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VRPI

VIRGINIA RAIL POLICY INSTITUTE

Virginia Rail Policy Institute

Initial Review of

Western Rail Initiative Contract

and report of

New River Valley Passenger Rail Facilities Tour

April 30, 2022

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This report is Dedicated to Bob Bryant, who spent his life improving and expanding rail transportation in Virginia.

Bob Bryant
January 4, 1935-May 8, 2022

EXECUTIVE SUMMARY

New River Valley Rail Facilities Purchase Agreement Review and VRPI Facilities Tour

In response to the January 22, 2022, release of the ***Comprehensive Agreement Between Norfolk Southern Railway Company and The Virginia Passenger Rail Authority*** (a.k.a.: "Western Rail Initiative Contract"), the Virginia Rail Policy Institute (VRPI) obtained and has reviewed the document. On April 30, a VRPI team conducted a tour of the rail facilities covered by the "Contract." Tour attendees included: VRPI President Meredith Richards; Vice President Mark Perreault; Secretary John Beall; Executive Director Michael Testerman, Director Dave Foster, Fellow Robert "Bob" Bryant; and local rail guide, Jim Overholser.

The tour prompted rail development considerations which VRPI is offering, to supplement the initial plans contained in the *Western Rail Initiative Contract*; most notably, a direct rail connection to the Virginia Tech Campus and the institution of rail transit service between the New River Valley (NRV) and Roanoke, in addition to the proposed intercity passenger rail (Amtrak) services.

Our considerations are only partially developed and may appear to be local "projects," however they are in keeping with VRPI's mission to highlight best practices and promote transportation policies that *delegate transportation responsibilities to the rail mode—with throughput capacities, reliability, attractiveness, and safety—*to leverage rail transportation's potential to significantly and economically lower global dependency on carbon-based energy sources.

OVERVIEW AND BACKGROUND

On May 5, 2021, Governor Ralph Northam held a press conference at the New River Valley Mall, between Christiansburg and Blacksburg, to announce that the Commonwealth has reached an agreement with Norfolk Southern Railway (NS) to reinstate passenger rail service to the New River Valley for the first time since 1979. VRPI President Meredith Richards, Treasurer Danny Plaugher and Executive Director Michael Testerman were in attendance.

Known as the Western Rail Initiative, this agreement will increase intercity passenger rail service from Western Virginia to the Northeast Corridor and is a significant feature of the ***Transforming Rail in Virginia*** program to build a 21st -century rail network.

The $257.2 million Western Rail Initiative includes:

- $38.2 million for acquisition of right-of-way and track for approximately 28.5 miles of the NS V Line, the former Virginian Railway (VGN) line from the Salem Connection (Virginian-to-Norfolk Southern), west of Roanoke, to Merrimac (Christiansburg)
- $219 million in infrastructure investments along the corridor that includes:
    - Roanoke Yard improvements.
    - A 7-mile siding from Nokesville to Calverton, creating a continuous two-track corridor for 22 miles from Manassas to Remington.
    - Improvements from Salem to Christiansburg, including signaling and track upgrades, a maintenance facility, and passenger platform.
    - Infrastructure improvements along the Route 29/Interstate 81 corridor.
    - The Commonwealth and Norfolk Southern (NS) have continued to work to finalize the purchase and capital investments agreements.

On March 6, 2022, VRPI Director, Dave Foster, FOIA-secured a redacted copy of the signed January 22, 2022, *Comprehensive Agreement Between Norfolk Southern Railway Company and The Virginia Passenger Rail Authority* (a.k.a.: "Western Rail Initiative Contract") and shared it with VRPI colleagues.

Virginia's decision to purchase the 28.5 miles of former Virginian Railway track has intrigued VRPI ever since Governor Northam made his May 5, 2021, announcement. The details of the Western Rail Initiative Contract further grabbed VRPI's attention and spurred a desire to conduct a site visit of the rail facilities between the Roanoke train station and the New River Valley.

The track charts in the final Exhibit Pages of the "Contract" give a general description of the rail line that the Virginia Passenger Rail Authority is purchasing. Here is our summary of that description:

- Approximately 34 miles, Roanoke station to NRV via former Virginian Railway ("V-line")

- Approximately 27 miles of Whitethorne District (V-Line)
    - No authorized speed above 40 MPH
    - 21 miles of 40 mph track
    - 2 miles of 35 mph track
    - 4 miles of 30 mph track
    - Twenty-five curves exceeding 5 degrees
    - Three of these curves are 8.7 degrees
    - Highest track cant is 3.5 inches, in several locations.
    - Six miles of at least 1.4% grade.
    - Passenger train average speed, Roanoke-NRV: 36.6 mph, sans intermediate stops
    - Passenger train average speed, NRV-Roanoke: 35.1 mph, sans intermediate stops
    - Right-of-way civil engineering dates to the first decade of the Twentieth Century; fairly modern, by railroad standards.

PURCHASE AGREEMENT AND REVIEW COMMENTS

About the NS-VPRA (Norfolk Southern/Virginia Passenger Rail Authority) contract, Dave Foster commented, "I am most gratified with §8.1(a)(iii), which keeps the door open for excursion trains and commuter service, both of which I have lobbied strenuously for."

Foster continues, "I intend to spend more time with the document so that I understand its payments regimen more clearly. At first brush I did not see a difference in NS per-car trackage rights payments for loaded vs. empty cars, although their monthly reporting requirement includes this breakdown. Perhaps I missed it. But especially after VPRA takes over maintenance of the line, it will be important to recognize that virtually all of the NS trains bridged [traveling over the Virginian line that the state is purchasing] are heavily loaded coal and grain trains, that will beat up the track much more than lighter passenger trains. The 286,000-lb. coal cars will be a huge determination of maintenance costs, and VPRA may need a differential for loads vs. empties."

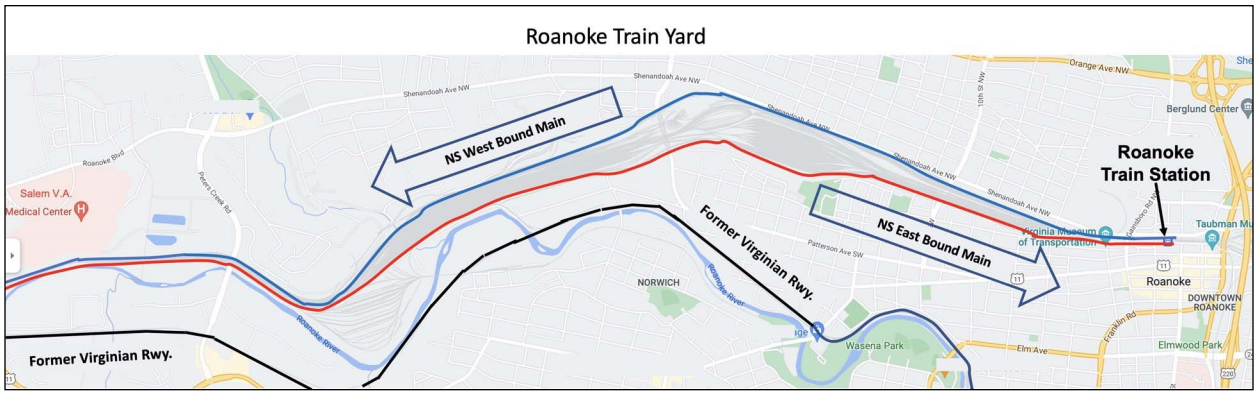
VRPI Director John Beall observes, "[T]he cost that NS would pay for use of the V-line does not differentiate between the type of train that NS would operate on the line. Heavy coal trains would increase maintenance costs versus lighter trains, [for] instance. We wondered how the $45 figure was arrived at, and wondered why there wouldn't be a variable rate that would more closely account for more costlier maintenance and less-costlier maintenance, for example."

The Western Rail Initiative Contract shows substantial infrastructure and signaling changes between the Roanoke Amtrak Station and the ***Salem Connection*** to the Virginian line.

