VERMONT
AGENCY OF TRANSPORTATION

VERMONT RAIL PLAN

DRAFT VISION, GOALS, NEEDS & POTENTIAL INITIATIVES

SUBMITTED BY
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LIST OF ACRONYMS

AAR	Association of American Railroads
AOT (VTrans)	Vermont Agency of Transportation
BUILD	Transportation's Better Utilizing Investments to Leverage Development
CAV	Cargo Air Vehicle
CCRPC	Chittenden County Regional Planning Commission
CEP	Comprehensive Energy Plan
CLP	Clarendon & Pittsford Railroad
CN	Canadian National
COVID-19	Coronavirus Disease 2019
CP	Canadian Pacific
CRISI	Consolidated Rail Infrastructure and Safety Improvements
EPCRA	Emergency Planning and Community Right-to-Know Act
FAST	Fixing America's Surface Transportation Act
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GMRC	Green Mountain Railroad
HFT	High Frequency Train
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century
MNRR	Metro-North Railroad
MPH	Miles per hour
MPO	Metropolitan Planning Organization
NECR	New England Central Railroad
NS	Norfolk Southern
OTP	On-time Performance
PAR	Pan Am Railways
PAS	Pan Am Southern
PRIIA	Passenger Rail Investment and Improvement Act
PTC	Positive Train Control
ROW	Right of way
RPC	Regional Planning Commission
SFY	State Fiscal Year
SLR	St. Lawrence & Atlantic
SRP	State Rail Plan
TIGER	Transportation Investment Generating Economic Recovery
TIP	Transportation Improvement Program
VRS	Vermont Rail System
VTR	Vermont Railway
WACR	Washington County Railroad

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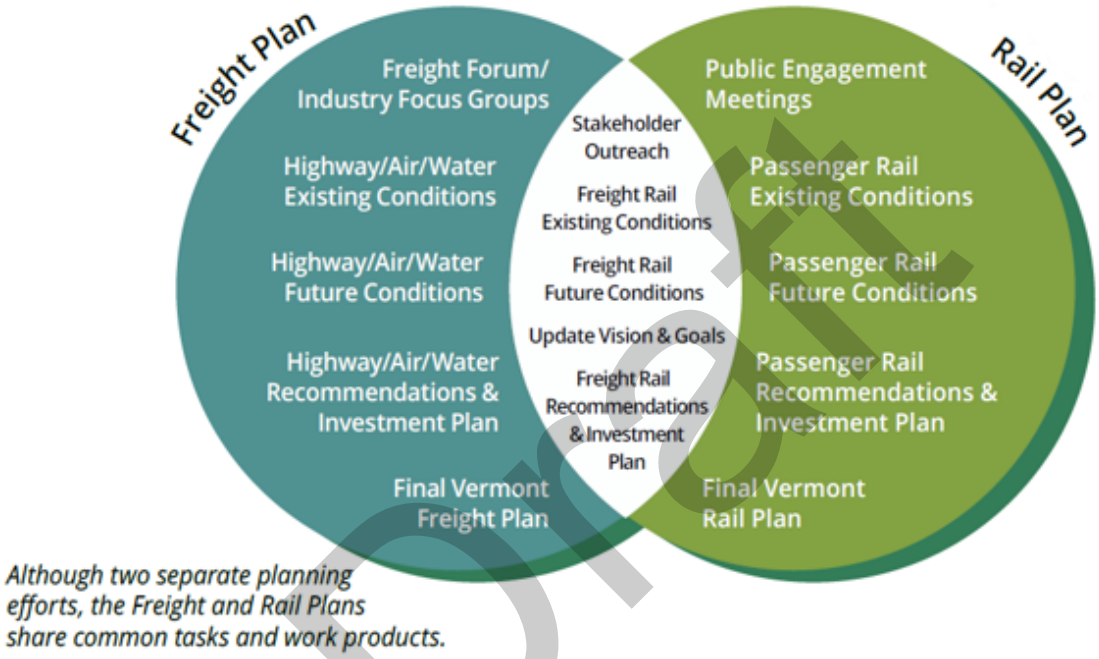
1.0 INTRODUCTION

In April 2020, the Vermont Agency of Transportation (AOT or VTrans) contracted with Cambridge Systematics to update its State Rail Plan (2015) and State Freight Plan (2012 with minor revisions in 2013, 2015 and 2017) to meet with Federal regulations under the Passenger Rail Investment and Improvement Act (PRIIA) and Fixing America's Surface Transportation (FAST) Act. Although two separate documents, there is a significant amount of overlap between the efforts as shown in Figure 1.1.

FIGURE 1.1 VERMONT FREIGHT AND RAIL PLAN ELEMENTS



Source: Cambridge Systematics, 2020.

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The State Rail Plan provides a framework for maintaining and enhancing the state rail system. It is important to note that the State Rail Plan focuses on rail freight and intercity passenger service provided by Amtrak. Commuter rail is a form of public transit that is addressed as part of public transit plans.[1]

The State Freight Plan provides a framework for maintaining and enhancing all modes of freight movement in Vermont—rail, highway, air, and wer.

This Technical Memo is the third in the set that will provide the background material and information necessary to complete the final State Rail Plan and State Freight Plan. The technical memos cover data

[1] https://vtrans.vermont.gov/planning/PTPP

analysis, forecasting, and the processes used in various steps of developing the rail and freight plans. The technical memos are available for review on VTrans' webpages for the State Rail Plan[2] and Freight Plan[3].

In addition, extensive public outreach will inform development of both plans and will meet Federal Railroad Admininstration (FRA) requirements for the Vermont Rail Plan.

The remainder of this Technical Memo contains the following Sections:

- Section 2 – Vision and Goals.
- Section 3 – Performance Evaluation and System Needs and Gaps.
- Section 4 – Additional Needs and Gaps.
- Section 5 – Potential Initiatives.
- Section 6 – Next Steps.

The next Technical Memo will focus on prioritizing and assessing the expected impacts of initiatives and programs and identifying specific recommendations for the Vermont Rail Plan and/or Vermont Freight Plan.

Additional work evaluating performance and identifying needs and gaps for non-rail freight modes (highway, water, air) will be developed separately as part of the Vermont Freight Plan update.

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[2] Vermont State Rail Plan webpage, available from: https://vtrans.vermont.gov/rail/reports.

[3] Vermont Freight Plan webpage, available from: https://vtrans.vermont.gov/planning/freight.

2.0 VISION AND GOALS

This section contains two groups of vision statements and goals and objective: one describes the vision and goals for the passenger and freight rail system, and will be used in the Vermont State Rail Plan Update; and the second describes the vision and goals for Vermont's multimodal freight transportation system, and will be used in the Vermont Freight Plan Update. Some of the contents of each subsection are repetitive, as there is overlap between the vision, goals, and objectives that will guide each plan's recommendations.

2.1 Rail System Vision and Goals

No specific vision for the rail system was identified in the last freight plan, but Vermont did develop a vision for the State's entire transportation system as part of the 2040 Long Range Transportation Plan (LRTP). That vision is that the State's transportation system is, "A safe, reliable and multimodal transportation system that grows the economy, is affordable to use and operate, and serves vulnerable populations."[4] This vision as it relates to the rail network serves as the Rail Plan vision.

After discussion with the Vermont Rail Advisory Committee (VRAC) and within VTrans, the goals of the 2015 Rail Plan were modified slightly to align with the State's Long Range Transportation Plan (LRTP) and on-going efforts to develop VTrans' Project Selection and Prioritization Processes (VPSP2).

The goals for Vermont's rail network include:

- Maintain the existing rail system (State of Good Repair).
- Expand capacity to accommodate growth.
- Increase use of the rail system use, both for freight and passenger service.
- Fund the rail system adequately and in a sustainable manner.
- Improve intermodal connectivity, both for freight and passenger service.
- Act on opportunities for ancillary economic development based on the rail system.
- Enhance safety, security, and resilience.

Important changes from the 2015 goals include:

- Adding a goal specifically for funding;
- Adding "security" and "resiliency" to the "Enhance Safety" goal; and
- Clarifying the intermodal connectivity goal to include both freight and passenger rail.

[4] https://vtrans.vermont.gov/sites/aot/files/planning/documents/planning/2040_LRTP_%20Final.pdf

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2.2 Multimodal Freight System Vision and Goals

As noted, the 2040 LRTP includes an overall vision for a safe, reliable and multimodal transportation sytsem that serves vulnerable populations, is affordable to use and operate, and grows the State's economy.

Numerous goals support the freight portion of that vision. Goal 3.1 for example is to "Improve connections between modes for passenger and freight transportation." This goal also aligns with the national performance goal included in the FAST Act to improve the national freight network, stregnthen the ability of rural communities to access national and international trade markets, and support regional economic development.

In addition, the National Freight Strategic Plan includes three strategic goals:

- Improve the safety, security, and resilience of the national freight system;
- Modernize freight infrastructure and operations to grow the economy, increase competitiveness, and improve quality of life; and
- Prepare for the future by supporting the development of data, technologies, and workforce capabilities that improve freight system performance.[5]

The prior freight plan found that overall the State's freight system was adequate to meet current and future freight needs as long as three "meta-goals" were advanced:

1. Ensure reliable truck travel times between Vermont and its major regional markets such Boston, New York City, Albany and Montreal;
2. Keep highway, rail, aviation and water transportation infrastructure in a state of good repair; and
3. Maintain viable rail service to ensure competitive truck services and preserve the capacity for future development of mid-length intermodal and transload rail services for Vermont.

These "meta-goals" were discussed with the Freight Plan Advisory Committee (FPAC) during the development of the Freight Plan Update and were confirmed to still be valid. The FPAC also suggested that adding a safety-related goal may be appropriate. This will be explored in future work on the Freight Plan Update.

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[5] https://www.transportation.gov/sites/dot.gov/files/2020-09/NFSP_fullplan_508_0.pdf

3.0 PERFORMANCE EVALUATION AND SYSTEM GAPS

Understanding progress towards meeting established passenger and freight rail performance targets provides insight into remaining gaps in the system and thus potential initiatives. Performance measures from the 2015 Rail Plan were reviewed with stakeholders and are used in this Plan to identify needs/issues and potential initiatives to address them. These measures are described in Table 3.1.

TABLE 3.1 VERMONT RAIL PERFORMANCE MEASURES AND TARGETS

Measure Category	Performance Measure	Target	Status
System Effectiveness	Freight Rail Volume originating and terminating in Vermont	3 million tons	Not being met
	Recruit new rail-using businesses	2 businesses per year	Being met
	Passenger trips in Vermont	5% increase	Not being met
	FRA PRIIA Performance and Service Quality Indicators	Above national average in half or more reporting categories	Partially being met
System Condition	Bridges meeting 263,000 pound standard	All bridges 263k	Being met
	Bridges meeting 286,000 pound standard	Improve 3 or more annually	Being met
	Rehabilitate and upgrade rail crossings	Improve 3 or more annually	Being met
	115 pound rail	5 miles annually	Being met
System Initiatives	Eliminate permanent slow orders along passenger routes	3 per year	Being met (still issues with temporary slow orders)
	Continuously welded rail along all passenger routes	Continously welded rail along all current and future routes	Not being met
	Minimum FRA Track Class 4 for all passenger routes	Class 4 operating speeds along all current and planned routes	Not being met
	Vertical clearances	Remove all obstructions to allow unrestricted double stack operations	Not being met

Source: Vermont State Rail Plan, 2015.

The sections below provide additional information for each measure and discuss where gaps remain. Section 3.1 focuses on overall system performance as well as freight-specific needs, with passenger-specific measures (Ridership and PRIIA Section 207) discussed in Section 3.2.

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3.1 Freight and Overall System Performance

This section provides information about freight-specific performance measures, as well as measures that impact the abilty to move both freight and passengers. This section builds upon the data and information presented in Tech Memo #1 Existing Conditions and Tech Memo #2 Commodity Flow and Economic Futures, while adding an assessment of apparent needs and gaps. These measures include:

- Freight Rail Volume Originating and Terminating in Vermont;
- Recruiting New Rail-Using Businesses;
- Bridges Meeting 263,000 Pound Standard;
- Bridges Meeting 286,000 Pound Standard;
- Rehabilitate and Upgrade Rail Crossings;
- Rail Weight (115 Pound Rail);
- Eliminate Permanent Slow Orders Along Passenger Routes;
- Continuously Welded Rail Along All Passenger Routes;
- Minimum FRA Track Class 4 on All Passenger Routes; and
- Vertical Clearances.

System Effectiveness

Freight Rail Volume Originating and Terminating in Vermont

This performance measure examines the amount of freight moved by rail that originates or terminates in Vermont. While through traffic generates revenue for the applicable railroad and supports investments that benefit Vermonter, goods moving directly to and from Vermont businesses is a better indicator of how the rail network is directly serving the needs of the State.

As discussed in detail in the Commodity Flow Technical Memo, the total flow of goods that touches Vermont in some way (including through traffic) is up approximately four percent since 2011 by tonnage and eight percent by the number of cars (see Figure 3.1). There has also been an increase in the amount of freight that moves inbound, rising from 14 percent of the total in 2011 to 24 percent of the total flows. Vermont Rail Systems (VRS) has noted that approximately 85 percent of the goods they carry originate or terminate in Vermont.

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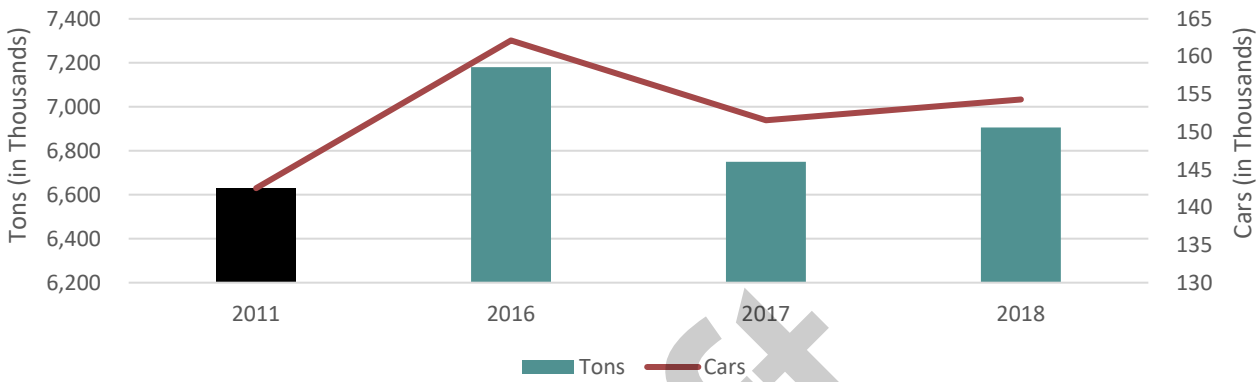
With a target of 3.0 million tons moved into or out of the State, Vermont was just below this total at approximately 2.8 million tons in 2018.[6] That total is similar to 2017 totals (2.8 million tons) and has risen from 2.2 million tons in 2012.[7]

FIGURE 3.1 VERMONT FREIGHT RAIL TOTAL TONS AND CARS



Source: STB Confidential Waybill Sample, Analysis by Cambridge Systematics (2020).

Needs and Gap

While Vermont is just short of meeting this performance target, the overall trend in freight volumes since 2011 indicates that the State will likely reach and exceed this performance target in coming years. This is bolstered by interviews with rail operators who indicate that business is steady and they see opportunities to continue to grow Vermont-based shipments through commodities such as granite tailings, wood pellets, and propane. These stakeholders also note that decreases in volume from COVID are not anticipated to last and they anticipate a return to pre-COVID levels relatively quickly.[8]

Although there are noted issues with the commodity forecasting tools and data (see Tech Memo 2), Figure 3.2 highlights top commodities by weight in 2018 and projected for 2045 based on the percent of total. Significant growth is projected for pulp, paper and allied products and nonmetallic minerals, while clay, concrete glass, or stone products will remain as a top-three commodity.

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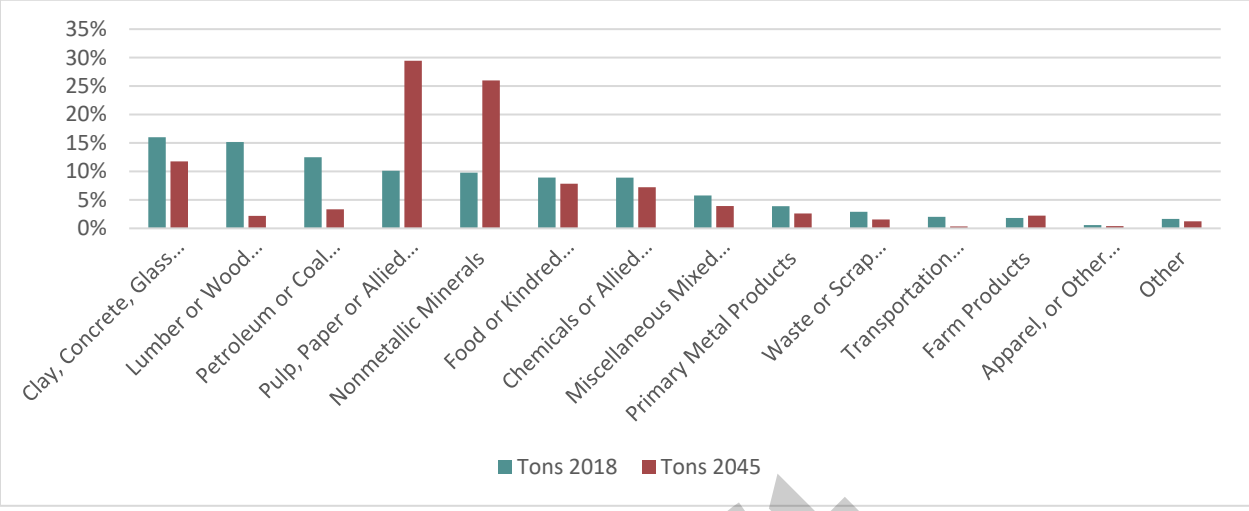
[6] STB Confidential Waybill Sample (2018).

[7] https://www.aar.org/wp-content/uploads/2019/01/AAR-Vermont-State-Fact-Sheet.pdf

[8] Interviews with VRS and Genesee & Wyoming. Freight Plan Advisory Committee Meeting, October 22, 2020.

FIGURE 3.2 DISTRIBUTION OF RAIL COMMODITIES BY WEIGHT (2018 AND 2045)



Source: STB Confidential Waybil Sample; FAF4; Analysis by Cambridge Systematics, 2020.

Other initiatives, such as Vermont's Comprehensive Energy Plan, which seeks to reduce greenhouse gas emissions, would also be furthered by a continued shift of freight to rail, indicating that efforts by Vermont agencies to support growth in tons inbound/outbound from the State could have wide-ranging benefits.

Other efforts discussed below, such as improving bridges to carry 286,000 pound cars, improving FRA Track Class, and economic development/zoning practices, will help the rail system to become more cost-competitive with other modes (principally truck).

Because of the relatively small number of freight rail shippers and receivers in the state, shifts in a single commodity can heavily impact the ability of Vermont to meet this target. For this reason, continuing to recruit new rail-using businesses and expanding the potential commodities carried is a way to continue to ensure growth towards this metric. Again, system-wide measures such as improving access for 286,000 pound rail cars and ensuring industrially zoned land near rail lines and sidings remains viable for freight use will help with this effort as well as ensuring that existing customers continue to have viable rail service into the future.

Recruiting New Rail-Using Businesses

The 2015 Vermont Rail Plan established that the vast majority of Vermont's rail tonnage is handled by a small number of rail users, that rail traffic projections are sensitive to changes to these large rail users, and that Vermont is interested in diversifying the railroad customer base so rail traffic could be less dependent on a small number of shippers. This performance measure helps gauge that growth.

A rail diversity analysis in the Commodity Flow Technical Memo noted that rail diversity, or the balance and proportion of rail traffic volumes between Vermont's rail users, has improved since 2015. **While user diversity has improved for each direction (inbound, outbound, internal), only inbound traffic can be**

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considered unconcentrated (similar to 2015). Adding new outbound customers in particular would help the State diversify and meet the freight volume performance measure (discussed above) while also protecting against the loss of inbound business.

However, specific rail users or companies are not revealed in the STB Waybill. This means that progress towards this measure must be determined through other means, including conversations with rail stakeholders. Interviews with rail stakeholders suggest that Vermont is meeting this target, with VRS indicating that they have added an average of two new rail users per year over the last five years.[9]

Needs and Gap

One challenge for this performance measure is quantitatively measuring performance. Without a consistent way to track new businesses being served by rail, VTrans must rely on input from rail stakeholders to measure progress.

In addition, rail stakeholders have noted that Vermont has a stringent land use permitting process under Act 250, which applies to a number of construction activities, including any commercial or industrial purpose on more than 10 acres. While advocates argue that this Act has been instrumental in protecting natural and cultural resources that are vital to the State, the additional cost and time required to comply with the Act can dampen the ability of freight-reliant businesses to move to or expand in the State with the resulting loss of jobs and tax revenue to other areas.

System Condition

Bridges Meeting 263,000 Pound Standard

The performance target for this measure is that all state-owned rail bridges can carry rail cars weighing 263,000 pounds. **Following the completion in the fall of 2020 of a re-routing of the WACR M&B to bypass two sub-standard bridges, this measure is being met**.

There are a number of additional bridges on the GMRC and WACR where travel is restricted to 10 miles per hour in order to accommodate 263,000 pound cars and the conditions of these bridges should be monitored to ensure they can continue to meet this standard.[10]

Needs and Gap

There are no gaps associated with this peformance measure at this time. However, continued maintenance of existing structures is necessary to ensure that bridges continue to be able to carry 263,000 pound cars.

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[9] Interview with VRS, July 22, 2020.

[10] Interview with VRS, July 27, 2020.

This is a significant improvement since 2015 where 21 structures were identified as not able to carry 263,000 pound cars.

Bridges Meeting 286,000 Pound Standard

Vermont, served primarily by short line and regional railroads, faces a challenge in updating its railroad infrastructure to accommodate heavier and larger rail freight cars. This national trend to "larger and heavier" is driven by large Class I railroads seeking to achieve greater economies of scale in the transport of freight. This standard weight change to 286,000 pound cars from 263,000 pound cars began in the early 1990s.

Vermont's performance target for this measure is to upgrade three structures per year to accommodate 286,000 pound cars. This target is being met, largely through work conducted as part of the 2018 BUILD Grant on the VTR Western Corridor. This work targeted 31 bridges (29 in Vermont) for rehabilitation or replacement in order to carry 286,000 pound rail cars. These structures are shown in Figure 3.3. Additional bridge work was completed in 2019 as part of a Transportation Investment Generating Economic Recovery (TIGER) grant to upgrade rail bridges north of Rutland to carry 286,000 pound cars.

