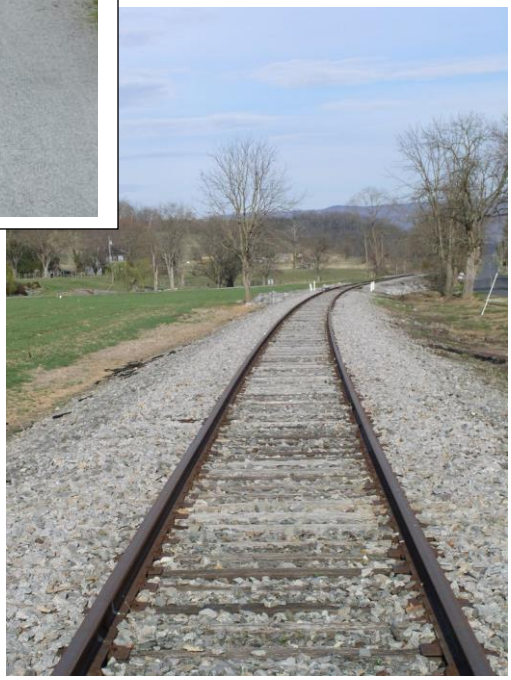
Northern Shenandoah Valley Transportation Preservation Corporation

Rails with Trails Analysis



May 2024

Submitted by:

Stone Consulting Inc.
324 Pennsylvania Avenue West
P.O. Box 306
Warren PA 16365
(814) 726-9870 tel (814) 726-9855 fax

Northern Shenandoah Rails with Trails Analysis

Report Prepared for:

Northern Shenandoah Valley
Transportation Preservation Corporation

Stone Consulting Inc.
324 Pennsylvania Avenue West
P.O. Box 306
Warren PA 16365
(814) 726-9870 tel (814) 726-9855 fax

May 2024

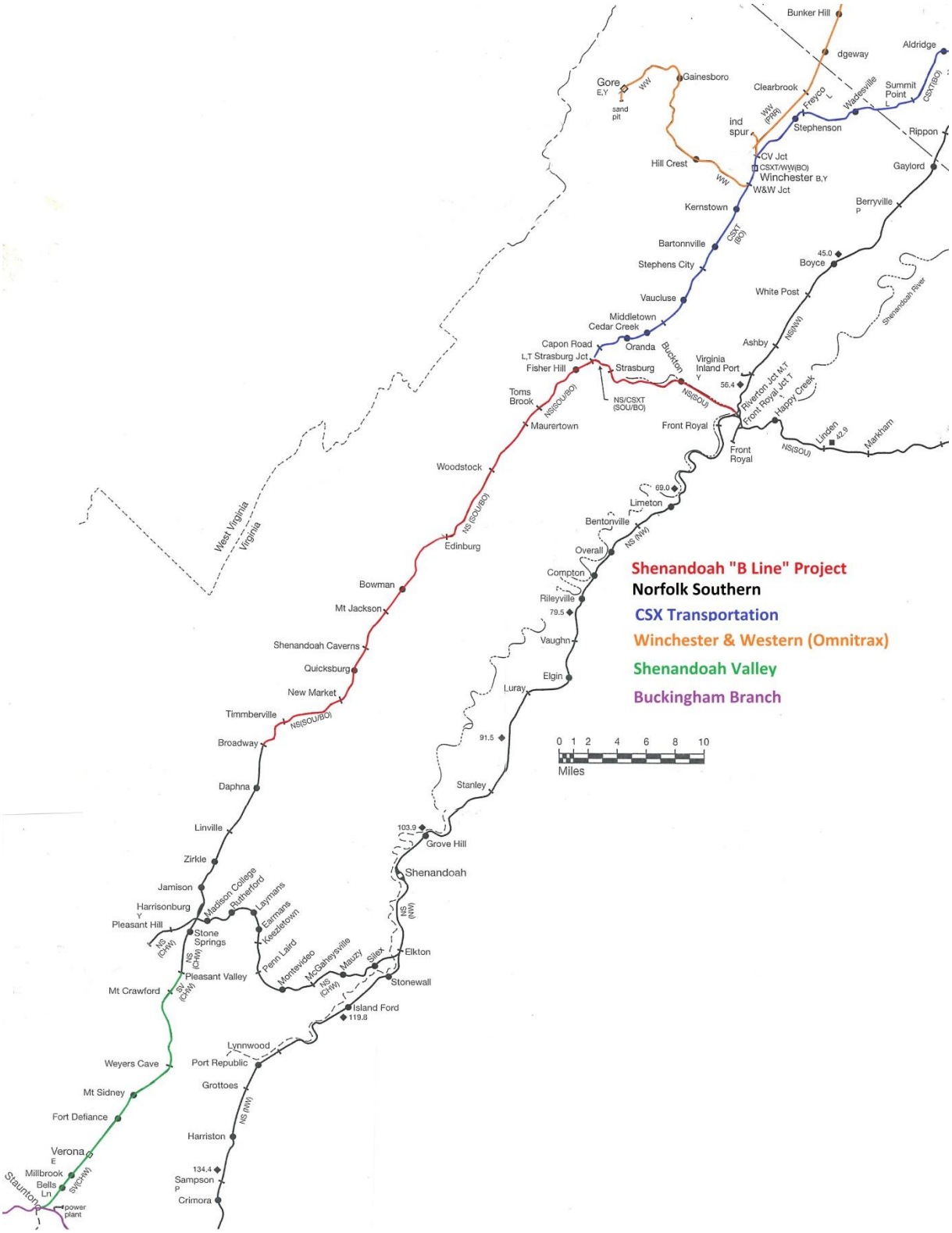
The Northern Shenandoah Rails with Trails Analysis