John Beall commented, "We were surprised right off to read that the plan calls to create a second main on the north side of the [yard], rather than just improve (signaling) the [former eastbound main track] on the south side of the yard."

Our Roanoke Valley railroad careerists raised questions about the need to make all of the track and signal changes from the Downtown Station to the Salem Connection lead. Dave Foster wrote, " From Shenandoah Avenue you can clearly see that the double track mainline [already] has signals over both tracks in both directions."

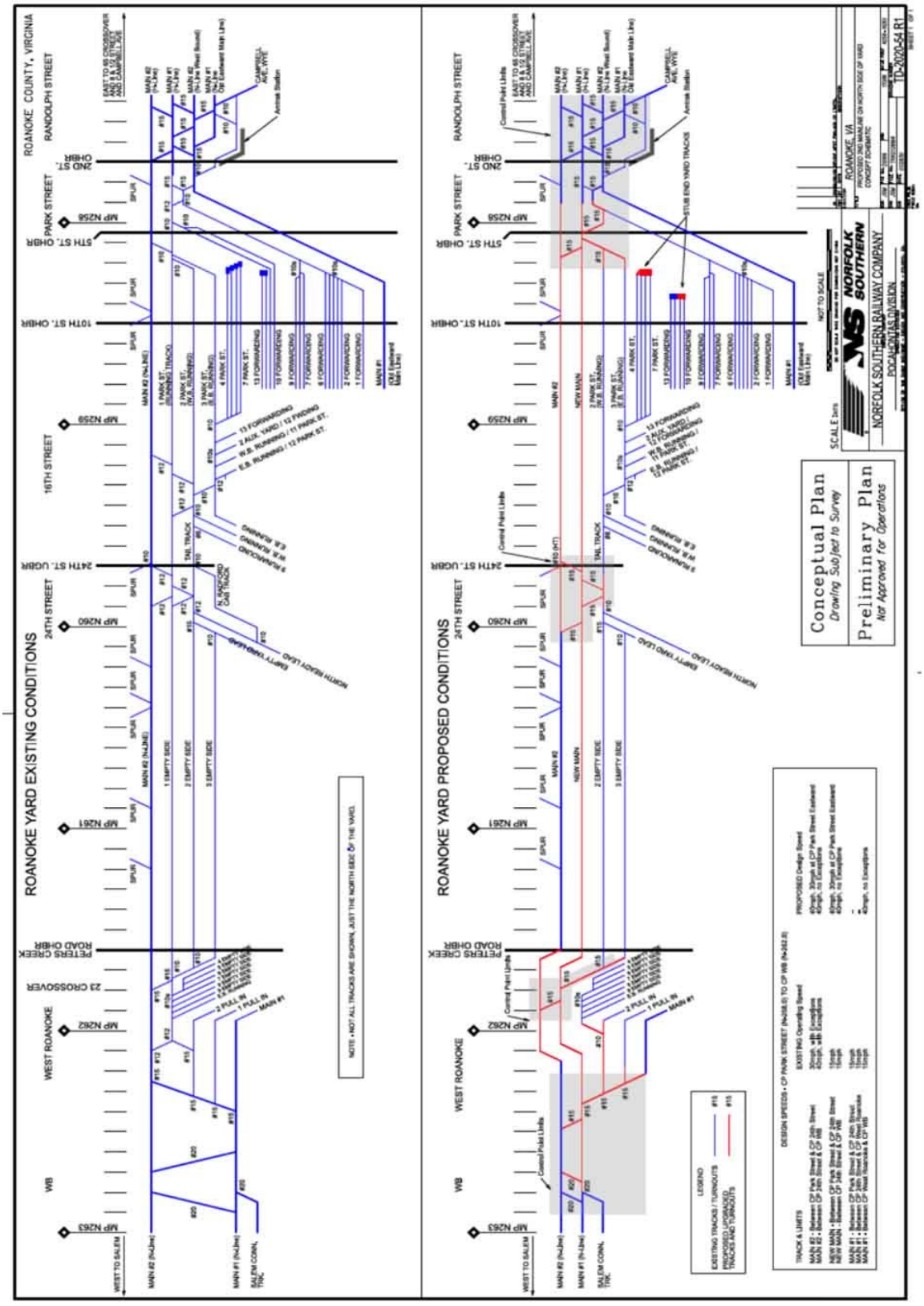
The contract is vague as to whether there are already two bi-directionally signaled main tracks on the north side of the Roanoke Yard. Granted, some additional track reconfigurations may be necessary to optimize their



Roanoke Easement Area Improvements

General Conceptual Plans

(Not Final Construction Plans)



utility, but they may not be essential for the proposed passenger train service and therefore, the VPRA shouldn't be paying for them.

Historically, the eastbound main was on the southern perimeter of the Roanoke Yard and would be expeditious for passenger trains going between the Salem Connection and Roanoke Station without having to enter and cross over the through-tracks on the north side of the yard. John Beall continued, "As we read [it], it seems that the contract creates an Acca Yard-like situation [Richmond] whereby the passenger trains will habitually interfere with or be interfered by freight trains. Moreover, the costs are increased due to the switches that need to be put in place and signalizations required. We wonder why this part of the plan got into the contract in the first place and what was the thinking of each side in arriving at this development?"

VRPI supports infrastructure improvements that will benefit joint operations of freight and passenger trains. There is only pause here if the Commonwealth will be mostly paying for upgrades that will be used primarily by freight operations. **Investments should be borne in proportion to their utilization by the joint-use partners.**

VRPI is mindful that signal upgrades must incorporate the latest Positive Train Control (PTC) technologies. From our tour of North Carolina rail facilities in 2019, we would hope that Virginia calls for <u>installing the latest version of PTC that avoids costly and unnecessary wayside signals and permits moving blocks</u>.*

***Separation between trains controlled virtually, based on train speeds and safe stopping distances. Increased line capacity and fluidity are moving-block advantages.**

THE NEW RIVER VALLEY RAIL FACILITIES TOUR

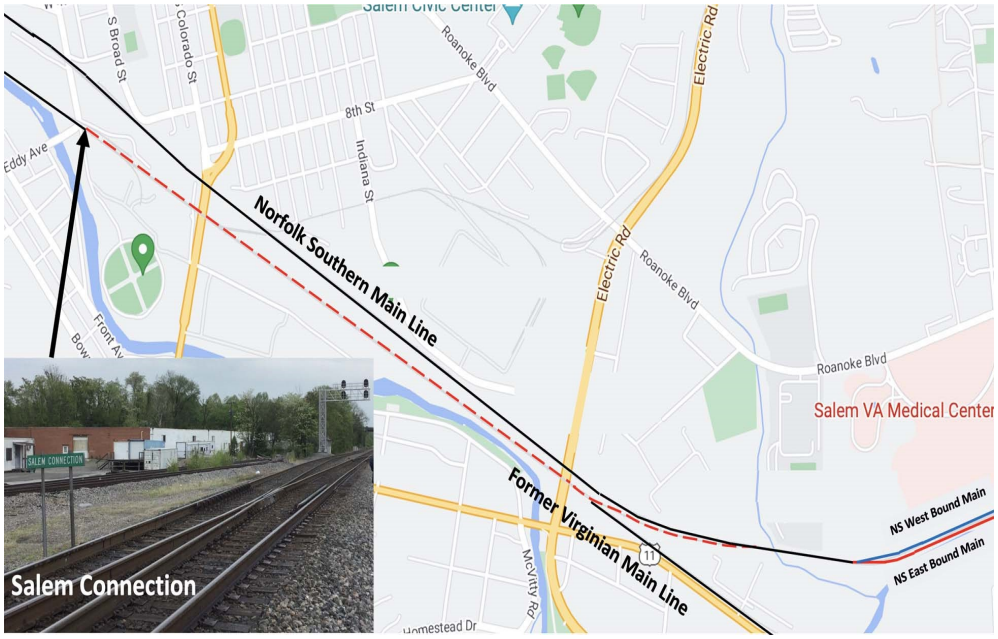
On April 30, 2022, Virginia Rail Policy Institute conducted its New River Valley Rail Facilities Tour. Attendees included: President Meredith Richards; Vice President Mark Perreault; Secretary John Beall; Executive Director Michael Testerman, Director Dave Foster, Fellow Robert "Bob" Bryant, and; local rail guide, Jim Overholser.