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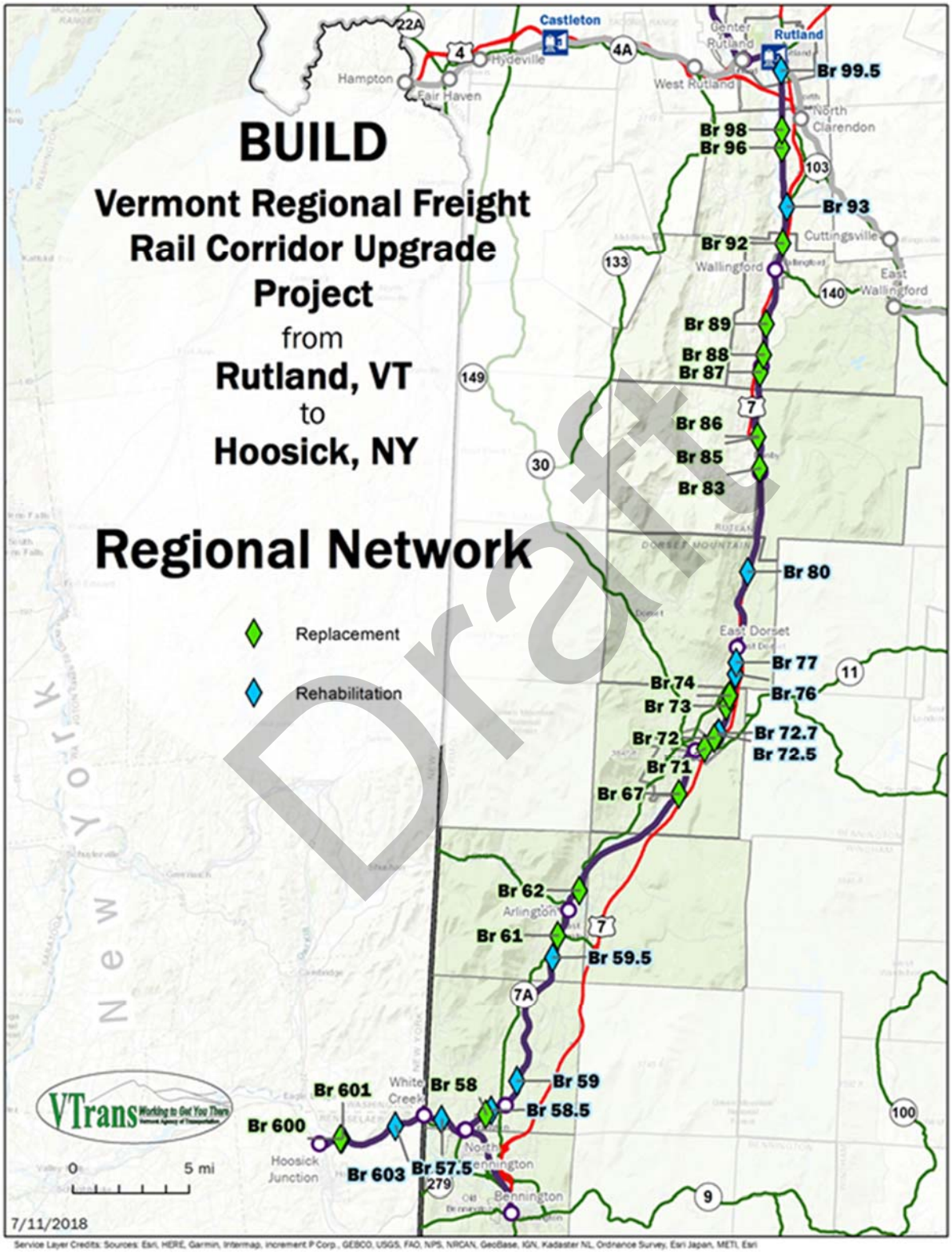
FIGURE 3.3 2018 BUILD GRANT BRIDGE WORK LOCATIONS



Source: 2018 BUILD Grant "Vermont Regoinal Freight Rail Corridor Upgrade Project"

Needs and Gap

The inability to accommdate industry-standard 286,000-pound railcars places many Vermont rail operators at a significant disadvantage. For many car types, a 263,000-pound car can carry around 100 tons of freight, whereas a 286,000-pound car can carry around 110 to 112 tons of freight. Also, the ratio of railcar equipment weight (tare) to payload weight is more favorable, with these railcars able to hold more freight. A study conducted by the Association of American Railroads (AAR) found that shifting from 263,000 pound to 286,000-pound railcars reduces operating expenses by about six percent, including the net of the increased maintenance of way expenditures.[11]

Shippers prefer not to locate on lines that can only accommodate 263,000 pound railcars, and in many instances, Class I railroads prefer not to interchange or route their freight around railroads that cannot handle 286,000 pound railcars. In addition, the lack of 286,000 pound capable lines reduces the resiliency offered by Vermont's rail network. During the closure of the Hoosac Tunnel on the PAS in Massachusetts in early 2020, the GMRC became the main detour route around the closure. However, that line is only able to handle 263,000 pound cars instead of the 286,000 pound cars that use the PAS, forcing VRS to pass on some loads (and the associated revenue) during the closure. Upgrading bridges along this route to allow for 286,000 pound rail cars is a priority for VRS.[12]

Figure 3.4 displays the load capacity of bridges in the State. **Of the 217 bridges shown, 45 (21 percent) either cannot carry 286,000 pound rail cars or do not have a load rating.[13] The State is responsible for maintaining 27 of these structures**. These are listed in Appendix A. In the long-term, Vermont should work to ensure all bridges are capable of carrying 286,000 pound rail cars. In the short-term and as shown during the Hoosac Tunnel closure, the GMRC is a critical piece of Vermont's network and as part of the regional rail system. Stakeholders noted that upgrading this route to allow for 286,000 pound cars should be a priority for the State.

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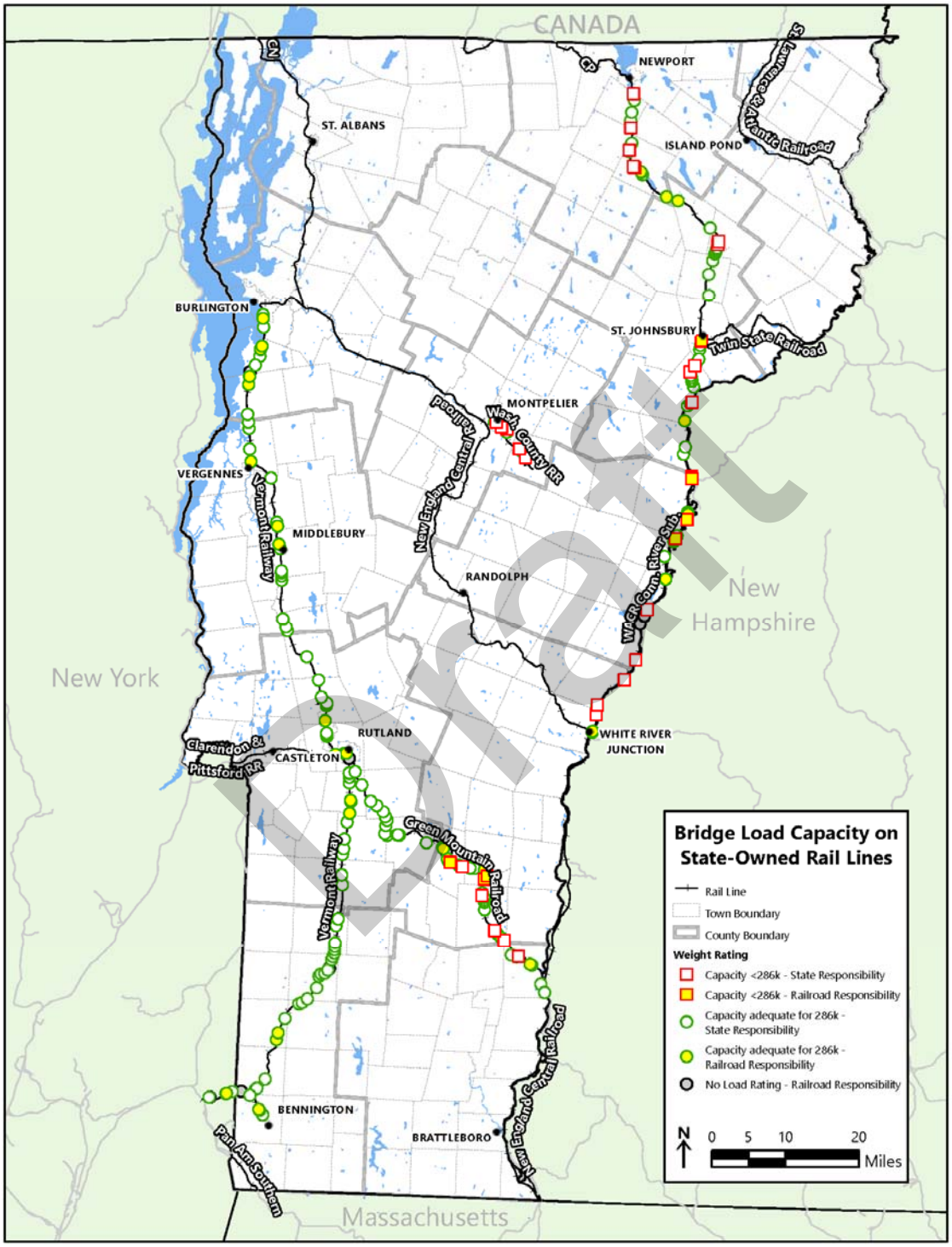
[11] M.B. Hargrove, Thomas S. Guins, and Carl D. Martland, "Economics of Increased Axle Loads: FAST/HAL Phase II Results," Report No. LA-007, Association of American Railroads, October 1996.

[12] Interview with VRS, July 27, 2020

[13] Note that bridges on the VTR south of Rutland are in the process of being upgraded to carry 286,000 through work conducted as part of a 2018 BUILD Grant.

FIGURE 3.4 VERMONT RAIL BRIDGE LOAD CAPACITY ON STATE-OWNED RAIL LINES



Source: VTrans; Analysis by VHB, 2020. Note that bridges on the VTR between Hoosick Junction, NY and Rutland, VT are being upgraded to allow 286,000 pound cars and are shown as 286,000 pound capacity, as of 2021.

As shown through the re-routing of the WACR M&B branch to avoid two structures with weight limits (see Figure 3.5), the cost to upgrade these bridges can be extensive. Reconstructing each bridge would have cost over $3 million each while the cost to return to the old alignment was considerably lower.

FIGURE 3.5 WACR MONTPELIER AND BARRE - NEW ROUTING

Source: https://railsandports.com/2020/06/wacr-vtrans-and-vrs-revive-old-montpelier-row/

Bridge rehabilitation is generally the responsibility of the bridge owner (either state or private railroad company) as part of general ownership responsibilities. The cost of rehabilitating bridges is large and must be programmed years in advance and must compete for funding with other priorities.

Vermont's railroad capital program includes inspection, analysis and rehabilitation of railroad abutments and superstructures. On lines owned by the State, per operating agreements, VTrans is responsible for bridges ten feet of length or longer over waterways and all bridges over roads and highways. The State has agreed to maintain, replace, repair and install non-track elements on these longer structures. The FRA established federal safety requirements for railroad bridges in 2010, and VTrans established a Rail Bridge Management Program in September 2012 in accordance with these regulations. These regulations mandated that annual safety inspections be performed for each bridge and that all bridges have an initial load capacity rating by September 2017.

Rehabilitate and Upgrade Rail Crossings

As described in detail in the Existing Conditions Tech Memo, Vermont is exceeding the performance target of rehabilitating or upgrading three at-grade rail crossings per year. The State has identified 25 grade

crossing projects in the 2020-2023 STIP with funding from FAST Act Section 130.[14] Additional funding for these crossings as well as additional crossing work that is not receiving federal funds is identified in the State Capital Program.[15] The FY2020 Capital Program includes a total of 36 rail crossing projects that include an improvement or upgrade of the crossing, with additional funds allocated for resurfacing.[16]

Needs and Gap

Vermont established a long-term goal in the 2015 Rail Plan of protecting all public highway-rail grade crossings on passenger rail routes with flashing lights and gates.

Various types of protection are used to control the interaction and awareness between rail and non-rail traffic at Vermont's more than 400 public at-grade rail crossings. Protection can either prevent non-rail traffic from using a crossing at the same time as rail traffic or simply increase awareness of non-rail traffic to the presence or possibility of rail traffic. The most common crossing protection is flashers (37 percent), followed by gates and lights (23 percent). Only 10 locations (2 percent) were listed as having no protection.Only 10 locations are listed as having no protection.

Between 2015 and 2019, there have been 21 incidents at highway-rail grade crossings resulting in three deaths and five injuries. Of the three fatalities, one occurred at a crossing with flashers, the other two locations had "other" and "no data" crossing protections.[18] For crashes with an injury, two locations had gates, two had flashers, and one had "no data".

The VTrans Section 130 Railroad-Highway Crossing Program was recently reviewed by the FHWA Vermont Division Office to ensure compliance with applicable Federal requirements. The Federal Highway Administration (FHWA) is the US Government agency that provides funding to State DOT's to improve safety at railroad – highway grade crossings under Title 23 United States Code section 130. In addition to funding FHWA provides policies, standards, guidelines for the correct design, assessment of safety and the proper placement of traffic control devices at grade crossings. FHWA also has requirements for a grade crossing the that is near the terminus or within another project funded through FHWA (Federal-aid project).

The VTrans Highway-Railroad at Grade Crossing Program Review focuses mostly on prioritization of Section 130-funded projects, but also goes beyond it to look at the appropriate decision making for crossing improvement projects, no matter the funding source. The findings of the program review included a number of observations as well as a number of recommendations for VTrans to consider. As a result of the program review, **VTrans has developed an Action Plan to address the recommendations and assigned a team to work toward the end goal of developing and enacting a clear VTrans policy for Railroad-**

[14] Vermont Statewide Transportation Improvement Program, SFY2020-2023.

[15] https://vtrans.vermont.gov/sites/aot/files/portal/documents/aboutus/capprog/20a/11RAIL.pdf

[16] Note that projects listed in the STIP are included in the Capital Program as well. See the Existing Conditions Technical Memo for a list of projects.

[18] The No Data location is identified as a farm crossing in the crash narrative.

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Highway Crossing Projects. The policy will identify a clear and documented Section 130 Prioritization Process, provide guidance for Non-130 Federal-Aid Projects containing Railroad-Highway crossings, provide clear guidance for developing the appropriate scope of work for both surface treatment and safety devices, and a clear process for when and how to use a Diagnostic Field Review.

The team has completed a rigorous literature review including from several states that have recently evaluated and redefined their hazard rating prioritization system. An updated **VTrans Railroad-Highway Crossing Sufficiency Rating Worksheet** with documentation for inputs and output is nearing completion and will be one element of the Section 130 Prioritization Process going forward. In addition, crossings will be screened for MUTCD compliance, screened for consistency with planning documents, and include stakeholder outreach and field review before finalizing Section 130 prioritization. **Guidance for Non-130 Federal-Aid Projects and updates to the VTrans Public Crossing Guidance Document** are also expected products of this effort. The entire Railroad-Highway Crossing Program Review Project is anticipated to be completed with the new policy in place during the summer of 2021.

It is important to note that there are also many private at-grade crossings where safety concerns may arise. Identifying and addressing safety issues at private crossings can be complicated by the need to identify and develop consensus between the various responsible parties, which include private property owners, the railroads, and in some cases, VTrans. Rail Weight (115 Pound Rail)

In addition to limits imposed by bridges, track condition may limit rail car weight. This performance measure tracks the condition of Vermont's rails. Table 3.2 below displays the ability of rail lines to accommodate 286,000 pound railcars as a function of freight density as measured in million gross tons per mile (MGT), operating speeds in miles per hour (MPH) and rail weight as measured in pounds per yard.[19]

TABLE 3.2 TRACK RAIL WEIGHT AND SPEED IMPACTS ON RAIL CAR WEIGHT LIMITS

Speed	Rail Weight	< 1 MGT	1-10 MGT
10-25 mph	100+	OK	OK
	90-99	OK	Marginal
>25 mph	≥115	OK	OK
	100 – 114	OK	Marginal
	90-99	Replace	Replace

Source: Vermont State Rail Plan, 2015.

[19] An Estimation of the Investment in Track and Structures Needed to Handle 129,844 kg (286,000 lb.) Rail Cars on Short Line Railroads, by ZETA-TECH Associates, Inc. for the FRA and American Short Line and Regional Railroad Association, 2001.

Draft

Most rail in Vermont has a weight of 100 pounds per yard or higher, except for sections of the Green Mountain Railroad and the Vermont Railway between Manchester and Rutland and the WACR M&B. Figure 3.6 below displays rail weights on the Green Mountain Railroad and the Vermont Railway, identifying areas of 90 pound rail. While trackage with this light weight rail can accommodate 286k cars, it does so at increased operating and maintenance costs, as well as higher derailment risk, irrespective of whether the bridges could handle the heavier rolling stock or not.

The target for this performance measure is the upgrading of five miles of track per year to 115 pound track. Over the past five years, this target has been met largely through work on the VTR. Approximately 34 miles of track between milepost 59 (Proctor) and milepost 120 (South Burlington) have been upgraded to 115 pounds since 2015, an average of more than six miles per year.[20]

Beyond the State-owned system, a few miles of light weight rail remain on the NECR Burlington Branch and also in Island Pond on the SLR mainline.

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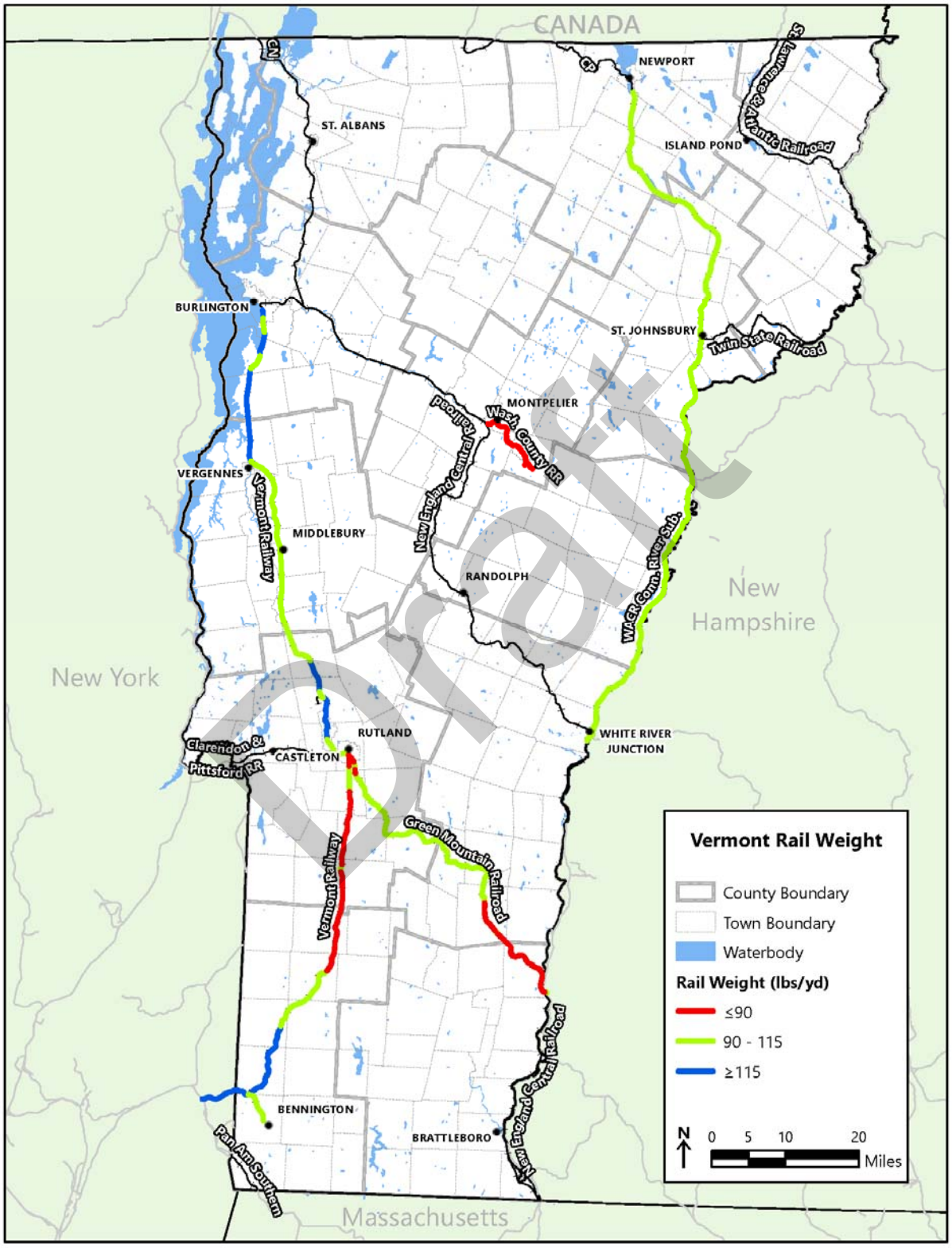
[20] Interview with VRS, July 27, 2020.

FIGURE 3.6 VERMONT STATE OWNED LINES RAIL WEIGHT



Source: VTrans; Analysis by VHB, 2020.

Needs and Gap

Research suggests that to support 286,000 pound cars at any speed or traffic density, rail lines should have at least ten crossties in good condition per standard 39 foot rail length.[21] Fifteen good ties per rail length are required for operations over ten miles per hour and or any significant freight density, while 20 good ties per rail length are required to accommodate 286,000 pound cars over 25 miles per hour. In some sections of the Washington County Railroad – Connecticut River line, tie conditions are such that the line could not support 286,000 pound railcars even at slow speeds and light density.

However, **sections of VTR track south of Rutland with less than 90 pound rail still pose problems for both freight and possible future passenger service from Albany to Rutland via Bennington**. In addition, any work undertaken to improve bridges on the GMRC should also include rail work to allow for 286,000 pound cars as this corridor provides an essential east-west alternative to the PAS route through southwest Vermont.

System Initiatives

Eliminate Permanent Slow Orders Along Passenger Routes

Slow orders are local speed restrictions that limit train speeds on specific sections of track. These restrictions can be temporary or permanent, depending on the cause. For example, some bridges may require trains to cross them at a lower speed than the surrounding track in order reduce infrastructure degredation, or specific segments of track could have slow orders due to erosion or other weather-related events.

The performance target for this measure is the removal of three permanent slow orders per year with priority given to removing them on passenger routes. According to interviews with VRS, **this target is being met with an average of at least three permanent orders removed over each of the last five years**. Some of this work is due to VTR improvements that have been partially funded through TIGER and BUILD federal grants. In addition, a number of permanent slow orders on the GMRC were removed due to work in 2019 and 2020 preparing that route to handle detours during the Middlebury tunnel construction project.[22]

Needs and Gap

Additional work remains to continue eliminating permanent slow orders in the State. One area of particular concern is on the VTR between Manchester and Rutland where track weights below 90 pounds limit speeds to 10MPH. While not on a current passenger route, this restriction limits freight movements and would impact any future expansion of passenger service on an Albany-Bennington-Rutland Western Corridor routing.

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[21] Interview with VRS, July 27, 2020.