- **The Rail with Trail concept offers the best benefits of the trail-only concept**, plus the economic benefits of developing an excursion rail and shortline freight railroad on the corridor.
- **Rail With Trail projects have grown exponentially** and are a proven concept nationwide with 343 projects and 917 miles of dual occupancy.
- **The design of a parallel trail alongside the railroad would either be a 'recreational trail'**, or and 'accessible path' to allow for more flexibility in design. This would allow the trail to be cantilevered on the many bridges on the line, yet maintain full trail usability.
- The anticipated track class and resulting train speed is FRA Class II; **maximum of 25mph freight and 30mph for passenger**. In practical terms, excursion operations would be operated at 20mph. This restricted speed also allows more flexibility in safe separation between rail and trail, unlike a 60mph freight and passenger main line corridor would allow.
- **Rebuilding the railroad and constructing the parallel trail will be done in three distinct phases** over a five-year period representing the current condition of the railroad. The easiest sections on both ends with welded rail will lead reopening, as track conditions are the best, although the mileage is the longest. The middle sections require heavy vegetation removal, more extensive rail and tie work, and some significant work on the bridges to accommodate parallel trail use.
- **Tourism visitation is heavily based on the experience and data from existing regional excursion railroads**, which is already publicly reported by month. Today's market is heavily based on events ridership, rather than a simple scheduled train ride, and the 4th quarter now dominated nationwide ridership between Halloween, fall foliage runs, and Christmas theme specials. Anticipated ridership at a five-year plateau level for budget and impact purposes was 75,000 riders, with 39% of those resulting in an overnight stay.
- **Railbikes are a new and emerging major market on a nationwide basis**. As they are classified as maintenance vehicles by the FRA, they may operate on any portion of track that is sufficiently clear of vegetation to allow safe passage. While under the control of the operating railroad dispatcher, they may be operated over the same track as other rail operations. Because they are more limited in capacity, and operating season, attendance is forecast at 20,000 additional annual riders that have similar season and demographics to trail users.
- **Freight business will redevelop** given the ideal proximity to two interchanging railroads, the existing agricultural and industrial activity ignored by NS in the valley, and the true potential of transloading operations between truck and rail given the I81 and I66 crossroads. Five potential shortline operations have responded with interest letters to submit proposals
- **Grade crossings remain in place**, with some paved over, and 6 of the 65 public crossings legally closed. Costs for rehabbing surface and warning devices are estimated for replacement.
- **The railroad is not currently abandoned**, although out of service. Formal STB abandonment will allow any railroad company to attempt to acquire the line at scrap value for freight only (no excursion or trail) if a negotiated price is agreed on and a need for freight service is proven.
- **A wide variety of ownership and funding alternatives exist**, particularly when freight service is preserved in the corridor. Nonprofit ownership allows a for-profit freight carrier to operate.
- Economic impacts beyond initial construction (Year 5) *in addition to the previous trail impact estimates* (by incorporating excursion and freight services) are estimated to be **an additional 140 full time jobs with an annual economic impact from visitors**, and operating budgets of over $21M.