Prior to the tour, VRPI Director Bill Ingram provided information about the Roanoke-to-New River Valley, former Virginian rail line, and that of the NS (former N&W (Norfolk & Western)) Blacksburg Branch, which extends from Christiansburg to the Corning Glass Industries plant near the New River Valley Mall. While he was not able to attend the tour, Bill Ingram shared his knowledge of this rail territory, from his days in management at Norfolk Southern.

Tour attendees met Dave Foster at the east end of the Roanoke Station platform. Foster noted that this is also the location where train passengers interchange with the Thruway Bus from the New River Valley.

Our tour followed Shenandoah Avenue along the north side of Roanoke Yard, trying to envision the capital improvements to the yard that the "Agreement" calls for.

The **Salem Connection** track between the Virginian and Norfolk & Western lines is approximately 7,933 feet long; giving passenger trains a place to park, if waiting for freight trains to clear the main tracks on either end. The #20 turnout at this location allows a divergence speed of 50 mph.



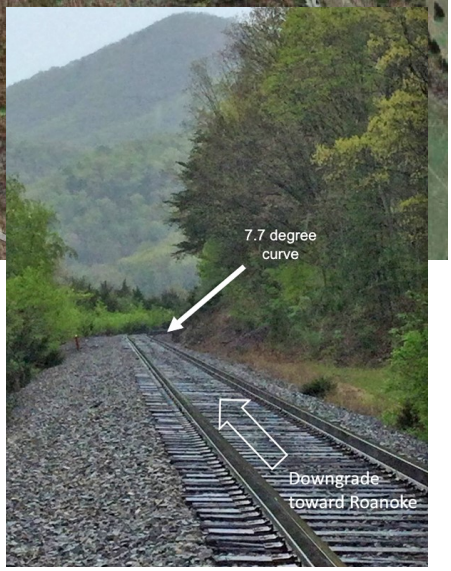
Leaving Salem, the group followed Old US 11 to West Salem where they got on West River Road to go by the location of the late October 2020 derailment of a coal train at the Roanoke River crossing, which destroyed the bridge (above). Norfolk Southern completely rebuilt the bridge within two weeks. The Class 1 railroads can put back track and structures quickly, when called upon. "Where there's a will, there's a way."

Beyond this crossing of the Roanoke River is Kumis, the first of two passing sidings on the Whitethorne District, between Salem and Merrimac. This siding has been lengthened to approximately 10,500 feet since the Virginian merger with N&W.

Continuing, the group got back on US-11 to pass by the aborted intermodal facility at Elliston. From there, we took Virginia 603 - North Fork Road - toward the I-81 Ironto interchange. In anticipation of the Elliston distribution center and intermodal terminal, the Virginia Department of Transportation (VDOT) significantly upgraded this segment of VA-603 to serve as a local connection to the Interstate for tractor trailers. VDOT has the expertise to swiftly modernize right-of-ways. "Where there's a will, there's a way."

Past the Ironto Interchange, the VRPI group followed North Fork Road and Virginian line to the location of the Roanoke Valley Resource Authority landfill's "Bradshaw Branch" line, the line that Norfolk Southern succeeded in closing, thus putting hundreds of daily trash trucks on the region's road network. Bob Bryant said that the Buckingham Branch Railroad offered to continue the trash hauling contract, using short line trackage rights, but they were turned down.

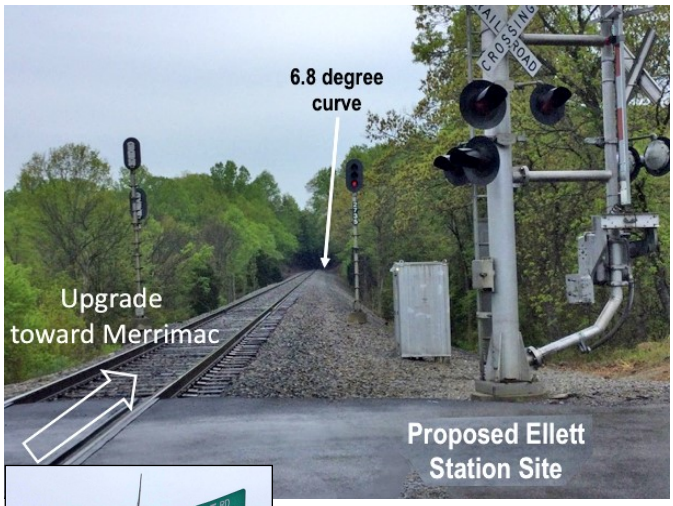
Past the Bradshaw Branch, our tour entered the upper reaches of the North Fork of the Roanoke River, as the railroad approaches the Eastern Continental Divide. The rail line goes through Slate Tunnel (~900 ft.), to bypass a sharp bend in the river, then in about a half mile, reaches the second passing siding at Fagg (~10,296 ft.). At the western end of Fagg Siding, the track speed drops from 40 mph to 35 mph for the next 1.4 miles, before dropping again to 30 mph for the increasingly curvy climb to the eastern portal of Merrimac Tunnel.



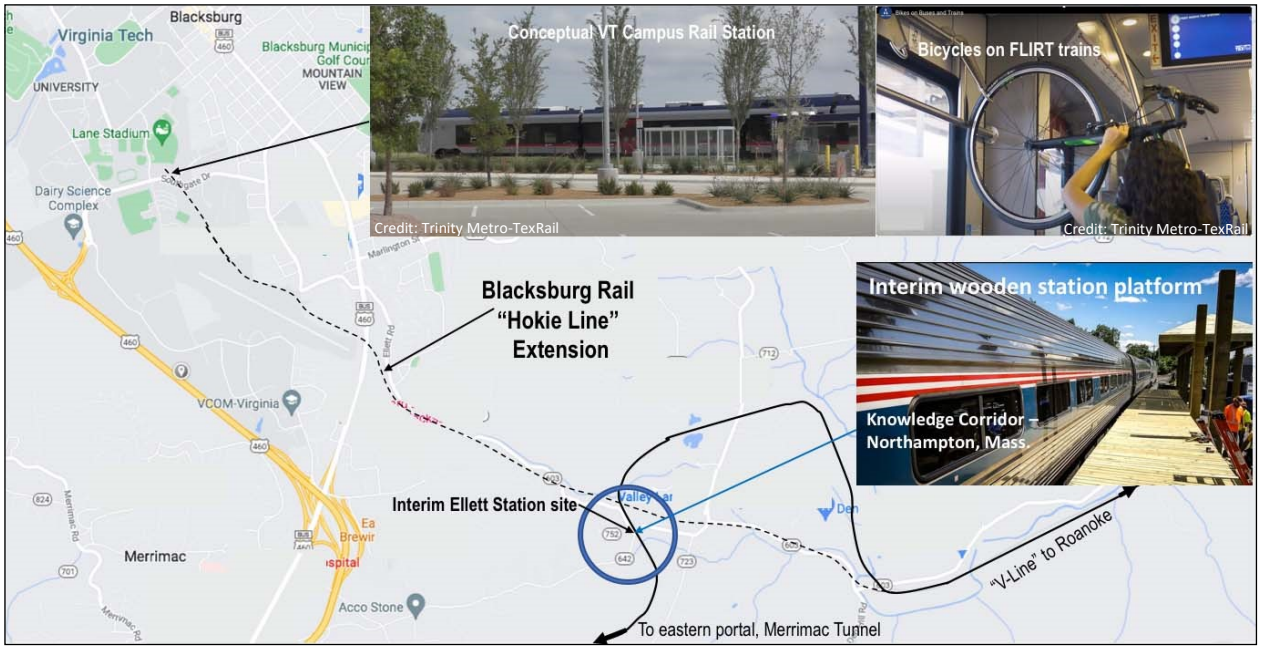
This ***aerial*** view shows the layout of the railroad through the 30 mph stretch. The gradient is 1.40% through here.