[22] Interviews with VRS, August 10, 2020 and subsequent emails.

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Continuously Welded Rail Along All Passenger Routes

Another goal is for all passenger rail routes in Vermont to be equipped with continuously welded rail (CWR). Through CWR, rails are welded together to form one uninterrupted rail that may be several miles long. Although CWR is normally one continuous rail, it may contain joints for one or more reasons, such as to separate track segments for signaling purposes. Continuously welded rail has a number of advantages, including longer rail life, savings in general track maintenance, reduced wear and tear on equipment, reduced noise, and reduced frequency and cost of rail relays.

FIGURE 3.7 WELDED RAIL JOINT

Source: "Geschweisster schienenstoss" by LosHawlos - Own work.

Needs and Gap

For existing services, the entire *Vermonter* route has CWR, though there are segments on the NECR mainline that will need to be replaced in future years to maintain a state of good repair. For the *Ethan Allen Express*, five of the 15 miles of CLP in Vermont has jointed rail and needs to be upgraded to CWR.

For future service, sections of the Vermont Railway that have been proposed for passenger rail service (extension of the *Ethan Allen Express* to Burlington) are being upgraded to CWR as part of exisitng passenger rail initiatives. For the *Vermonter* extension to Montreal, approximately 3 miles of CN-owned track from East Alburgh to the US/Canada border would need to be upgraded to CWR to meet this requirement.

Minimum FRA Track Class 4 On All Passenger Routes

The FRA has established minimum track safety standards requirements and maintenance levels for railroad operators, which dictate the minimum track conditions that are allowable for train operations at given operating speeds. Track classes and allowable speeds are shown in Table 3.3.

Rail lines of higher FRA track classification are typically in better condition than rail lines with lower FRA track classification. If a line is not maintained sufficiently for trains to operate at the class of track associated with published timetable speeds, then slow orders must be placed on the tracks. If maintenance is not performed over a period of time, permanent slow orders must be imposed on those sections of track.

The performance target for this measure is that all track carrying passenger service be, at minimum, FRA Class 4. Figure 3.8 shows the Track Class for rail lines in Vermont.Only the NECR south of White River Junction (*Vermonter* route) meets this target, as of 2021.

TABLE 3.3 VERMONT TRACK CLASS AND ALLOWABLE OPERATING SPEEDS

Track Class	Maximum Allowable Operating Speed (mph)	
	FREIGHT TRAINS	PASSENGER TRAINS
Excepted Track	10	Not Allowed
Class 1	10	15
Class 2	25	30
Class 3	40	60
Class 4	60	80
Class 5	80	90

Source: Vermont State Rail Plan, 2015.

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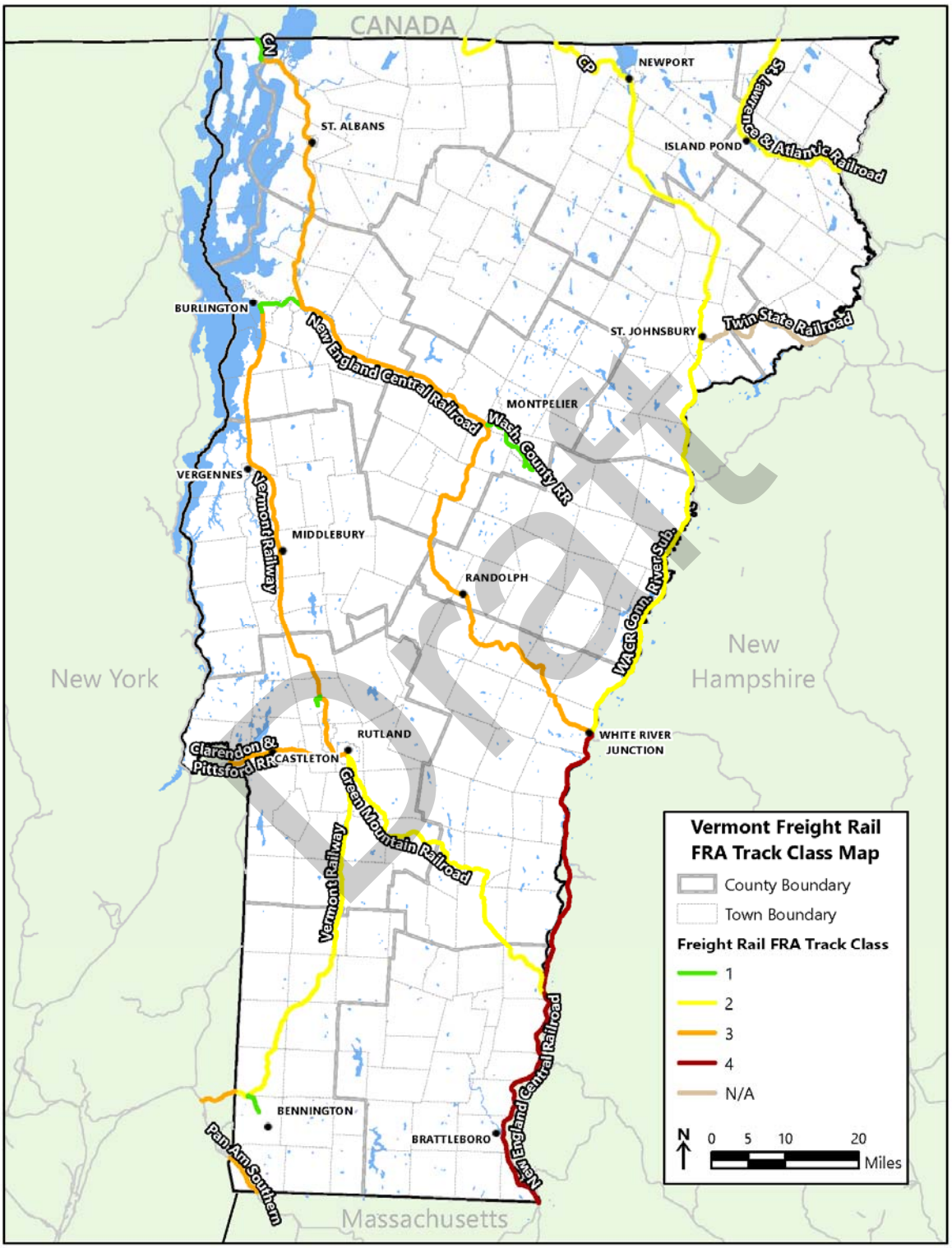
FIGURE 3.8 VERMONT FRA TRACK CLASS



Source: VTrans, Interviews with railroads. Analysis by VHB, 2020.

Needs and Gap

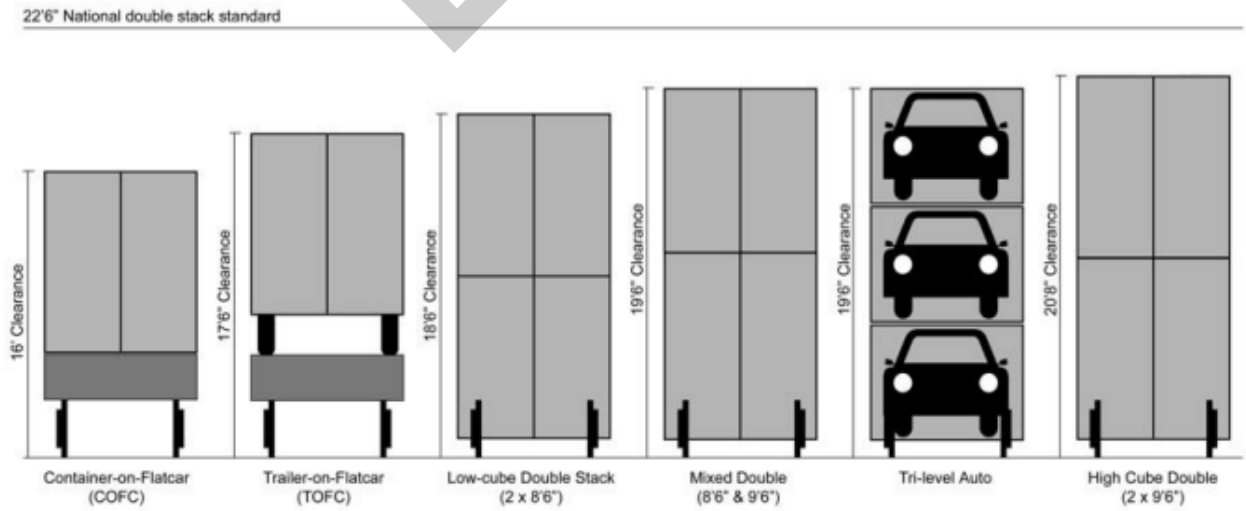
To fully meet this performance target, FRA Class 4 rail is needed on the remainder of the NECR (north of White River Junction to St. Albans and eventually Montreal) as well as the Clarendon & Pittsford (CLP) and VTR north of Rutland to Burlington. This need would expand if additional passenger service beyond the extension of the *Ethan Allen Express* and *Vermonter* (such as the Albany to Rutland via Bennington routing or a connection between Burlington and Essex Junction) is developed.

It should be noted that although Track Class 4 allows for running trains at higher speeds, it is not by itself sufficient to allow for higher speeds. The practicality of upgrading Vermont's rail lines to allow service at higher speeds is also influenced by track geometry, signalling systems, well as other conditions, including civil works, visual sight lines, and right-of-way safety risks,. Train speeds are limited by curves. Adding banking or "super-elevation" to curves can support increased train speeds. By doing so, the outer rail in a curve is raised above the lower rail, so that some of the outward centripetal force associated with negotiating a curve is offset, thereby increasing passenger comfort and avoiding the perception of being thrown around. However, while incorporating additional super-elevation is a cost-effective approach to increasing track speeds, it does increase ongoing maintenance costs (through more frequent rail replacement and lining and surfacing), and negatively affect train handling for slow moving freight trains. Since all of Vermont's passenger trains operate over trackage also used by freight, this is an important consideration.

Vertical Clearances

This performance measure tracks the number of vertical clearance limitations on the system. The AAR has established a standard of 22 foot six inches for unrestricted rail operations, though there are other configurations that require less clearance as shown in Figure 3.9.

FIGURE 3.9 RAIL VERTICAL CLEARANCE STANDARDS



Source: VTrans State Rail Plan, 2015.

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There are numerous obstacles to unrestricted double-stack service, both within Vermont and in neighboring states and Canada. Table 3.4 shows vertical clearance restrictions in Vermont.

TABLE 3.4 VERMONT VERTICAL CLEARANCE RESTRICTIONS

Railroad	Obstructions to Unrestricted Double Stack Operations
New England Central Railroad	Lowest clearance is 19'6" (US 5 in Hartland and US 7 in Georgia)
Clarendon & Pittsford Railroad	Lowest clearance is 19'2" in Rutland Center
Vermont Railways	17'8" bridge clearances in Proctor, VT (projects in design phase)
Green Mountain Railroad	Lowest clearance is 19'2" in Proctorsville
Washington County Railroad (Conn River)	Lowest clearance is 18'10" in Fairlee
Pan Am Southern	None in Vermont
St. Lawrence & Atlantic	None
Canadian National	
Canadian Pacific	One clearance restriction

Source: Interviews with rail operators, 2020.

Needs and Gap

There are still significant hurdles to achieveing unrestricted double-stack clearance in Vermont.

Intermodal rail services typically link large metropolitan areas. In the case of intermodal services that cross Vermont, the State would most logically provide a link between New England, Quebec, and Atlantic Canada. Intermodal service between Montreal and Worcester crosses Vermont on the NECR. PAS service on the Patriot Corridor cuts through the southwest corner of Vermont.

Similar to the case for removing weight limitations, improving the clearance of Vermont rail lines is limited by the clearance of these lines as they pass into neighboring states. The status of New England gateways are as follows:

1. The New England Central has identified 39 obstructions that would need to be cleared in Massachusetts and Connecticut in order to allow unrestricted double stack operations, along with 14 clearance in Vermont. The total cost of clearing the New England Central to unrestricted double stack operations would be about $21.98 million, of which $5.2 million would be associated with obstructions located in Vermont.
2. CP's Canadian Subdivision that runs parallel to the Vermont/New York border in New York is cleared to unrestricted double stack operations except for the segment between Ticonderoga and Whitehall, which is limited to 19' 2" with a restriction in Whitehall, NY.
3. The PAS line between Ayer, Massachusetts and Mechanicville, New York is cleared to 19' 6" but not unrestricted double stack operations.

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4. The Commonwealth of Massachusetts completed an initiative to raise the clearance of CSX's Boston and Albany route that runs east/west in the State to unrestricted double stack operations from the New York border to Worcester, MA. Previously, trains had to stop in Syracuse, NY to either add or remove a second container from each car. The work included increasing vertical clearances at 31 locations in Massachusetts and reduced transit times by as much as 24 hours.[23]

Given that the NECR is Vermont's only rail line that currently handles double stack intermodal cars, increasing the clearances on this line is a logical first step. The CN/NECR service route would benefit from unrestricted double stack operations. CN must reshuffle containers bound for Worcester, Massachusetts in Montreal to accommodate clearance limitations on the NECR and Providence & Worcester that prevent the operation of double-stacked domestic containers. Saving this step would allow for the NECR route to be more fully integrated into CN's doublestack network, thereby offering the potential of a competitive intermodal option between southern New England and major Canadian and US trade centers.

3.2 Passenger-Specific Performance Measures

This section examines performance, needs, and issues directly related to passenger rail performance measures identified in the 2015 Rail Plan and carried forward in this Rail Plan Update. These two measures are:

- Passenger Trips on Amtrak; and
- Amtrak/PRIIA Section 207 Measures.

Passenger Trips on Amtrak

This performance measure tracks overall Amtrak ridership in Vermont with a target of a 5 percent annual increase in ridership.

Amtrak ridership on the *Ethan Allen Express* and *Vermonter* has decreased from a high in FFY2014, as shown in Figure 3.10. The top four stations in Vermont by ridership—Essex Junction, Brattleboro, White River Junction, and Rutland—account for approximately two-thirds of the total ridership, and all except for Essex Junction had a decrease in passenger trips during this time.. Nationally, Amtrak ridership is up slightly to 32.5 million passengers in FFY2019 from 31.3 million passengers in FFY2016 (3.8 percent growth).[24]

During outreach, stakeholders noted that recently completed projects in Connecticut and Massachusetts may have contributed to a decline in ridership due to service interruptions or delays. Significant work on the

[23] https://www.csx.com/index.cfm/about-us/media/press-releases/csx-opens-new-englande28099s-first-double-stack-cleared-route/?mobileFormat=true

[24] Amtrak Ridership and Revenue Fact Sheets.

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New Haven-Springfield High-Speed Corridor was completed in 2018, including the addition of double-track along various segments of this 62-mile corridor.[25]

Looking forward, it should be noted that past ridership trends may be a poor indication of ridership in 2020 and future years given the COVID-19 pandemic. This is especially true of 2020 ridership as Amtrak service to Vermont has been suspended since March 2020 with no confirmed date of return (as of December 2020).[26]

FIGURE 3.10 AMTRAK RIDERSHIP (FFY2013-2019)

Source: Amtrak, 2014 data from Vermont Transportation Board. Note, ridership includes all Vermont stops on the Ethan Allen Express *and* Vermonter*, and the Claremont, NH stop on the* Vermonter.

Draft

Needs and Gap

Immediate needs for this performance measure revolve around re-starting existing Amtrak service on the *Ethan Allen Express* and *Vermonter* and improving marketing and multimodal connections to re-capture existing and drive additional ridership. However, the impact of COVID-19 on ridership once service is re-established is difficult to predict and will likely depend in large part on factors beyond Vermont's control (such as people's attitudes towards transit).

[25] https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/statefactsheets/CONNECTICUT19.pdf

[26] https://www.vpr.org/post/amtrak-hasnt-run-vermont-march-and-state-wont-commit-restart-date#stream/0

Beyond the performance measure established in the Rail Plan, the 2011 Vermont Comprehensive Energy Plan (CEP) set a goal of increasing Vermont-based passenger rail trip to 400,000 annually by 2030. The 2016 Plan maintains this goal as part of an overall strategy to "Reduce total transportation energy use by 20 percent from 2015 levels by 2025."[27] This would represent a more than quadrupling of ridership over recent levels.

Based on recent Vermont ridership trends as well as national Amtrak ridership trends, additional service *may be* required. In order to meet Vermont's CEP goal of quadrupling ridership by 2030, additional service *will be* needed.

To explore the potential ridership impacts of potential new services, eight scenarios were defined and the potential demand modeled. To reflect the high degree of uncertainty around COVID-19 impacts and socio-economic growth, "High" "Medium" and "Low" growth forecasts were developed for all scenarios through 2040. This process is described in detail in Tech Memo 4 (Passenger Rail Ridership Forecast).

Amtrak/PRIIA Section 207 Measures

PRIIA Section 207 requires that Amtrak report certain performance metrics for train routes in order that Amtrak, elected officials, and other policy makers may work together to improve the national passenger rail network.[28] The Section 207 performance metrics for the *Ethan Allen Express* (entire route from Rutland to/from New York City) are reported in Table 3.5 while performance measures for the *Vermonter* (north of New York City) are reported in Table 3.6. These results are the average of the four most recent quarterly reports from FFY2018 Q4 through FFY2019 Q3. The Section 207 performance metrics are organized into categories: financial, on-time performance, train delays, and customer service. The financial metrics are measured the basis of continuous year-over-year improvement over the prior eight quarters, a rolling metric, while other metrics are measured against standards. The latest information, including current and past Section 207 reports is available from the FRA Rail Service Metrics and Performance website at https://railroads.dot.gov/passenger-rail/amtrak/rail-service-metrics-and-performance-reports.

Neither service met all PRIIA-defined goals over the last four quarters, with continous financial improvement being a concern for the *Ethan Allen Express* and delay a concern for the *Vermonter*. Both routes received mixed customer service indicator scores, with on-board food service scoring lowest of the categories monitored.

Draft

[27] https://outside.vermont.gov/sov/webservices/Shared%20Documents/2016CEP_Final.pdf

[28] The latest information, including current and past Section 207 reports is available from the Federal Railroad Administration Rail Service Metrics and Performance website at https://railroads.dot.gov/passenger-rail/amtrak/rail-service-metrics-and-performance-reports

TABLE 3.5 *ETHAN ALLEN EXPRESS* PRIIA SECTION 207 PERFORMANCE

Category	Metric	PRIIA Section 207 Standard	Last Four Quarters Average (2018 Q4-2019 Q3)	Met PRIIA Goals?
Financial	Percentage of operating costs recovered by passenger related revenue (last 8 quarters)	Continuous Improvement	83%	No (was 83% in 2013-2014)
	Passengers per train mile (last 8 quarters)	Continuous Improvement	144	No (was 164 in 2013-2014)
On-Time Performance	Change in effective speed from FFY2008 baseline (mph)	>=0	4.4	Yes
	End point on time performance	80%	92.6%	Yes
	All stations on time performance	80%	89.0%	Yes
Train Delays	Host Responsible Delays – minutes per 10,000 train miles (by each host railroad)	<=900	MNRR* – 1,635.8	No
			Amtrak – 93.8	Yes
			CP** – 690.5	Yes
			VTR – 317.0	Yes
	Amtrak Responsible Delays – minutes per 10,000 train miles for off-NEC corridors	<=325	208.3	Yes
Customer Service Indicators	Overall Service	82	85.0	Yes
	Amtrak personnel	80	84.5	Yes
	Information given	80	76.8	No
	On-board comfort	80	82.5	Yes
	On-board cleanliness	80	74.0	No
	On-board food services	80	67.8	No

Source: https://railroads.dot.gov/passenger-rail/amtrak/rail-service-metrics-and-performance-reports

**MNRR – Metro-North Railroad. **CP – Canadian Pacific*

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TABLE 3.6 *VERMONTER* PRIIA SECTION 207 PERFORMANCE

Category	Metric	PRIIA Section 207 Standard	Last Four Quarters Average (2018 Q4-2019 Q3)	Met PRIIA Goals?
Financial	Percentage of operating costs recovered by passenger related revenue (last 8 quarters)	Continuous Improvement	103%	Yes (was 49% in 2013-2014)
	Passengers per train mile (last 8 quarters)	Continuous Improvement	145	Yes (was 134 in 2013-2014)
On-Time Performance	Change in effective speed from FFY2008 baseline (mph)	>=0	3.5	Yes
	End point on time performance	80%	85.0%	Yes
	All stations on time performance	80%	76.2%	No
Train Delays	Host Responsible Delays – minutes per 10,000 train miles (by each host railroad)	<=900	MADOT* – 2,468.5	No
			MNRR** – 2,801.5	No
			NECR*** – 1,142.0	No
	Amtrak Responsible Delays – minutes per 10,000 train miles for off-NEC corridors	<=325	334.3	No
	Amtrak Responsible Delays – minutes per 10,000 train miles for the NEC	FFY2018: 475 FFY2019: 475	412.3	Yes
Customer Service Indicators	Overall Service	82	80.0	No
	Amtrak personnel	80	81.8	Yes
	Information given	80	75.8	No
	On-board comfort	80	81.0	Yes
	On-board cleanliness	80	73.0	No
	On-board food services	80	64.3	No

Source: https://railroads.dot.gov/passenger-rail/amtrak/rail-service-metrics-and-performance-reports
**MADOT – Massachusetts DOT. **MNRR – Metro-North Railroad. ***NECR – New England Central Railroad.*

On-time performance (OTP) and delay are a contributor to a number of the other metrics. For example, trains that do not run on time are more likely to see reduced ridership and have lower customer satisfaction scores. Amtrak defines OTP as the total number of trains arriving on-time at a station divided by the total number of trains operated on that route. A train is considered on-time if it arrives at the final destination within an allowed number of minutes, or tolerance, of its scheduled arrival time.

Causes for Amtrak train delays can be attributed to a number of reasons including the host railroad, Amtrak itself, or other delays such as law enforcement actions. The delay profile reported by Amtrak for the *Vermonter* and the *Ethan Allen Express* for FFY2015-2019 is provided in Figure 3.11 and Figure 3.12 respectively. Note that these figures do not reflect any outright service cancellations.

