-threat crossing. A driver in the rightmost lane may decide to stop for a pedestrian preparing to cross, while a driver in the outer travel lane may not. The process repeats itself for the two lanes traveling in the opposite direction. The Federal Highway Administration (FHWA) has known since 2005[1] that marked crosswalks on multilane roads with no other enhancements are associated with higher pedestrian crash rates than simply unmarked crossings. However, these types of crossings continue to be built and maintained. An example of a multiple-threat crossing can be seen in **Figure 6b-1**. Crossings such as the one pictured should be prioritized for enhancement as soon as possible. Enhancing uncontrolled, multiple-threat crosswalks can take many forms:

- Lane reduction along the road to one travel lane in each direction (excluding bike or transit lanes)
- Installing a central median to provide a refuge and stopping point for pedestrians
- Installation of rectangular rapid-flashing beacons (RRFBs) or high-intensity activated walk (HAWK) signals at the crossing site
- Removal and relocation of crosswalk to a different segment of the road
- Surface treatment to enhance the visibility of the crossing (such as bricks or solid paint)
- Installation of a speed table to raise the crosswalk and slow vehicle traffic
- Installation of bump-outs or choke points to narrow the traveled way around the crosswalk

Figure 6b-1: Multiple-threat uncontrolled crossing on South Street in Pittsfield

1 https://www.fhwa.dot.gov/publications/research/safety/04100/04100.pdf

KEY ACTION

Analyze all marked, uncontrolled crosswalks in the Berkshire County region for deficiencies and recommend a standard set of enhancements.

The above strategies can be implemented in different combinations, based on the conditions of the location in question, via engineering study and judgment. While priority should be given to multiple-threat crossings, all uncontrolled crossings of two or more lanes in Berkshire County should be reviewed for ways to enhance their visibility and safety.

Two-lane crosswalks will benefit from many of the same types of enhancements, especially on roadways with higher volumes of vehicles. One such example is First Street in Pittsfield. A painted crosswalk connects a major municipal parking lot with the Pittsfield Common, the central urban park in downtown Pittsfield (see **Figure 6b-2**). Yielding compliance is low and speeds are high along this functionally deficient corridor given the surrounding context, and despite the presence of RRFB signals. The site would be a prime candidate for a central median island, as there is currently a central striped buffer space approximately nine feet wide along that segment. **Figure 6b-3** provides an example of such a recently installed crosswalk in Westfield, MA.

Figure 6b-2: Uncontrolled crossing in Pittsfield

Figure 6b-3: Uncontrolled crossing with central island, Westfield, MA

Existing Sidewalk Networks, Gaps, Walksheds, and Maintenance

According to MassDOT records, there are approximately 276 miles of sidewalk in Berkshire County as of 2022. This number has grown slightly with road projects completed in 2022. Further study of this inventory could uncover gaps between segments that can be filled, or nearby connections to local points of interest that are within reach. Using GIS software, "walksheds" of existing sidewalk infrastructure can also be analyzed. A walkshed is the geographic area that can be reached by walking for a certain time or distance, for instance, a 10-minute walk or a quarter-mile walk. Studying the land use of parcels currently served by sidewalks can show the potential for everyday walking trips in the Berkshires, and help visualize impact from expanding the network or creating new connections.

Just as crucial or even more so is ensuring that existing sidewalks are in a state of good repair, and meet the expectations of those who are able to make trips by walking or rolling. Barriers presented by sidewalks in poor condition can cause safety concerns like tripping hazards, or forcing those with limited mobility to use the road or find alternate routes for getting to their destinations.

Sidewalk dead-ends should be addressed wherever possible. One prominent example is Government Drive in Pittsfield. A study is currently underway to determine the best ways to enhance a degraded set of stairs and a dead-end sidewalk that at are found on the western end of Government Drive where it transitions to West Street. Pedestrians can often be seen walking on Government Drive to reach destinations on Columbus Ave or other areas downtown. If one is using a mobility device like a power chair or a stroller for a child, it can be a more direct route than the alternative of following West Street under the railroad tracks and looping back up Center Street.

All-season Maintenance
While fewer residents may be walking or rolling on sidewalks in the coldest winter months, it is imperative that access be available to these facilities on a year-round basis. Incentives and accountability for abutting property owners to clear sidewalks of snow is an important priority for municipal governments. Towns and cities should also explore investment in snow removal equipment for other trails and sidewalks that are publicly owned.

Recommended Projects:

- Route 7, Pittsfield: Approx. 3,200 LF of sidewalk to close the gap between MP 28.2 and MP 28.8 (Dan Fox Drive). Estimated cost: $1,200,000
- Route 7/20, Lenox: Approx. 950 LF of sidewalk to connect isolated bus stops south of the intersection with New Lenox Road, including crosswalk upgrades at existing signal. Estimated cost: $2,200,00
- Crane Avenue, Pittsfield: Approx. 550 LF of sidewalk and crosswalks in the vicinity of 898 Crane Ave, the Allendale Shopping Center, and the Ashuwillticook Rail Tail trailhead. Estimated cost: $213,000
- East Street, Pittsfield: Construct a raised crossing at the existing crosswalk immediately east of Park Square. Estimated cost: $100,000
- West Street/Government Drive, Pittsfield: Sidewalk extension or other pedestrian accommodations on Government Drive and College Way. Estimated cost: $3,000,000

UPWP Activities:

- Conduct sidewalk inventory and gap analysis
- Conduct walkshed analysis in Berkshire County
- Conduct an inventory of crosswalks in Berkshire County and categorize their current conditions and other characteristics
- Recommend priority crossings within the Urbanized Area and Urban Clusters in Berkshire County for enhancement
- Study how to utilize existing Roadsoft software to build the crosswalk inventory
- Collaborate with local Departments of Public Works and MassDOT to promulgate best practices for crosswalk installation in a standard way around the county

5c. Expand Shared Micromobility

Bike Share

Bike share is a transportation mode that has been growing in many urban areas over the past decade. The basic principle of bike share is to provide a fleet of shared bicycles for local trips around a community. The bicycles are owned by a private service provider or municipality. They can either be locked at fixed stations (or "docks") that are placed around a community, or the bikes may be free-floating. There are also hybrid systems where docks are used, but bikes may be locked in other places inside a given service area.

The two nearest bike share systems to Berkshire County are Valley Bikes in the Springfield-Northampton metropolitan area, and CDPHP Cycles in the Albany-Schenectady-Troy-Saratoga metropolitan area. These two systems each demonstrate the Docked and Hybrid approach, respectively.

