

# BEDFORD STATION RTC ANALYSIS

Virginia Department of Rail and Public Transportation

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## **1. Executive Summary**

Item 447.10 of Chapter 552 of the 2021 Special Session I Acts of Assembly directed the Secretary of Transportation to “provide an assessment of both the total project costs and incremental costs resulting from...modeling conducted to assess any infrastructure or network costs needed to service a rail station in Bedford, Virginia.” To fulfill this requirement, the Commonwealth and Norfolk Southern Railway (NSR) agreed to assess the track and signal improvements needed for Amtrak to provide service to the Bedford community.

Since October 2017, Amtrak has operated daily state-sponsored round-trip service originating in Roanoke. This service travels north through the Commonwealth on NSR trackage with stops in Lynchburg, Charlottesville, Culpeper, Manassas, Burke Center, and Alexandria before proceeding to Washington, DC and cities in the Northeast Corridor. In 2022, a second daily round trip service will originate in Roanoke.

Due to the success of the service both in Lynchburg and Roanoke, community leaders in the Bedford/Franklin County region have advocated for an Amtrak passenger rail stop in the Town of Bedford, which is located along the route. The Commonwealth and NSR have agreed to assess the track and signal improvements needed for Amtrak to provide service to the Bedford/Franklin County region as a part of the Commonwealth’s partnership with NSR to advance the Transforming Rail in Virginia initiative.

NSR performed Rail Traffic Control (“RTC”) modeling to determine the anticipated infrastructure (including communication and signaling) necessary and reasonable to address the anticipated adverse effects on future freight and intercity passenger service by the addition of the proposed Bedford Amtrak stop, assuming the prior addition of a second round trip Amtrak service.

### **1.1 Methodology**

The Virginia Passenger Rail Authority (VPRA) and the Virginia Department of Rail and Public Transportation (DRPT) worked closely with NSR to review and collaborate on the performance of the RTC Study. NSR, DRPT, and VPRA reviewed the modeling results, non-confidential inputs of freight projections, and agreed upon passenger services. Additional model assumptions are described in section three of this report.

### **1.2 Results**

NSR’s analysis concluded that the addition of Bedford passenger rail stop creates non-material new delay to freight operations, assuming that Amtrak schedules adhere to the agreed-upon schedule and that Amtrak does not add service on any part of the study area above what is included in this study. The assumed 2040 infrastructure defined in this study results in no material increase in fluidity impairment. For additional information about the analysis and results, please refer to NSR’s September 2021 *Amtrak Northeast Regional Proposed Bedford, VA Station RTC Analysis Final Report*, attached as an appendix to this report.

## 2. Purpose

The purpose of the Bedford Station RTC Analysis is to analyze the reasonable and necessary infrastructure to support the introduction of a passenger rail station depicted in Figure 1 and Figure 2 on track shared with existing and anticipated freight and intercity passenger operations in such a manner as to permit transparency. In the context of this RTC Study, the term "transparency" is the capacity for the added rail stop to be introduced in a manner that does not cause the operations of the existing and anticipated freight and intercity passenger operations to suffer additional delay, however minimal, while still allowing for route maintenance in accordance with NSR standards and practices.