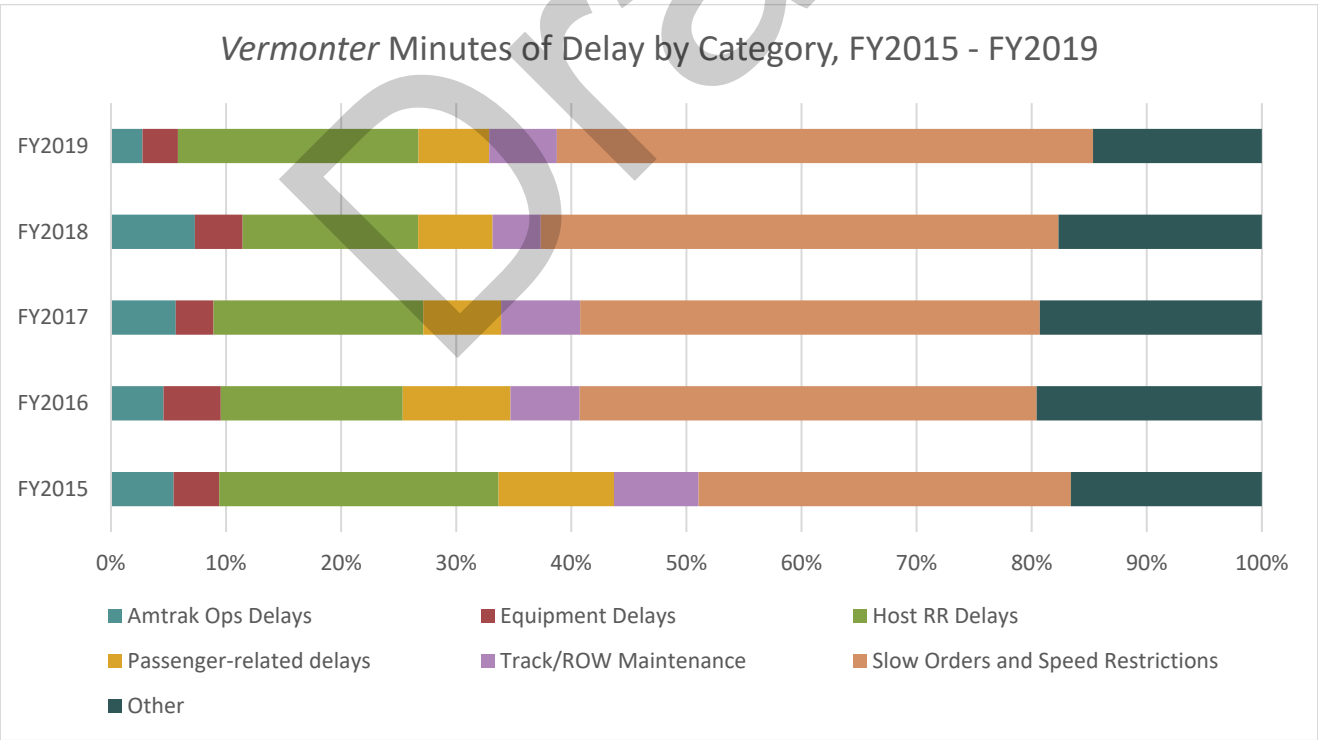
Draft

Slow orders and speed restrictions are the largest contributing factor to delay on the *Vermonter*, representing between 30 and 50 percent of the total delay in each of the five years. According to Q3 FFY 2019 statistics, approximately 61 percent of those delays occurred on the Massachusetts DOT-owned segment of the route between Springfield and East Northfield, with the remainder split between Metro-North Railroad and the NECR. This aligns with stakeholder input which identified delays associated with projects in Massachusetts and Connecticut as a potential reason for the decline in Vermont ridership. Host railroad delays and "Other" are the two other top causes of delay.

For the *Ethan Allen Express*, host railroad delays are responsible for the majority of delay minutes across all five years at just over 50 percent in each year. Most of these delays occur on Metro-North Railroad between New York City and Poughkeepsie and Candian Pacific Railway territory in the Capital District of New York State. Often, Amtrak trains delayed on one of those two railroads miss the intended time window for entering the territory of the other, resulting in additional delays.

With track improvements in Connecticut and Massachusetts largely complete in 2020, on-time performance on the *Vermonter* should improve once it resumes operation. However, it is important to note that major infrastructure projects are just getting underway on Metro North, as well as the ongoing need to keep up with maintenance on the NECR. On the *Ethan Allen* route, an increased focus on managing host railroad delays could produce significant improvements in OTP

FIGURE 3.11 CAUSES OF DELAY FOR *VERMONTER (FFY2015-2019)*



Source: Amtrak

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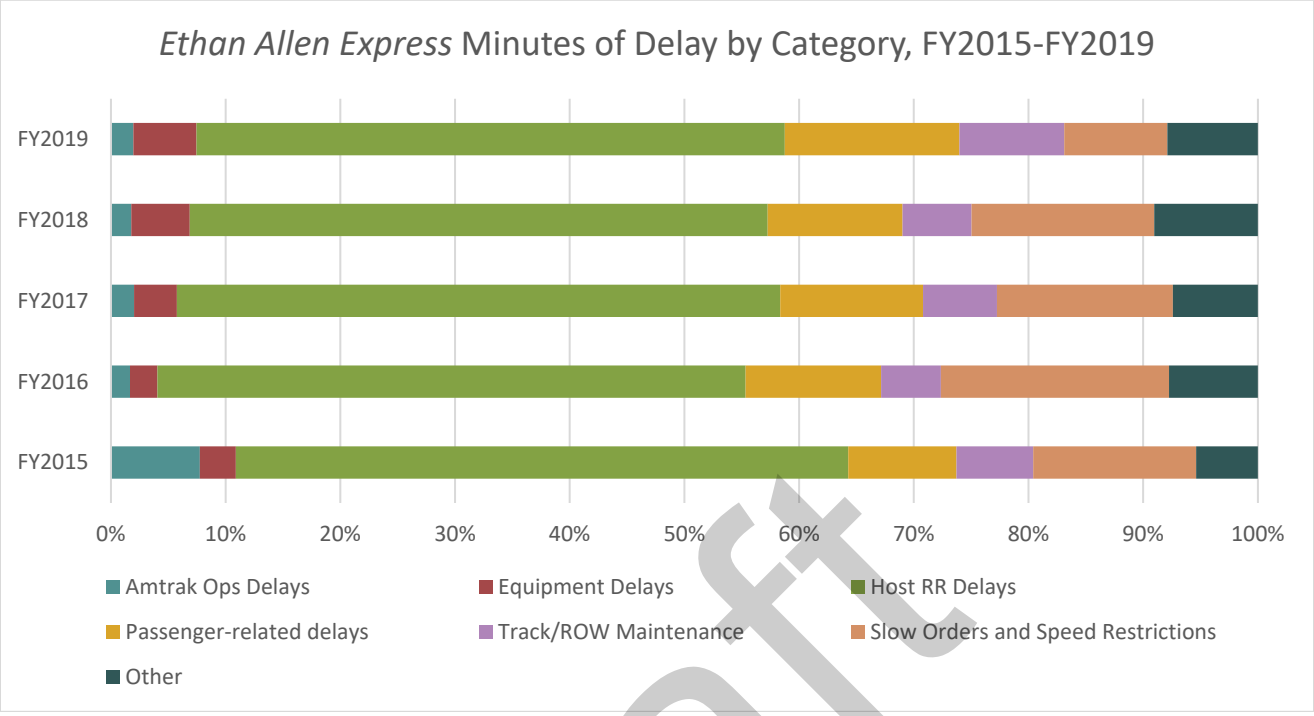
FIGURE 3.12 CAUSES OF DELAY FOR *ETHAN ALLEN EXPRESS (FFY2015-2019)*



Source: Amtrak

Needs and Gap

Both services are failing to meet a number of the PRIIA Section 207 goals. The *Ethan Allen Express* is meeting its Section 207 on-time performance targets, though the train is still impacted by high host railroad delay along Metro-North trackage from New York City north to Poughkeepsie. The *Ethan Allen Express* is also failing to meet both financial metrics: percent of operating costs met and passengers per train mile. The *Vermonter* is meeting existing financial metrics, but delays and associated ability to meet the "all stations on time performance" metric are cause for concern. In addition, both services have mixed scores from passenger surveys.

The most impactful has been **on-time-performance** and **travel time,** which affect both operating costs and revenues. Delays directly affect costs that must be borne by Vermont, including additional fuel and crew costs, while dampening revenues resulting from a perception of unreliable service. Scheduled travel times likewise affect operating costs, with longer trip times affecting crew and fuel usage, and potentially equipment utilization. Reduced travel times can improve the attractiveness of the service vis a vis other alternatives, particularly private automobile, the most common competitor in most of the shorter haul markets served by Vermont's trains. **It is imperative that Vermont continue to work with Amtrak and the other state partners to continue to identify and implement ways to improve on-time performance and travel times.**

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For example, the trip times on the *Vermonter* have been reduced as a result of infrastructure improvements in Vermont, Massachusetts, and Connecticut. Earlier, in 2012, NECR and the State of Vermont completed track upgrades along the segment of the *Vermonter* located in Vermont and New Hampshire. These led to a reduction in the in-state travel time of the *Vermonter* by around 25 minutes and improved reliability. Other enhancements to the *Vermonter* route in Massachusetts and Connecticut have improved trip times as well. In Massachusetts, between 11 and 45 minutes of travel time were eliminated in 2015 when the train was shifted from a circuitous route through Amherst and Palmer back to its historical route along the Connecticut River between East Northfield and Springfield. Additional work between New Haven, CT and Springfield, MA shaved another ten minutes off the *Vermonter*'s travel time and increased reliability, with opportunities for significant further reductions in the near future.[29]

Another challenge facing Vermont is that of **funding for State-supported passenger trains.** PRIIA Section 209 greatly increased the allocated costs that states must cover paying for Amtrak "corridor" intercity passenger rail services.

Draft

[29] https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/statefactsheets/VERMONT19.pdf

4.0 ADDITIONAL RAIL NEEDS AND GAPS

In addition to the performance measure-related needs and gaps discussed in the previous sections, there are additional areas where initiatives could help meet rail needs in the State. Some of these areas are specific to freight rail, some are specific to passenger rail, and some apply to both areas. These areas of need include:

- Resiliency/Climate Change.
- Freight as a "Good Neighbor".
- Asset Management.
- Economic Development and Industrial Access.
- Passenger Stations.
- Passenger Rail Equipment.
- Deployment of PTC.
- Coordination with Other Rail Plans.

4.1 Climate Change and Resiliency

Freight and passenger rail require substantially less energy and emit fewer tons of greenhouse gases (GHGs) than truck and automobile transportation. Freight trains can move a ton of freight more than 470 miles on one gallon of diesel fuel.[30]

Compared to automobile transportation, rail emits less than one-third the volume of greenhouse gases on a pounds-per-passenger basis. As Figure 4.1 shows, rail emits 90 pounds of carbon dioxide per passenger on a trip from Essex Junction to New York City, and 67 pounds per passenger on a trip from Rutland to New York City, compared to 272 pounds and 228 pounds, respectively, for an automobile trip between the same points. Illustrated alternatively, an automobile traveling from New York could only travel a short distance before emitting the same volume of carbon dioxide as a rail trip between New York and the selected Vermont destinations.

[30] https://www.aar.org/climate-change

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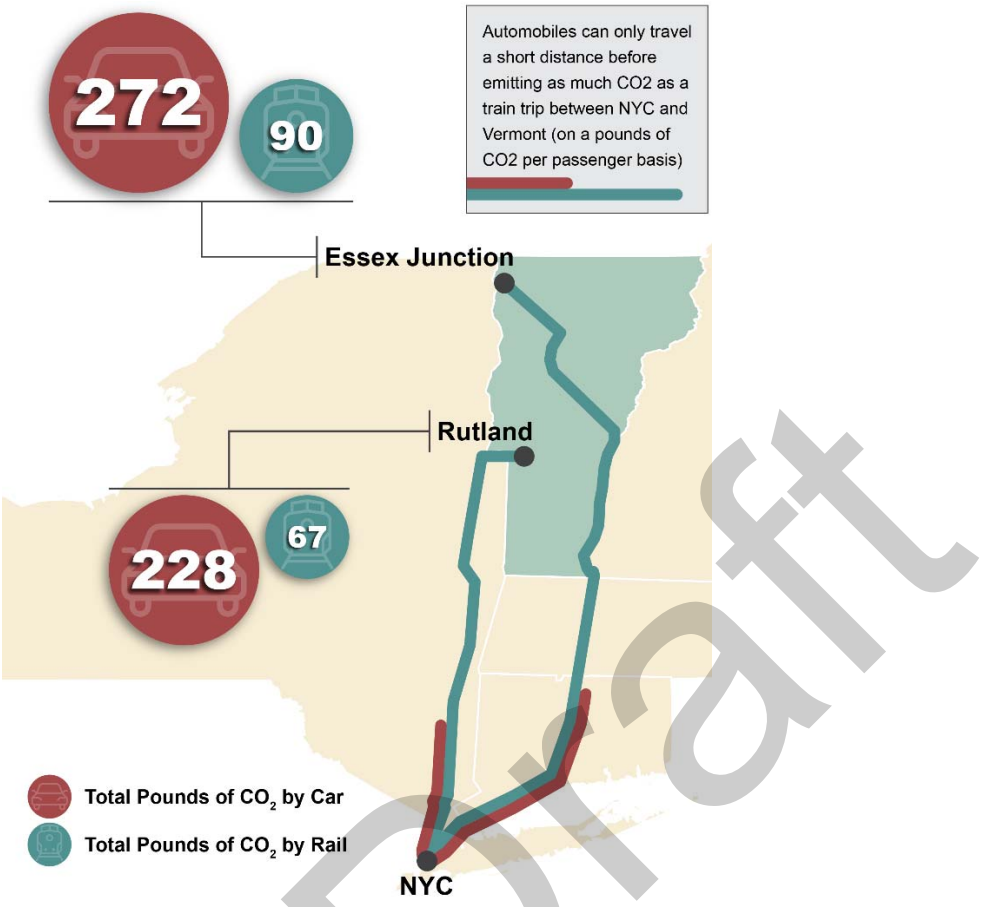
FIGURE 4.1 GREENHOUSE GAS EMISSIONS COMPARISON, PASSENGER RAIL VERSUS AUTOMOBILE TRAVEL BETWEEN VERMONT AND NEW YORK CITY[31] [32]



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Vermont's rail network is part of a larger regional and national system. By adding alternative routes and redundancy to the state's passenger and freight transportation network, rail provides a resiliency benefit in the event that emergency conditions impact the availability of the roadway network or other rail routes for travel, disaster response, or other immediate needs.

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[31] Automobile emissions data assumptions derived from EPA 'Greenhouse Gas Emissions from a Typical Passenger Vehicle' page https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#:~:text=typical%20passenger%20vehicle%3F-,A%20typical%20passenger%20vehicle%20emits%20about%204.6%20metric%20tons%20of,around%2011%2C500%20miles%20per%20year.

Rail emissions data assumptions derived from 'Savings in per-passenger CO2 emissions using rail rather than air travel in the northeastern U.S.' (2020) https://www.tandfonline.com/doi/abs/10.1080/10962247.2020.1837996?journalCode=uawm20

[32] Rail emissions data considers electrification along the New Haven – New York corridor, and diesel for all remaining segments of the two corridors.

The closure of the Hoosac Tunnel between February and early April, 2020 due to a partial collapse provided the most recent example. Although the closure itself was not in Vermont, the State's rail assets allowed freight traffic to bypass the closure. However, due to weight limits on the GMRC, rail cars were limited to 263,000 pounds reducing the efficacy of the bypass route.

Tropical Storm Irene, which passed through Vermont in August 2011, damaged more than 500 miles of state highway and 200 bridges, with more than 2,000 segments of municipal road damaged along with more than 280 bridges and 960 culverts. The rail network suffered as well: 107 washouts, including 50 very large washouts, and six rail bridges had major structural damage.[33] In total, more than 200 miles of rail in the state-owned rail system were damaged, and with the bridges cost an estimated $21.5 million in repairs, with the Federal Emergency Management Agency (FEMA) covering those costs.

Since then, advocacy and stakeholder organizations in Vermont advanced a collaborative effort to identify lessons learned, along with a series of preemptive actions and plans to minimize the impacts and costs of similar events in the future. A significant part of these resiliency planning efforts is to integrate improvements to infrastructure, including transportation infrastructure,to be able to withstand weather events and climate change with the aim of mitigating property loss.

As part of these efforts, the Vermont Roadmap to Resilience was created, with four key principles:

- Know Our Risks
- Elevate & Integrate Emergency Management
- Align Rules & Investments for Stronger Communities
- Working Together & Learning Together[34]

This work also addresses a FAST Act planning goal, guiding statewide and non-MPO transportation planning processes to"improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation." This goal has been incorporated into the State's LRTP through Objective 1.5 "Improve the resilience of the transportation system." [35]

The TRPT does not currently provide resiliency data for the rail network. Expanding the TRPT to explore rail resiliency issues using a similar methodology within five years is a next step in the Rail Plan.

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[33] Vermont Agency of Natural Resources: http://www.anr.state.vt.us/anr/climatechange/irenebythenumbers.html; http://www.vermontrailway.com/news_pages/images/gallery.pdf

[34] https://anr.vermont.gov/about_us/faq/cr

[35] https://vtrans.vermont.gov/sites/aot/files/planning/documents/planning/2040_LRTP_%20Final.pdf

In the meantime, Figure 4.3 provides a high-level analysis of where rail lines are within flood risk areas based on three data sources. These include:

- A river corridors layer, developed by the Vermont Agency of Natural Resources, which shows where rivers are likely to shift or meander over time;
- High risk dam inundation areas which show areas likely to flood if these at risk dams as identified by Vermont Emergency Management should fail; and
- Flood hazard areas from the Federal Emergency Management Agency (FEMA) which identifies areas at risk of flooding.[36]

Of the State's 578 miles of track, approximately 109 miles of state owned line and 71 miles of privately owned rail lines (180 miles total) are at risk of inundation, including much of the NECR, the VTR south of Middlebury, and sections of the GMRC. NECR is working to improve conditions on three culverts through a Consolidated Rail Infrastructure and Safety Improvements (CRISI) grant this year to help alleviate known issues, but the length of track in risk areas complicates any systemic efforts.[37] Interviews with rail stakeholders indicated that bridge abutments are a critical area of concern and that having an overflow in place to help alleviate damage from high water is a potential mitigation approach. As of 2021, VRS is examining this issue at two bridges, one in East Dorset and one in Brandon.[38]

Threats beyond Vermont could also greatly impact rail service to the State. New York City, the most popular origin/destination for travelers on the *Ethan Allen Express* and *Vermonter*, along with much of Amtrak's Northeast Corridor faces severe risks from sea level rise and storms. Disruptions on the Northeast Corridor would likely impact service to Vermont, especially the *Vermonter* which utilizes the Northeast Corridor between New Haven, CT and Washington, D.C. A 2017 study found that the cost to protect assets along a 10-mile stretch of track in Delaware would cost $78 million.[39]

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[36] River Corridors from VT Open Data: https://anrmaps.vermont.gov/arcgis/rest/services/Open_Data/OPENDATA_ANR_WATER_SP_NOCACHE_v2/MapServer;

High Risk Dam Inundation Areas from VCGI Open Data: https://maps.vcgi.vermont.gov/arcgis/rest/services/EGC_services/OPENDATA_VCGI_EMERGENCY_SP_NOCACHE_v1/MapServer;

Flood Hazard Areas from FEMA (note, statewide coverage not available): https://anrmaps.vermont.gov/arcgis/rest/services/Open_Data/OPENDATA_ANR_EMERGENCY_SP_NOCACHE_v2/MapServer

[37] Interview with Genesee and Wyoming, July 7, 2020.

[38] Interview with VRS, July 27, 2020.

[39] https://www.bloomberg.com/graphics/2018-amtrak-sea-level/

VTrans should continue to work with the railroads, emergency personnel, and other relevant stakeholders to identify threats to critical rail infrastructure, and to ensure adequate preparedness and response capabilities. The Federal Emergency Management Agency (FEMA) has prepared frameworks[40] for states, communities, and private sector to work together to implement in order to prevent, protect, mitigate, respond, and recover from disasters—natural or man-made. Figure 4.2 illustrates the functions and assets contained in each framework. In addition, VTrans and Vermont Agency of Natural Resources can work together and with railroads to ensure that future initiatives preserve and protect the state's fragile flood plains and water courses.