- **Docked Bike Share** - The *Valley Bike Share* in the Northampton metro area uses the docked bike share system. All bicycles are locked to a docking system that is accessed by a kiosk. Users may also use a smartphone app or key card to unlock a bike. A user will request to unlock a bike, and remove the bike they choose from the dock space. At the end of the ride, the user returns the bike to any dock in the system that has a free space available. It does not need to be returned to the same dock where the ride began.
- **Hybrid Bike Share** - The *CDPHP Cycles* system in the New York State Capital Region utilizes a hybrid bike share system. The CDPHP system uses docks that are placed near areas of interest in the region. Rather than using a kiosk at the dock, users pay for and unlock a bike by using an app on their smartphone. The bikes can then be ridden and locked to any secure location within the bike share service area, or another dock. Bikes locked in locations away from a dock can also be reserved and ridden.

Most bike share systems have a fee structure that charges per hour or per minute, rather than per mile. Systems will incentivize short, local trips by charging an up-front fee for 30 or 60 minutes

of unlimited riding. If a bicycle is not returned to a dock or otherwise locked before the time window is over, an additional per-minute fee is often assessed. If a longer trip is desired, short trips may be "chained" between docks by dropping one bike off, and checking out another at the same dock and paying for a new time window.

The ideal use case for bike share is for "last mile" trips that may connect a regional transportation center (like a train station or bus terminal) with a local attraction or commercial center, like a museum, park, shopping center, or downtown district. Round-trips to grocery stores, restaurants, or other services are also possible by bike share when the service is strategically placed and the local land use and infrastructure are conducive to quick, pleasant trips by bicycle. Bike share systems are not targeted toward riders who want to use a bicycle for one or more days at a time, or travel long distances.

In 2020 and 2021, a study was conducted by the city of Pittsfield to determine feasibility and recommendations for a bike share system in the city and Berkshire County at large. The report came away with the following recommendations:

- **Bike share system:** Docked
- **Bike types:** Mix of electric and non-electric
- **Business model**: Private ownership/ operation
- **Phase 1 host cities:** Pittsfield, Adams, North Adams, Williamstown, Lenox, Great Barrington
- **Total Phase 1 Bikes available:** 301
- **Total Phase 1 Dock Stations:** 54

Berkshire County Phase 1 municipalities should begin exploring funding structures or pilot programs for a bike share system in conjunction with local employers or points of interest.

TARGET

Implement or pilot shared micromobility options (i.e. bike share or e-scooter share) in the Phase 1 host cities identified.

Scooter Rental

Beginning in 2022, and continuing in 2023, the Bird Rides company deployed electric scooters for rental in the city of Pittsfield, available from late April through late November. The scooters are able to be reserved and unlocked through a companion smartphone app. Rentals are assessed with a fee per minute of use, along with a fixed price of $1 to unlock a scooter and begin a ride. The scooters are powered by an internal battery and equipped with a headlight, taillight, bell, and front and rear brakes. The scooter's acceleration is controlled by a throttle installed on the handlebars, and the assisted speed of the scooters is limited to 15mph.

Figure 6c-1: Bird rental scooters in Pittsfield

The scooters are GPS monitored and only able to operate within a designated service area. Within this larger zone are "slow zones" where the scooter's electric motor disengages until the user is outside of the zone. Designated slow zones within Pittsfield consist of city-owned parcels, which cover all parks, parking lots, and school grounds. The overall allowable zone of scooter operation consists of the more central, interconnected neighborhoods within the city. Areas of the city that require travel on major roads or that generally lacked sidewalks were not included within the operation zone.

Expanding safe bicycling and walking infrastructure will benefit scooter riders as well. This use case should be considered in Complete Streets projects.


RTP
2024

Goal 6

Adapt for Sustainability and Resilience

A sustainable transportation system is more than being "green." It is ensuring that the needs of the future are accounted for in planning happening today. It is ensuring that our air, water and soil are not compromised to the detriment of the next generation, which is a stark reality for many longtime Berkshire County residents. Reducing greenhouse gas emission is one important component of planning for sustainability. Land use and transportation are inextricably linked, and ensuring that land is developed, conserved, and restored smartly will help sustain the economic, environmental, and social networks of the region.

Objectives:

a. Highlight the Links Between Transportation and Public Health
b. Promote Electrification
d. Mitigate Impacts on Natural Habitats

Graphic by Hrbon for the Noun Project

6a. Highlight the Links Between Transportation and Public Health

Background

Major indicators of public health have continued to trend upward through the 21st century. These include rates of heart disease, obesity, and Type 2 diabetes. The causal links between these conditions is a complex web between many factors. Research has been able to draw definitive links between increased risks of developing heart disease, obesity, and Type 2 diabetes and the types of built environments where Americans live.[1] These higher risks of chronic disease come with a price tag of lost productivity, costs of treatment, and loss of lifespans. According to the American Heart Association, the annual costs of chronic diseases amount to the following:

- Obesity: $173 billion in 2021
- Cardiovascular disease: $555 billion in 2015
- Diabetes: $327 billion in 2021

The Built Environment and Health Outcomes

Investing in infrastructure that can reduce the chances of developing these diseases, among other steps, will help to lower the costs associated with their treatment and management. Building and retrofitting our environments to make walking and cycling viable options create positive health effects, not only in terms of weight and cardiovascular management, but also in stress and mental health management. How communities are designed can create a cascading effect of behaviors and choices, biological responses, and the health effects that result from those responses (whether positive or negative). See **Figure 7b-1** for an illustrated view of these effects.

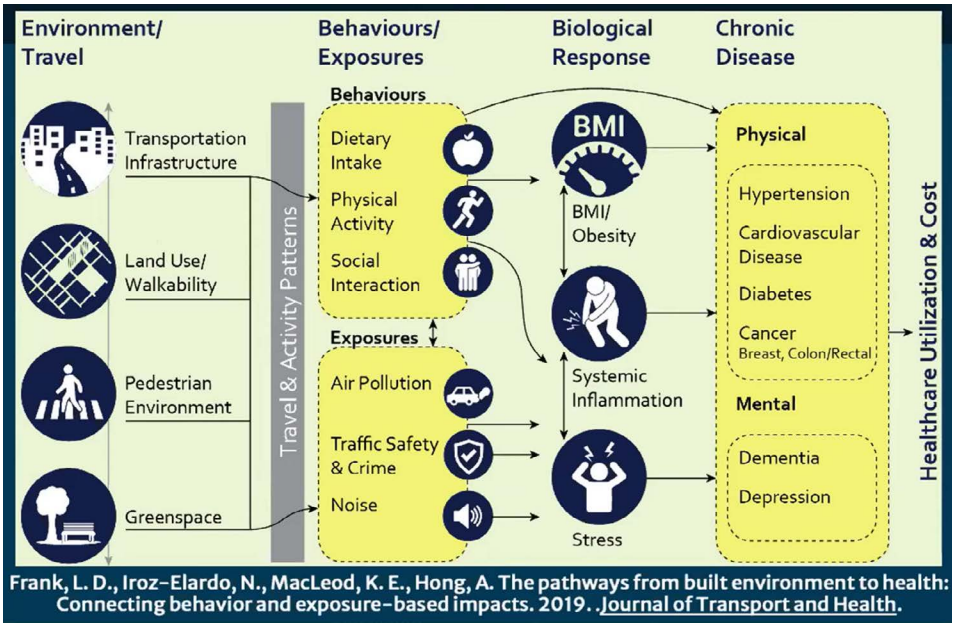
Walkable urban design promotes organic social interactions and reduces stress responses from noise pollution, isolation, and the risks associated with driving. A study (Frank et al, 2022) investigating the links between chronic disease and the built environment found the following associations:

