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meet Chittenden County’s transportation needs

CHITTENDEN COUNTY METROPOLITAN PLANNING ORGANIZATION

Essex Junction Highway-Rail
Grade Crossing Study

October 18, 2000

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PURPOSE

The Village of Essex Junction requested the MPO examine the automating a switch between the New England Central Railroad Mainline and the Winooski Branch of the New England Central Railroad, which travels to Burlington. In response to this request, the MPO has examined what it would take to automate the switch and presents the general findings in this report.

Introduction

The Village of Essex Junction is an important link in Vermont’s economic infrastructure. The Village is home to Vermont’s largest private employer, IBM, and contains one of Vermont’s largest tourist attractions – the Champlain Valley Exposition. Essex Junction also contains over 300 other businesses and the second busiest Amtrak Station in Vermont.
All of these activities bring with them associated demands on the local transportation system. Railroad operations have served regional passenger travel and industrial needs since 1850. Passenger operations include AMTRAK Vermonter service and proposed commuter rail service. The New England Central Railroad (NECR) mainline travels through the Village and has the highest levels of freight rail use in the state – carrying about 65% of the total rail tonnage (source - 1993 Vermont Rail Feasibility Study).

The Village also has a network of state and local roads developed to serve the needs of vehicular travel. These roads experience high levels of use in peak travel periods. In particular, the Five Corners intersection in the center of Essex Junction has approximately 30,000 vehicles passing through it every day, and is functioning at capacity.\(^1\)

Table 1 below contains summary traffic information for the five arterial streets comprising the Five Corners intersection. These traffic counts are bi-directional. For example the 1,308 vehicles on Park Street south of the Five Corners intersection are in both the southbound and northbound directions of that particular segment of highway. The railroad operates through the Village Center in close proximity to the Five Corners. The roads and railroad intersect at seven highway-rail grade crossings in the village area (see Figure 1). Normal train operations on the north-south mainline New England Central Railroad (NECR) are a minor inconvenience to the traveling public, but operations between the Winooski Branch and the Mainline of the NECR are resulting in excessive congestion in the Village of Essex Junction. Trains traveling through Five Corners often block three state highways as they switch between the Winooski Branch and the Mainline.

### Table 1 – Traffic Data for Arterial Streets in Essex Junction

<table>
<thead>
<tr>
<th>Road</th>
<th>Location</th>
<th>Avg Weekday 4 - 5p.m. traffic (year)</th>
<th>1998 Average Annual Daily Traffic (AADT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park St - VT 2A</td>
<td>South of 5 corners int.</td>
<td>1308 (1994)</td>
<td>18,300</td>
</tr>
<tr>
<td>Maple St – VT 117</td>
<td>East of 5 corners int.</td>
<td>804 (1998)</td>
<td>8,900</td>
</tr>
<tr>
<td>Main St - VT 15</td>
<td>NE of 5 corners int.</td>
<td>870 (1998)</td>
<td>11,900</td>
</tr>
<tr>
<td>Lincoln St – VT 2A</td>
<td>North of 5 corners int.</td>
<td>790 (1998)</td>
<td>8,500</td>
</tr>
<tr>
<td>Pearl St - VT 15</td>
<td>West of 5 corners int.</td>
<td>1219 (1998)</td>
<td>13,200</td>
</tr>
</tbody>
</table>

### Highway-Rail Grade Crossing Switching Issues

In the midst of this significant highway and rail transportation corridor for Chittenden County is a manually operated railroad switch on the northern leg of the wye in the village. This switch (NECR switch 108.08 - see Figure 1 for location, Appendix C for photograph) guides trains traveling between the Winooski Branch of the railroad and the Mainline of the New England Central. Switch 108.08 is the single greatest contributor to exceptional driver delays in the Village. For example, a train

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\(^1\) IBM FAB 2000 Complex Traffic Impact Analysis Final Report, CCRPC. 1996
traveling from the Winooski Branch onto the Mainline often causes highway-rail grade crossing delays of nine minutes or more throughout the Village during peak afternoon rush hour traffic.