FIGURE 4.2 NATIONAL PREPAREDNESS PLANNING FRAMEWORKS

<table>
<tr><th>Prevention</th><th>Protection</th><th>Mitigation</th><th>Response</th><th>Recovery</th></tr>
<tr><td colspan="5">Planning</td></tr>
<tr><td colspan="5">Public Information and Warning</td></tr>
<tr><td colspan="5">Operational Coordination</td></tr>
<tr><td colspan="2">Intelligence and Information Sharing</td><td rowspan="4">Community Resilience
Long-term Vulnerability Reduction
Risk and Disaster Resilience Assessment
Threats and Hazards Identification</td><td colspan="2">Infrastructure Systems</td></tr>
<tr><td colspan="2">Interdiction and Disruption</td><td rowspan="4">Critical Transportation
Environmental Response/Health and Safety
Fatality Management Services
Fire Management and Suppression
Logistics and Supply Chain Management
Mass Care Services
Mass Search and Rescue Operations
On-scene Security, Protection, and Law Enforcement
Operational Communications
Public Health, Healthcare, and Emergency Medical Services
Situational Assessment</td><td rowspan="4">Economic Recovery
Health and Social Services
Housing
Natural and Cultural Resources</td></tr>
<tr><td colspan="2">Screening, Search, and Detection</td></tr>
<tr><td rowspan="2">Forensics and Attribution</td><td rowspan="2">Access Control and Identity Verification
Cybersecurity
Physical Protective Measures
Risk Management for Protection Programs and Activities
Supply Chain Integrity and Security</td></tr>
<tr></tr>
</table>

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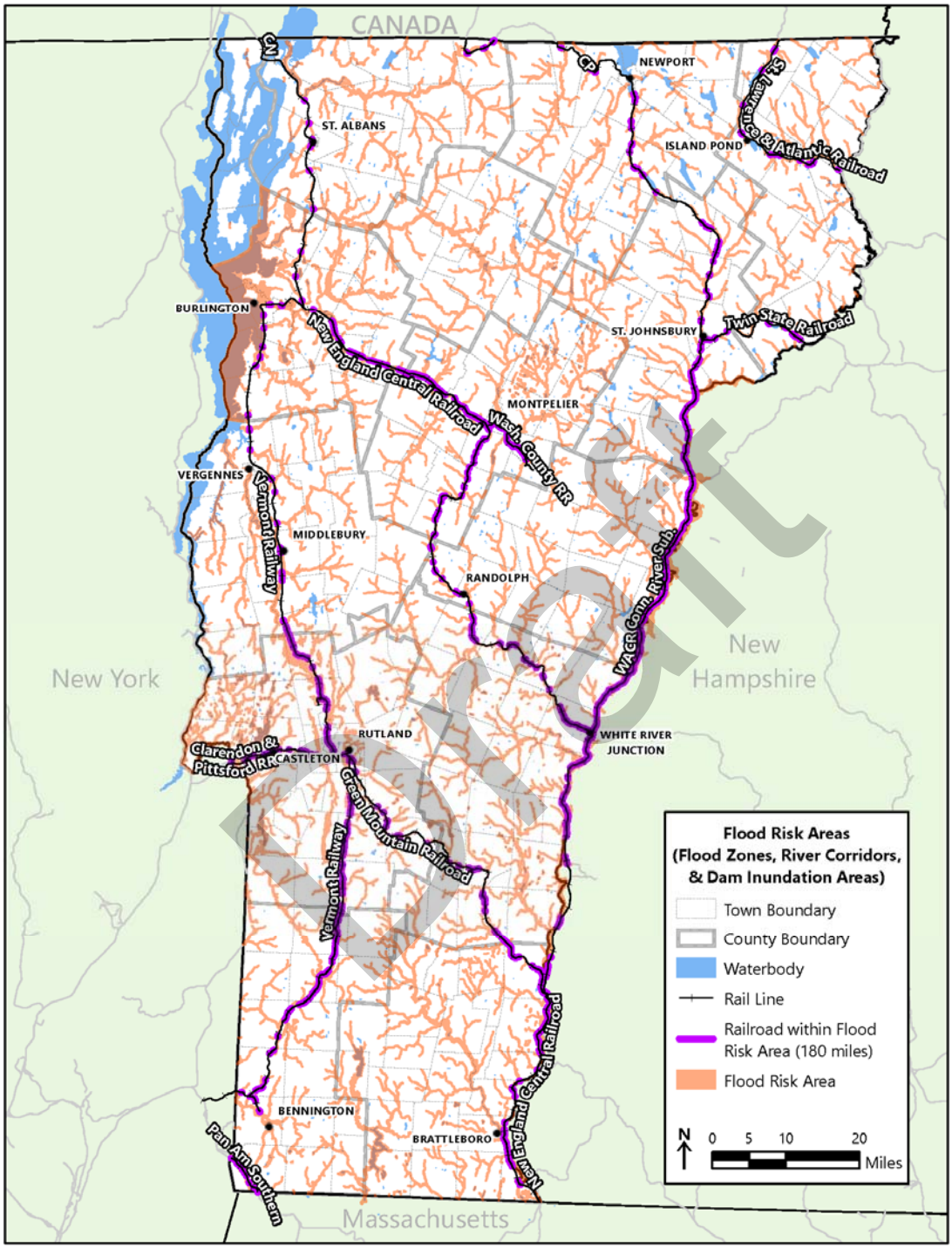
Source: FEMA

[40] https://www.fema.gov/emergency-managers/national-preparedness/frameworks

FIGURE 4.3 RAIL FLOOD RISK VULNERABILITY



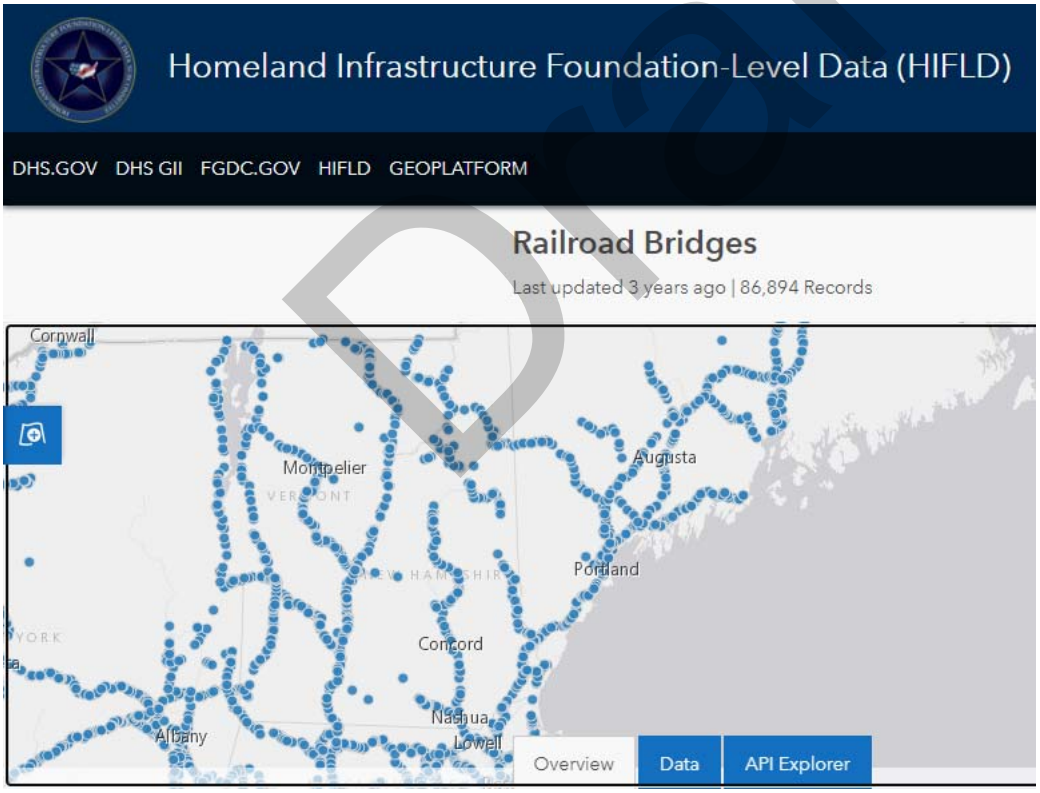
Sources:
https://anrmaps.vermont.gov/arcgis/rest/services/Open_Data/OPENDATA_ANR_WATER_SP_NOCACHE_v2/MapServer;
https://maps.vcgi.vermont.gov/arcgis/rest/services/EGC_services/OPENDATA_VCGI_EMERGENCY_SP_NOCACHE_v1/MapServer;
https://anrmaps.vermont.gov/arcgis/rest/services/Open_Data/OPENDATA_ANR_EMERGENCY_SP_NOCACHE_v2/MapServer

In addition, the **U.S. Department of Homeland Securiy maintains datbases of transportation assets and other infrastructure critical to the nation's defense** in the Homeland Infrastructure Foundaion-Level Data (HIFLD) datbase. According to DHS:

> *"The HIFLD Subcommittee attracts a voluntary coalition of Federal, State, and Local government organizations and supporting private industry partners who are involved with geospatial issues related to Homeland Defense, Homeland Security, Emergency Preparedness and Response, or Civil Support. HIFLD members and non-federal contributors are involved in a wide range of different functions including Critical Infrastructure Protection, Crisis and Consequence Management, Intelligence and Threat Analysis, Antiterrorism/Force Protection, Defense Support to Civil Authorities, Man-Made and Natural Hazard Modeling, and Government Facilities Management."*

While much of the data in the HIFLD contains some open (public) information, many of the data layers are accessible to Federal, State, and/or local governments only.[41] Rail layers include railroads, rail bridges, and railroad crossings. Figure 4.4 is an example of the railroad bridge data available in HIFLD.

FIGURE 4.4 PUBLIC RAIL BRIDGE INFORMATION AVAILABLE ON HOMELAND INFRASTRUCTURE FOUNDATION-LEVEL DATA (HIFLD)



Source: U.S. Department of Homeland Security, https://hifld-geoplatform.opendata.arcgis.com/datasets/railroad-bridges?geometry=-82.098%2C42.440%2C-61.191%2C45.213.

[41] https://gii.dhs.gov/hifld/

4.2 Freight as a "Good Neighbor"

Moving freight, by all modes, is critical to supporting the State's economy. However, freight movement often raises concerns in communities, including safety and security, noise and air pollution, and potential land use compatability issues. With regard to moving freight by rail, working with stakeholders representing the freight modes to ensure that they act as "good neighbors" can help alleviate some of these concerns and reduce tensions while respecting rail exemptions from some local control.[42]

Nationally, such efforts have been grouped into an approach of "freight as a good neighbor."[43] Outreach efforts for this Plan identified three particular areas where a "good neighbor" approach could help improve the acceptance of rail freight.

Hazardous Materials

Hazardous materials (HAZMAT), such as propane and other fuels that move by rail, are a significant cause of stakeholder concern in Vermont. Incidents such as the 2007 derailment of 18 cars carrying gasoline in Middlebury can have lasting impacts even if the infrastructure is quickly repaired.[44] Storage of rail cars containing these materials, which shippers often plan in order to accommodate winter fueling needs, are similarly of concern to residents when they are parked near residential or environmentally sensitive areas. Petroleum or coal products accounted for approximately 12 percent of the total rail tonnage moving to, from, within, or through the State in 2018. Although this total is projected to decrease slightly through 2045, railcars carrying these substances will continue to be a concern.

A 2018 study of commodity flows in Vermont included a list of freight yards and sidings where HAZMAT were stored, based upon 2017 reports. Table 4.1lists the locations and the materials reported in 2017.

TABLE 4.1 RAIL YARD AND SIDING 2017 TIER II MATERIAL REPORTING DATA

Facility	Location	Reported Chemicals
Bartonsville Siding	Rockingham	Propane
Bell Passing Siding	Ryegate	Propane
Brattleboro Rail Yard	Brattleboro	Curve Grease
Burlington Rail Yard (2 Yards)	Burlington	Acetylene, Activators/Hardeners, Anti Freeze, Cleaning Solvents, Fuel Oil #2, Laquer Thinner, Motor/Engine Oil, Oxygen, Paint Polyurethane, Sodium Chloride, Sulfuric Acid, Traction Sand
Charlotte Rail Facility	Charlotte	Propane

[42] https://vtrans.vermont.gov/sites/aot/files/planning/documents/Tech%20Memo%20%231_DataCollection%26ExistingConditions_10282020_Finalclean.pdf

[43] http://www.trb.org/Main/Blurbs/175482.aspx; https://ops.fhwa.dot.gov/publications/fhwahop12006/index.htm.

[44] https://addisonindependent.com/news/two-freight-train-cars-derail-middlebury-no-injuries-or-spills

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Facility	Location	Reported Chemicals
Danby Passing Siding	Mount Tabor	Propane
Ely Rail Racility	Fairlee	Propane
Hacienda Rail Yard	East Dorset	Propane
Rutland Rail Yard	Rutland	Acetylene, Anti Freeze, Cleaning Solvents, Electrical Cleaner, Fuel Oil #2, Motor/Engine Oil. Oxygen, Propoane, Sodium Chloride, Sulfuric Acid, Traction Sand
South Wallingford Passing Siding	Wallingford	Propane
St. Albans Rail Yard	St. Albans	Acetylene, Mineral Spirits, Anti Freeze, Battery Acid, Degreaser, Curve Grease, Water Treatment, Diesel Fuel, H2O Conditioner, Hydraulic Fluid, Journal Oil, Lube Oil, Motor Oil, Oxygen, Silica, Thermite Welding Kits
Steel Track	Bellows Falls	Propane
Summit Siding	Mount Holly	Propane
Wells River Siding	Wells River	Propane
Willoughby Passing Siding	Sutton	Propane

Source: *2018 Vermont Commodity Flow Study,* Two Rivers-Ottauquechee Regional Commission (TRORC), 2018.

HAZMAT planning is a critical need for the State in terms of supporting and enhancing existing solid efforts. Railroads are responsible for the safe transport and handling of HAZMAT on their systems. However, multiple parties are involved in HAZMAT spill and incident response, including the Vermont Emergency Management (VEM), Vermont Agency of Natural Resources, AOT, local fire departments, and private/local jurisdictional officials. Railroad partners such as VRS are also critical partners who can provide prepardness and response training to local and state officials. Exsting efforts in this area include:

- VEM produces training events, including a session on response to overturned rail cars. Such sessions are open to the public, and registration is available on the VEM website.[45]
- Vermont Hazardous Materials Response Team. Vermont's Department of Public Safety has a dedicated HAZMAT response team which has a regional footprint such that it can address incidents quickly and statewide. It is at the request of local fire departments in need of assistance. The team, colloquially referred to as the "Glow Team" due to their brightly colored body protection attire, exercises and trains frequently and its personnel are all trained through the HAZMAT

Source: Vermont Hazardous Materials Response Team

[45] https://vem.vermont.gov/training/trainingprogram

Technician level of expertise. Educational videos and training opportunities are available on the Vermont Hazardous Materials Response Team's website.[46]

- Regional Local Emergency Planning Committees (LEPC). The State is currently divided into, generally, county-based LEPCs, which are chartered by the State Emergency Response Commission (SERC) to develop HAZMAT-specific response/coordination plans. While the regional LEPCs are in various states of maturity, their meetings frequently draw in local emergency management directors, first responders, and owner/operators of those sites which hold and store HAZMAT. More information on the LEPCs can be found at: https://vem.vermont.gov/programs/lepc

It should be noted that the State is moving towards a single statewide LEPC model. This will provide consistent focus, enhanced compliance with federal statutes, higher fidelity awareness of Vermont's HAZMAT storage sites and commercial users, improved engagement with managers and operators of these sites, and direct support to all-hazards planners throughout the State, including a planned GIS capability.

Continued communication between these groups and the railroads can help to ensure safety precautions, protocols, and incident response plans are more than adequate, and that officials who liase with the public have information that responds to their concerns. An occasional "summit" or meeting of relevant stakeholders could be useful for facilitating this communication. A regional summit which includes partners from other states are held annually through Transportation Community Awareness and Emergency Response (TRANSCAER). Three VEM members attended this training in the fall of 2019 and the 2020 training was scheduled for Bellows Falls, VT prior to COVID-19.[47]

Construction Activities

Staging and temporary storage of railcars containing construction material to support ongoing maintenance and construction projects is also a concern in some Vermont communities, due to real or perceived risks to health and safety. Some of the concerns could be addressed through open communication and education about the materials being stored, safety protocols and procedures. Railroads or rail customers, in some instances, and where feasible, may consider alternative storage or staging plans in order to alleviate community concerns, and to act as "good neighbors" in the communities where they do business even though this is not a requirement..

Quiet Zones

Quiet zones are designated stretches of track where routine sounding of train horns while approaching public crossings is not required. This greatly reduces the impact of both freight and passenger rail activities on nearby residents, especially on active rail lines or lines that see substantial use during the night when noise can be particularly disruptive. Minimum warning device requirements for public crossings designated as Quiet Zones include flashing light signals with gates, constant warning time train detection circuitry and

[46] https://firesafety.vermont.gov/emergency/hazmat

[47] Email from Patrick McLaughlin (Chief, VT Hazardous Materials Response Team), December 17, 2020.

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power-off indicators visible to the train crew. In addition, crossings in Quiet Zones typically require additional safety improvements such as gates with channelization or medians, four-quadrant gates, one-way streets, and crossing closures.[48]

Quiet zones can only be established by public agencies, but railroads can provide valuable input, including where certain improvements may or may not be feasible.[49]

4.3 VTrans Asset Management

An asset management approach helps VTrans maintain its roads, bridges, sidewalks, bikepaths, and other transportation facilities in a cost-effective way by:

- Ensuring VTrans is making the right level of investment in the right asset at the right time;
- Making preventive maintenance a priority;
- Integrating efforts throughout VTrans, including communication, business practices, and projects; and
- Investing strategically toward an efficient, cost-effective, sustainable transportation system.[50]

Asset Management is a highly information-intensive process, and VTrans is continuing to collect information on State assets. A component of asset management practices includes working with stakeholders to determine customer service levels. In the context of state-owned bridges and upgrades to state-owned trackage, this would include meetings with the railroads to determine their required levels of service. A key aspect is to focus on a life cycle cost management for maintaining, rehabilitating, and replacing assets to provide the highest levels of service over time for the least cost. In the case of state-owned rail bridges, this would entail determining appropriate scopes of work to maintain, repair, replace, and upgrade bridges over time while ensuring the efficient uses of public funds. Another key component of the VTrans commitment to Asset Management is transparency, so that railroads, tax payers, and others can understand the nature, cost, and decision-making regarding State assets.

The re-route of the WACR M&B described in Section 3.1 above is an example of understanding and using an asset management approach to compare both short- and long-term costs between two potential projects (replacing two bridges versus re-activating an old right of way).

Vermont is continuing to improve its approach to managing data by implementing the Vermont Asset Management Information System (VAMIS) that will help store, analyze, and use data across highway, rail, aviation, transit modes. This solution will help use deterioration modeling and analysis to inform decision-

[48] https://oli.org/safety-near-trains/track-safety-basics/quiet-zones

[49] https://railroads.dot.gov/elibrary/how-create-quiet-zone

[50] https://vtrans.vermont.gov/sites/aot/files/planning/documents/2018%20Final%20VTrans%20TAMP.pdf

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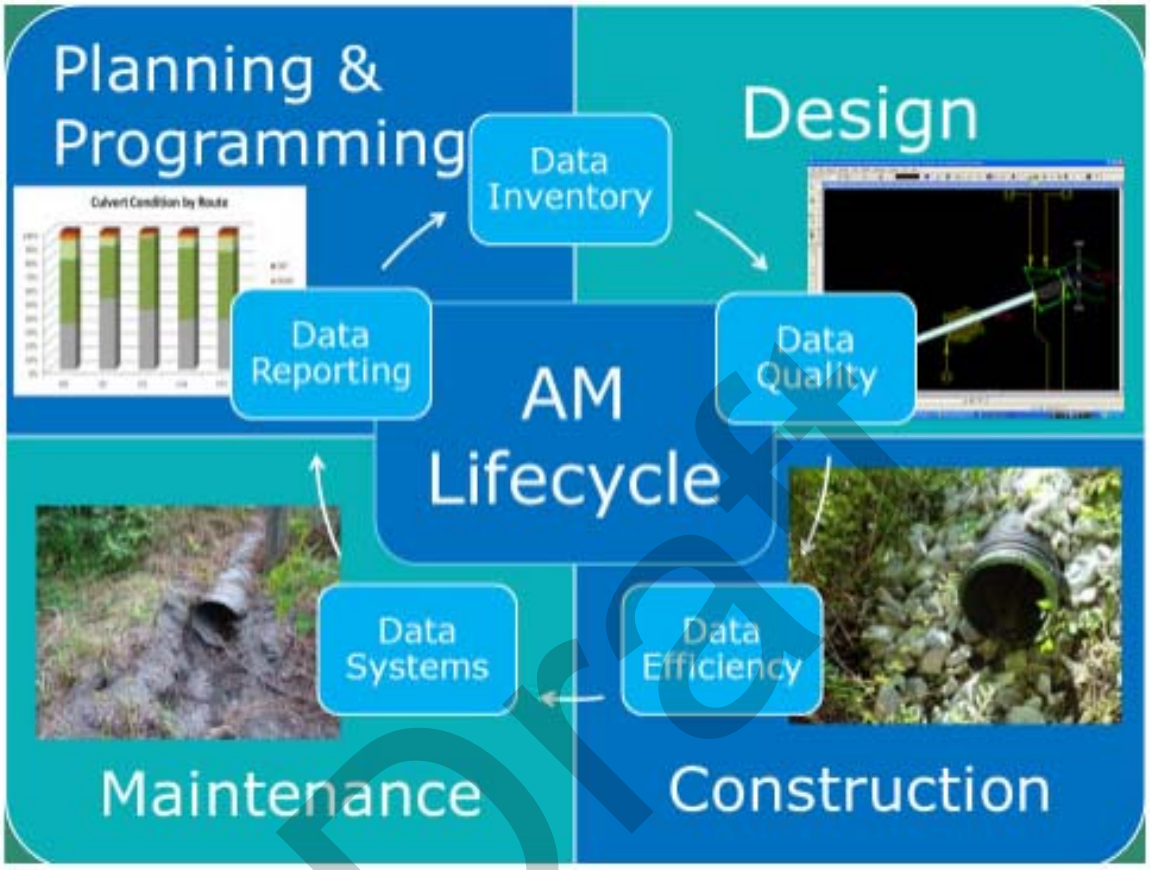
making and help VTrans monitor lifecycles and perform budgeting programming tasks that ensure the right treatment on the right asset at the right time.[51]

FIGURE 4.5 ASSET MANAGEMENT LIFE-CYCLE CONCEPT



Source: https://vtrans.vermont.gov/sites/aot/files/planning/documents/2018%20Final%20VTrans%20TAMP.pdf

4.4 Improvements to Rail Yards and Structures

Infrastructure needs are not limited to rail lines and bridges. Rail yards also represent key components of railroad operations. Yards serve numerous purposes. Cars are sorted into and out of trains for various destinations. Transload facilities are often located in rail yards, where freight is transferred between trucks and railcars. Support functions are performed in rail yards, such as car repair, storage and inspection, locomotive fueling and service, and train crew bases. As with other rail infrastructure, yards must have adequate capacity to perform their functions adequately. Yard infrastructure must also be kept in a good state of repair.

[51] https://vtrans.vermont.gov/sites/aot/files/2020%20VAMIS%20FACT%20SHEET%20Final.pdf

Vermont railroads have completed a number of projects in this area in recent years. VTR added a new siding in their Riverside Yard and extended an existing siding by approximately 1,500 feet. They also added a new 2,500 foot siding in their Rutland Yard and completed wye projects in Leicester and on the CLP. On the WACR Connecticut River, VRS completed a crossover between the NECR and WACR yard to allow access to the yard by northbound trains.[52]

One major yard project still being developed is the Burlington Railyard Enterprise Project (REP). This project is aimed at improving transportation connections, promoting economic development, and improving livability in the area around the Vermont Railway yard in Burlington. The alternatives considered include the relocation of some rail activities in the yard in order to make way for additional roadway connections, including bicycle and pedestrian accommodations. Burlington City Council voted to pursue funding after completion of scoping study in 2020. Three potential designs have been identified to move forward to preliminary engineering pending securement of grant funding.[53] VTrans has programmed $100,000 for preliminary engineering analysis in the FY 2022 Capital Program.

Improvements are needed elsewhere as well. At Bennington Rail Yard, for example, physical improvements would be needed to expand capacity in order accommodate long Class 1 train sets within the yard. Such improvements would allow for improved efficiency of interchanges between Class 1 and shortline railroads at Bennington.

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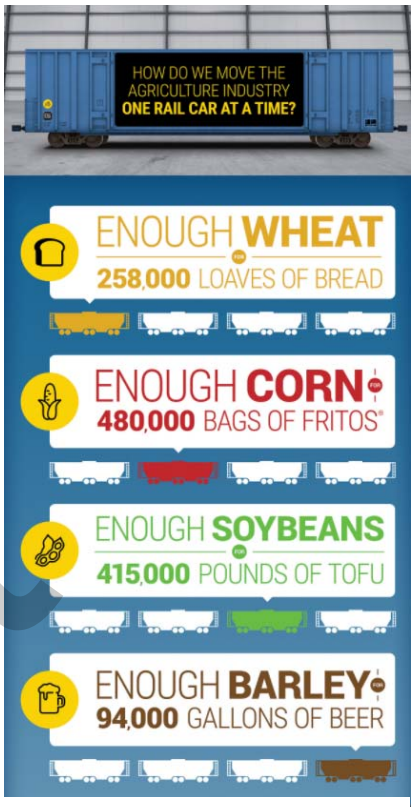
[52] Correspondence with VRS, November 30, 2020.

[53] https://www.ccrpcvt.org/our-work/transportation/current-projects/scoping/railyard-enterprise-project/

4.5 Economic Development and Industrial Access

As mentioned previously, this Rail Plan Update includes a performance metric of shipping 3.0 million tons of freight by rail to or from Vermont, a target which Vermont is just short of (2.8 million tons in 2018).