TABLE OF CONTENTS

The Northern Shenandoah Rails with Trails Analysis

PROJECT MAP


Shenandoah "B Line" Project
Norfolk Southern
CSX Transportation
Winchester & Western (Omnitrax)
Shenandoah Valley
Buckingham Branch
0 1 2 4 6 8 10
Miles
Bunker Hill
Aldridge
Gore
Gainesboro
Clearbrook
Summit Point
Stephenson
Rippon
Hill Crest
Winchester
Gaylord
Kernstown
Berryville
Bartonnville
Stephens City
Boyce
White Post
Vaucluse
Middletown
Cedar Creek
Capon Road
Oranda
Ashby
Fisher Hill
Strasburg
Virginia Inland Port
Toms Brook
Maurertown
Front Royal
Woodstock
Edinburg
Limeton
Bentonville
Overall
Compton
Rileyville
Vaughn
Elgin
Luray
Stanley
Bowman
Mt Jackson
Shenandoah Caverns
Quicksburg
New Market
Timmberville
Broadway
Daphna
Linville
Zirkle
Jamison
Harrisonburg
Pleasant Hill
Stone Springs
Pleasant Valley
Mt Crawford
Grove Hill
Shenandoah
Elkton
Stonewall
Island Ford
Lynnwood
Port Republic
Weyers Cave
Grottoes
Mt Sidney
Fort Defiance
Harriston
Verona
Millbrook
Sampson
Crimora
Staunton
West Virginia
Virginia
Shenandoah River

The purpose of this entire project, and resulting analysis, is not an 'either-or' alternative of the Shenandoah Corridor. All costs, projections, and impacts as a result of this rail with trail effort are an addition, not a substitution, to the existing trail concept – it only impacts and adds to the proposal that has already been submitted.

We are equally committed to the parallel trail concept as there are no victories to be claimed by not developing this community and state trail benefit. But by preserving the rail corridor itself, *in addition to promoting the trail*, it captures transportation cost benefits to local business, develops an entirely new business with an operating budget, payrolls, and local purchasing with significant economic impact, and targets a demographic visitor market that is entirely different from the majority of trail users. This rail plus trail alternative benefits business, recreation, tourism, and has its own unique benefits only by keeping the tracks in place.

Designing a rail-with-trail project is now common enough *("… by the end of 2018, there were 343 identified rails-with-trails in the United States, totaling 917 miles of rails with-trails in 47 States")*[1] that it is far easier to research and investigate all issues based on existing data rather than conjecture. This is no longer a 'new idea'.

The key impediments to rail-with-trail project development in a corridor are typically the overwhelming resistance of the owning railroad involved to allow any parallel trail occupation in their private land control. This is often based on overarching liability exposure concerns to a publicly-held corporation despite an established safety history. More projects have actually succeeded where right-of-way ownership is publicly controlled and the operating railroad is a tenant, contractor, or on a shared-use corridor. In this opportunity, no large railroad corporation or shortline holding group can invent or prevent development of the concept based strictly on corporate anti-trail policies, as Norfolk Southern has agreed to sell the corridor outright rather than leasing it.

Even the American Short Line Rail Association has taken a rather anti-trail public stance, in addition to many of its key members. This makes this project – with an available land corridor not privately controlled by a railroad company – ripe for the dual-use potential. A project of this size to benefit all corridor users should not be dismissed when the potential is too large.

Rail and Trail Assumptions

The feasibility description, and particularly the economic impacts, is generated on an additive, not total, basis to previous trail studies. We accept the potential trail usage and benefits as offered, although the detailed methodology and underlying data is not fully accessible to us to examine. What is presented here is not shown as an alternative, but an additive – the object of this is a rail *with* trail corridor, not a rail *vs*. trail debate offering but one choice.