The Winooski Branch serves important freight needs, and could become an even more vital link in the region’s transportation infrastructure with proposed commuter rail service and increased freight demands. Freight traffic along the Winooski Branch includes regular service to the McNeil electric generating plant in Burlington. This plant burns large quantities of wood chips as fuel, and this fuel is delivered via rail 3-4 times per week. Burlington Electric may expand operations at the McNeil plant, and expansion would result in increased wood chip service if implemented. Appendix A contains a copy of a Burlington Free Press Article from August 1999 regarding potential increases in McNeil’s generating power. In addition, the Winooski Branch is used to link freight traffic traveling from the Vermont Railway railyard in Burlington to the NECR mainline (known as “bridge traffic”).

The average train traveling through switch 108.08 at the northern leg of the Essex Junction wye onto the Mainline NECR from Burlington is approximately 19 woodchip railcars from the McNeil Generating Plant along with an additional 9-15 cars of bridge traffic traveling through the Burlington Railyard to the mainline, for a total of approximately 34 cars. The length of individual railcars is approximately 55 feet, and the total length of the average train is 1,900 – 2,000 feet. Figures 2 and 3 on the following pages illustrate the switching movements from and to the Winooski Branch railroad. The train lengths are drawn to scale for an average train 1900’ in length. As the trains move through the switch, they can block up to three state highways (VT 2A, VT 117, and VT 15) as well as other local roads.
Switching Movement from Mainline to Winooski Branch


2. Train travels through switch. Conductor returns manual switch to position and walks to front of train. Train continues on Winooski Branch.
Switching Movement from Winooski Branch to Mainline

1. Train arrives at switch. Conductor disembarks and throws manual switch onto mainline NECRR.

2. Train travels through switch. Conductor returns manual switch to position.

3. Train backs up onto mainline to pick up conductor who is still at the switch and then continues on.
Automating the Switch between the Mainline and Winooski Branch

Automating switch 108.08 should result in significantly less train delay and traffic congestion at the highway-rail grade crossings in the Village. Table 2 below includes a breakdown of two timed events of trains traveling from the Winooski Branch onto the Mainline at the Maple Street crossing. The switch clearance time includes the following actions: the conductor exits the train, throws the switch, the train travels through the switch, and the conductor throws the switch back to the Mainline. The backup time is the amount of time required for the train to backup on the mainline and pick up the conductor (see Figure 2, map 3). The proceed north time is the time required for the train to proceed north out of the Village after picking up the conductor.

Table 2 – Maple Street Crossing Times for NECR Trains from Winooski Branch

<table>
<thead>
<tr>
<th>Date – Time</th>
<th>Direction</th>
<th>Train Size</th>
<th>Maple Street Crossing Times (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Switch clearance</td>
</tr>
<tr>
<td>6/08/2000 – 4:00 p.m.</td>
<td>Outbound from Burlington</td>
<td>28 cars</td>
<td>3:30</td>
</tr>
<tr>
<td>6/12/2000 – 3:56 p.m.</td>
<td>Outbound from Burlington</td>
<td>25 cars</td>
<td>2:50</td>
</tr>
</tbody>
</table>

Automating the switch would reduce switching delays for trains traveling both from and to the Winooski Branch. For trains traveling to the Winooski Branch from the Mainline (see Figure 2), an automated switch would eliminate the time required for the conductor to disembark, manually throw the switch, and then walk to the front of the train after it has traversed the switch. For trains traveling from the Winooski Branch to the Mainline (see Figure 3), an automated switch would eliminate the time required for the conductor to disembark, manually throw the switch, and the have the train backup to pick him up. Provided the NECR Dispatcher is able to control the switch in advance of trains entering the wye, the only remaining delays in both directions would be the amount of time actually required to traverse the switch interlock. The New England Central Railroad estimates an automated switch would provide a five minute reduction in train movement time through the Village. This five minute reduction in highway-rail grade crossing delay could have a substantial impact in reducing the current frustration and delays caused by train movements.

New England Central Railroad has prepared a detailed preliminary cost estimate of automating the switch mechanism and providing the necessary infrastructure to support the operation of the switch. This includes a heater for winter operation and a control link to the central dispatcher. This information is attached as Appendix D. The total estimate for performing the work is currently $494,000.