This ground-level view is of the 7.7 degree curve, looking northeast.

Our facilities tour next took us to the intersection of Cedar Run (VA-603) and Jennelle Roads (VA-642); the **Ellett** location option for a New River Valley train station. The second view (next page) looks downgrade, toward the leftmost curve shown in the preceding aerial photo. The third picture (also next page) faces upgrade, toward a 6.8-degree curve.



When looking at a map (below), one can see why the Ellett area was considered as an optional site for a station. It is *very* close, as the crow flies, to the US-460 Corridor that runs between Blacksburg and Christiansburg. If the utilization of the V-Line were deemed a placeholder until the Norfolk Southern main line becomes available for inter-city passenger rail through-service, beyond the New River Valley, ***it might make sense for VDOT to upgrade Ellett/Cedar Run Road (VA-603), as was done in Elliston, to make this temporary station easily accessible for regional transit buses from the main transportation artery, BUS US-460.*** A temporary station platform might be constructed, as Massachusetts did at Northampton, on the Knowledge Corridor. (See insert image below.) The Ellett Station site would avoid the more costly civil engineering, needed to access a station on the western side of Merrimac Tunnel; especially if the Mall-West location is not going to be the permanent NRV station site. We adhere to the motto, "Build it right. Build it once."



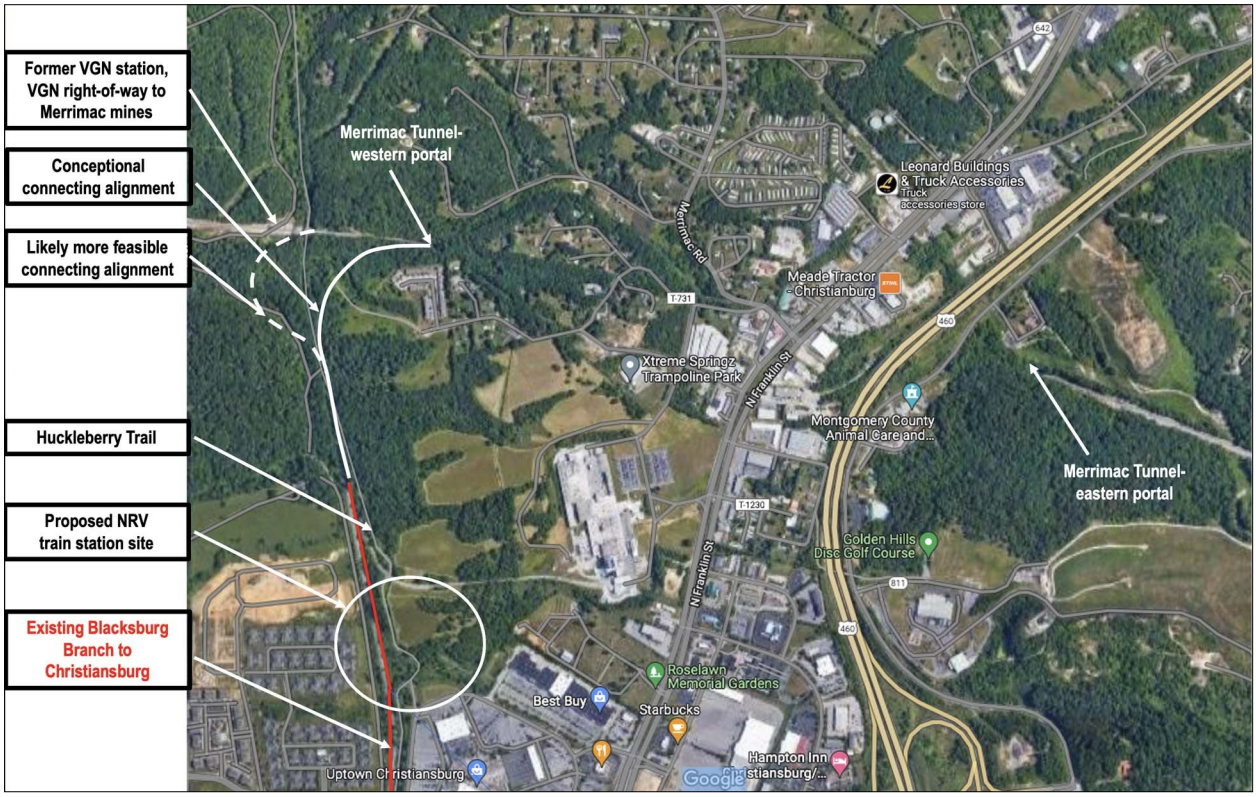
Thinking transformatively, **VRPI recommends a new alignment—the Blacksburg Rail Extension**, a.k.a., "**Hokie Line**"—branching from the Virginian line in Ellett Valley. The V-Line rail could be re-engineered to transport thousands of daily commuters between endpoints; completely avoiding I-81 and US-460. Virginia Tech (VT) might want to link its academic Blacksburg campus and VT-Carillion Medical Campus, in Roanoke, with direct rail service. In which case, the Virginian line, east of Salem, to the foot of Mill Mountain, could also be acquired.

Our group was curious to see the rest of the V-line on the eastern portal side of Merrimac Tunnel. We were rewarded by seeing a coal train exiting the tunnel as we arrived (right). The train seemed to roll by at the authorized 30 --mph speed limit, relying mostly on the dynamic braking of the locomotives as it descended the 1.4% grade at this location.

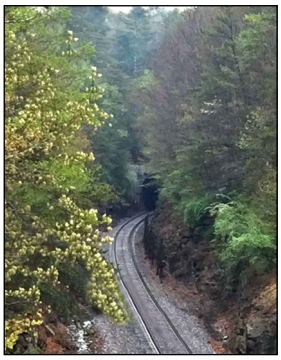
Several in our group were surprised to learn that this seemingly remote railroad tunnel runs underneath such a densely developed urban area. Our site visit to the western tunnel portal was equally revealing.

The Town of Christiansburg graciously arranged for a municipal worker to unlock the gate to the private road/sewer line easement that parallels the Huckleberry Trail and N&W Blacksburg Branch, from Peppers Ferry Road (VA-114) to its intersection with the V-Line. From there, we walked up to the Trail and backtracked to see where the branch line ends, just north of the Corning Glassworks.

The Western Rail Initiative graphic indicates where the new alignment would leave the V-line to access the proposed station sites at the Mall. The graphic seems to indicate an immediate hard-left turn toward the Mall. That would entail significantly more excavation than would the "jughandle" alignment suggested by the dashed line, just under/past the Huckleberry Trail bridge.



The Virginian line is in a deep cut (upper right and lower left photos) as it exits the western portal of Merrimac Tunnel, and it is about 35 feet below the former Blacksburg Branch overpass, whose piers remain in place. The upper left view is from the newer Huckleberry Trail Bridge and is looking west over the V- Line. This location is where the Virginian's Merrimac Station and branch line to the coal mines were located. The archival photo (lower right) was taken at the Virginian's Merrimac Station on August 2, 1950. Note the elevation delta between the Huckleberry line and the Virginian. The proposed new station, behind the New River Valley Mall, is at an even higher elevation than the N&W branch line is at this location.