- Living in a **moderately walkable** environment suggests up to a 27% decrease in the likelihood to have diabetes
- Living in a **walkable** environment suggests up to a 39% decrease in the likelihood to have diabetes
- Living in a **moderately walkable** environment suggests 24% increase in the likelihood of having a strong sense of community
- Living in a **walkable** environment suggests 47% increase in the likelihood of having a strong sense of community

Walkability means more than simply installing sidewalks along a street. Thoughtful street design standards must be enforced, and land development patterns conducive to making trips by foot, bike, scooter, wheelchair, or transit must be promoted and codified. Walkability also does not mean closing an area off motorized trips completely. It can include traffic calming elements that make traffic move at the desired speed for a pleasant walking environment. These elements can take the form of narrowed roadways, speed humps, roundabouts, street trees,

1 Frank, L.D., Adhikari, B., White, K.R., Dummer, T., Sandhu, J., Demlow, E., Hu, Y., Hong, A., Van Den Bosch, M. (2022). Chronic Disease and Where You Live: Built Environment Relationships with Physical Activity, Obesity, And Diabetes. Environmental International.

Figure 6a-1: Connections Between the Built Environment and Public Health



Frank, L. D., Iroz-Elardo, N., MacLeod, K. E., Hong, A. The pathways from built environment to health: Connecting behavior and exposure-based impacts. 2019. .Journal of Transport and Health.

zero-lot-line zoning codes, capping a maximum amount of off-street parking in a district, installing bicycle lanes and paths, installing transit shelters, widening sidewalks, and installing best-practice crosswalk equipment with well-calibrated signal timing.

The Complete Streets policy of MassDOT creates a starting point to implement best-practice infrastructure for road construction projects. Achieving real public health impacts through managing the built environment will require a whole-of-government approach to zoning, planning, permitting, curating, and implementing projects in every municipality.

One tool to study the current states and potential changes to public health indicators is the National Public Health Assessment Model (NPHAM)[2]. This tool uses publicly available demographic data at the Census block group level to estimate the current prevalence of chronic disease in a study area. Regional and local planners can utilize the tool to help predict statistical changes in chronic disease resulting from policy decisions that promote land uses and infrastructure changes that afford more walkable lifestyles. The tool is currently undergoing statistical analysis. When widely available, the tool could prove useful to estimate health impacts in Berkshire County from promoting walkable development.

Substance Use Recovery

Transportation to treatment and support centers for those living in recovery can sometimes prove challenging. Transportation to appointments can occur outside of transit operating hours, or locations may not be within transit service areas. Lack of vehicle ownership or a driver's license adds additional challenges. Creative collaborations between transportation service providers could open the door for more people to receive the treatment and support they need. Recovery Ride Shuttles have been proposed in areas of Pittsfield that could provide curb-to-curb service for appointments. Another proposal is to collaborate with COAs to utilize vans at times when they are not in demand. These proposals should be further considered as an element of the Coordinated Human Services Transportation Plan.

2 https://npham.ud4htools.com/index.html

Berkshire County Health Improvement Plan

The Berkshire County Health Improvement Plan (CHIP) is a collaborative effort among BRPC, Berkshire Health Systems, regional health networks, the City of Pittsfield. Volunteers in Medicine, and Northern Berkshire Community Coalition. One of the major goals of the plan is to increase opportunities and access to living a healthy lifestyle. Among the strategies and objectives listed are increasing access to outdoor recreation and exercise opportunities, increasing physical activity through engagement with the outdoors, increase resilience to climate change, and encouraging "neighborliness." Our transportation planning and design paradigms can play role in helping to accomplish these goals.

Designing our built environment to exclusively convey motor vehicles is a self-fulfilling cycle that encourages more driving. This reduces chances for residents to get outdoors in their own neighborhoods, accomplish tasks by other means like by foot, bicycle, and transit, and can reduce neighbor connections when it feels unsafe or unpleasant to be on the street.

KEY ACTION

Conduct a public health analysis for the population of Berkshire County using the NPHAM tool

UPWP Activities:

- Conduct a special study of land use and public health indicators in Berkshire County
- Consider how to incorporate addiction recovery and prevention into CHST initiatives
- Incorporate measurable public health goals into transportation planning activities
- Collaborate with Public Health and substance recovery organizations to learn how the transportation system can better serve those seeking recovery
- Document how the infrastructure in our region can be adapted to encourage more in-person connections, outdoor recreation, exercise, and public engagement

6b. Promote Electrification

Background

Transportation is the largest contributor to national greenhouse gas (GHG) emissions in the United States.[1] Internal-combustion engine (ICE) vehicles have become more efficient thanks to progressive standards such as the Corporate Average Fuel Economy (CAFE) standards, enacted by Congress in 1975. While vehicles have become much more efficient since the implementation of fuel economy standards, this would never eliminate tailpipe emissions of GHGs.

A transition to electric vehicles (EVs) would further reduce tailpipe emissions as fleets are gradually replaced. Preparing the infrastructure in Berkshire County for a transition to electric vehicle fleets is an important task in tackling the climate crisis. While transitioning vehicle fleets to electric would not, on its own, eliminate all environmental impacts from transportation, the reduction in tailpipe emissions is a benefit to ambient air quality and atmospheric GHG reductions.

Transition to and promotion of an electric transportation fleet is a massive undertaking for the region. It will require continuous collaboration and cooperation between levels of government, utility distribution firms, vehicle operators and consumers, and vehicle manufacturers and distributors.

This section will focus on recommendations for rolling out EV charging infrastructure in the Berkshire region. Unlike with gasoline fill-ups, electric charging and distribution will be more decentralized, with the vast majority of charging for EVs taking place at residential or business locations overnight or during the work day. Fast-charging infrastructure will also need to be strategically sited for longer-distance trips and in cases of emergency. As battery capacities rise and efficiencies increase, ranges for EVs are extending with every new model year.