Other Local and Environmental Concerns

Local businesses in the Essex Junction area are negatively impacted by delays at the grade crossings. Shoppers and potential clients traveling through the Essex Junction area experiencing delays at highway-rail crossings will often chose to avoid the area in favor of other business locations due to the lengthy delays.
The Village center of Essex Junction includes many destinations for pedestrians and bicyclists, and is served by Chittenden County Transportation Authority (CCTA) bus service. The Village has a comprehensive network of facilities for this non-automobile travel and the movement of trains through the highway-rail crossings causes delays to pedestrians, bicyclists, and buses in addition to motor vehicles.

The traffic congestion and substantial delays caused by the highway-rail grade crossings in the Village also have secondary effects on the local environment. The congestion increases automobile pollution levels by an indeterminate amount, and the concentration of traffic at the Five Corners intersection could lead to a local “hotspot” of pollution in the Village Center. Although Chittenden County is in attainment of the National Ambient Air Quality Standards set by the federal Clean Air Act, there are obvious advantages to reducing pollutants whenever possible.

Another local concern of great importance is the provision of emergency services when trains are moving through the highway-rail crossings. Appendix B contains copies of letters written by local emergency service providers regarding difficulties experienced trying to respond to emergency calls when trains are moving through the Village Center.

**Findings**

Automating switch 108.08 is the most feasible approach to dealing with excessive highway-rail grade crossing delays in the Village of Essex Junction. Other approaches would most likely entail the relocation of entire sections of railroad, or grade-separated overpasses for vehicles. The costs of relocating rail or building new grade separated structures would most likely reach into the millions of dollars, and would not be sensitive to the historic character of Essex Junction. Eliminating railroad operations does not appear to be an option with potential increases in service along the Winooski Branch and statewide goals of moving greater volumes of freight via rail.

The “do-nothing” approach will result in further increases in delay. The Five Corners intersection would continue operating at capacity during peak hours of the day, and emergency services would continue to encounter challenges in serving the needs of the public. In addition, neighborhood streets are being used as alternate routes when the highway-rail crossings are causing delays. This lowers the quality of life for Village residents.

The CCMPO and the Village of Essex Junction has met with the Director of the Rail Division for the Vermont Agency of Transportation (VTrans) and outlined the motorist traffic/rail congestion issue, which exists within the Village during the movement of the wood chip train. The CCMPO and the Village will work with VTrans to explore funding opportunities for mitigating the impacts of the train movement. State and Federal funding sources will be explored and defined during the next phase of this project.

While automating Switch 108.08 will not wholly eliminate congestion in the Five Corners intersection, it will result in decreased delays and improved mobility in the Village during key times of the day.
Appendix A – Burlington Free Press article regarding McNeil Generating Plant
Appendix B – Letters from Emergency Service Providers
Appendix C – Photographs

New England Central Railroad Switch 108.08
Traffic Congestion at Highway-Rail Crossings in Essex Junction
Essex Junction Highway-Rail Grade Crossings

Legend

- Railroad Crossings
  - Gated Crossing
  - Lighted Crossing

Scale: 0 - 0.1 - 0.2 Miles

5 Corners Intersection
Switch 108.08
Appendix D – New England Central Railroad Cost Estimate
10/6/00

Chittenden County Metropolitan Planning Organization
South Burlington, Vermont
Attn: Dave Roberts

Re: Power Switch for Burlington branch.

Dear Dave

The following is the estimate for the powering of the north switch for the wye at Essex.. As always there will have to be a revised estimate that will be done when and if the work is approved as the numbers will most likely change, albeit hopefully not much.

Should you have any questions on this issue please contact me in the St. Albans office.

**New Personal Traffic Master System for the office in St. Albans** $160,000.00
**North switch control point with north and south approaches** $195,000.00
$355,000.00

**Additional Signal & Control Equipment.**
Switch Heaters 1 ea. @ 6,000 $6,000.00
Maple St. Upgrade $50,000.00
Park St. Upgrade $40,000.00
AC services for CP’s & Approaches $2,000.00
$98,000.00

**Track Work**
North Switch Material $20,000.00
North Switch Labor $10,000.00
South Switch Material $9,000.00
South Switch Labor $2,000.00
$41,000.00

**Total** $494,000.00

These are general estimates, venders will have to visit site to do engineering studies to create a formal estimate.

Formal estimates will be given if and when funding is approved as they will have a time clock on their validity.

M. Olmstead
New England Central