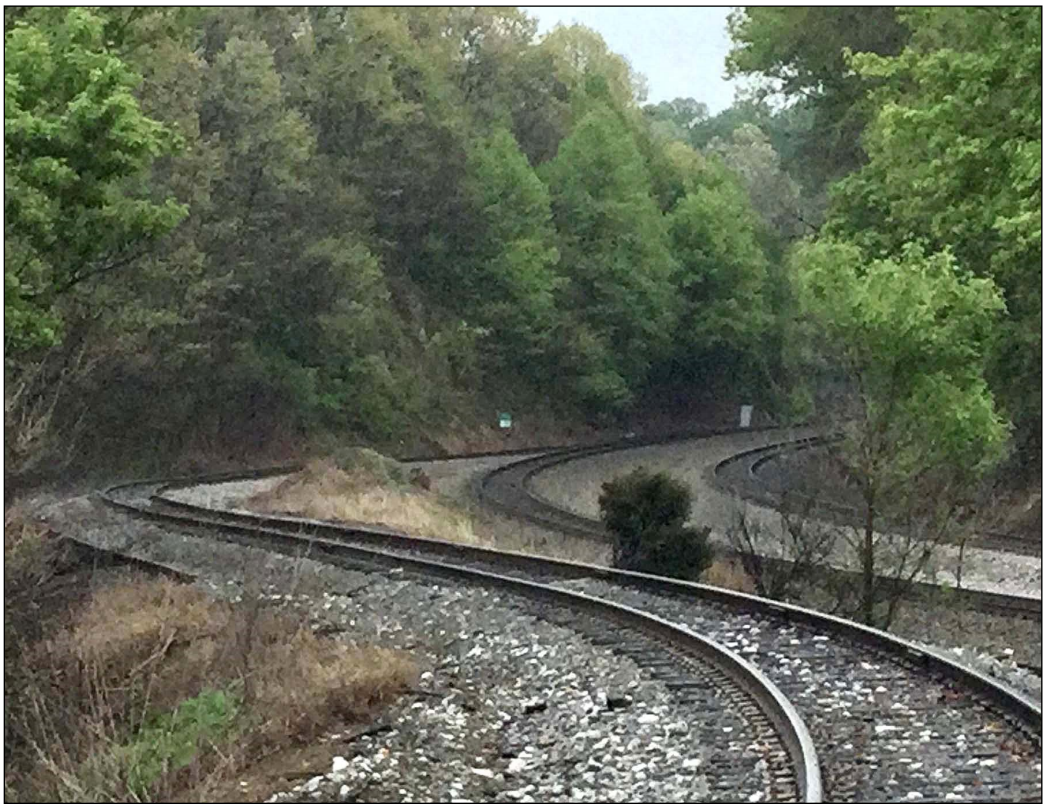


The picture at left illustrates the co-existence of ***rail-with -trail.*** The Huckleberry Trail is located uphill from the remnant of the Blacksburg Branch that is still used to serve the Corning Glassworks.

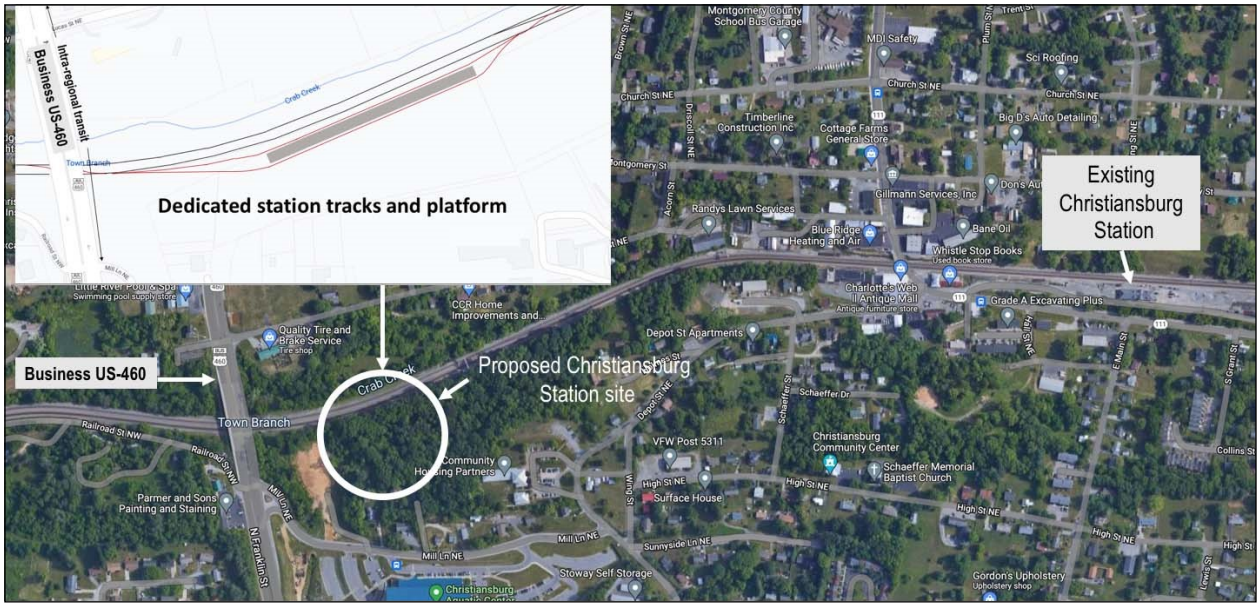
The picture below (and enlarged) shows where the Huckleberry Trail has rejoined the original railroad right-of-way, but note that the bridge over the Virginian line is lower, and to the left, of the removed railroad bridge. Note also that the railroad was even going through a rather deep cut before crossing the Virginian line, another 35-40 feet below.

The railroad track behind the New River Valley Mall—to be used for the new train station—traverses a wetland (right). We tried to envision a station on the graded hill above the rail line and Huckleberry Trail. It's a tight space in which to fit everything, particularly, two dedicated station tracks.

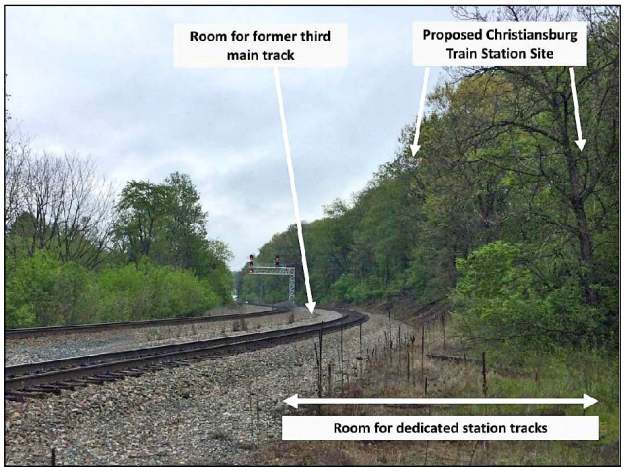
Before leaving "Greater Christiansburg," our tour group viewed the modern-day connection (below) of the Blacksburg Branch with the Norfolk Southern main line, east of Christiansburg, and about four miles from its current end-point at Corning Glassworks. The connection faces toward Roanoke.



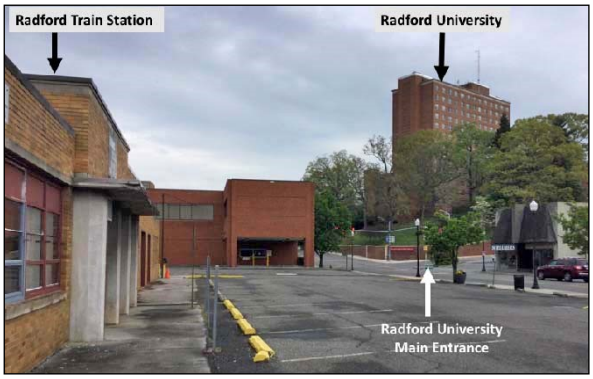
The picture tells an additional story. Once upon a time, before Interstate highways, this railroad handled all the through traffic, both passenger and freight, in the joint US-11/US-460 corridor. There was a middle track, making a three-track main line, on both sides of the Eastern Continental Divide in Christiansburg. Faster trains could get around slower trains on the extra track. N&W's acquisition of the Virginian Railway moved all of the eastbound coal traffic off of this route and the loss of other traffic to trucks and autos made the middle tracks unnecessary. Though they were removed, they could easily be replaced.



On the way to Radford our group visited the property (above and right) that **Christiansburg** purchased for the New River Valley Train Station, next to Business US-460 and the Norfolk Southern main line. This stretch of railroad also used to be three tracks. There's room here for two through tracks, plus dedicated station tracks with a high-level platform. While the original Christiansburg Station exists, best practices and transformative policy would suggest that a new facility, with a half-century utility horizon be planned, close to the intra-regional transit service.



