1. Overview

The Vermont Agency of Transportation (AOT or VTrans) is embarking on an update of two important statewide modal plans; the Vermont Freight Plan (2012) and the Vermont Rail Plan (2015). The updates will be closely coordinated to efficiently incorporate the overlap of freight rail components. Keeping these plans current is necessary to meet federal requirements related to Federal Highway Administration (FHWA) Freight Formula funds, and to remain eligible for certain types of Federal Railroad Administration (FRA) grant programs. Both plan updates will address developing issues, including changes to the global economy and evolving trade agreements, e-commerce, technological advancements, and reliability and resilience of our transportation system.

The Freight Plan Advisory Committee (FPAC) will provide guidance on the overall direction and development of the Vermont Freight Plan update. VTrans will update the FPAC on progress, discuss outreach activities, and solicit topics of concern. VTrans and the consultant team will meet with the FPAC up to five times during the development of the Plan, through the early summer of 2021.

This data trends and discussion questions piece presents a sample of freight trends identified thus far in the data analysis for the updates. It ends with questions for FPAC members and others interested in these matters. The insight from responses will add value to both plan updates.

2. Vermont Freight Overview

While shipping decisions are typically a private-sector choice, State government plays an important role maintaining and managing portions of the road, rail, air, and water networks and in developing initiatives, policies, and programs that benefit all freight users. Further, freight planning in Vermont considers freight issues and needs within the context of all Vermont efforts, including economic development, environmental stewardship through emissions and energy-use reduction, and thoughtful land management.

From rock salt to keep roads clear in the winter and propane to keep houses warm, from a spare part to keep a manufacturing line running to malt for a craft brewer and cheese for a world market, freight plays a role in our everyday life. Different types of freight are generally moved using different modes, shown in Figure 1.

Figure 1: Common Freight Modes by Industry Sectors

Note: PST includes the professional, scientific, and technical services industry sectors.
In total, more than 46 million tons of freight moved in to, out of, within, or through the State in 2018 as shown in Figure 2.1 Nearly 70 percent of freight, when measured by weight, moved within the State or inbound from other states.

Figure 2: Vermont Tons of Goods by Direction (2018)

2018 Tons by Direction
Total = 46.67 Million Tons

Source: FAF, STB Confidential Waybill Sample.

The value of freight moved in Vermont in 2018 was nearly $71 billion. As Figure 3 shows, the distribution of freight by direction of movement and value suggests that goods shipped outbound from Vermont to other places are higher-value goods than those moved within the State.

Figure 3: Vermont Value of Goods by Direction (2018)

2018 Value by Direction
Total = $70.9 billion

Source: FAF, STB Confidential Waybill Sample.

Trucks are the dominant mode for moving freight in Vermont. As shown in Figure 4, about 84 percent of freight tonnage moves by Truck. The predominance of trucking as a freight transportation mode is due in part to: the mix of commodities and industry sectors in the state; a limited number of rail-served businesses, which necessitates a transfer of freight from rail to truck for the “first mile” or “last mile” to customer sites, and also due to the length of haul. Generally, the transfer from truck to rail and handling costs make trucking more price-competitive for short trips. The lower per-mile operating cost of rail typically overcomes the first/last-mile and handling costs when trips exceed 400-600 miles.

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1 Note that through volumes are not available directly from USDOT’s Freight Analysis Framework (FAF) and were calculated using a select link analysis. This may underestimate through trips due to the size and location of surrounding FAF regions.
Trucks also move the greatest proportion of Vermont’s freight when measured by value of goods moved. More than two-thirds of Vermont’s freight, measured by value, moved by truck in 2018, as Figure 5 shows.

Source: FAF, STB Confidential Waybill Sample. Note “Air” includes goods moved by a combination of air and truck. “Multiple modes and mail” includes shipments by multiple modes (e.g., rail and truck) and by parcel delivery/mail service of goods less than 150 pounds.
3. Rail

There are approximately 578 miles of active rail lines in the State of Vermont of which 305 miles are owned by Vermont. Freight rail volumes have varied year-to-year in Vermont with an overall growth in both tons (4%) and carloads (8%) between 2011 and 2018. The changes in tons by direction, however, were more variable as shown in Figure 6. Freight rail tonnage inbound to Vermont increased by 71% with substantial growth in petroleum/coal products and nonmetallic minerals (particularly rock salt). Shipments within Vermont (intrastate) increased by 33% with growth in nonmetallic minerals and clay, concrete, glass or stone products. Nationally, tonnage shipped by rail has declined over the past decade driven in large part by reduced shipments of coal.2

Figure 6: Vermont Rail Tons by Direction, 2011 (Left) and 2018 (Right)

Source: STB Confidential Carload Waybill Sample. Analysis by Cambridge Systematics.

Figure 7 shows Vermont’s trading partners, which are the origins of inbound moves and the destination of outbound moves of freight by rail. New York (inbound) and Maine (outbound) are top domestic trading partners. Since 2011, shipments between Vermont and New York have nearly doubled. There has also been significant growth in trade with Massachusetts and Canada. Inbound/outbound tons to/from regions outside the Northeast are generally lower than in 2011.