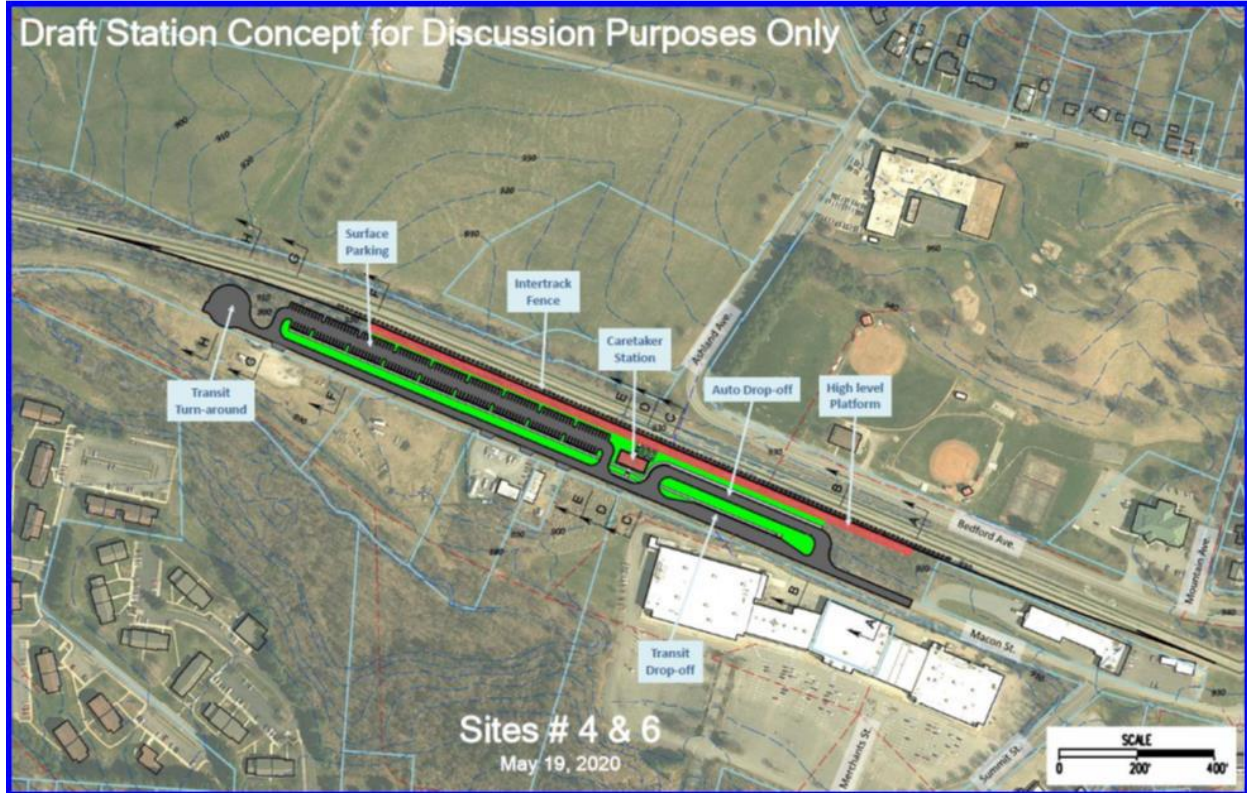
The Transforming Rail in Virginia (Virginia-Norfolk Southern Railway Partnership) Map depicted in Figure 1 shows the location of a potential future station at Bedford, among other improvements in the corridor between Manassas and the New River Valley.

FIGURE 1: CORRIDOR MAP



Figure 2 shows the proposed site of a Bedford Amtrak Station at Macon Street between MP 229 and 230, also known as the Merchants Site.

FIGURE 2: DRAFT STATION CONCEPT



### 3. Methodology

#### 3.1 Scenarios

The RTC Study used Berkeley Simulation, LLC’s RTC rail network operations simulation software and included the following scenarios:

##### 1) Base Case (year 2040)

- a. NSR freight traffic levels were determined for the future year 2040.
- b. Amtrak service was assumed to operate at pre-COVID-19 levels and frequencies, with the added service in accordance with the general timetable reflected in Figure 3 and Figure 4 below.
- c. The Base Case assumed existing infrastructure, together with the Roanoke Yard infrastructure enhancement, with a defined geographic expanse between Coolwell and Riverside.
- d. The Base Case developed baseline condition scenario metrics, designed to measure the operational fluidity of the study area facilities. The performance metrics were defined as delay minutes per hundred train miles for each train type that exists on the segment of the NSR corridor being studied (i.e. passenger, automotive, bulk, coal, grain, and merchandise).

##### 2) Modified Case (year 2040)

- a. The Modified Case added to the Base Case construction of the Bedford station in general conformance with Figure 2.

- b. The following were identified as necessary elements of the construction: turnouts, station track, and reasonably necessary communication and signaling additions.
- c. Freight and Amtrak traffic were assumed as in the Baseline Condition Scenario, with an added stop at Bedford.

### 3) Improved Case (year 2040)

Originally, the study anticipated a step in which additional infrastructure would be tested to return the operational fluidity of the improved system (using the Performance Metrics) to at least the operational fluidity of the Baseline Conditions Scenario. No “Improved Case (year 2040)” scenario was needed for analysis, however, as the assumed 2040 operational environment on the assumed 2040 infrastructure (as defined in this document) resulted in no material increase in fluidity impairment.