VRPI's *New River Valley Rail Facilities Tour* concluded in downtown **Radford,** at the former N&W station, across from Radford University. The railroad company now uses the building for offices. As with Christiansburg's existing station, the existing Radford station will be quickly outdated from a 50-year planning horizon, but it seems that there is ample track-side space to construct dedicated station tracks for a replacement facility in this geographically ideal location.

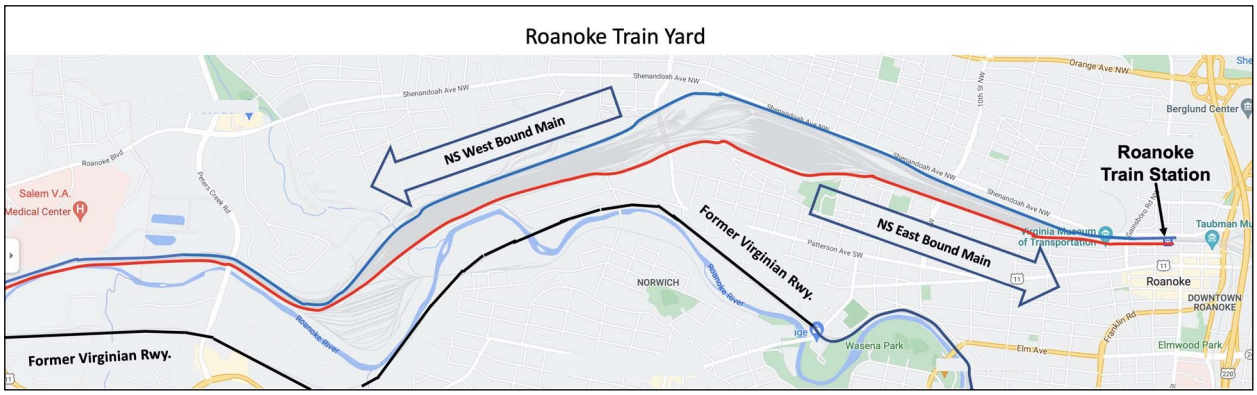


Recommendations

It is intuitive that rail infrastructure and facilities, everywhere, will need to be upgraded to handle additional volumes of passengers and cargo if the public's aim is to rely more on railroads and less on highways as this century unfolds. The Virginia Rail Policy Institute's tour of the New River Valley rail facilities has been conducted to examine how rail can be developed, through best practices and policies, **to shoulder greater mobility responsibilities**. We are treating our ***New River Valley Rail Facilities Tour*** as a teachable moment; as much for ourselves, as for others. We do not have final answers and turnkey proposals, but we can offer the insights of our rail professionals who are dedicated to helping the rail mode be all it can be, in service to the public.

ROANOKE STATION AND YARD

There was a major rearrangement of tracks in Roanoke before the current station was sited on the south side of the right-of-way. Much real estate on the north side of the right-of-way was repurposed from former station trackage to a maintenance vehicle road and parking area. The current station site appears to have room for only one platform track and no room to expand. In best practices, all metropolitan stations should have a minimum of ***two*** dedicated station tracks so multiple passenger trains can simultaneously use the station at a given time. A fifty-year planning horizon would anticipate that a Metropolitan Statistical Area (MSA) the size of Roanoke would handle thousands of regional and intercity rail passengers daily, connecting to other MSAs and city pairs within a 300-mile radius; or ~ three-to-five-hour travel time, at highway-competitive speeds. **Now is the time to plan for the Roanoke Station's expansion.** On a positive note, a new multimodal transit facility is being planned nearby and there was past talk about a streetcar circulator. All of this should be considered, to connect Roanoke's activity nodes within the city to its train station, and its train station to the rest of the Commonwealth and nation.



We have questioned the public and private sector's investment splits for creating two bi-directionally, signaled, main tracks, on the north side of the Roanoke Yard. This infrastructure upgrade may be needed but we maintain that if many passenger trains will be operating between the downtown station and the Salem Connection, it makes sense for them to use the trackage on the southern perimeter of the Roanoke Yard, so those trains do not have to cross over the north-side main tracks at each end of the Yard. **The public's capital investments should go toward improving the former Eastbound Main.**

As coal traffic further declines, **the state should consider acquiring additional Virginian-line trackage between Salem Connection and South Roanoke,** to provide a direct rail transit connection between Virginia Tech's Southwest Virginia campuses.

New River Valley Facilities

Like everyone else, VRPI has assumed that the extension of passenger rail service from Roanoke to the New River Valley would use the Norfolk Southern main line all the way to Radford. It is double tracked and there is ample room in the Radford yard for a layover facility. This direct route will ultimately be the way through Southwest Virginia and into Tennessee; providing the most transportation output for the public's dollar.

While VRPI has lent its endorsement for the New River Valley Mall-West station site, none of the four options, presented to the public thus far, are optimal. A station that can only handle one or two trains a day can

only move a few hundred passengers per day. How many daily passenger trips use the road system between the New River and Roanoke Valleys? What percentage of interregional trips do we want to delegate to the rail mode? How do we reach economy of scale?

The above questions prompt additional ones. What transportation policies and funding instruments will it take to daily handle thousands of regional passenger trips by rail? Why must our implementation timelines be measured in decades, primarily for rail?

We conducted our NRV Rail Facilities Tour with an eye for seeing how the public can best leverage its purchase of the Virginian line to move the most people. Several of our directors have felt, even before Virginia committed to buying the "V-Line," that it could best be used for some sort of rail transit line between the New River Valley and Roanoke. We mused, since most train riders between Roanoke and Bristol will be from Virginia Tech, **why not maximize train ridership by directly accessing the Virginia Tech campus by rail** and avoid a transfer-penalty at the proposed New River Valley Mall-West station?

As noted on Page 11, and in the graphic there, **VRPI recommends a new alignment—the Blacksburg Rail Extension**, a.k.a., the "**Hokie Line**"—branching from the Virginian line in Ellett Valley. The new alignment *might* follow Ellett/Cedar Run Road (VA-603), duck under BUS US-460, skirt the northern edge of the Blacksburg-Virginia Tech Airport in a trench, and terminate near Lane Stadium, at a campus-circulator facility. Virginia Tech might want to link its academic Blacksburg campus and VT-Carilion Medical Campus, in Roanoke, with direct rail service. In which case, the Virginian line, east of Salem, to the foot of Mill Mountain, could also be acquired. The V-Line rail facilities could be re-engineered to transport thousands of daily commuters between endpoints; completely avoiding I-81 and US-460.

The elevation rise between Ellett Valley and the Tech campus will require a rail line gradient between 2.5% and 5%. This is steeper than locomotive-hauled passenger trains normally handle. Re-electrification of the V-Line would solve this issue in one fell swoop but there are interim, off-the-shelf technologies, readily available, which leads us to repeat, "Where there's a will, there's a way."


Trinity Metro, Fort Worth-DFW Airport, TEX Rail FLIRT trainset
Credit: Trinity Metro-TexRail


Credit: Trinity Metro-TexRail

Several North American regions have recently begun using **diesel multiple-unit (DMU) trainsets,** with self-contained power units, that can reach speeds of 79 mph and climb grades as steep as 8%. These trainsets are federally certified to be interoperable in mixed traffic with freight trains. (See Appendix for additional information.) This might be an appropriate technology to connect the Roanoke and New River Valleys, ***at a large scale*.**

Our "**Hokie Line**" proposal would make a good visionary design project for a multi-disciplinary workgroup of VT students. We previously worked with a similar group

that offered designs for a new Roanoke train station. Let's train our future university graduates to "think train." Virginia Tech would also do well to establish an Eastern-US graduate curriculum in *mid-range* intermodal rail transportation, to compliment the University of Denver's ***Intermodal Transportation Institute*** and University of Memphis' ***Intermodal Freight Transportation Institute*****.**

We urge Virginia to **concurrently work to provide direct passenger rail service between Radford and Roanoke via the Norfolk Southern main line.** With an amicable partnership, this service can be up and running in a few years' time. Initial upgrades to accommodate a single daily round-trip passenger train can lead to long-term public investments that can substantially capture car and truck traffic off I-81. Norfolk Southern's shareholders and the public will mutually benefit. Specific to our recommended upgrades would be **putting back the third through-tracks on either side of the Eastern Continental Divide and engineering curves to permit passenger trains and mid-range intermodal freight trains to travel at 79 mph. If VDOT can "move mountains" to build a 65 mph, five-lane, I-81 in this same vicinity, Norfolk Southern's main line can be upgraded to perform like a "Steel Interstate."**

FREIGHT TRAINS ON THE WHITETHORNE DISTRICT

If the public will be owning the Merrimac-to-Salem-Connection segment of the Virginian line, why not **relay track on the Bradshaw Branch right-of-way and reinstate trash trains,** with a willing operator, for the remaining life of the Roanoke Valley Resource Authority's landfill? **The Commonwealth should be working to reinstate rail freight services while it is reinstating passenger trains.**

Maintenance expenditures on the Virginian line must be apportioned to reflect the ongoing use/wear & tear by heavier freight trains.