[1] https://railroads.dot.gov/sites/fra.dot.gov/files/2021-06/Rails%20with%20Trails%20Best%20Practices%20and%20Lessons%20Learned.pdf

Within that assumption, several key factors emerge on rail with trail design:

- ⊗ The width of the right-of-way is adequate for both rail and trail, although a parallel trail presents significant additional construction costs. These have been estimated at an additional $ 1 million per mile over existing estimates, simply to accommodate clearing and grading of a parallel recreational trail.
- ⊗ The *recreational vs. accessible* trail issue definition and standards continues as a significant, and somewhat hidden, design issue, specific to width and grades. In many locations where it is highly desirable, such as many of the communities, an accessible trail design is no more expensive than a recreational one. In others, the minimum trail width considerations with shoulder slopes make parallel design only practical for a recreational design cross-section rather than a 14' accessible trail design standard. Realistically, many railroad right-of-ways have great difficulty supporting a 14' footprint without additional roadbed construction, considering that the ties themselves are no longer than 9' for comparison to a new trail width.
- ⊗ A second defined set of design standards exist for an "accessible path", a document developed by the US Forest Service[2]. This allows a narrower footprint where design challenges exist, yet maintain grade and slope standards to remain accessible. Width may be increased wherever feasible and use standards apply.
- ⊗ Our assumption continues that while there actually have been safe and successful on-bridge trail occupancy joint with a regular train operation (Astoria, OR waterfront trail[3]) the trail corridor will be on parallel and cantilevered bridge designs. These additive costs are included in construction and impacts.
- ⊗ A key design point emerges on an assumption of minimum design clearances between trail and rail. The underlying safety issues are actually based on train speed and frequency – it is naturally desired to be further away from a 79mph commuter rail track than a 15mph infrequent freight and excursion track. However, the federal standards indicate that separation is to the judgment of the project design engineer, not a firm dimensional design envelope that is presented without any specific standard referenced. Trails literally at the 'end of tie' have been successfully and safely operated in multiple locations such as York, PA, the Allegheny Great Passage trail at Cumberland, MD, and the Sacramento River Bike Trail in downtown Sacramento, CA. In all these cases, minimal train frequency and low train speeds (15-25mph) make this possible. *"The AASHTO Guide for the Development of Bicycle Facilities includes minimum setback standards but it does not specifically consider the characteristics of adjacent rail use. Many States' Public Utilities Commissions also outline minimum setback standards, also known as "clearance standards" for adjacent walkways, which represent the legal minimum setbacks based on the physical size of the railroad cars. These setback standards are commonly employed along all railroads and at public at-grade*

[2] https://www.fs.usda.gov/sites/default/files/Accessibility-Guide-Book.pdf pgs. 35-40
[3] https://www.lewisandclark.travel/listing/astoria-riverwalk/ (with photos)

crossings. However, these setback distances are geared towards railroad workers and are not considered generous enough for the public. 61 Section 1A.13, MUTCD (2009)."[4]

- ⊗ Virginia's separation standards are heavily weighed toward experience in downtown metropolitan areas, and alongside high speed and high traffic rail and transit lines. While rational in those locations, this project is quite unlike anything previously proposed in the Commonwealth.
- ⊗ According to the 2020 "Rails with Trails – Lessons Learned" report, [5] the clearances between track and trail vary widely, as well as type and manner of separation, or none at all. "A comparison of rail-with-trail setback with both train speed and frequency reveals little correlation, with some trails reporting a narrow setback existing along high speed and frequently traveled rail lines." Further examination of required FRA rail accident-incident reports by railroad going back eight years indicate no reportable fatalities between designated parallel trail users and rail equipment other than one trail crossing fatality in Santa Fe, NM (commuter rail, 2014). Public road crossings used by bicycles and pedestrians are far more likely to create legitimate user hazards with rail traffic than parallel trail occupations.