Source: STB Confidential Carload Waybill Sample. Analysis by Cambridge Systematics.

Figure 7

Source: STB Confidential Carload Waybill Sample. Analysis by Cambridge Systematics.

Figure 7: Vermont Inbound and Outbound Rail Tons (2018)

Source: STB Confidential Carload Waybill Sample. Analysis by Cambridge Systematics.

Figure 8 shows how rail freight flows over the State’s rail network. The seven-mile segment of Pan Am Southern in the southwest corner of the State carried 56 percent of all through traffic in 2018.
Figure 8: Vermont Rail Traffic Flows (2018)

Source: STB Confidential Carload Waybill Sample. Analysis by Cambridge Systematics.
4. Highway

The State-owned portion of road network consist of the Interstate highway system, U.S. routes, and state routes. It totals 3,870 miles, split into the three categories as shown in Figure 9.

Figure 9: Vermont Truck Tons by Direction (2018)

Source: FAF. Analysis by Cambridge Systematics.

Trucks are the dominant mode for moving freight in to, out of, within, and through Vermont, accounting for more than 39 million tons and nearly $45 billion in 2018 (see Figures 10 and 11).

Figure 10: Vermont Truck Tons by Direction (2018)

Source: FAF. Analysis by Cambridge Systematics.

Figure 11: Vermont Value of Goods Moved by Truck by Direction (2018)

Source: FAF. Analysis by Cambridge Systematics.

Top commodities transported by truck are similar to those transported by rail. On the basis of tonnage, raw, heavy materials including aggregates, oils, and wood comprise much of the top commodities, along with
food. In terms of value, top commodities consist of electronics, pharmaceuticals, food, and mixed freight. In both cases, a large amount of “other” freight indicates a diversity in goods shipped.

Transload facilities are a key node in both the freight rail and truck networks. They allow goods to switch between modes, giving shippers and receivers the transportation benefits of both (lower cost for longer rail trips, flexibility and speed for truck trips). There are 16 transload facilities which provide rail-truck transfer options to businesses in Vermont (see Figure 12). Intermodal facilities, which move containers or other packaged goods between modes without breaking down the cargo, are found nearby in Western Massachusetts (Ayer, Palmer, Worcester, West Springfield) and New York (Mechanicville) as well as Canada (Montreal).

Figure 12: Vermont Transload Facilities
**Figure 13** shows truck volumes in the state. The Burlington area has the highest truck volumes, following by sections of I-91 near White River Junction and Brattleboro. Most US/State routes carry less than 1,000 trucks per day with the exception of US 7. US 4 and VT 9 serve as the key east-west connectors in the State (along with I-89). We do not have good data for future truck volumes, but known projects such as A35 in Quebec are likely to create continued growth on the Interstate corridors, especially I-89. VTrans is participating in the Chittenden County metropolitan planning organization’s I-89 2050 Study, which is investigating potential network changes in this corridor.

*Figure 13: Vermont Truck Volumes (2018)*

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**5. Air**

Vermont has 16 public use airports, shown in **Figure 14**. Of these, ten are state-run, one is municipal (Burlington), and five are private. Burlington is the key hub for freight movement in the State, receiving approximately 4.9 million pounds of freight and originating approximately 3.7 million pounds in 2019. Air freight is underreported in public data sources (BTS T-100) for Rutland and non-existent for E.F. Knapp.
Both nationally and in the northeastern U.S., air cargo volumes generally declined between 2000 and 2016. Outliers to this are airports that serve the two major remaining companies in the air cargo market—UPS (Memphis) and FedEx (Memphis)—and gateways to Latin America (Miami) and Asia (Anchorage).

Figure 14: Vermont Airports

6. Water

There is limited if any freight movement utilizing Lake Champlain and Champlain Canal south to the Hudson River or the Chambly Canal north to the St. Lawrence River. General Electric’s dredging of PCBs in the Upper Hudson River is substantially complete. They removed approximately 450,000 cubic yards of sediment from the channel, but many locations still have depths of less than 12’. The US EPA believes the NY Canal Corporation can now seek funding for maintenance dredging. The Chambly Canal has a depth of six to seven feet, limiting commercial navigation.

7. Key Freight Trends

- **Global Shipping and Tariffs**: Volatile international trade relationships could increase the cost of producing and transporting consumer products in the near term and/or facilitate a shift in production locations, particularly away from East Asia in years to come.

- **E-Commerce**: E-commerce sales spiked in the first quarter of 2020, and are likely to have continued rapid growth through the second quarter. Figure 15 shows the growth in e-commerce sales as a percent of total retail sales by quarter from the first quarter of 2011 through the first quarter of 2020. E-commerce accounted for 16 percent of all retail sales in the US in the first quarter of 2020, compared to 5 percent in 2011. This rapid growth in e-commerce deliveries places stress on local roads using less-than-truckload and parcel service and is shifting warehousing towards more/smaller facilities close to population centers to meet delivery demands.