Summary

The Virginia Rail Policy Institute visited each of the four New River Valley station sites, suggested by the Virginia Passenger Rail Authority, as well as the two "main line" station sites in Christiansburg and Radford. We fully agree that the Ellett site is inappropriate as a *permanent* passenger rail station but may warrant consideration as an *interim* station until a permanent, long-view regional facility is built. The Merrimac site, also, does not seem to work, being so inaccessible. We saw the two New River Mall sites, from the Mall side, and from the access road to the Christiansburg sewer service road. We appreciate that those two sites are near transportation arteries and closer to Virginia Tech. The preferred Mall-station facility still seems to be ***car-access dependent*** and too small to handle long-view mobility responsibilities. This train facility should be heavily reliant on local transit and bicycle access. We also visited Christiansburg's preferred, and-purchased site for the New River Valley station—on the direct route to Bristol and East Tennessee. We recognize the limitations that that site poses besides being further away from Virginia Tech, but we continue to bemoan the very clear fact that the current plan pushes "down the track" any extension of passenger rail service, even to Radford, which has adequate infrastructure to handle passenger rail service, especially for "across-the-street" Radford University.

ADDITIONAL CONSIDERATIONS:

- **Christiansburg and Radford need their own stations,** regardless of if one is built on the Blacksburg Branch/ Huckleberry Line at NRV Mall-West. All of these stations need to be designed to accommodate high-capacity intra-regional transit. The aim is to lower dependency on US-11/460 and I-81 for regional commuting.
- **We suggest consideration of a direct rail link to the Virginia Tech campus and concurrent planning to serve Christiansburg and Radford with conventional passenger train service via the Norfolk Southern main line.**
- **We request that the Virginia Passenger Rail Authority provide the public with its plan for heading to Bristol and East Tennessee before considerable investments are made just to reach the New River Valley, with no clear path to go further. "Build it right. Build it once."**

Conceptual Roanoke/Carilion Campus Station

Credit: Trinity Metro-TexRail

ACKNOWLEDGEMENTS

We wish to thank the following who contributed to this report: John Beall; Ken Briers; the late Robert "Bob" Bryant; Miriam Daughtry; Nancy Finch; Dave Foster; Bill Ingram; Jim Michel; Jim Overholser; Mark Perreault; Meredith Richards; Stadler US, Inc.; Michael Testerman; Town of Christiansburg; TrainsInTheValley.org (Mass.), and; Virginia Passenger Rail Authority.

Our NRV Rail Facilities Tour attendees assembled for a group photo alongside the Blacksburg Branch before heading toward Radford.

L-R: Dave Foster, Michael Testerman, John Beall, the late Bob Bryant, Meredith Richards, Mark Perreault and Jim Overholser.

APPENDIX

STADLER

Stadler US FLIRT Platform

Executive Summary

Stadler is a manufacturer and maintainer of world-class rolling stock and provides these products to a wide range of customers all over the world. We continuously invest in the development of our product platforms to ensure these meet the current and emerging needs of clients.

Our service-proven solutions include diesel, electric, battery, supercapacitor technologies and hybrids, and we have delivered various configurations of these units to a range of application. These propulsion technologies are developed to be integrated to any one of our product platforms - such as the FLIRT and KISS.

This document provides Product Datasheets that demonstrate our capability and experience in the delivery of FLIRT products in the United States, and also provides details on the modularity of the platform.

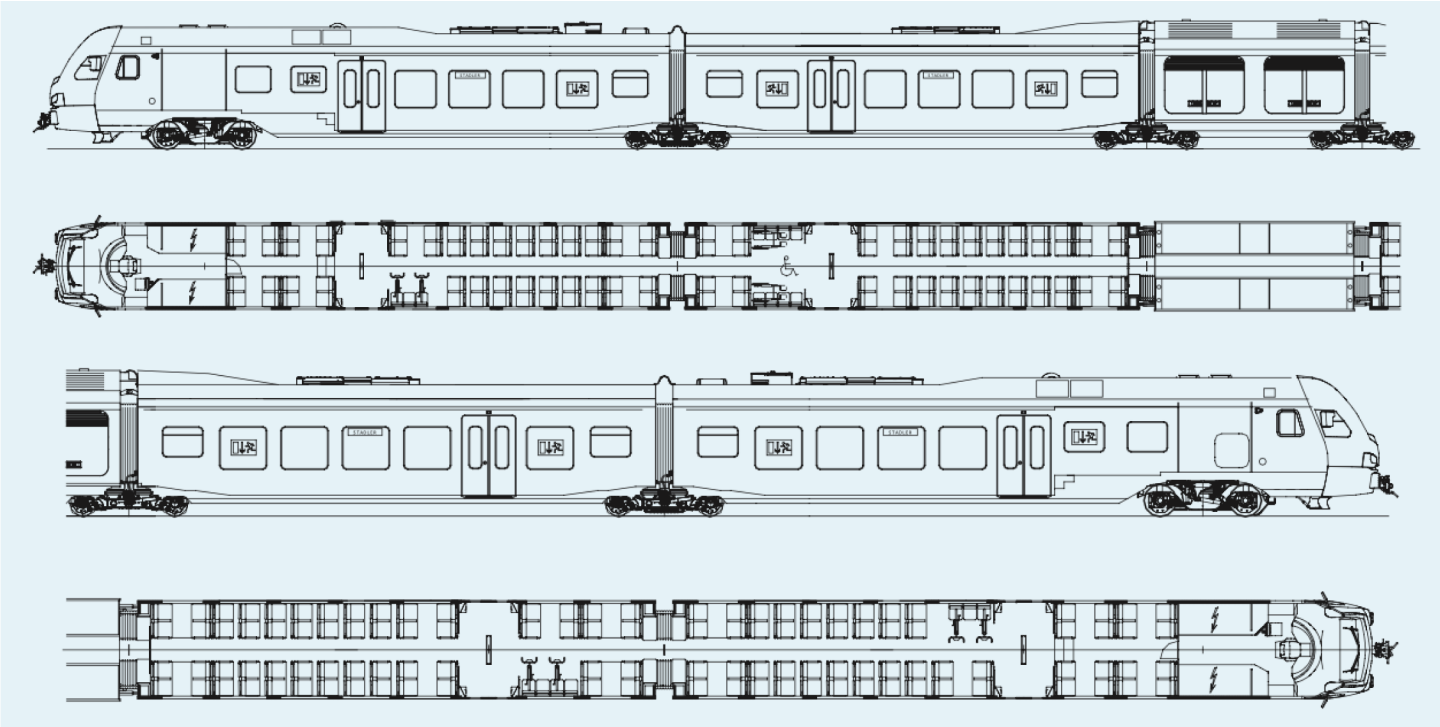
The examples provided demonstrate that we have successfully delivered several FLIRT Projects from our Salt Lake City manufacturing plant. Applying lessons learned from these contracts, as well as those currently being designed and manufactured, ensures the continuous development and improvement of these products.