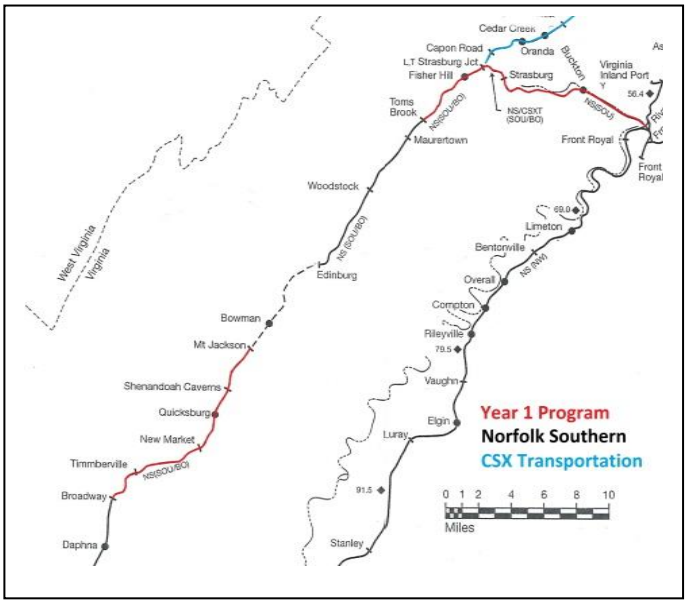
The Five-Year Plan

The calculations for capital spending, operations, and resulting economic impact inputs are based on a general assumption of how the rail with trail services in the valley would be reintroduced. This is an unusual railroad because the physical track conditions vary so widely over 50 miles, and also because under any standards, this is a significant, multi-year project to rehabilitate and operate a rail corridor as well as a parallel trail. There is no minimizing the project size, but the benefits are equally impressive.

Year 1

Initial rail operations would be restarted essentially as two physically separate shortline operations; one being restarted out of the Front Royal to Strasburg zone extending to Toms Brook, and the second on the south end of the railroad out of Broadway, for a total of 32 of the 50 miles of corridor track.

The portion of track with welded rail between Riverton and Strasburg Jct. is in by far the best physical condition, along with the 100# welded section north out of



[4] https://railroads.dot.gov/sites/fra.dot.gov/files/2020-04/RWT_Report_Final_031620_0.pdf
[5] https://railroads.dot.gov/sites/fra.dot.gov/files/2020-04/RWT_Report_Final_031620_0.pdf

Broadway to Shenandoah Caverns as far north as MP 85.4 (Valley Fertilizer). Those two end portions are the easiest to immediately restore to service although they are longest in terms of mileage. While it will depend on how much time elapses until operations commence, tie conditions at the last track inspection in 2022 were at or near FRA Class 1 (15mph passenger operation) on the north end, and sub-FRA1 but operational (FRA excepted track) on the south end. Spot tie replacement programs are still likely but are not exceptional line items.

Limited rail tourism operations may initiate at least on the north end in the first operational year after track class is confirmed to at least be FRA Class 1 and a physical connection for equipment interchange can be reestablished. The timetable on this is notable – the prime target period for reopening will be the Fall of Year 1 to capture maximum ridership with minimum effort. For the purposes of impact and pro-forma, an initial ridership of only 11,250 with 39.6% overnight stays was used[6] – as startup time is so indeterminate depending on equipment delivery and track reconnection progresses.

Freight operations by a third-party operator are most likely to initially develop into Strasburg and Shenandoah Caverns, based upon initial economic development indicators revolving around direct rail services and the potential transloading and warehousing opportunities into the ex-R R Donnely facility. The customer most affected in the south by loss of direct rail services by NS was at Shenandoah Caverns, when service was terminated by notice.

Railbike activity in Year 1 is likely limited to equipment procurement, as the lead time for both manufacture or contracting can easily be a year for what is projected to be at least 10 and preferably more vehicles[7]. It is also necessary to do extensive brush clearing and minimal grade crossing opening on any potential railbike region, and stay clear of any active track rehab zones by contractors. However, existing track condition is actually irrelevant for railbikes as they are considered maintenance vehicles.

As there is a parallel trail, much of the significant construction, clearing and grading occurs in Year 1 over the longest mileage distance parallel to the active track portions. Note that parallel trail construction is an additional cost to the prior trail construction estimates, as grading a parallel subgrade will be necessary. Separation is only a matter of practical engineering practices with the right-of-way, rather than policy.

Bridge repairs for rail operations require timber redecking in many locations. The same repairs would also be required for trail use. For parallel trail use across the high bridges, significant modifications to cantilever a parallel walkway are assumed.

This makes Year 1, over the initial five year plan, the most expensive construction and capital budget year. Economic impacts are heavily weighted on construction rather than operation.