Source: AAR

The 2011 Vermont Comprehensive Energy Plan included a goal to double the volume of freight shipped by rail from Vermont by 2030. Although the 2016 Energy Plan does not include any specific goals surrounding freight rail volumes, the overall goal to increase energy efficiency in the transportation sector includes a desire to shift truck freight to rail.[54] **Trains can move a ton of freight an average of 479 miles on a gallon of fuel, so any shipments that can be shifted to train from truck represents an improvement for fuel economy and a reduction in energy use**.[55]

Infrastructure initiatives such as increasing bridge weight limits to ensure 286,000 pound cars can utilize the entire rail system, improving rail weight, and removing vertical clearance restrictions can be expected to encourage shippers to ship by rail, since these infrastructure improvements would render the rail network more efficient and effective, thus reducing the costs of shipping by rail.

There are other ways to increase usage of the rail network as well. Companies in rail-intensive industries can be encouraged to move to Vermont and locate at rail-accessible sites. Access for existing companies can be enhanced by building or improving sidings, spurs, or other access to the rail network. On the highway side, additional work can be done to improve highway access or maintain a state of good repair on key routes. These types of activities are often performed in conjunction with economic development agencies.

Stakeholder outreach conducted during this Rail Plan Update identified a number of commodities that could see growth in future years, including:

- Granite tailings for U.S. Army Corp of Engineer's projects using the WACR Montpelier & Barre Line. Depending on future federal legislation, a push for infrastructure-related projects in the U.S. could help create additional demand.
- Propane for home/business heating. This product is seasonal, but growing, although commodity flow forecasts project a decline in demand for this product long-term.
- Liquified petroleum gas shipments via Canada.

[54] https://outside.vermont.gov/sov/webservices/Shared%20Documents/2016CEP_Final.pdf

[55] https://www.aar.org/wp-content/uploads/2019/01/AAR-Vermont-State-Fact-Sheet.pdf

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- Wood pellets used for generating heat. The volumes are relatively low but there is interest in expansion.
- Agriculture and food grade products volumes are relatively steady, but the exact mix of goods and locations of highest use are shifting.

Two overall strategies could promote goods movement and economic development. They are:

1. Attract rail business that otherwise terminates elsewhere. Some freight destined for Vermont customers travels to out-of-state locations by rail and is then trucked into the State. Traffic is routed this way because Vermont is not well-served by Class I carriers, a large portion of the State's rail network does not support industry-standard 286,000-pound railcars, and there are no intermodal facilities located in the State. Improvements to rail infrastructure and service could bring increased transloading activity into Vermont, thereby reducing the number of truck-miles of travel on Vermont roads and the related wear-and-tear on pavements and bridges. However, transload centers located along Class I main lines are often able to offer superior service compared to transload center services offered by short line railroads because the Class I railroads handle more trains more frequently and can avoid delay-prone interchanges. More reliable and timely interchange of traffic between Class I carriers and their connections would help short lines compete for transload business and maximize the potential for transloading services in Vermont.
2. Better link economic development and transportation policies, programs, and investment to compete more effectively as a region in national and global markets. As a relatively small state, most rail freight to, from, or across Vermont relies on a regional rail network. Working together, the New England states could be more competitive. The Coalition of Northeastern Governors (CONEG), the New England Governors and Eastern Canadian Premiers (NEG/ECP) could be forums for such initiatives.

Vermont business, industry, and government leaders have repeatedly emphasized the importance of encouraging statewide economic growth and development. Investment in freight transportation is an effective strategy for promoting economic development. As illustrated in Figure 4.6, investment in the freight transportation system can reduce travel time and cost, improve the reliability of trips, and provide greater connectivity to statewide, regional, and global markets. These changes enable business and industry to improve productivity. In turn, increases in productivity and market access make business and industry more competitive and able to invest earnings in expansion and creating more jobs, leading to economic growth which benefits the public. Vermont offers a Rail Siding Investment Program that funds projects to connect and/or improve connections to the freight rail network for rail shippers shippers and receivers. In FY2022, $600,000 is programmed in the 3-way Partnership Program, of which $200,000 comes from the State's Transportation Fund.

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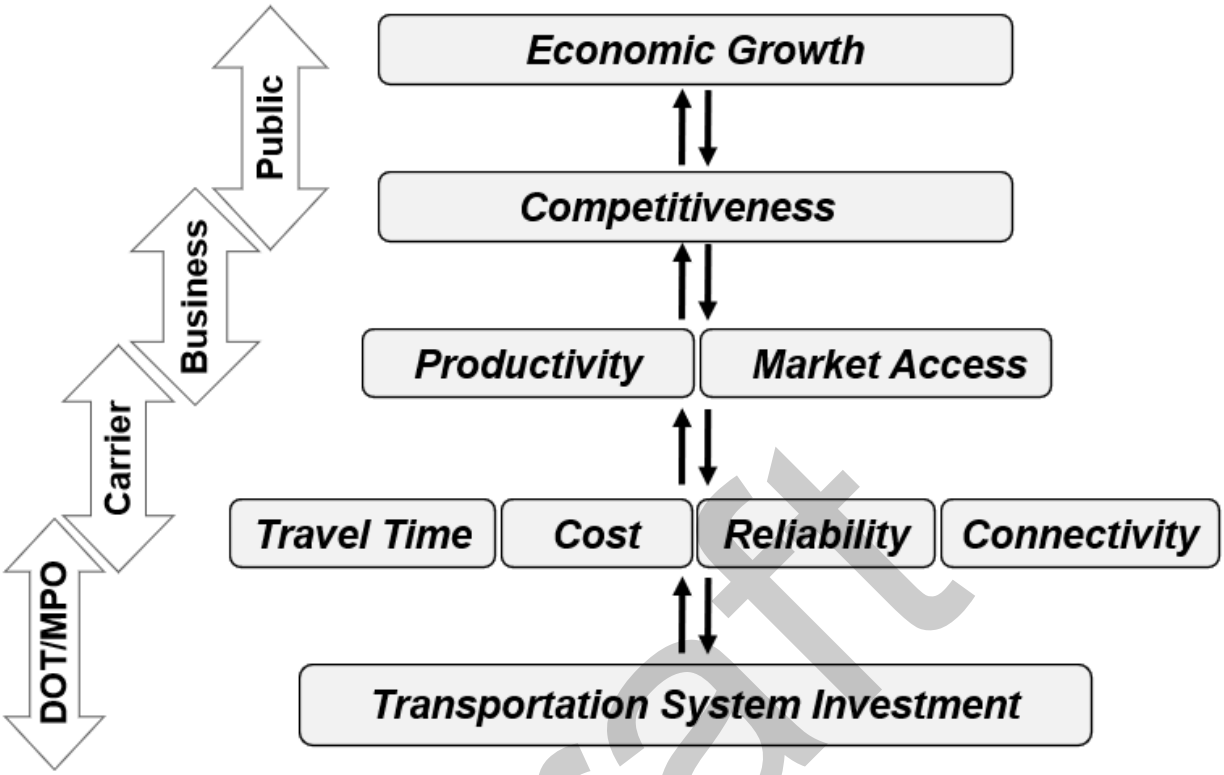
FIGURE 4.6 TRANSPORTATION SYSTEM INVESTMENT CONNECTION TO ECONOMIC GROWTH



Source: Cambridge Systematics

Land Use and Economic Development

The ACCD conducted a review of Act 194 S22 in 2018, which made recommendations to support industrial parks and rural economic development. The ACCD recommended amendments to Act 250's master plan permit process as well as changes to the Economic Development Authority Local Development Corportation loan program to reduce the cost to pre-permit master-planned indutrial parks. One of the main findings is that it is beneficial to provide developers incentives to comply with Act 250 criteria during the master plan phase rather than having those costs be borne by small and medium size firms trying to develop individual parcels within the park.

The report also acknowledges that related topics such as workforce development, housing/transportation, and childcare issues were beyond the scope of the review but remain critical to supporting rural industrial development. The report notes that "While some high-impact industrial uses require separation from incompatible users or rely on functionally depending transportation infrastructure, many modern processes, controls, buildings, and equipment can minimize sounds, odors, and vibrations—making industrial uses and industrial parks a good neighbor." This ability to better "live" near other land uses helps encourage compact

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growth in Vermont's small towns and rural areas, reinforcing goals in other Vermont planning documents such as the LRTP.[56]

One key need is for an updated inventory of properties that are or could be served by rail. Inventories were completed by some RPCs over ten years ago such as Rutland RPC in 2005,[57] and Southern Windsor County RPC in 2007[58]). Both studies identified potential locations for future rail-related development (as shown in Figure 4.7). An updated, more action-oriented version of this task is being explored to fund RPC work in the FY 2022 VTrans Transportation Planning Initiative work program. RPCs would lead this work in coordination with appropriate partners such as railroads and ACCD. It may include exploration of zoning and land use data as well as better marketing priority locations..

The coordination with ACCD would include providing contents to their website listing industrial and commercial properties available within Vermont.[59] Adding properties found through the above analysis to the database which includes an ability to filter by rail-served propertiescould help make this site a central clearinghouse for data on this topic.

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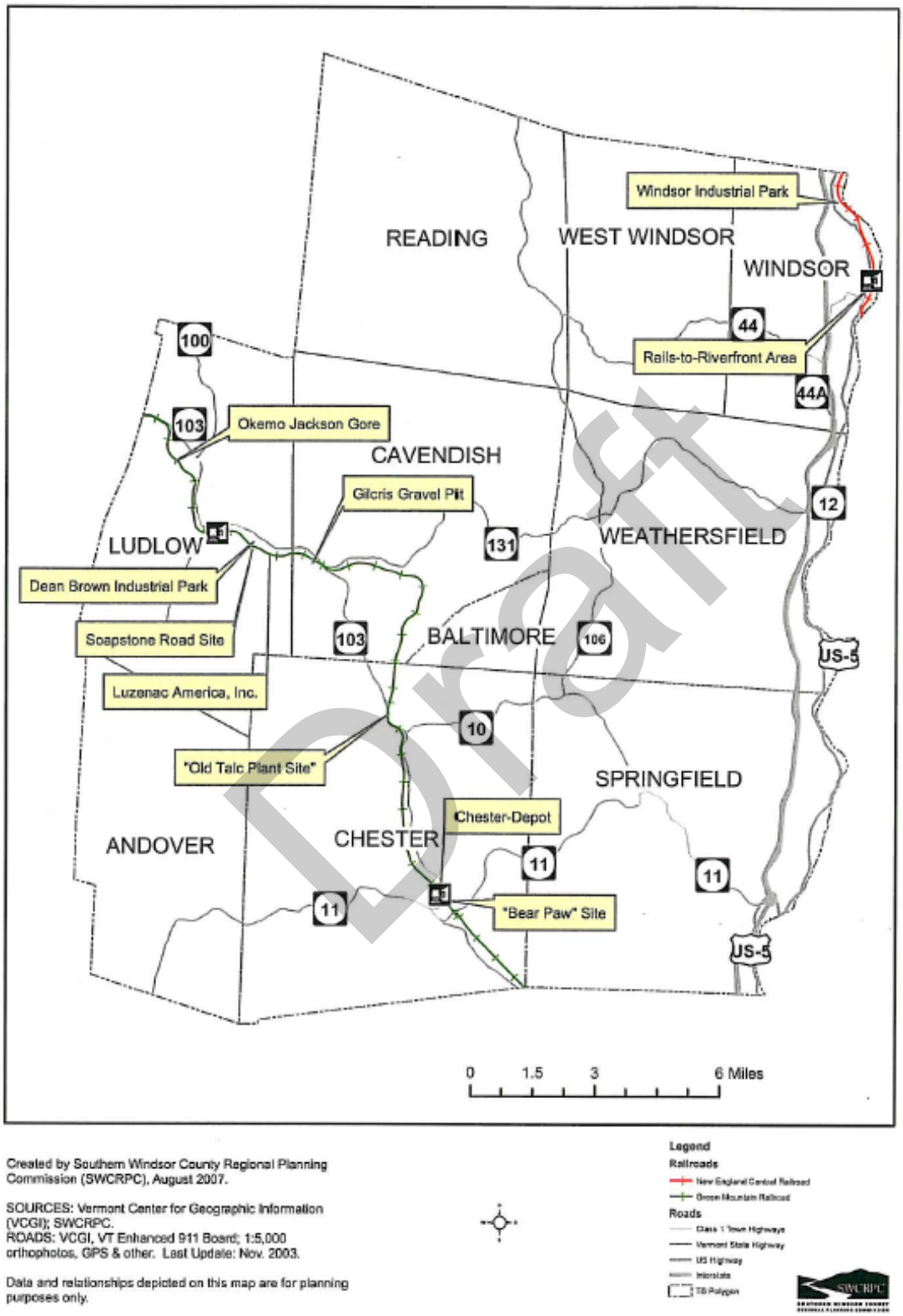
[56] "Act 194 S22 Report on Recommendations Supporting Industrial Parks and Rural Economic Development." Vermont Agency of Commerce and Community Development. December 15, 2018.

[57] https://www.rutlandcity.org/vertical/sites/%7B7B135F7F-3358-43FC-B154-A313EF1F3222%7D/uploads/%7B02065776-6D13-421C-8323-A7511D728216%7D.PDF

[58] Railroad Corridor Inventory in Southern Windsor County – Phase 2. 2007

[59] https://accd.vermont.gov/economic-development/properties

FIGURE 4.7 REGIONAL RAILROAD CORRIDOR INVENTORY: SITES FOR POTENTIAL RAIL USE



Source: Southern Windsor County RPC, 2007.

4.6 Station Considerations

Rail stations in Vermont are owned by a variety of parties, including municipalities and freight railroads whose antecedents provided passenger service prior to the establishment of Amtrak. In cases where stations are owned by freight railroads, they are then leased to Amtrak.

Like other rail assets, railroad stations must be maintained and kept in a state of good repair. Vermont rail stations vary widely in their amenities, ranging from historic buildings with restrooms and waiting areas, to simple platforms with shelters. It is necessary that any rail stations not readily accessible to and usable by individuals with disabilities under the Americans with Disabilities Act (ADA) be upgraded to be ADA compliant. A full list of Vermont's current Amtrak stations and their amenities ADA status is provided in Table 4.2.

Additional enhancements, whether related to state of good repair issues, added amenities, or ADA compliance, will be required to at least some stations over the coming years. Figure 4.8 below shows renovations completed in 2014 at Randolph. A typical approach is to install concrete platforms 8" above the top of rail, a wheelchair lift, and a hut in which to store it. Amtrak intends to upgrade the platform at the Montpelier station in FFY2022-2023 and is working in partnership with the Town of Brattleboro, NECR, and the State of Vermont to design and build a new station in Brattleboro with a high-level platform (which allows patroms to move on and off a train without stepping up or down), an ADA compliant waiting area and restrooms and additional features such as parking and covered outdoor seating.[60] Information about completed and planned ADA-related projects initiated by Amtrak are also included in Table 4.2. As of 2021, VTrans is assessing the needs for improvements at Vermont stations and plans to apply for a CRISI grant to help subsidize future costs.

Finally, significant work, including moving the historic Vergennes Depot to a new site in Ferrisburgh (see Figure 4.9), has already been completed as part of efforts to prepare for the expansion of the *Ethan Allen Express* to Burlington. Additional station work is still underway at Middlebury, Vergennes/Ferrisburgh, and Burlington (mainly related to platforms) to prepare for service, anticipated in late 2021 or early 2022.

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[60] https://media.amtrak.com/2020/11/amtrak-town-of-brattleboro-state-of-vermont-and-vtrans-announce-feasibility-study-for-new-brattleboro-station/

FIGURE 4.8 RANDOLPH STATION PLATFORM RENOVATIONS

Source: Cambridge Systematics. Note the old station platform is still visible on the right side of the tracks.

FIGURE 4.9 RELOCATED VERGENNES DEPOT

Source: https://accd.vermont.gov/sites/accdnew/files/documents/HP/VTrans%20Vergennes%20Depot%20Review%20Information.pdf

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TABLE 4.2 VERMONT AMTRAK STATION AMENITIES AND ADA PROJECT STATUS

Station	Amenity										ADA Project Status
	PLATFORM	WAITING AREA	WHEELCHAIR LIFT	RESTROOMS	PAYPHONE	WIFI	ATM	VENDING MACHINE	SAME DAY PARKING	OVERNIGHT PARKING	
Rutland	ADA	ADA	No	ADA	Yes	No	No	No	ADA	ADA	To be determined. City of Rutland responsible for Station Structure and Parking, State of Vermont responsible for Platform
Castleton	ADA	ADA	Yes	ADA	No	No	No	No	ADA	ADA	Projects completed FY2017-2020
St. Albans	ADA	Yes	No	Yes	No	No	No	Yes	ADA	ADA	Projects completed FY 2012-2014
Essex Junction	ADA	ADA	Yes	No	Yes	No	No	No	ADA	ADA	Project planned FY2021 (Structure, Platform, and Parking all under Amtrak responsibility)[i]
Waterbury-Stowe	ADA	ADA	Yes	ADA	Yes	No	No	No	ADA	ADA	Project completed FY2013-2014
Montpelier-Barre	ADA	Yes	Yes	ADA	Yes	No	No	No	ADA	ADA	Project planned FY2022-2023 (Platform); Station and parking projects completed FY2017
Randolph	ADA	No	Yes	No	No	No	No	No	ADA	ADA	Project completed FY2013-2014
White River Junction	ADA	ADA	Yes	ADA	No	No	No	Yes	ADA	ADA	To be determined. State of Vermont responsible for Station, Platform, and Parking
Windsor-Mt. Ascutney	ADA	No	Yes	No	Yes	No	No	No	ADA	ADA	Project completed FY2019-2020
Claremont, NH	ADA	No	Yes	No	No	No	No	No	ADA	ADA	Project completed FY2019-2022
Bellows Falls	ADA	ADA	Yes	No	Yes	No	No	No	ADA	ADA	Project planned FY2022 (Structure)
Brattleboro	ADA	ADA	Yes	ADA	No	No	No	No	Yes	No	Project Planned FY2022-2023 (Platform)

Source: Amtrak. ADA = Amenity is Americans with Disabilities Act accessible..

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4.7 Pedestrial and Transit Connectivity

Comments received during stakeholder outreach indicate a need to examine station connectivity to the surrounding communities, both for bicycle/pedestrian needs and transit.

As discussed in the Existing Conditions Tech Memo, Walkscore.com rates locations on a 0-100 scale based on the number of businesses within a 30 minute walk, with fewer "points" awarded to destinations further away. Vermont's stations vary widely in their connectivity for walkers as shown in Table 4.3.

TABLE 4.3 WALKSCORE FOR VERMONT AMTRAK STATIONS

Amtrak Station	Walk Scores
Rutland	78 – Very Walkable
Castleton	30 – Car Dependent
St. Albans	85 – Very Walkable
Essex Junction	66 – Somewhat Walkable
Waterbury-Stowe	61 – Somewhat Walkable
Montpelier-Barre	0 – Car Dependent
Randolph	53 – Somewhat Walkable
White River Junction	69 – Somewhat Walkable
Windsor-Mt. Ascutney	59 – Somewhat Walkable
Claremont, NH	18 – Car Dependent
Bellows Falls	60 – Somewhat Walkable
Brattleboro	90 – Walker's Paradise

Source: Walkscore.com

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Recent efforts have begun to improve access to trains by bicycling and walking. For example, the City of Rutland recently completed a Downtown Strategic Plan which identified a number of needs for the Amtrak station area including wayfinding, enhancing streetscapes and pedestrian safety, and including a bike share location at the station.[61] The Plan also identified an opportunity to redevelopment the surrounding area, as shown in Figure 4.10. The Rutland Regional Transportation Council is also pursuing a concerted effort to promote alternate modes, including bicycle/pedestrian and bus connections with the existing Amtrak station.[62] **Carry-on bicycle service is available on both the *Ethan Allen Express* and *Vermonter*.** As of May 2016, the *Vermonter* has available on-

[61] https://downtownrutland.com/news/2020/strategic-plan

[62] Meeting with Rutland RPC, September 21, 2020.

board bicycle racks which carried 602 bicycles in FY2019, increasing the importance for viable bicycle connections at Amtrak stations along this route.[63]

FIGURE 4.10 RUTLAND AMTRAK STATION AREA REDEVELOPMENT CONCEPT

4E. Facilitate redevelopment of Amtrak station "gateway area"

Description: *The vacant and underutilized space in the vicinity of the Amtrak station and Evelyn Street is a prime and rare development opportunity for the downtown area. It's redevelopment could catalyze new investment and development in the downtown area.*

Tactics:

- **i.** Partner with Brixmor (property owner) to complete a redevelopment master plan for the site that considers mixed-use development with market-rate apartments or an indoor adventure park, among other potential uses.
- **ii.** Incorporate a new "signature" city park (or expanded Depot Park) along Evelyn Street, that could potentially include a dog park, splash pad, additional farmers market/event space, and other uses.
- **iii.** Conduct a financial feasibility analysis to determine what, if any, funding gap would exist for the preferred development concept and identify resources or public-private partnership arrangements to fill the gap, such as the city provision of infrastructure.
- **iv.** In partnership with Brixmor, issue a developer request for expressions of interest (REI) to solicit developer interest and feedback on the desired outcome, which can be used to modify/adjust the development plan and consider alternative incentives/partnership arrangements. Select a preferred developer or issue a full request for proposals (RFP).

The "Amtrak Gateway Area" is underutilized and aesthetically detracting from downtown but holds great development potential and the ability to catalyze additional investment downtown.

The City of Valparaiso, Indiana transformed a downtown parking lot into an award-winning Downtown Central Park Plaza featuring greenspace and outdoor performance space.

A high-quality public park should be explored and incentivized by the city as part of future redevelopment of the gateway area. Uses of the park may include a dog park, splash pads, outdoor concert space, public art, or expanded farmers market and festival space. Photo source: SEH;

Mixed-use or multi-family (apartments) development would be an ideal use for the Amtrak Gateway Area in conjunction with a new community park. The Garden Street Apartments (shown to the left) with 60 mixed-income units in South Burlington is a good example of the type of project that would be a good fit for the site. Photo source: Champlain Housing Trust.

Source: https://downtownrutland.com/news/2020/strategic-plan

Based on the Walkscore analysis as well as known multimodal connections, the Montpelier-Barre and Castleton stops are the two in most need of initial improvements (within Vermont). The Castleton stop is of particular interest, as the Amtrak station is only 0.3 miles from the Marble Valley Regional Transit District Fair Haven Route bus stop located in downtown Castleton, and approximately the same distance to Castleton University which has 1,900 students, approximately 1,000 of whom live on campus.[64] **Another potential area to explore is providing a better connection between the Vergennes/Ferrisburgh station and the Vergennes downtown area.** There is an approximately 0.3 mile gap along Route 22A between the station and the start of

[63] https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/statefactsheets/VERMONT19.pdf

[64] https://www.castleton.edu/about-castleton/quick-facts/. Statistics may not account for changes due to COVID-19.

sidewalk near the Vergennes Police Department. Increased wayfinding along with improvements to bicycle and pedestrian connections in this short corridor could be simple projects to help improve acccess.