According to the USDOT Office of Highway Policy Information (OHPI), the average number of miles driven per year per driver in the United States is 13,500 miles. This equates on average to 259 miles driven per week, or 37 miles per day. This kind of average range is easily within reach of any EV model sold in 2023. With a fast-charging network available for recharging during longer trips, range anxiety is easing among consumers. Charging EVs to achieve this kind of range is also more than likely possible with consumer-grade infrastructure installed in the home. Rolling out charging infrastructure in neighborhoods where homes may not have garages or off-street parking represents one of the more challenging hurdles in adopting widespread consumer EV adoption.

Types of Electric Vehicles

This information is referenced from BRPC's EV Charging Station Plan, published in March 2022.

In general, there are three classes of electric vehicles. These include hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and battery electric vehicles (BEVs). HEVs are more aligned with our traditional notion of ICE vehicles but have a particular architecture that allow them to achieve more range with less gas/diesel. PHEVs and BEVs take it up a notch by capitalizing on electrical power that is provided by an external source (i.e., charging station), stored in the vehicles' battery, and then used to drive the vehicle. PHEVs and BEVs require charging infrastructure, while HEVs do not.

Hybrid Electric Vehicles (HEVs)
HEVs primarily run on gasoline or diesel, but in addition have a small on-board electric motor and battery pack. HEVs do not require charging infrastructure, and gasoline or diesel is still the primary fuel.

Plug-In Hybrid Electric Vehicles (PHEVs)
Plug-in hybrid electric vehicles (PHEVs) go a step further than HEVs by relying on a larger on-board battery and electric motor for extended electric-only range. PHEVs still have an ICE that runs on gasoline or diesel. PHEVs are perfect for individuals with short commutes to work and also provide the assurance that unforeseen or longer trips are achievable when publicly accessible charging infrastructure cannot be located. As the name implies, PHEVs require charging infrastructure.

1 Congressional Budget Office (2022). "Emissions of Carbon Dioxide in the Transportation Sector" https://www.cbo.gov/publication/58566

Battery Electric Vehicles (BEVs)
A BEV, referred to in this report as EV, relies solely on an electric power train consisting of an electric motor, power electronics, and a battery pack. BEVs run entirely on electricity and have an internal architecture that has far few parts than a traditional ICE vehicle. The battery pack for a BEV is charged by plugging the vehicle into an electric power source.10

Current EVs can travel between 60 to 270 miles on a single charge, with some Tesla models exceeding 360 miles on a single charge (Tesla Model S Long Range can achieve a 379-mile range). As this technology continues to mature, we are seeing higher ranges from a single charge. The Volvo XC40 Recharge, Hyundai Ioniq, Chevrolet Bolt, Kia Niro EV, Kia Soul EV, Volkswagen ID.4, and Hyundai Kona Electric all offer around 200-250 miles of range. Other models including BMW i3, Nissan LEAF, and Mini Cooper SE don't offer as much range but should suffice for most people's daily commutes and responsibilities. For reference, EV battery capacity is measured in kilowatt-hours (kWh) – and can be thought of as the gallons of gas in a fuel tank (in terms of a traditional ICE vehicle). On average, most electric cars can travel 3 to 4 miles on 1kWh of electricity.

Types of Electric Vehicle Charging

Currently, there are three main charging station configurations that each have their own designation, referred to as 'charging-level.' Charging level reflects the power supplied from the charging unit to the EVs battery. Charging level essentially translates to the rate at which the EVs battery will be recharged, from 30 minutes to 12+ hours for a full recharge (refer to Figure 3). Typically, the faster the charger, the more expensive it is to install and operate.

AC Level 1 Charging (L1)
Level 1 charging is limited to 120 volts of alternating current (AC), and typically uses a three-pronged plug common most households. All current EVs are sold with AC Level 1 capabilities and only need a dedicated 20-amp outlet to charge. These chargers charge slowly and are generally used in home or workplace applications where EVs will be parked for long periods of time. L1 charging provides approximately 4.5 miles of additional range per hour of charging.

AC Level 2 Charging (L2)
Level 2 charging provides electric energy at either 240V AC (typical for residential applications) or 208V AC (typical in commercial and industrial applications). Commonly found in workplace, public, and some home charging applications, L2 chargers provide approximately 26 miles of additional range per hour at a 6.6 kWh charge rate. L2 charging is becoming quicker over time, with 20 kW charge rates possible on some vehicles and chargers (capable of supplying 50 miles of range per hour). L2 chargers compared to L1 chargers require additional hardware that can be mounted on the wall, a pole, or as a stand-alone pedestal and must be hard-wired to the electrical source.

Level 3 / Direct Current Fast Charging (DCFC)
DCFC utilizes direct-current (DC) energy transfer and anywhere from 400-9000V AC input to provide rapid recharges at heavily used public charging locations. Typically found in public commercial charging plazas and fleet charging applications, DC fast chargers provide approximately 40 miles of range in ten minutes at a 50kW charge rate. Put another way, DCFC stations can provide an 80% recharge in as little as 30 minutes – depending on the size of the vehicle's battery. DCFC capabilities are also becoming much quicker over time, with 150kW-350kW chargers now being deployed. Fast chargers require high-cost electric infrastructure upgrades and, according to Rocky Mountain Institute, can range in cost from $20,000 all the way to $150,000. The Department of Energy reports that DCFC's cost $10,000 to $40,000+ for equipment and $4,000 to $50,000+ for installation