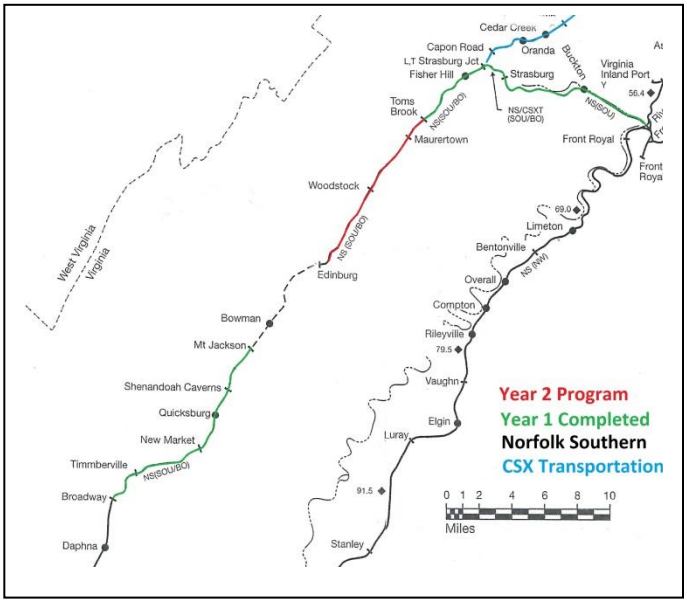
[6] State Overnight stay percentage from https://www.vatc.org/wp-content/uploads/2023/08/Virginia-Tourism-Economic-Impact-2022.pdf

[7] https://claycountyfreepress.com/news/cc-top-stories/rail-explorers-awarded-contract-for-dundon-rail-excursions/ Railbike operating Contract awarded August 2023 with startup anticipated April 2024 by the State of West Virginia

Year 2

The next portion of the railroad south of Strasburg Jct. from Toms Brook to the ex-Johns Mansville facility is targeted for the next 8.4 miles. This portion will require less lineal distance but more intensive track rehab, as well as targeting some of the largest bridge structures for both rehab and trail purposes.

As the facility already has extensive available warehousing and existing track facilities, and is virtually yards away from I-81, this remains the prime target for developing new rail-based (truck to rail) transload facilities in the valley – the prime growth market for rail transportation that all independent shortlines have come to embrace. This was also the 'second to last' section operated by Norfolk Southern. It is highly likely that any third-party freight contractor would consider getting this site back on 'live rail' to be an essential and strategic goal for economic survival.

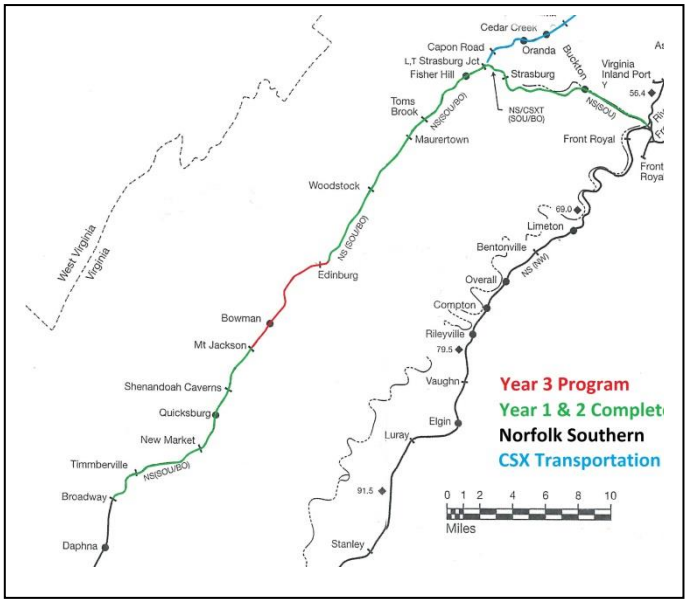


Operationally, this would be the first full calendar year of limited excursion operations, with ridership projected to be 30,000 based upon full reopening of both north and south segments to a full calendar year alternative and full FRA1 track conditions on the Year 1 32 mile trackage segment project.

Year 2 marks the beginning of transition between construction and operation impacts, and fleshing out of the staffing for both the freight and excursion operations beyond the minimal Year 1 operation program.