Some inactive or abandoned rail lines across the country have been transitioned to multiuse (pedestrian, cyclist, etc.) paths, in some cases with the assistance of the Rails-to-Trails Conservancy and/or other organizations.[65] The rails-to-trails concept preserves an intact right of way that otherwise may be lost if the land along a rail corridor were sold piece-by-piece. In cases where the line is inactive but not abandoned, the owning railroad typically retains the right to reactivate the line in for rail service in the future, if and when that service is needed.

A variation of the rails-to-trails concept is often referred to as "rails *and* trails," in which a right of way accommodates active rail trackage and a separated multiuse trail, with all necessary infrastructure to separate and safely operate the rail and pedestrian/bicycle traffic. The The WACR right of way, for example, hosts the Montpelier Recreation Path, a popular multi-use path which provides a safe, shared route for bicyclists and pedestrians in Montpelier, as Figure 4.11 shows.

FIGURE 4.11 PORTION OF THE MONTPELIER RECREATION PATH IN WACR RIGHT OF WAY

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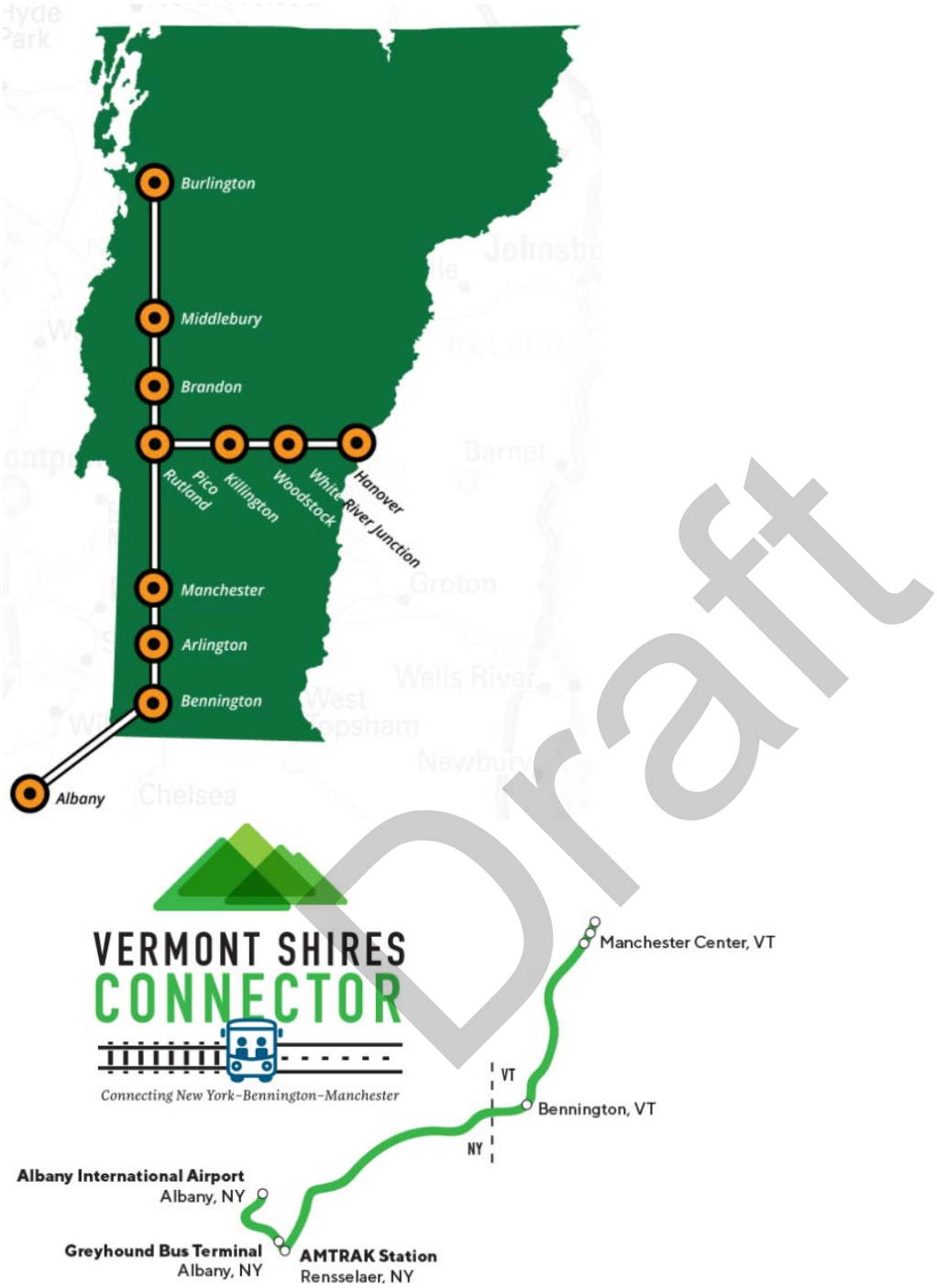
On the transit side, VTrans should continue to work with transit providers to link transit service with Amtrak schedules whenever feasible. Changes to the Vermont Translines and Vermont Shires Connector bus operations is planned once COVID restrictions are lifted.[66] Vermont Translines and Vermont Shire Connector routes are shown in Figure 4.12 below. Once services re-start their schedule will include Amtrak information and Amtrak will cross-list the schedules of these continuing transportation services.

[65] Rails to Trails Conservancy – Vermont, https://www.railstotrails.org/our-work/united-states/vermont/

[66] https://www.vttranslines.com/vermont-bus-routes/

FIGURE 4.12 VERMONT TRANSLINE (TOP) AND SHIRES CONNECTOR (BOTTOM) ROUTES



Source: https://www.vttranslines.com/vermont-bus-routes/

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4.8 Equipment Considerations

As current passenger rail services are maintained and new passenger rail services are considered, Vermont will face issues in terms of the maintenance of existing equipment and potential alternatives for new equipment.

As discussed in the Existing Conditions Tech Memo, both the *Vermonter* and the *Ethan Allen Express* are operated using standard Amtrak Northeast Corridor intercity rolling stock, consisting of single level Amfleet coaches and P40/P42 diesel (*Vermonter*) or P32ACDM dual-mode (*Ethan Allen Express*) locomotives which run on electric near New York Penn Station and on diesel everywhere else. The Amfleet equipment dates from the mid-1970's, and the locomotive fleet is in excess of 20-years in age, with both approaching an age where replacement is required.

Amtrak's 2019 Equipment Asset Line Plan notes that acquisition of dual power propulsion would eliminate electric-deisel engine changes on a number of routes including the *Vermonter*, reducing trip time by 15 to 30 minutes. A dual-mode solution to replace P32ACDM units on the *Ethan Allen Express* is also envisioned in partnership with New York State DOT. Approximately 20 units would be needed to cover Adirondack, Maple Leaf, and extended Ethan Allen Express service to Burlington.[67]

Vermont is working with other eastern states, Washington D.C., and Amtrak to procure new rolling stock for both the *Vermonter* and the *Ethan Allen Express*. Offerors have submitted proposals that are being evaluated by Amtrak and its State and federal partners, with a decision expected in 2021.

4.9 Deployment of Positive Train Control in Vermont

Positive Train Control (PTC) is a federally mandated railroad safety improvement that provides a system capable of reliably and functionally preventing train-to-train collisions, over-speed derailments, incursions into established work zone limits, and the movement of a train through a main line switch in the improper position. As of 2021, none of Vermont's rail network is equipped with PTC, nor is it required under current federal regulation on the basis of freight traffic density, hazardous materials (HAZMAT) risk, and passenger train traffic. Thus far, PTC installations in the US have supplemented existing lineside signaling and traffic control systems, whose installation cost typically exceeds $1 million per mile where they do not exist. The only Vermont locations where such a system exists (as of 2021) is on PAS and the NECR between White River Junction and Brattleboro. Initiatives are underway to develop a "lightweight" version of PTC that will provide most or all of the safety and operational benefits associated with the technology, including the potential for passenger train speeds in excess of 60 mph. As of 2021, Amtrak and VRS are engaged in a pilot of this technology. If successful, it could be part of a comprehensive low-cost PTC solution for Vermont.ii

4.10 Coordination with Other State's Passenger Rail Efforts

Vermont's experience over the past decade demonstrates the importance of working closely with New York State for the *Ethan Allen*, and Connecticut and Massachusetts for the *Vermonter*. In both instances, significant investments in partner state's rail infrastructure have led to improvements in travel time, thereby making the

[67] https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/businessplanning/Amtrak-Equipment-Asset-Line-Plan-FY20-24.pdf

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services more attractive for travelers going to and from Vermont. Such activities, along with associated service expansions, are expected to continue along both routes in the coming years and will require on-going communication and coordination with adjacent states. This includes the following:

- Ongoing efforts to increase service, track capacity and operating speeds along the New Haven – Hartford – Springfield-Greenfield corridor by Connecticut and Massachusetts. These improvements impact Vermont's services in a positive way by reducing travel time and increasing reliabilty; they also may divert some travelers from southeastern Vermont who will drive to Massachusetts to take advantage of the additional train frequencies. On the other hand, the increased services could could reduce the level of effort required by Vermont to add an additional frequency along the route by leveraging off of an existing frequency.

- Masachusetts' efforts to expand intercity passenger rail service along the I-90 corridor between Boston, Springfield, Pittsfield, and Albany. The subject of multiple studies over the last 20 years, interest continues to build in western Massachusetts for auto-competitive service beyond the slow and single daily frequency Boston-Chicago Amtrak *Lake Shore Limited*. As of 2021, MassDOT is completing the East-West Passenger Rail Study, which is examining rail service options for Boston-Springfield-Pittsfield.[68] While this study focuses on the I-90 corridor, new service provides an opportunity for direct connectivity from Boston to Vermont and Montreal, an option that was examined in one of the service scenarios described in Section 3.2 above.

- Efforts in New York to improve rail service. NYSDOT maintains an ongoing effort improve the performance of the Empire Corridor that crosses the entire state, as well as the CP-owned trackage used by the Adirondack. Improvements made to either of these routes used by the *Ethan Allen* would directly benefit the train. In recent years, NYSDOT has completed re-installation of doubletrack along a key bottleneck between Albany-Renssalaer and Schenectady. Further substantial action on this corridor awaits completion of a long-delayed EIS.

In addition to these intercity rail initiatives, there are various organizations exploring regional or commuter service within Vermont. As these efforts are not intercity services, they would fall under FTA jurisidiction, and thus are outside the scope of this Plan.

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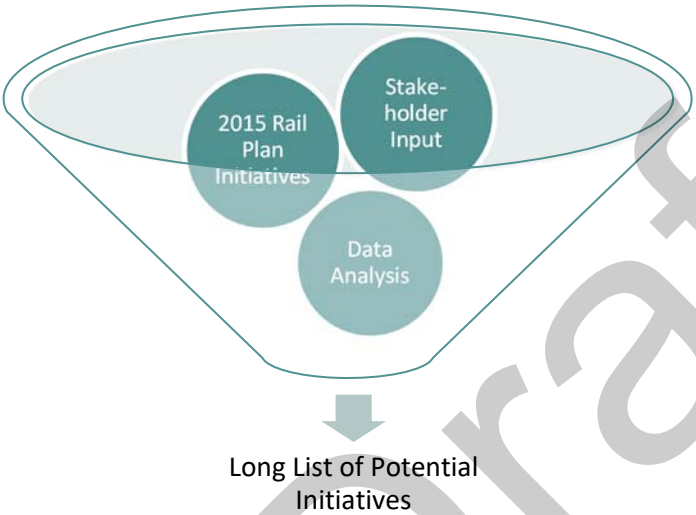
[68] https://www.mass.gov/lists/east-west-passenger-rail-study-documents

5.0 POTENTIAL INITIATIVES

Based on the needs and issues discussed above, a set of potential initiatives was developed to advance the rail plan goals.

As shown in Figure 5.1, in addition to the analysis of needs and issues, potential initiatives were also drawn from outstanding recommendations from the 2015 Rail Plan as well as input from stakeholders gathered during stakeholder outreach activities including two Town Hall meetings, numerous briefings to RPCs, and a web map tool that allowed users to input comments on existing conditions or provide information on proposed initiatives.

FIGURE 5.1 SOURCES FOR RAIL PLAN INITIATIVES



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Potential initiatives are the range of actions that would support and enhance inter-city passenger rail and freight rail in Vermont. These initiatives could be advanced by a number of agencies or stakeholders in addition to VTrans.

The initial list of potential Initiatives was divided into two categories, those that are location-specific (such as a rail corridor) and those that are policy/programmatic in nature. Information for both categories includes a description, the primary rail plan goal area addressed (see Section 2), if the initiative involved freight or passenger rail (or both), any notes about the initiative, which performance measure is addressed (see Section 3) and an ID number for internal reference.

Note that two of the goal areas are combined in this table. The goals of expanding capacity and increasing use are so closely linked that potential initiatives that address either are noted as "Increase Use/Expand Capacity" in the table. Initiatives are sorted by primary goal area. It should also be noted that many of the initiatives that address passenger ridership as the primary peformance measure may also have a positive impact PRIIA Section 207 scores.

5.1 Project Initiatives

Table 5.1 on the following pages provides information about the 22 location-specific potential initiatives.

TABLE 5.1 LOCATION-SPECIFIC POTENTIAL INITIATIVES

Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Burlington Railyard Enterprise Project - multimodal transportation infrastructure improvements. See: https://www.ccrpcvt.org/our-work/transportation/current-projects/scoping/railyard-enterprise-project/	Economic Development	Both	Burlington City Council voted to pursue funding after completion of scoping study in 2020. Three potential designs have been identified to move forward to preliminary engineering pending securement of grant funding.	Other (Improvements to railyards)	116
Extension from Burlington to Essex Junction to connect *Ethan Allen Express* with *Vermonter*.	Increase Use/ Expand Capacity	Both	See results of modeling. This is a complicated initiative that would need further exploration. Also see #126 improving freight movement in the corridor.	Passenger ridership	103
Bring the *Vermonter* up to 79 MPH	Increase Use/ Expand Capacity	Both	See results of modeling. Would require signaling system and track work west of White River Junction, as well as installation of signaling system between Brattleboro and East Northfield, MA.	Passenger ridership	105
Bring the Western Corridor up to 79 MPH	Increase Use/ Expand Capacity	Both	See results of modeling. Would require signaling system and track improvements between Whitehall, NY and Burlington.	Passenger ridership	106
Upgrade NECR Winooski Branch Bridges and Track to 286k standard (Burlington to Essex Junction)	Increase Use/ Expand Capacity	Both	This is Class I track, rated at 10 MPH for freight. This initiative would serve freight and support extending Ethan Allen service from Burlington to Essex Junction (#103). Some work was completed to support Middlebury Tunnel detour (rail, ties, bridge timber replacement).	Bridges capable of 286,000 pounds and passenger track Class 4	126
Upgrade GMRC Bridges and Track to 286k standard (Rutland to Bellows Falls)	Increase Use/ Expand Capacity	Freight	8 bridges with a load rating <286k, 17.9 miles of track is 90 lb. rail or lower.	Bridges capable of 286,000 pounds	112
Upgrade WACR Montpelier & Barre Sub. Bridges and Track up to 286k standard (Montpelier to Barre)	Increase Use/ Expand Capacity	Freight	3 bridges not capable of handling 286k, 12.7 miles of 90 lb. rail or lower.	Bridges capable of 286,000 pounds	113
Upgrade WACR Connecticut River Line Bridges and Track up to 286k standard (White River Junction to Newport)	Increase Use/ Expand Capacity	Freight	21 bridges load rating not sufficient for 286k, rail weight between 90 and 115 pounds.	Bridges capable of 286,000 pounds	115

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Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Achieve full NECR Double Stack Clearance (Alburgh to MA border)	Increase Use/ Expand Capacity	Freight	Lowest clearance is 19'6" (US 5 in Hartland and US 7 in Georgia, VT). 14 total restrictions in Vermont to double-stack access.	Vertical clearance	120
Achieve full GMRC/CLP Double Stack Clearance (NY border to Bellows Falls)	Increase Use/ Expand Capacity	Freight	19'2" clearance restriction in Proctorsville (GMRC) and Rutland Center (CLP).	Vertical clearance	121
Vermonter Extension to Montreal – one round trip/ day	Increase Use/ Expand Capacity	Passenger	See results of modeling.	Passenger ridership	100
Vermonter Extension to Montreal – two round trips/ day	Increase Use/ Expand Capacity	Passenger	See results of modeling.	Passenger ridership	102
Vermonter connection at Springfield, MA to trains to Boston	Increase Use/ Expand Capacity	Passenger	See results of modeling. Would provide connection for *Vermonter* at Springfield to train service MassDOT is exploring in the "East-West Passenger Rail Study." See: https://www.mass.gov/east-west-passenger-rail-study	Passenger ridership	109
New Albany-Bennington-Manchester Route to Burlington	Increase Use/ Expand Capacity	Passenger	See results of modeling. Bus service was put in place to assess existing demand.	Passenger ridership	104
Add a second daily service to the *Ethan Allen Express* New York City to Burlington.	Increase Use/ Expand Capacity	Passenger	See results of modeling.	Passenger ridership	107
Extend one Valley Flyer service from Greenfield, MA to White River Junction	Increase Use/ Expand Capacity	Passenger	See results of modeling. This low-volume service may be required to meet Federal Transit Administration (FTA) regulations. Under current FRA regulations, installation of PTC is not required. PTC likely would be part of a broader upgrade in the future.	Passenger ridership	108
Add whistle stop in Brandon and Shelburne areas once *Ethan Allen Express* is extended to Burlington	Increase Use/ Expand Capacity	Passenger	Brandon is approximately 15 miles from both Rutland and Middlebury, Shelburne is approximately. 15 miles from Vergennes and 7 miles from Burlington. Would need to assess balance of added access with added travel time.	Passenger ridership	123
Passenger Rail Station Improvements statewide	Intermodal Connectivity	Passenger	See list of ADA improvements in Table 4.2. Rutland & White River Junction are VTrans/City of Rutland responsibility. Montpelier (2022), Bellows Falls (2022), Brattleboro (2022-23), Essex Junction (2021) have projects planned by Amtrak.	Other (asset management and station conditions)	111
VTR track upgrade between Manchester and Rutland to continuous welded rail (CWR) and 115 lb. capacity	Maintenance	Freight	Higher track weight to allow for higher train speeds (passenger and freight) as well as maintain State of Good Repair.	Rail weight	110

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Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Add quiet zone near South Summit St. crossing in Essex Junction	Maintenance	Passenger	Quiet Zone analysis required: https://railroads.dot.gov/elibrary/how-create-quiet-zone Quiet zones could be explored if supported by analysis as part of Initiative #103 or #126.	Rehabilitate and upgrade rail crossings	124
Upgrade public grade crossings on current and planned Amtrak passenger rail routes (*Ethan Allen Express* to Burlington and *Vermonter* extension to Montreal) to gates and flashers	Safety	Both	Phased implementation prioritized through Section 130 effort. 80 locations identified under this initiative. Cost of upgrades and maintenance could increase subsidy required of State for Amtrak service.	Rehabilitate and upgrade rail crossings	122
Improve multi-modal crossings, such as WACR line at Montpelier Main Street and bike path area	Safety	Freight	2020 VTrans Bicycle & Ped. grant, See 2019 Scoping study: https://www.montpelier-vt.org/DocumentCenter/View/7105	Rehabilitate and upgrade rail crossings	125

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5.2 Policy/Program Initiatives

The second set of potential initiatives are programmatic or policy-focused and are not easily located to a specific corridor or location in the State. Table 5.2 provides details on these 18 initiatives, again sorted by goal area addressed.

TABLE 5.2 PROGRAM AND POLICY INITIATIVES

Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Educate shippers about rail and intermodal service options and contracting approaches	Economic Development	Freight	Work with economic development agencies to encourage intermodal rail freight use by private businesses where viable.	Recruit rail using businesses/Freight Volume	5
Preserve rail siding access to existing industrial sites and preserve and fully use parcels with access to rail	Economic Development	Freight	Coordinate with railroads to identify and prioritize rail spurs or siding needs to provide access to industrial/commercial properties. Work with agencies, economic development groups, RPCs, etc. to update inventory of these properties and help publicize and maintain viability of industrial zoned land near existing or potential sidings, spurs, etc.	Recruit rail using businesses/Freight Volume	6
Develop quick-response capability to leverage economic development opportunities	Economic Development	Freight	Collaborate with state and local economic development agencies to develop tools to help identify, promote, and calculate public/private benefits of developing rail-served sites.	Recruit rail using businesses/Freight Volume	7
Maintain and modernize freight rail yards such as NECR and CP Yards	Economic Development	Freight	Improve sorting of cars for various destinations and support functions such as car/locomotive maintenance, storage and inspection.	Other (yards and sidings)	20
Track and respond to COVID-19-related changes regarding impacts on the passenger and freight rail system, both direct and from demographic changes	Funding	Both	Work with Departments of Health & Education (school enrollment), RPCs, and others to understand demographic and transportation change. Increase advertising and bike/ped station access where population is increasing; engage more with e-commerce shippers to understand supply chain changes due to COVID-19 and how rail may help serve changing needs.	Other (COVID-19 impacts)	12
Seek grants and innovative funding approaches for freight and passenger rail	Funding	Both	Continue to position State to pursue federal grant opportunities and collaborate with ACCD and other economic development agencies on opportunities.	Other (funding)	18
Upgrade all rail lines to 286K weight-bearing capability	Increase Use/ Expand Capacity	Freight	286,000 pound is the national standard for freight rail cars. Increasing all lines to this standard will improve regional and	286,000 pound bridges	2

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Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
			national connections and enhance freight business opportunities in the State.		
Further enhance marketing of Vermont passenger rail	Increase Use/ Expand Capacity	Passenger	Work more closely with ACCD, economic development and tourist groups, chambers, to promote passenger rail opportunities and connections to local tourist attractions.	Passenger ridership	4
Facilitate development of freight transload and intermodal terminals in or near Vermont	Intermodal Connectivity	Freight	As demand warrants, work with customers and railroads to identify opportunities to expand or develop new transload or intermodal freight facilities in the State.	Freight Volume	8
Maintain and improve freight access to regional short-haul markets and competitive Class I railroad connections	Intermodal Connectivity	Freight	Advocate and educate on behalf of Vermont businesses for operating agreements between short line and Class I railroads to improve efficiency of interchanges.	Recruit rail using businesses/Freight Volume	9
Improve multi-modal connections including bicycle, pedestrian, and transit to Amtrak stations. Improve wayfinding	Intermodal Connectivity	Passenger	Work with transit & tourist services to match scheduling, increase comfort and reliability of transfers. Work with municipalities to develop station area plans, improve wayfinding, and enhance bicycle and pedestrian accommodations (crosswalks, bicycle lanes, bicycle parking).	Passenger ridership	14
Explore transit-oriented development (TOD)	Intermodal Connectivity	Passenger	Work with municipalities to explore and support TOD opportunities near Amtrak stations.	Passenger ridership	15
Maintain State-owned freight trackage at FRA Track Class 2 or better and state-owned passenger rail trackage at Class 4 or better where viable based on geography	Maintenance	Both	Long-term goal for the State to upgrade where necessary and then maintain rail at levels suitable for competitive and cost-effective use. Class 2 is 25 MPH for freight, 30 MPH for passenger. Class 4 is 60 MPH for freight, 80 MPH for passenger.	FRA Class 4 for passenger rail lines	3
Workforce development and training	Maintenance	Freight	Partner on job training with Dept. of Labor, educational facilities, and businesses to ensure that critical rail-related jobs can be filled.	Other (workforce)	11
Maintain, publicize, and enhance appropriate communication regarding rail movement and storage of hazardous materials (hazmat) while respecting rail exemptions from local control	Safety	Freight	Publicize voluntary efforts by railroads, such as the local first responder classes offered by VRS. Share the big picture, for example that storage of fuel in Vermont responds to bad winters when there were shortages. Maintain appropriate communication among State agencies, municipal staff and first responders, and railroads. Explore opportunities as part of shift underway to Statewide Emergency Planning Committee.	Other (rail as a good neighbor)	10

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Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Increase resilience of rail system to make critical infrastructure more resilient now and to prepare for increasing storm severity	Safety	Both	180 miles of rail (109 State-owned) in flood risk areas (see Figure 4.3. Work with railroads to identify priorities and funding to increase resilience.		13
Publicize existing voluntary efforts of railroads and encourage "freight as a good neighbor" (NCHRP Syntheses 320) while respecting rail's exemptions from local control	Safety	Freight	Highlight and support coordination on rail maintenance, operations, and construction activities. This could include -Proactively share information such as FAQs that will be on the VRS website in early 2021 -Collaborate more on getting information visible to varied audiences such as outreach campaigns ahead of *Ethan Allen* extension to Burlington. -Continue to explore positive ways for railroads and other Vermonters to resolve issues in a way that strengthens Vermont's economy and communities.		19

While the preliminary list of potential alternatives was reviewed by VTrans staff, some of the initiatives were combined, refined, or otherwise edited, and the two tables were consolidated into one master list of potential alternatives. Table 5.3 is the list of potential initiatives that was published in the Draft Rail Plan.