FIGURE 3: PROPOSED SCHEDULE – NORTHBOUND

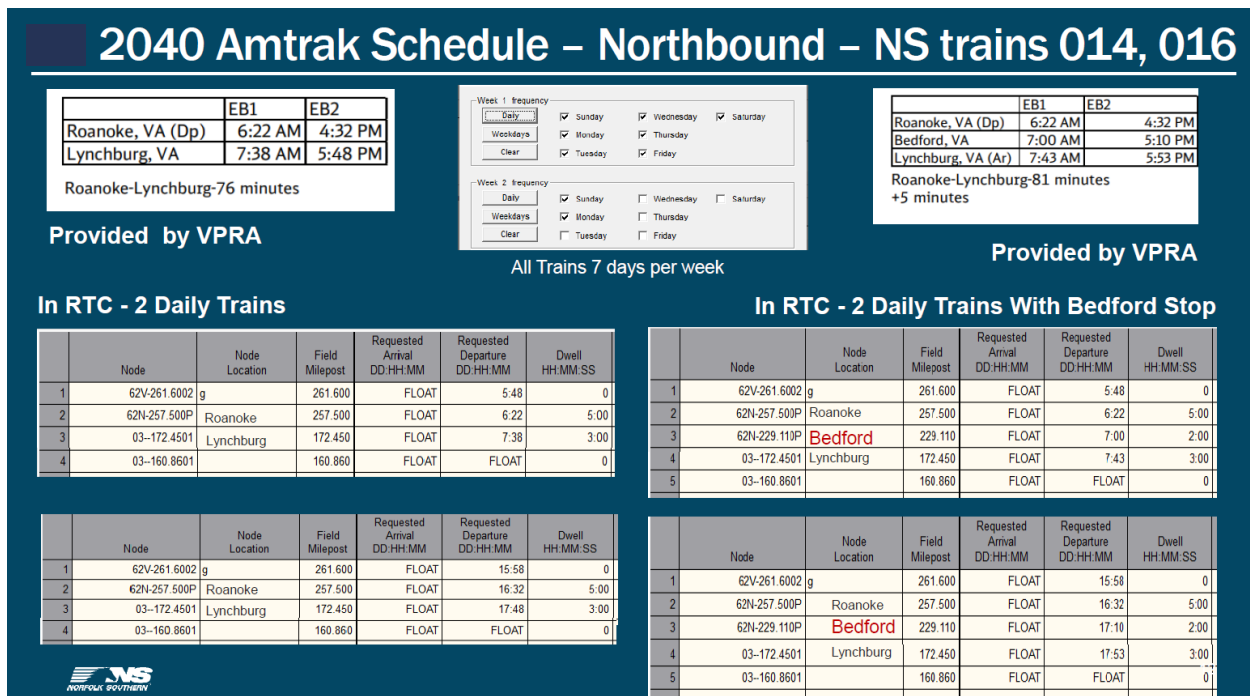
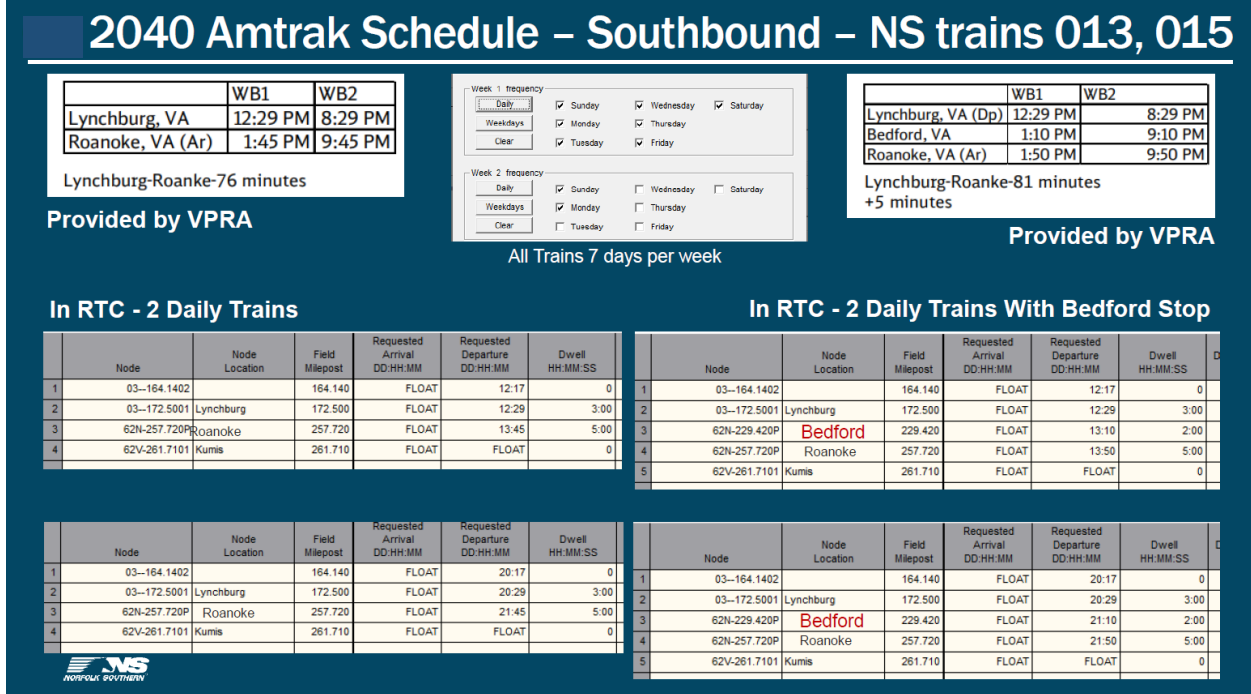