Year 3

Year 3 closes the final gap for an end-to-end unified rail connection, by closing the final 8.9 miles between Bowman and Edinburgh – which features track that has been out of service the longest, has extensive vegetation, as well as more significant bridges on the line. But closing the gap also allows new operational efficiencies of a shortline operating five days per week (most likely hubbing out from Strasburg Jct.) as well as connecting to multiple rail connections. NS may, by their own preferences, require that only Riverton or Broadway be the primary freight interchange point as the freight project



develops. But this completion also unifies the trail, and allows complete operational flexibility for an excursion operation to offer services from endpoints, midpoints, and special all-day excursions capable of 100 mile special runs as the market interest develops.

Year 3 begins a significant build toward 'plateau' level (mature market) ridership, and also opens up the maximum amount of track for dispatcher-controlled railbike operations if no other active rail creates safety concerns. This FRA-approved dual-use has been actively achieved on the same track on the Western Maryland Scenic Railroad out of Frostburg, MD.

With a unified system, a single base of operations will necessitate the construction of a locomotive storage and maintenance shop for inspection, repair, and upkeep. The location is 'likely' to be at Strasburg Jct. but will be dictated by the operating practices preferred by the freight operator.

Year 4

Year 4 draws to a conclusion the major construction projects of the railroad and trail, and converts impacts to an operating model only, with full rail employment and a projected tourism ridership of 78,000, which is 5% higher than what can be regarded as a 'plateau' ridership – as the railroad will essentially generate peak ridership from curiosity and free publicity.

While freight revenues may expand over time based upon the evolving success of industrial development, transloading, and competitive access to rail transportation, the tourism levels will tend to level off to a sustainable level based on the success of attracting event-based attractions and the underlying summer-season demand. But, by nearly any standards, this remains an exceptional ride through a scenic valley characterized by farmland, iconic historic resources, and over the high valleys on the steel deck bridges. Most excursion operations 'may' have one peak attraction bridge while this line has no fewer than 7 high trestles and two river bridges – any one of which would be the 'star event' on any other excursion railroad in a national market.

Year 5

Year 5 is considered to be the projected 'plateau' level of ridership that can be sustained with a good operator and 4th quarter events ridership program – 75,000 riders, which likely 50% would be 4th quarter given the national experience metrics, along with a potential additional 24,000 from a contracted railbike operator with peak summer season demand. This railbike program remains constrained by both weather and capacity, unlike the railroad, but has the distinct advantage of being a 'movable feast' capable of using different portions of the railroad at different times to keep a new and fresh experience that can be promoted.

And Beyond..

Experience dictates that once an operation reaches plateau ridership, it is more than not dictated by macro economic events and overall tourism visitation than the attraction itself; nearly every excursion railroad in the US saw ridership plummet by 50-60% during COVID, with many operations dependent on aged volunteers simply closing during the crisis. But ridership has now recovered dramatically on almost all operations surpassing 2019 levels.

If there is actually an opportunity to grow revenues steadily beyond Year 5 by developing new revenue opportunity, the bright spot remains the transload freight market, and the skill of the selected freight operator to tap it. The sheer volume of I-81 truck traffic is nearly unsurpassed on a national level, and the proximity to eastern ports, nearby Virginia Inland Port, and regional markets makes both inbound and outbound markets within range. The definition of transload here is not necessarily containers, but more into bulk commodities including agricultural, petrochemical, lumber materials, and general warehousing where rail-accessible space exists. While the domestic short-haul (> 500 miles) container market is huge, it is totally dependent on the ability of the connecting Class 1 railroad to effectively price it, block the cars out to separate destinations on port loading, and deliver them on a scheduled basis. Technological change to facilitate this has happened relatively rapidly.

Tourism Visitation Assumptions

There are several key assumptions built into the impact, budget and planning of the resuscitation of the rail corridor that are tourism related. The entire valley is already a known tourism destination and established attractions.

One of the first questions that must be squarely addressed is 'how many for the railroad?'. It's a tempting but elusive target to claim that any excursion rail operation can command hundreds of thousands of visitors in such a vibrant travel corridor and market, and many rail feasibility studies will claim that. The reality is that this is not a new business model, and excursion railroads have been operating – and publicly reporting their monthly ridership to the federal government – since the late 1980's. This means rather than relying on a percentage of regional visitors penetration methodology (often 3-4% of an established market base) to determine ridership, the better methodology is simply to look at existing regional operations in either the same or similar markets and analyze their actual performance.