Regional Charging Station Locations

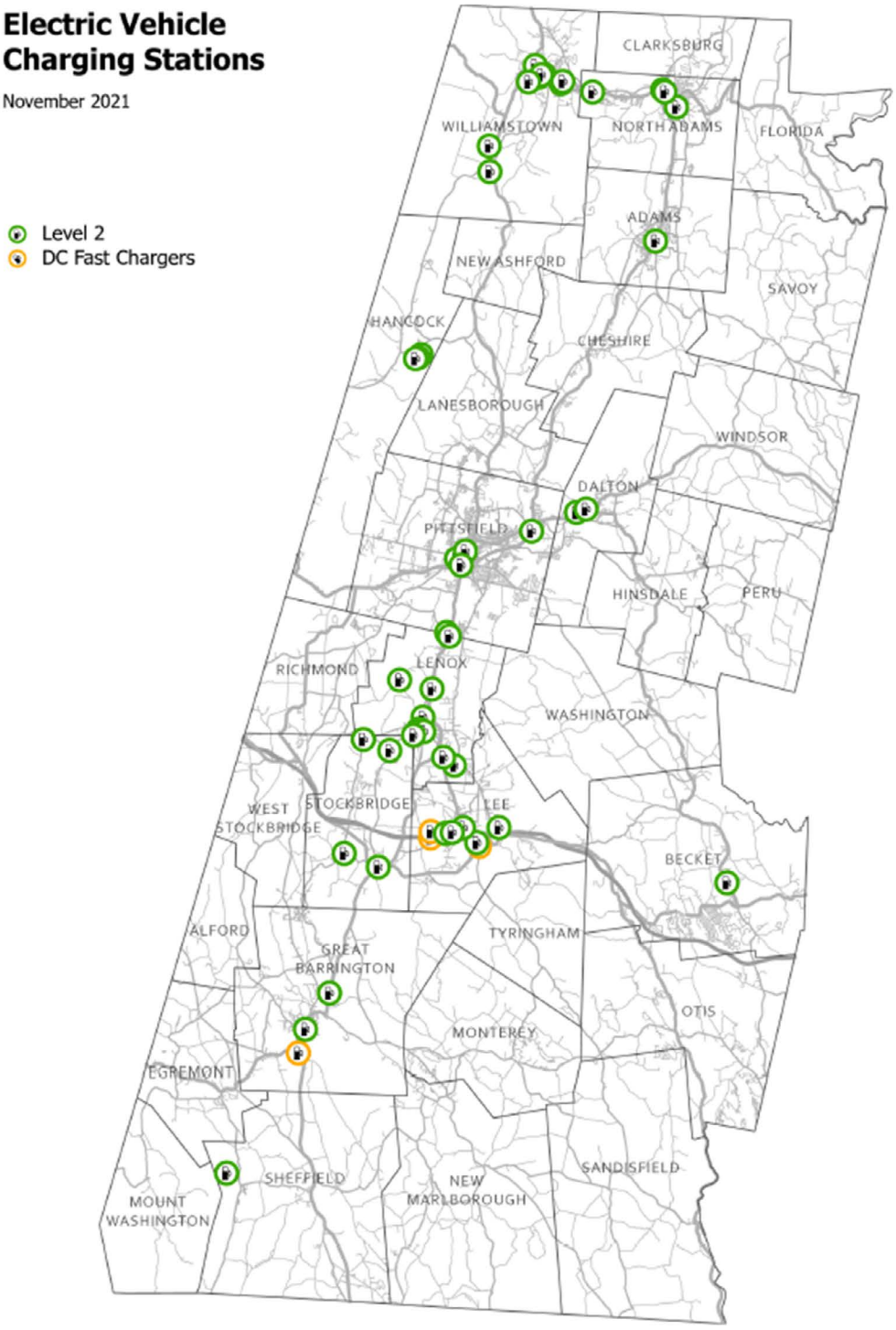
Based on data available on Plugshare.com, a free EV driver's app that allows users to locate public charging stations, there were 53 EV charging stations scattered throughout Berkshire County as of March 2022 (refer to **Figure 6b-1**). Four (4) charging sites offer Direct Current Fast Charging (DCFC) (located in Lee and Great Barrington) and the rest are Level 2 (L2) chargers. Typically, charging stations have two ports, or plugs, meaning they can charge two vehicles at once. Among the existing charging sites in the Berkshires, a total of twenty (20) DCFC ports/plugs are available and one-hundred and fifty-four (154) L2 plugs/ports are available. The heaviest concentration of stations are located in Lee, Lenox, Pittsfield, and Williamstown.

Suitable Charging Station Locations

AC L1 charging stations are most suitable for residential overnight charging or long-dwell charging at workplaces. Due to their low cost and lower power draw from the grid, L1 chargers are compatible with locations where EVs are parked all day, especially PHEVs that have smaller battery packs. This includes some workplaces, commuter lots, or long-term parking at airports. Most L1 applications are most appropriate for home use as they draw the amount of power supplied by a 3-pronged outlet common in most households.

AC L2 charging stations are typically accessible in outdoor settings, public venues, and workplaces, retail establishments, municipal parking lots and garages, college campuses, hotels, and motels – areas where an EV may be parked for 1 to 6 hours. Some L2 home charging applications are also available. L2 power requirements (240 volts) in most instances require little or no utility upgrades.

Figure 6b-1: EV Charging Stations in Berkshire County



DCFCs draw considerable power and, as a project, are much more capital-intensive and often require utility upgrades. DCFCs lead to increased electrical use and thus higher cost for the host facility. However, DCFCs are necessary for enabling inter-regional travel by EVs traveling along major highways. Moreover, as the size of EV battery packs continue to increase, fast charging will continue to play an important role in facilitating quick and convenient passenger and fleet charging. Thus, suitable DCFC sites are areas along the Interstate, National Highway System, and typically within 1-mile of arterial exits.

As EV adoption rates continue to increase, DC fast chargers will be effective in densely populated areas with a high population of EVs because they provide convenience over L2 charging (quicker) and, in theory, require a smaller footprint (less parking space) due to their ability to supply fast charges to more vehicles

At-Home Charging

According to the U.S. Department of Energy, over 80% of EV charging happens at home,

where EV owners have set up their own chargers. New EVs typically come with portable charging equipment to allow you to plug in to any 120-volt outlet. The average daily commute of about 30 miles can easily be replenished overnight with an L1 charger.

EV Implementation Resources

Municipalities, employers, and other organizations that are considering large-scale EV charging infrastructure on their property may be able to benefit from the following programs offered through utility providers and the state and federal government. More information is available in the Berkshire EV Charging Station Plan. Locations highlighted in **Figure 6b-2** represent potential locations for large-scale charging implementation, such as town halls, office buildings, and tourist attractions.

Eversource EV Infrastructure Program
Eversource provides assistance to private organizations and municipal governments to install L2 and DC Fast Chargers through their EV Charging Station Program. Through the program, Eversource advertises that it will cover 100% of the costs associated with infrastructure implementation and readiness. The only cost to the site-host (i.e., business or municipality) is the purchase of the physical charging station(s). It should be noted however, depending on the intended number of chargers that are planned to be installed, and the work needed to make the site ready – there is a chance the site host will have to pay additional costs to meet site requirements. This is highly situational, and those details will be provided prior to any commitments made by the prospective site host. In most instances, site hosts must be Eversource customers to qualify.

In state-defined Environmental Justice (EJ) communities, Eversource, in addition to paying 100% of infrastructure implementation costs, provide financial assistance (to varying degrees) to pay for the cost of the physical charging station and other electric vehicle supply equipment (EVSE).

National Grid EV Infrastructure Assistance Program
National Grid provides varied assistance, both financial and technical, to municipalities and private organizations pursuing the construction of L2 and DC Fast Charging stations. Again, prospective site hosts typically need to be existing National Grid customers to utilize the assistance.