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TABLE 5.3 POTENTIAL INITIATIVES

Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Educate shippers about rail and intermodal service options and contracting approaches	Economic Development	Freight	Work with economic development agencies to encourage intermodal rail freight use by private businesses where viable.	Recruit rail using businesses/Freight Volume	5
Preserve and fully use industrial land parcels with access to rail sidings as well as the rail infrastructure that provides the access.	Economic Development	Freight	Work with RPCs, railroads, agencies, economic development groups, municipalities, etc. to update inventory of these properties and help publicize in a strategic manner. Maintain viability of industrial zoned land near existing or potential sidings, spurs, etc.	Recruit rail using businesses/Freight Volume	6

Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Develop quick-response capability to leverage economic development opportunities	Economic Development	Freight	Collaborate with State and local economic development agencies to develop tools to help identify, promote, and calculate public/private benefits of developing rail-served sites.	Recruit rail using businesses/Freight Volume	7
Maintain and modernize freight rail yards such as NECR and CP Yards	Economic Development	Freight	Improve sorting of cars for various destinations and support functions such as car/locomotive maintenance, storage and inspection.	Other (yards and sidings)	20
Burlington Railyard Enterprise Project - multimodal transportation infrastructure improvements. See: https://www.ccrpcvt.org/our-work/transportation/current-projects/scoping/railyard-enterprise-project/	Economic Development	Both	Burlington City Council voted to pursue funding after completion of scoping study in 2020. Three potential designs have been identified to move forward to preliminary engineering pending securement of grant funding.	Other (Improvements to railyards)	116
Track and respond to COVID-19-related changes regarding impacts on the passenger and freight rail system, both direct and from demographic changes	Funding	Both	Work with Departments of Health & Education (school enrollment), RPCs, and others to understand demographic and transportation change. Increase advertising and bike/ped station access where population is increasing; engage more with e-commerce shippers to understand supply chain changes due to COVID-19 and how rail may help serve changing needs.	Other (COVID-19 impacts)	12
Seek grants and innovative funding approaches for freight and passenger rail	Funding	Both	Continue to position State to pursue federal grant opportunities and collaborate with ACCD and other economic development agencies on opportunities.	Other (funding)	18
Upgrade all rail lines to 286K weight-bearing capability	Increase Use/ Expand Capacity	Freight	286,000 pound is the national standard for freight rail cars. Increasing all lines to this standard will improve regional and national connections and enhance freight business opportunities in the State.	286,000 pound bridges	2
Further enhance marketing of Vermont passenger rail	Increase Use/ Expand Capacity	Passenger	Work more closely with ACCD, economic development and tourist groups, chambers, to promote passenger rail opportunities and connections to local tourist attractions.	Passenger ridership	4
Extension from Burlington to Essex Junction to connect *Ethan Allen Express* with *Vermonter*.	Increase Use/ Expand Capacity	Both	See results of modeling. This is a complicated initiative that would need further exploration. Also see #126 improving freight movement in the corridor.	Passenger ridership	103
Work to reduce causes of delay to Ethan Allen Express and Vermonter service within and beyond Vermont's borders.	Increase Use/ Expand Capacity	Passenger	Most of the delays that affect on-time performance of the Ethan Allen Express and Vermonter occur outside Vermont. Working with other states and railroads to ensure delays within and beyond Vermont's borders are addressed can improve service reliability and attract more riders.	Passenger ridership On-time performance	127
Bring the *Vermonter* up to 79 MPH	Increase Use/ Expand Capacity	Both	See results of modeling. Would require signaling system and track work west of White River Junction, as well as installation of signaling system between Brattleboro and East Northfield, MA.	Passenger ridership On-time performance	105
Bring the Western Corridor up to 79 MPH	Increase Use/ Expand Capacity	Both	See results of modeling. Would require signaling system and track improvements between Whitehall, NY and Burlington.	Passenger ridership On-time performance	106

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Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Upgrade NECR Winooski Branch Bridges and Track to 286k standard (Burlington to Essex Junction)	Increase Use/ Expand Capacity	Both	This is Class I track, rated at 10 MPH for freight. This initiative would serve freight and support extending Ethan Allen service from Burlington to Essex Junction (#103). Some work was completed to support Middlebury Tunnel detour (rail, ties, bridge timber replacement).	Bridges capable of 286,000 pounds and passenger track Class 4	126
Upgrade GMRC Bridges and Track to 286k standard (Rutland to Bellows Falls)	Increase Use/ Expand Capacity	Freight	8 bridges with a load rating <286k, 17.9 miles of track is 90 lb. rail or lower. Preliminary engineering and/or right-of-way costs for the rehabilitation of three bridges on this line are included in the Governor's proposed FY22 budget.	Bridges capable of 286,000 pounds	112
Upgrade WACR Montpelier & Barre Sub. Bridges and Track up to 286k standard (Montpelier to Barre)	Increase Use/ Expand Capacity	Freight	3 bridges not capable of handling 286k, 12.7 miles of 90 lb. rail or lower. Preliminary engineering costs for the rehabilitation of one bridge on this line are included in the Governor's proposed FY22 budget.	Bridges capable of 286,000 pounds	113
Upgrade WACR Connecticut River Line Bridges and Track up to 286k standard (White River Junction to Newport)	Increase Use/ Expand Capacity	Freight	21 bridges load rating not sufficient for 286k, rail weight between 90 and 115 pounds. Preliminary engineering costs for the rehabilitation of five bridges, and construction costs for the rehabilitation of three bridges on this line are included in the Governor's proposed FY22 budget.	Bridges capable of 286,000 pounds	115
Achieve full NECR Double Stack Clearance (Alburgh to MA border)	Increase Use/ Expand Capacity	Freight	Lowest clearance is 19'6" (US 5 in Hartland and US 7 in Georgia, VT). 14 total restrictions in Vermont to double-stack access. This is the only line in the state carrying double stack containers, but it cannot accommodate double stacked high cube containers.	Vertical clearance	120
Achieve full GMRC/CLP Double Stack Clearance (NY border to Bellows Falls)	Increase Use/ Expand Capacity	Freight	19'2" clearance restriction in Proctorsville (GMRC) and Rutland Center (CLP).	Vertical clearance	121
Vermonter Extension to Montreal – one round trip/ day	Increase Use/ Expand Capacity	Passenger	See results of modeling.	Passenger ridership	100
Vermonter Extension to Montreal – two round trips/ day	Increase Use/ Expand Capacity	Passenger	See results of modeling.	Passenger ridership	102
Vermonter connection at Springfield, MA to trains to Boston	Increase Use/ Expand Capacity	Passenger	See results of modeling. Would provide connection for *Vermonter* at Springfield to train service MassDOT is exploring in the "East-West Passenger Rail Study." See: https://www.mass.gov/east-west-passenger-rail-study.	Passenger ridership	109
Add passenger service on the Albany-Bennington-Burlington freight route to supplement *Ethan Allen Express* service in Western Corridor	Increase Use/ Expand Capacity	Passenger	See results of modeling. Bus service was put in place to assess existing demand. Initiative could benefit from the improvements associated with Initiative #110.	Passenger ridership	104

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Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
Add a second daily service to the *Ethan Allen Express* New York City to Burlington.	Increase Use/ Expand Capacity	Passenger	See results of modeling.	Passenger ridership	107
Extend one Valley Flyer service from Greenfield, MA to White River Junction	Increase Use/ Expand Capacity	Passenger	See results of modeling. This low-volume service may be required to meet Federal Transit Administration (FTA) regulations. Under current FRA regulations, installation of PTC is not required. PTC likely would be part of a broader upgrade in the future.	Passenger ridership	108
Add whistle stop in Brandon and Shelburne areas once *Ethan Allen Express* is extended to Burlington	Increase Use/ Expand Capacity	Passenger	Brandon is approximately 15 miles from both Rutland and Middlebury, Shelburne is approximately. 15 miles from Vergennes and 7 miles from Burlington. Would need to assess balance of added access with added travel time.	Passenger ridership	123
Facilitate development of freight transload locations in or near Vermont	Intermodal Connectivity	Freight	As demand warrants, work with customers and railroads to identify opportunities to expand or develop new transload facilities. An intermodal site could be explored where there are high volumes and Class 1 access.	Recruit rail using businesses/Freight Volume	8
Maintain and improve freight network connections for Vermont businesses to regional short-haul markets and competitive Class I railroad (mix of physical and policy matters)	Intermodal Connectivity	Freight	Advocate on behalf of Vermont businesses for enhanced operating agreements between shortline and Class I railroads to improve efficiency of interchanges. Make physical improvements to support effective interchanges, for example for the State-owned Bennington Rail Yard to be able to support interaction with long Class 1 train sets.	Recruit rail using businesses/Freight Volume	9
Improve multi-modal connections including bicycle, pedestrian, and transit to Amtrak stations. Improve wayfinding	Intermodal Connectivity	Passenger	Work with transit & tourist services to match scheduling, increase comfort and reliability of transfers. Work with municipalities to develop station area plans, improve wayfinding, and enhance bicycle and pedestrian accommodations (crosswalks, grade crossings, paths/trails, bicycle lanes, bicycle parking). Improve sharing of Amtrak guidance for bringing bicycles on trains.	Passenger ridership	14
Explore transit-oriented development (TOD)	Intermodal Connectivity	Passenger	Work with municipalities to explore and support TOD opportunities near Amtrak stations, including zoning, utility and other infrastructure, multimodal connections (see ID#14), and other needs.	Passenger ridership	15
Passenger Rail Station Improvements Statewide	Intermodal Connectivity	Passenger	See list of ADA improvements in Table 4.2. Rutland & White River Junction are VTrans/City of Rutland responsibility. Montpelier (2022), Bellows Falls (2022), Brattleboro (2022-23), Essex Junction (2021) have projects planned by Amtrak.	Other (asset management and station conditions)	111
Maintain State-owned freight trackage at FRA Track Class 2 or better and State-owned passenger rail trackage at Class 4 or better where viable based on geography	Maintenance	Both	Long-term goal for the State to upgrade where necessary and then maintain rail at levels suitable for competitive and cost-effective use. Class 2 is 25 MPH for freight, 30 MPH for passenger. Class 4 is 60 MPH for freight, 80 MPH for passenger.	FRA Class 4 for passenger rail lines On-time performance	3
Workforce development and training	Maintenance	Freight	Partner on job training with Dept. of Labor, educational facilities, and businesses to ensure that critical rail-related jobs can be filled.	Other (workforce)	11

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Initiative Description	Primary Goal Area	Freight or Passenger	Notes	Performance Measure Addressed	ID #
VTR track upgrade between Manchester and Rutland to continuous welded rail (CWR) and 115 lb. capacity.	Maintenance	Freight	Higher track weight to allow for higher train speeds (passenger and freight) as well as maintain State of Good Repair. This improvement could also support Initiative #104.	Rail weight	110
Add quiet zone near South Summit St. crossing in Essex Junction	Maintenance	Passenger	Quiet Zone analysis required: https://railroads.dot.gov/elibrary/how-create-quiet-zone Quiet zones could be explored if supported by analysis as part of Initiative #103 or #126	Rehabilitate and upgrade rail crossings	124
Maintain, publicize, and enhance appropriate communication regarding rail movement and storage of hazardous materials (hazmat) while respecting rail exemptions from local control	Safety	Freight	Publicize voluntary efforts by railroads, such as the local first responder classes offered by VRS. Share the big picture, for example that storage of fuel in Vermont responds to bad winters when there were shortages. Maintain appropriate communication among State agencies, municipal staff and first responders, and railroads. Explore opportunities as part of shift underway to Statewide Emergency Planning Committee.	Other (rail as a good neighbor)	10
Increase resilience of rail system to make critical infrastructure more resilient now and to prepare for increasing storm severity	Safety	Both	180 miles of rail (109 State-owned) in flood risk areas (See Figure 4.3. Work with railroads to identify priorities and funding to increase resilience.	Other (resiliency)	13
Publicize existing voluntary efforts of railroads and encourage "freight as a good neighbor" (NCHRP Syntheses 320) while respecting rail's exemptions from local control	Safety	Freight	Highlight and support coordination on rail maintenance, operations, and construction activities. This could include -Proactively share information such as FAQs that will be on the VRS website in early 2021 -Collaborate more on getting information visible to varied audiences such as outreach campaigns ahead of *Ethan Allen* extension to Burlington. -Continue to explore positive ways for railroads and other Vermonters to resolve issues in a way that strengthens Vermont's economy and communities.	Other (rail as a good neighbor)	19
Phased deployment of Gates/flashers at existing and planned Amtrak public road grade crossings	Safety	Both	Long-term goal of State. Phased deployment at 80 public road crossings including *Ethan Allen* (to Burlington) and *Vermonter* (to Montreal) routes. Cost of upgrades and maintenance could increase subsidy required of State for Amtrak service.	Rehabilitate and upgrade rail crossings	122
Improve multi-modal crossings, such as WACR line at Montpelier Main Street and bike path area	Safety	Freight	2020 VTrans Bicycle & Ped. grant, See 2019 Scoping study: https://www.montpelier-vt.org/DocumentCenter/View/7105	Rehabilitate and upgrade rail crossings	125

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5.3 Rail Studies and Reports

Recently Completed Studies and Reports

Vermont has completed or participated in a number of rail planning studies in past years including:

- 2006 and 2015 State Rail Plans.
- Northern New England Intercity Rail Initiative Study.[69]
- Western Corridor Transportation Management Plan (2010).[70]
- Vermont Freight Plan (2013).[71]
- New York-Vermont Bi-State Intercity Passenger Rail Study (2014).[72]
- Ethan Allen Extension to Burlington Tier 1 Environmental Assessment.
- Northern New England Intercity Rail Initiative (NNEIRI). NNEIRI is a conceptual planning study to examine adding more frequent and higher speed rail service on two rail corridors, the Inland Route (Boston-Springfield-NYC) and the Boston-to-Montreal Route (2016).[73]
- Montpelier-St. Albans Commuter Rail Service (2017).[74]
- Vermont Commodity Flow Study, 2017-2019
- WACR Montpelier & Barre Freight Corridor Commuter Rail Study (2019).[75]
- Burlington Amtrak Train Servicing and Storage Facility Assessment (2019).[76]
- Regional Rail Service The Vermont Way (2019) – Chittenden County RPC.[77]

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[69] http://www.pvpc.org/content/northern-new-england-intercity-rail-initiative-nneiri

[70] http://54.172.27.91/transportation/corridor_studies/western_corridor/

[71] Note that this document is being updated in 2021.

[72] https://railroads.dot.gov/environment/environmental-reviews/new-york-vermont-bi-state-intercity-passenger-rail-study

[73] https://railroads.dot.gov/environment/environmental-reviews/northern-new-england-intercity-rail-initiative

[74] https://vtrans.vermont.gov/sites/aot/files/Montpelier-St.%20Albans%20Commuter%20Rail%20Study%20Revised.pdf

[75] https://legislature.vermont.gov/assets/Legislative-Reports/WACR-MB-Freight-Corridor-Commuter-Rail-Study.pdf

[76] https://www.ccrpcvt.org/wp-content/uploads/2019/07/Burlington-Amtrak-Servicing-and-Storage-Facility-Assessment-FINAL-20190624.pdf

[77] https://www.ccrpcvt.org/wp-content/uploads/2019/07/Regional-Rail-Service-White-Paper.pdf

Future Studies and Analysis

Stakeholders have indicated that extension of the *Ethan Allen Express* to Essex Junction to connect with the *Vermonter* is a priority. While this study examined the potential impacts on ridership based both on a continuation of existing schedules and, at a high level, the impact of allowing for a cross platform transfer between the Ethan Allen and the *Vermonter* for travel to and from Montreal, a more comprehensive approach to evaluating potential passenger rail service alternatives would be to undertake a Service Development Plan (SDP). With the goal of creating an integrated passenger rail network serving Vermont and northeastern New York, the SDP could examine passenger demand of north- and south- connectivity at Essex Junction, and the specific impacts of particular schedules and frequencies. Options to consider may include daytime versus overnight services to Montreal, or the potential of extending the *Ethan Allen Express* to Montreal as an additional frequency to the *Vermonter* versus once or twice daily *Vermonter* service to Montreal. Changes to schedules to improve connections to existing service such as the Lake Shore Limited at Springfield or Albany-Rensselaer could be explored as part of this effort.

In addition, rail issues should be included in other ongoing efforts and information from these could be useful in enhancing the analysis conducted during this Plan update. These other efforts include:

- Include rail in future Commodity Flow Studies (CFS) – the State periodically funds CFS which are essentially collection and analysis efforts which look at HAZMAT trans-shipment upon the State transportation system, primarily State and Federal roads. They are useful to determine the density of HAZMAT flow as well as to determine which types of HAZMAT are brought into the state. This data is essential for first responders and EMDs to use as they generate HAZMAT response contingency plans. Future efforts should include rail transport of these commodities.
- The Federal Highway Administration is in the process of updating their commodity flow information from the Freight Analysis Framework (FAF4). Once FAF5 is released, a study should be done to compare projected flows in FAF4 to FAF 5 in order to update commodity flow data and forecasting.
- Expand the Vermont Transportation Resiliency Planning Tool (TRPT)[78] to explore rail resiliency issues using a similar methodology. While this Plan took a preliminary look at applying similar criteria (see Section 4.1), additional work is needed to bring the rail network analysis to a similar level as that already completed for the highway network.

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[78] https://vtrans.vermont.gov/planning/transportation-resilience

APPENDIX A. RAIL BRIDGE LOAD RATING UPGRADE TO 286,000 POUNDS

This table shows bridges for which the state is responsible for that have a weigh rating of less than 286,000 pounds.

Bridge Number	Milepost	Load Rating Year	Load Rating Speed	Weight Rating	County	Feature Crossed	Rail Division
549.5	29.2	2014	25	Capacity <286k	Caledonia	Roundy Brook	Washington County Railroad Connecticut River
110	7.4	2015	20	Capacity <286k	Windham	Williams River	Green Mountain Railroad
114	10.95	2016	30	Capacity <286k	Windsor	Williams River	Green Mountain Railroad
119	12.8	2016	10	Capacity <286k	Windsor	Middle Branch Williams River	Green Mountain Railroad
124	18.2	2017	10	Capacity <286k	Windsor	Williams River	Green Mountain Railroad
133	25.47	2014	25	Capacity <286k	Windsor	Unnamed Stream	Green Mountain Railroad
503	38.21	2014	25	Capacity <286k	Windsor	Dothan Brook	Washington County Railroad Connecticut River
505	36.87	2014	25	Capacity <286k	Windsor	Bloody Brook	Washington County Railroad Connecticut River
506	31.66	2018	10	Capacity <286k	Windsor	Ompompanoosuc River	Washington County Railroad Connecticut River
507	28.34	2014	25	Capacity <286k	Orange	Zebedee Brook	Washington County Railroad Connecticut River
510	20.96	2014	25	Capacity <286k	Orange	Unnamed Stream	Washington County Railroad Connecticut River
522	0.59	2017	10	Capacity <286k	Orange	Wells River / US 302	Washington County Railroad Connecticut River
310	8.42	2014	10	Capacity <286k	Washington	Jail Branch	Washington County Railroad Montpelier & Barre
306	3.15	2019	10	Capacity <286k	Washington	Winooski River	Washington County Railroad Montpelier & Barre
305	2.31	2019	10	Capacity <286k	Washington	Winooski River	Washington County Railroad Montpelier & Barre
304	1.28	2018	10	Capacity <286k	Washington	North Branch Winooski River	Washington County Railroad Montpelier & Barre
528	52.6	2016	10	Capacity <286k	Caledonia	Overflow	Washington County Railroad Connecticut River
534	48.2	2014	25	Capacity <286k	Caledonia	Water Andric	Washington County Railroad Connecticut River
550	28.8	2014	25	Capacity <286k	Caledonia	West Branch Passumpsic River	Washington County Railroad Connecticut River

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556.3	12.75	2014	25	Capacity <286k	Orleans	Barton River	Washington County Railroad Connecticut River
556.5	12.5	2014	25	Capacity <286k	Orleans	Barton River	Washington County Railroad Connecticut River
558	10.1	2018	60	Capacity <286k	Orleans	Overflow	Washington County Railroad Connecticut River
561	6.9	2016	10	Capacity <286k	Orleans	Overflow	Washington County Railroad Connecticut River
568	2.2	2016	60	Capacity <286k	Orleans	Cobb Brook	Washington County Railroad Connecticut River
308	6.9	2014	10	Capacity <286k	Washington	Stevens Branch	Washington County Railroad Montpelier & Barre
568	2.2	2016	60	Capacity <286k	Orleans	Cobb Brook	Washington County Railroad Connecticut River
535	47.1	2013	10	Capacity <286k	Caledonia	Passumpsic River	Washington County Railroad Connecticut River

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[i] Scope of work includes new accessible path, two ADA parking spaces, new 8" above-top-of-rail 400' long by 12' wide platform, relocate existing mobile lift and enclosure, ADA-compliant unisex restroom, ADA-compliant hardware and entrances in existing building, alter station attendant office, and provide Amtrak ADA signage, directional signs, interior signs, and ADA-compliant parking signs. Amtrak email, November 25, 2020.

[ii] http://www.railswitchnet.com/