  Figure 15: National E-Commerce Trends (2011-2020)

![Figure 15: National E-Commerce Trends (2011-2020)](source: "Quarterly Retail E-Commerce Sales Report, Quarter 2, 2020", U.S. Census Bureau.)

- **Additive Manufacturing**, also known as 3D printing, allows companies to print parts or products using a computer design. This approach to manufacturing may help reduce the need to produce some consumer goods overseas, though it may also increase the need for raw material (resins, plastics, etc.) distribution to more domestic locations.

- **Broadband**: High quality broadband access helps maintain and grow businesses and attract residents, both of which increase the need to move goods, especially as consumers increasingly turn to online purchasing. Vermont ranks 36th in the US in terms of broadband access with higher speeds in the State’s urban areas (Burlington, Barre-Montpelier, Rutland, Connecticut River Valley) and poorer connections in rural areas such as the Northeast Kingdom.

- **Workforce**: Many jobs in the transportation and goods movement industries are what is considered “middle skill” jobs—more than a high school diploma, but less than a four-year degree. The skillsets may be technical, such as operating a computerized freight routing system; operational, such as driving a forklift; or, administrative, such as scheduling shipments and communicating with freight operators. Truck drivers are chronically in short-supply, causing some industries in Vermont to explore “sharing” drivers to help alleviate shortages.5 VTrans offers some assistance for people wanting to obtain a commercial drivers license and other agencies such as the Dept. of Labor have programs to help job-seekers.

- **Autonomous Vehicles**: Driverless vehicles that operate in specific conditions/corridors are being used for commercial service (with a human driver on-board) in parts of the South and West. The northeast will likely be one of the last areas to see deployment due to weather, age of infrastructure, and challenges of a dense region with shorter trips between population centers.

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• **Precision Scheduled Railroading (PSR):** This operating scheme, adopted by many of the major (Class I) railroads, optimizes and prioritizes equipment utilization and operating efficiency. This efficiency can sometimes come at the expense of the level of service to rail customers.

• **Electric Vehicle Initiatives:** Vermont joined a 15 state (and District of Columbia) agreement to accelerate electrification of medium- and heavy-duty buses and trucks to help meet emission goals. The agreement calls for 100 percent of new medium- and heavy-duty vehicle sales to be zero emission vehicles by 2050 (interim goal of 30 percent by 2030). Large pickup trucks and vans, delivery trucks, box trucks, long-haul delivery trucks and school and transit buses collectively account for 14 percent of the on-road sector greenhouse gas (GHG) emissions. Transportation in total accounts for 44 percent of Vermont’s GHG emissions. This compact will help Vermont meet its goals under the State’s Comprehensive Energy Plan.

8. **Questions for the Freight Plan Advisory Committee**

Please help update the Freight Plan by responding to the questions below. The questions are oriented to members of the FPAC but responses from anyone interested are also appreciated.

1. Are the data trends in this document consistent with newer development: after 2018 and pre-Coronavirus? If not, what have you observed that is different? What will the trends be for the next five years? Over the next 20-30 years? What will be the long-term impact of Coronavirus on the different modes?

2. Are there any additional key trends you are aware of that may impact Vermont’s freight future?

3. Three “meta-goals” were identified in the last State Freight Plan to maintain a system adequate to meet current and future needs. Do these still make sense? Are we missing anything? (note these all had associated strategies we can get into)
   - Ensure reliable truck travel times between Vermont and its major regional markets such Boston, New York City, Albany, and Montreal;
   - Keep highway, rail, aviation and water transportation infrastructure in a state of good repair; and
   - Maintain viable rail service to ensure both competition with and connections for truck services and preserve the capacity for future development of additional transload or intermodal service in Vermont.

4. What are the top 2-3 concerns or issues you have about moving freight in Vermont? These could include specific issues (e.g., a weight-listed bridge, need for more truck parking at a rest area, etc.), or broader policy or program concerns (e.g., zoning, economic development, oversize/overweight permits, etc.).

5. What is something the State is doing well to help businesses move freight and should remain an area of focus for the future? Again, this could be a specific topic (e.g., online Find My Plow) or a broader policy or program.

6. Do you have recommendations of who to engage from the rest of the freight industry and the best way to reach out to them?

9. **Next Steps and Further Information**

The Vermont Freight Plan Update is expected to be completed by July 2021. The Vermont Rail Plan update is expected to be completed by January 31, 2021. VTrans and the consultant team will engage the FPAC at periodic meetings through the completion of the Freight Plan. In addition, a wide range of stakeholders will be engaged and material will regularly be posted at the web pages for the two plan updates: https://vtrans.vermont.gov/planning/freight and https://vtrans.vermont.gov/rail/reports.

• For more information about the Vermont Freight Plan Update, contact Dave Pelletier at Dave.Pelletier@vermont.gov or (802) 595-9675.

• For more information about the Vermont Rail Plan update, contact Zoe Neaderland at Zoe.Neaderland@vermont.gov or (802) 793-2778.