- **Construction Costs:** Prior to construction, National Grid (most likely through vendor) will conduct a preliminary site assessment to document site needs and site suitability. In virtually all circumstances, National Grid will cover 100% of the construction costs. Among other construction costs, National Grid will pay for pulling the line from the main electrical panel up to the charging station site (site preparation). National Grid will also cover the cost of any electrical unit upgrades – if those costs are reasonably low (site-by-site basis).
- **Hardware Costs**: Hardware costs cover the actual purchase of the charging stations. In most instances, National Grid will pay for 50% of the cost for the site-host (i.e., municipality) to acquire the charging stations. However, there is a possibility that National Grid will pay for 30% - 75% (75% cost covered for public charging station) of the costs to acquire EV chargers. In Environmental Justice communities that meet 2 of the 3 EJ thresholds (income, English isolation, minority), National Grid will pay for 100% of the costs associated with acquiring and EV chargers.
- **Software Costs:** Software costs refer to the technology used to operate and track data from each charging port. Software costs represent the primary cost to the site host. National Grid stipulates that communities funded through their program must use the company's EV charging station software (subscription-based). The software, among other functions, allows National Grid to track EV charging data (data is also available to site-host), allows the site-host to set-up fees for EV charger usage (fees for usage can be determined by site-host) and allows site-hosts to implement 'charging policies.'

Bipartisan Infrastructure Law (BIL) Formula and Discretionary Grant Programs
The BIL includes a total of up to $7.5 billion in dedicated funding to help make EV chargers accessible to all Americans for local to long-distance trips. This funding is separated into two distinct buckets – a $5 billion National Electric Vehicle Infrastructure (NEVI) Formula Program and a $2.5 billion Discretionary Grant Program for Charging and Fueling Infrastructure. The NEVI Formula Program will focus on funding EVSE deployment on designated Alternative Fuel Corridors (AFCs),

particularly along the Interstate and National Highway System. The Discretionary Grant Program for Charging and Fueling Infrastructure is further broken into two separate funding buckets (Corridor Charging Grant Program and Community Charging Grant Program) which will focus on funding EVSE deployment along AFCs and in community areas. Massachusetts is expected to receive around $63.5 million in NEVI program funding over the next 5-years to support EV charging network deployment and expansion. The state will also have the opportunity to apply for additional funding through the Discretionary Grant Program for Charging and Fueling Infrastructure to further support these efforts. As of the writing of this plan, the state has yet to announce how BIL funding for EV charging infrastructure will be allocated (reinvested into existing funding programs or funding new programs) and made accessible to communities throughout the Commonwealth.

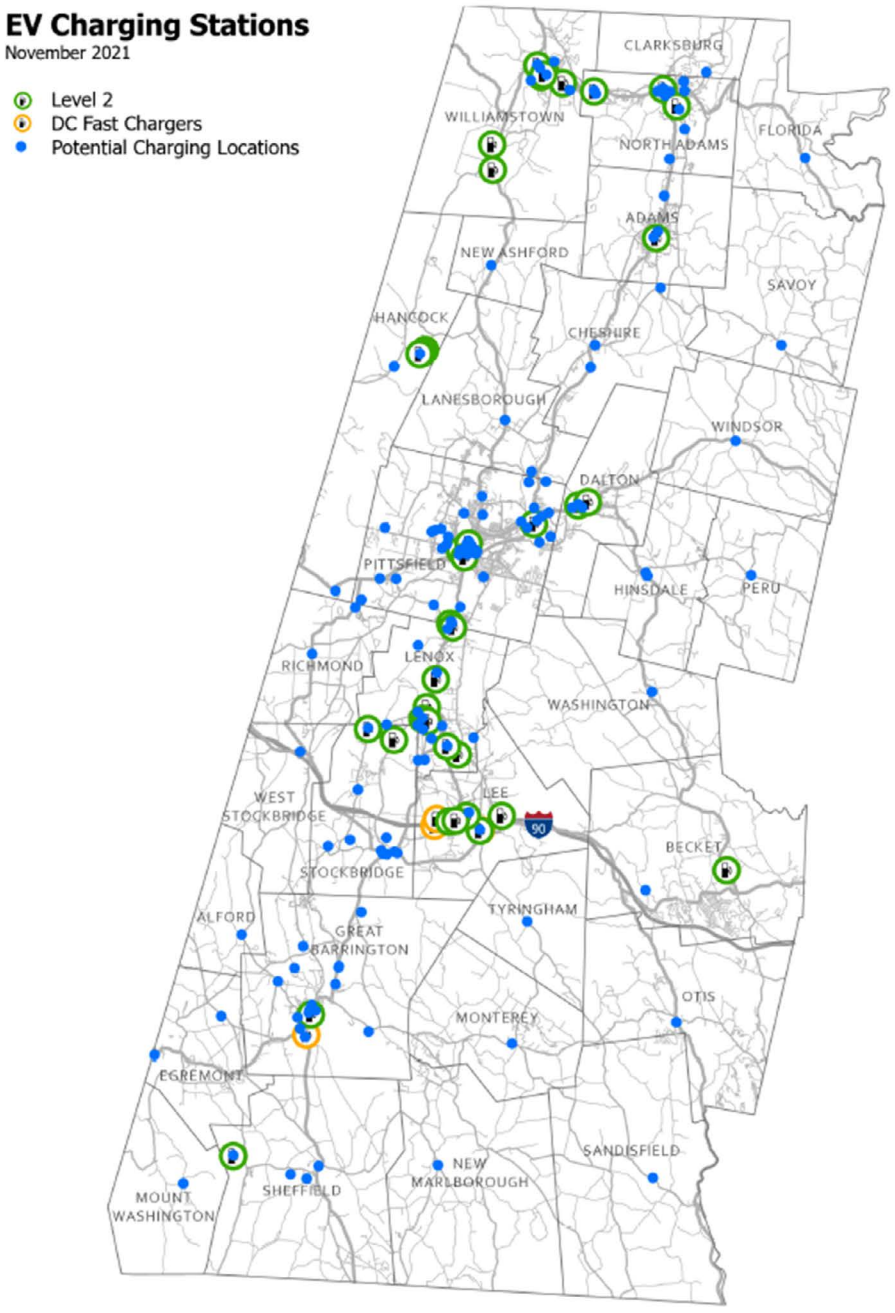
Electric Transit Fleets

Transitioning public transportation fleets from diesel or gasoline to electric represents another crucial element of reducing and eliminating tailpipe emissions moving forward. There are two major transit fleets in Berkshire County: Public transit operated by the BRTA, and school buses operated by school districts. Adapting these fleets each have their own hosts of variables to consider.