Highlights

- The FLIRT can handle a gradient up to 8%.
- The FLIRT is compliant with 49 CFR. No more waivers needed for interoperability on mixed lines. We run all the FLIRTs in the US with a PTC and most of them in mixed traffic.
- Software adjustments to PTC 2.0 are manageable as it is quite similar to ETCS Level 3 in Europe.
- Due to the modularity of the FLIRT, Stadler is able to provide Hydrogen fuel cell and Battery powered versions beyond the DMU.

DIESEL-ELECTRIC LOW-FLOOR MULTIPLE UNIT FLIRT

Fort Worth Transportation Authority (The T), Texas, USA



In June 2015, The T ordered eight diesel-electric low-floor multiple unit FLIRTs from Stadler for the TEX Rail project. The trains will operate on the commuter route in the corridor between Fort Worth and the northern railway terminus of the Dallas/Fort Worth International Airport in Texas. The design of the vehicles allows The T to operate a mixed fleet including freight trains, with the vehicles meeting the new AVT requirements of the Federal Railroad Administration. The diesel generator units are installed in a separate midsection, which allows the FLIRTs to offer exceptionally quiet passenger compartments and a large proportion of low-floor area. The vehicles are scalable, which makes it easy to add an additional passenger car or an additional diesel generator unit as required. It is also easy to outfit the vehicles with bimodal drive equipment, since the electrical traction unit i s the same as in vehicles that are solely electrically powered, and has the same design. The FLIRTs for TEX Rail offer 229 seats and additional standing room for 256 passengers, and are equipped with a bathroom system that – as with the entire vehicle – meets the American ADA requirements for persons with reduced mobility.

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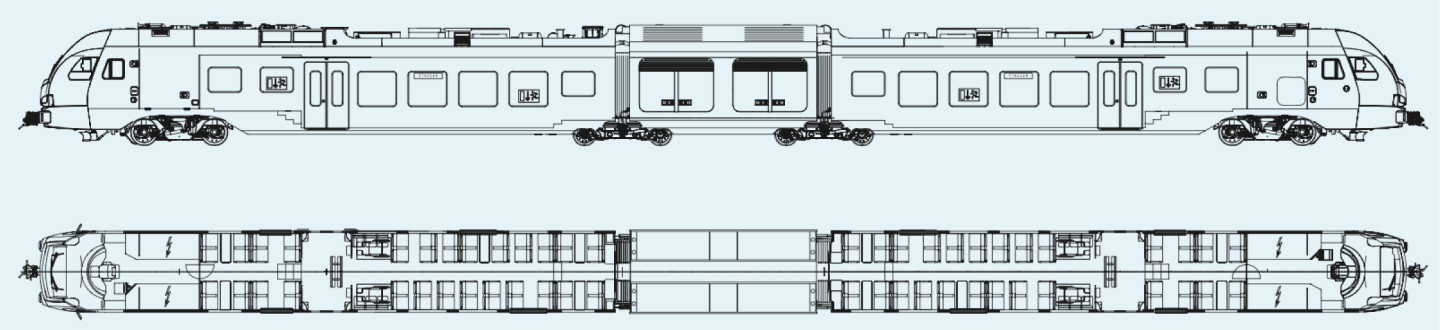
DIESEL-ELECTRIC LOW-FLOOR MULTIPLE UNIT FLIRT

San Bernardino County Transportation Authority (SBCTA), California USA



In September 2017, the San Bernardino County Transportation Authority ordered three (3) diesel-electric low-floor multiple unit FLIRTs from Stadler for the Arrow passenger rail service, also known as the Redlands Passenger Rail Project. The trains operate on a nine (9) mile commuter route with five (5) stations in the corridor between San Bernardino Transit Center to the University of Red- lands Station. The design of the vehicles allows operation of a mixed fleet including freight trains with the vehicles complies with new AVT requirements of the Federal Railroad Administration (FRA), and meet the Federal Transit Administration (FTA) Buy America requirements. The diesel generator units are low-emission, clean diesel engines which meet the Environmental Protection Agency (EPA) Tier 4 Final standard. The diesel engines are installed in a separate midsection, which allows the FLIRTs to offer exceptionally quiet passenger compartments and a large proportion of low-floor area. The vehicles are scalable, allowing the option to easily add an additional passenger car. Vehicles may also be outfitted with bimodal drive equipment, as the electrical traction unit is the same as in vehicles that are solely electrically powered, and have the same design. The FLIRTs for SBCTA offer 116 seats and additional standing room for 120 passengers.

Technical Features

Technology

- Redundant traction power system consisting of two units, each with a diesel engine, asynchronous generator, IGBT power converter and asynchronous drive motor
- Light aluminum car body design, complies with newest Crashworthiness (EN 15227) and Structural Strength (EN 12663) standards and EPA Tier 4 Final compliant
- Meets FRA Alternate Compliance requirements for operating in mixed traffic
- Traction equipment in separate power car, insulates passenger cars from noise and vibrations

Comfort

- Extremely powerful, redundant HVAC system
- Comfortable seating with tables
- Fully ADA compliant with wide entrance doors
- Low-floor vehicle level boarding at all passenger doors

Personnel

- Ergonomic and comfortable working environment
- Intuitive design and arrangement of control elements

Reliability / Availability / Maintainability / Safety

- Crash absorption system for the protection of driver and passengers (fulfills FRA and EU crashworthiness standards)
- Latest vehicle control systems with detailed diagnostic features
- Fire detection and suppression systems
- Emergency intercoms in passenger compartment
- Redundant traction power system and redundant HVAC system
- Low life-cycle costs due to light-weight design and improved energy efficiency

Vehicle Data

Customer	San Bernardino County Transportation Authority, California USA
Operated Networks	ARROW, From San Bernardino Transit Center to the University of Redlands Station
Gauge	1435 mm (4'–8.5")
Axle Arrangement	4 powered, 4 unpowered
Number of Vehicles	3
Delivery	Spring 2020
Seats	104
Flip-up Seats	12
Standing Spaces	317.5 ft2 (29.5 m2)
Floor Height	
Low-floor	24.02" (610 mm)
High-floor	47.64" (1210 mm)
Entrance Width	4' – 3.18" (1300 mm)
Longitudinal Force	1'500 kN
Length Over Coupling	163' – 0.68" (49700 mm)
Vehicle Width	9' – 5.4" (2880 mm)
Vehicle Height	14' – 0.71" (4285 mm)
Bogie Wheelbase	
Motor bogie	98.43" (2500 mm)
Trailer bogie	106.3" (2700 mm)
Driving Wheel Diameter, new	36.22" (920 mm)
Carrying Wheel Diameter, new	29.92" (760 mm)
Continuous Power at Wheel	550 kW
Max. Power at Wheel	700 kW
Starting Tractive Effort	160 kN
Starting Acceleration, gross	0.43 (MPHPS)
Maximum Speed	79 mph

FLIRTSBCTA0220e_us

DIESEL-ELECTRIC LOW-FLOOR MULTIPLE UNIT FLIRT

for Dallas Area Rapid Transit (DART), Dallas, Texas, USA

In June 2019, Dallas Area Rapid Transit ordered eight diesel-electric low-floor multiple unit FLIRTs from Stadler for the Silverline project. The trains will operate on the commuter route in the corridor between Plano and the northern railway terminus of the Dallas/Fort Worth International Airport in Texas. The design of the vehicles allows operation of a mixed fleet including freight trains with the vehicles meeting the new AVT requirements of the Federal Railroad Administration (FRA) and Buy America. The diesel generator units are installed in a separate midsection, which allows the FLIRTs to offer exceptionally quiet passenger compartments and a large proportion of low-floor area. The vehicles are scalable, allowing the option to easily add an additional passenger car as required. Vehicles may also be outfitted with bi-modal drive equipment, as the electrical traction unit is the same as in vehicles that are solely electrically powered, and have the same design. The FLIRTs for DART offer 222 seats and additional standing room for 263 passengers, and meet the Americans with Disabilities Act (ADA) requirements for persons with reduced mobility.

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