FIGURE 4: PROPOSED SCHEDULE – SOUTHBOUND



### 3.2 RTC Study Modeling Assumptions

Below is a list of defined assumptions from the “Agreement to Assess the Proposed Bedford Station” between VPRA and Norfolk Southern Railway Company:

- The study used Berkeley Simulation Software LLC., Rail Traffic Controller Model Version 75T (64-bit), August 3, 2021 release date
- Maximum authorized speed for model: 79 mph (Amtrak)
- Freight trains randomized as 15 minutes early to 15 minutes late for departures
- Key Metric for simulation output: delay minutes per 100 train miles by train type
- Passenger trains always departed initial station on time
- For late passenger trains, model assumed full dwell time at station stops
- Each simulation ran a minimum of 10 times with randomization and results averaged
- Trains dispatched in accordance with normal NS priorities by Train Type
  - Passenger trains first, then Intermodal, then non-Intermodal, then everything else

The following positive train control (PTC) and passenger protection assumptions were applied:

- PTC is active on all Amtrak Routes
  - RTC enforces PTC
- No adjacent signal block protection is required if PTC is active
  - No need to model in RTC
- Rule EQ-32, Protecting Passenger Trains, is not required
  - PTC enforces protection
  - No need to model in RTC

**The following additional assumptions also were applied:**

- 2019 traffic based on actual historical train movements from September 22 through 30
- 2019 traffic grown or reduced to match 2040 projected traffic
  - If sufficient growth warranted daily service, a new train was scheduled
  - If growth is not sufficient for daily service, then cars were added to existing trains
- Nine-day simulation with no statistics collected during first and last day
- Track Patrols are included and are lowest priority movement

**The model assumed the following net changes in traffic volume between 2019 and 2040:**

- Growth of freight volumes based on NS historic trends, NS Marketing forecast, and Moody's GDP forecast
- Net of 12 NS Trains Added (+1.3 per day)
- Also made 191 trains longer (21.2 per day)
- +11.5% in overall combined train length

## **4 Results**

The addition of Bedford Amtrak stop creates non-material new delay to NSR operations. This assumes that Amtrak schedules do not deviate from those shown in this analysis and that Amtrak does not add service on any part of the study area above what is included in this analysis. It was determined that no "Improved Case (year 2040)" scenario was needed as the assumed 2040 infrastructure (as defined in this document) resulted in no material increase in fluidity impairment. For additional information about the analysis and results, please refer to NSR's September 2021 *Amtrak Northeast Regional Proposed Bedford, VA Station RTC Analysis Final Report*, attached as an appendix to this report.

As per the "Agreement to Assess the Proposed Bedford Station" between VPRA and Norfolk Southern Railway Company, performance of the RTC Study is for informational purposes and does not constitute consent or agreement by any or all of the Parties to either (i) the further consideration of infrastructure that may be evaluated hereunder, or (ii) the implementation of the proposed rail service under any of the scenarios studied.

5 Appendix

***Amtrak Northeast Regional Proposed  
Bedford, VA Station RTC Analysis Final  
Report***