One major variable is the fuel type that is used by the buses. They can vary between hybrid-electric, battery-electric, or hydrogen fuel-cell electric buses. Each of these architectures has their benefits and drawbacks. Hybrid buses are currently in use with many regional transit authorities, and generally do not need dedicated charging infrastructure. Battery electric buses are considered the cleanest option in terms of GHG emissions, provided the electricity supplied to the buses comes from a clean source. Hydrogen fuel-cell buses are also clean at the tailpipe, but hydrogen fuel sourcing is often taken from natural gas, which emit GHGs during extraction and refinement. Ultimately, the "gold standard" for a transit fleet would be zero-emissions throughout the life cycle of power generation and consumption. This could theoretically be achieved by on-site power generation from renewable resources feeding into battery-electric buses.

Range considerations factor heavily into rural bus routes that often utilize smaller "cutaway" buses that would not be able to hold as large a battery

Figure 6b-2: Potential Future EV Charging Stations in Berkshire County



as a full-length "traditional" bus. Purchasing buses that are larger than the capacity typically demanded of certain routes to achieve the needed range may not be the best use for extremely limited transit funds. Equipping smaller buses with batteries is also possible, but more frequent recharging may be required, which would take the bus out of revenue service for recharging time during operating hours, or require a significant investment in fast-charging equipment at hub locations to reduce charging and dwell time. This is feasible from a technical standpoint, but might also be difficult to finance with limited transit funds and the number of buses in Berkshire fleets that could take advantage of the hardware upgrades.

School buses may be able to take more advantage of battery electric infrastructure, as they are typically only in use for several hours during the day, and also off-line for several months of the year. Charging could take place during the school day, so that buses are full by the time of dismissal. Schools may not need to upgrade to DC fast-charging infrastructure depending on range needs. During summer months, buses could be utilized as energy storage banks for other community needs, or to return power to the grid in peak demand times.

Hydrogen fuel cell-electric buses are an alternative option to battery electric buses. Electricity for the a bus' motor is generated using a fuel cell on board the vehicle, fueled by hydrogen gas. The only tailpipe "emission" produced is water. Hydrogen may provide a more flexible option for rural bus operators, and it also comes with benefits and drawbacks. Sourcing hydrogen gas that is free from "fugitive" emissions (that is, GHGs emitted during the extraction or refining of natural gas) can be challenging, and those emissions cannot be discounted. While infrastructure upgrades do not require high-voltage electrical grid upgrades, storage for fuel is required at an accessible depot. Transporting the fuel also generates emissions of GHGs, from trucks or pipeline construction.

There has not been a definitive benefit-cost analysis performed that compares different fuel sources for bus fleets. An urban school district like Pittsfield Public Schools (PPS) may be able to benefit from alternative-fuel buses such as battery or hydrogen fuel-cell. BRPC has worked to collaborate with both PPS and the BRTA to consider future directions to take for implementing alternative-fuel bus fleets. This work will continue, and resources for a benefit-cost analysis of bus fueling alternatives should be identified. It is important to not that any single-occupant vehicle trip diverted by using public transportation is a benefit to air quality and the environment, regardless of the fuel of the bus. Service should not be affected in such a way as to cause more trips by car to take place as a result of switching to alternative-fuel buses. Transit is a valuable resource that should remain as accessible as possible.

Recommended Programs:

- Establish a Berkshire regional EV charging station working group, including leadership from local governments and industries such as electrical distributors and suppliers
- Work with municipalities on installing publicly-accessible L2 charging infrastructure in parking areas such as curbsides and municipal parking lots
- Conduct a benefit-cost analysis of adapting local bus fleets such as BRTA and PPS to alternative-fuel buses

UPWP Activities:

- Work with regional employers and tourism destinations to assist with EV charging station awareness, planning, financing and implementation
- Continue collaboration with regional bus operators to pursue reductions in tailpipe emissions from transit vehicles.
- Establish a community liaison or partner to provide a starting-off point for interested stakeholders, communicate with local utility providers, and advocate to policy makers about the needs of Berkshire County to continue EV adoption
- Collaborate with designated Green Communities in Berkshire County to leverage Green Communities grant funding for the acquisition of EV charging equipment
- Encourage municipalities to adopt electric vehicle fleets

6c. Mitigate Impacts on Natural Habitats

Background

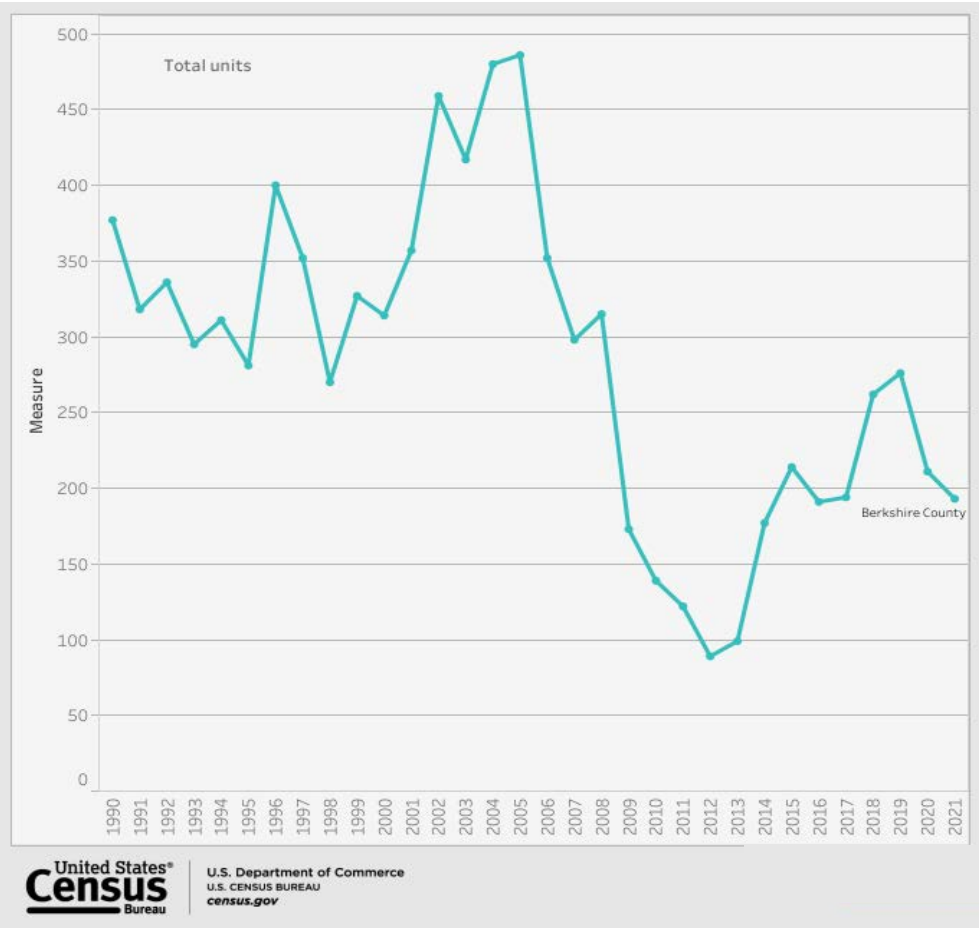
There is an intrinsic link between land use patterns and travel patterns in wealthy, developed countries around the world. Free mobility is often associated with increased quality of life and economic development. As a region grows, its transportation needs grow with it. More trips are generated as a population increases, more employers open their doors, and demand increases for delivery of goods and services.

As a population declines, more land may still be developed. This paradoxical idea has been studied in Upstate New York and can be referred to as "sprawl without growth."

As the Berkshire County population continues to decline, will this pattern also take hold? According to the U.S. Census Bureau, the numbers of building permits issued in Berkshire County has declined since 1990 (see **Figure 6c-1**), though new homes continue to be built each year as the population declines. While the county is not uniformly declining, and some towns do indeed continue to grow, it is important to consider adaptive reuse of existing buildings or developed land, and to work to keep natural landscapes and habitats protected. As population density declines, a further strain is put on aging infrastructure, as more resources are shared by fewer people. Extending utility services to new developments is costly; while existing lots and structures already served by water, sewer, electricity, and telecommunications provide a much more sustainable alternative.

It will be important to consider how the limited developed land will continue to be used in Berkshire County as the population is expected to decline over the next twenty years. Keeping natural habitats wild and protected is as much a transportation issue as it is an ecological one. Maintaining roads and bridges that serve to create barriers to the free movement of wildlife causes strains on our fragile ecosystems, especially as the climate changes.

Figure 6c-1: New Privately Owned Housing Unit Authorizations (via Building Permits). Source: U.S. Census Bureau Building Permits Survey



Berkshire Wildlife Linkage

One of the stated goals of the Berkshire Wildlife Linkage program, under the Nature Conservancy, is to provide opportunities for wildlife to safely cross all major roadways in the region. Wild animal strikes are a well-known occurrence on Berkshire roads, whether they are with large animals like deer, pheasants, and turkeys, or small animals like rodents and amphibians. For wildlife, crossing a road can be an extremely dangerous undertaking. Besides risking strikes from motor vehicles, animals are also taken outside their habitats and exposed to additional elements and predators.

Culverts and underpasses often serve not only as hydrological connections, but as wildlife connections as well. This includes both aquatic and terrestrial wildlife, who use the culvert to traverse under roadways, especially busy, elevated roads like the Massachusetts Turnpike, which creates a wall across the center of Berkshire County for wildlife. The best access points to get to the other side of this wall are culverts and underpasses.

Berkshire Municipal Vulnerability Preparedness (MVP) Projects

This information is referenced from reporting under BRPC's work with towns around the region on MVP Action Grant projects.

There are approximately 25,000 culverts and small bridges in Massachusetts - the majority of which are undersized. In Berkshire County there are some towns that have more culverts than people! Culverts that are too small can be barriers to fish and wildlife movement, can cause flood hazards for communities, need more maintenance, and are more likely to fail (flood or wash out completely) during storm events.

With no formal management system, many Berkshire communities lack a complete inventory of culvert locations. Many times these locations become known once flooding or washout issues occur.

Of all the regions in the United States, the Northeast has seen the most dramatic increase in the intensity of rainfall events. The U.S. National Climate Assessment reports that between 1958 and 2016, the Northeast saw a 55% increase in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events).

Climate projections for Massachusetts, developed by the University of Massachusetts, suggest that the frequency of high intensity rainfall events will trend upward, and the result will be an increased risk of flooding.

The Towns of Lenox, Stockbridge, New Marlborough, and the City of Pittsfield have all identified flooding as a top hazard and the existing culvert infrastructure as one of their top vulnerabilities in their MVP planning process. Culvert assessments and prioritization of replacement are a high priority action. While each community has a sense of the most immediate priority structures, none of the communities have a fully updated inventory of their culverts and a completed analysis of the flood risk potential.

Culverts and Aquatic Organisms

The North Atlantic Aquatic Connectivity Collaborative (NAACC) is a participatory network of practitioners united in their efforts to improve aquatic connectivity across a thirteen-state region, including western Massachusetts. Rivers and streams are particularly vulnerable to fragmentation -the interruption of water flow. Most of the current culverts were designed with the objective of moving water across a road. Little consideration was given to ecosystem processes such as the natural hydrology, sediment transport, fish and wildlife passage, or the movement of woody debris.

It is not surprising, then, that many culverts significantly disrupt the movement of aquatic organisms and water. NAACC inventories culverts to understand how severely they impact the Aquatic Organism Passage (AOP) in order to address barriers to wildlife movement and river and stream continuity more effectively.

Culverts that are "perched" above a water body, blocked by debris, or lacking a natural bottom surface (instead having metal, plastic, or concrete), create a more difficult environment for wildlife to move. A reduced AOP disrupts the movement of fish and other wildlife. This disruption has ecological consequences but also impacts stream connectivity, increasing flood risks. We use the AOP score to help us understand which culverts should be prioritized for replacement.

Designing and Financing Nature-Based Solutions

Nature-Based Solutions (NBS) are adaptation measures focused on the *protection*, *restoration*, and/or *management* of ecological systems to safeguard public health, provide clean air and water, increase natural hazard resilience, and sequester carbon. Incorporating NBS in local planning and design projects produces long term solutions that benefit human and natural systems.

Solutions concerning transportation infrastructure can include:

- Infiltrating stormwater through vegetated swales and rain gardens
- Replacing culverts with structures that fully span the stream width

Implementing these important projects can be challenge for smaller towns in the Berkshires with limited resources. Enhancing a small bridge or culvert to meet modern stream crossing and aquatic connectivity standards, like the one shown in **Figure 6c-2**, is more costly and technically involved than replacing a structure in-kind. This does not mean that the work should be deferred, however. More resources and incentives are needed to keep the work advancing.

Technical assistance should be provided when structures trigger a new Chapter 85 review, if the structure is being brought up to modern stream crossing standards. Additional funds for programs like the Municipal Small Bridge Program and partnering services with qualified design firms will help to get more safe crossings for wildlife built throughout Berkshire County.

UPWP Activities:

- Continue collaboration with BRPC's Environmental Planning program as well as partners like Housatonic Valley Association, Greenagers, Mass Audubon, and the Nature Conservancy to identify key culverts and wildlife crossing points
- Advocate for increased funding and technical resources for culvert and stream crossing infrastructure that will be upgraded to modern stream crossing standards
- Continue updating the inventory of culverts in Berkshire County and their AOP ratings

Figure 6c-2: A modern culvert built with adequate wildlife and stream crossing dimensions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