This result is generally a lower, but far more rational, attendance number. While there are significantly large excursion railroads that regularly command over 200,000 annual riders (Strasburg PA, Great Smoky Mountain, Cuyahoga Valley, others) the median ridership of all 300+ reporting museum and excursion operations is much lower, more in the 30,000-50,000 range, and given a mix of paid staff and volunteers. Given a good regional market, good scenery, and most importantly a good operator that knows how to command the event-based market, a 75-100,000 ridership base is achievable in the Virginia market, but certainly not guaranteed. Unlike the demographic-based estimates of the past, ridership today is influenced far more by the marketing skill of the operator – particularly on securing licensed and special events – which can result in sustained capacity crowds. All high ridership excursion operations today that boast ridership over 100,000 lean heavily on event-based ridership – which was not true 20 years ago or in the startup era of the 1960's where any train ride would do.

Historically, excursion railroads in the northeast always flourished in fall foliage seasons. Operations like the Potomac Eagle could be nearly empty a good part of the summer vacation season, but with sufficient seat capacity, make the entire season up in October. It was not

uncommon for October to be the high ridership month of the entire year, and for the 4th quarter to produce 60-70% of annual ridership. That trend is now even more pronounced.

For this study, why this is so critically important is that the peak demands for excursion operation do not coincide with the peak demands of good-weather trail activity, which works well for the regional hospitality and small businesses in the valley. While railbikes share a rather similar demographic to trail users, the 4th quarter is it's own world for excursions, dominated by family groups with children, and not weather dependent. This means that hospitality demand is increased in a quarter where it is usually declining. Rail combined with trail are a true winning combination for visitor impacts when they are combined. Capacity in terms of peak load carrying capability is also critical; that means more cars for special events and the 4th quarter need to be available than any other time to capitalize on the opportunity.

An excursion railroad operation almost anywhere that is a 'new start' experiences a 2-3 year period of rapid growth fueled by the 'newness' of the operation and rail enthusiasts desire to visit the property. It is not unusual for record ridership to be seen in the second, or even third year, and then drop 5-10% to reach what is then a sustained ridership level referred to as a 'plateau', which is what impact analysis needs to be based upon. That plateau ridership is developed by an actual marketing plan, events development, and the reality that only 5-10% of the sustainable market is characterized as "rail enthusiasts", and the impact of the operation is determined by ability to hold overnight visitation – which is fueled by regional population and developing evening events such as "Polar Express" and imitators.

The Rail Excursion Market for Shenandoah County

In the case of a potential rail passenger excursion market, there are several major differences in the demographics and characteristics of the target customer when comparing rail to trail. This is not unique to the Shenandoah Valley. Over the last 25 years, this market has dramatically changed and requires a completely different analysis than it would 25 years ago. This creates new opportunity when it is recognized, and only serves to benefit the viability of the project and benefits to the region.

In the 1960's and into the 1970's, when excursion railroads first appeared as steam locomotives were retired and branch lines became available, they became a summertime vacation exercise in nostalgia. Grandparents had often worked for the railroads, and sometimes the parents. Most remembered steam locomotives from 15 or 20 years earlier, along with high-quality passenger train travel of the 50's. Virtually any railroad that could field a steam locomotive on a 'weedy branchline through a cornfield' could succeed with a little luck, and no railroad epitomized that trend more so than the 4-mile Strasburg Railroad outside Lancaster, PA. Combine a summer vacation visitor market with fall foliage trips, and it became a business. Excursion railroads appeared all over the United States, and the formula was replicated by many.

During that era and up into the early 1990's, ridership in virtually every excursion railroad east of the Mississippi followed the same (and predictable) ridership demand curve to a predictable summer vacation market– a Memorial Day weekend start, a July-August ridership peak, a post-Labor Day ridership slump through September, and a final – often even bigger – October peak

that coincided with fall foliage in the northeast. It was not unusual for a northeast railroad to have over 50% of their ridership in a three-week period in that October fall foliage market. The summer demand peak generally fell directly in line with other summer attractions such as beaches, camping, and family vacations. The only question was the market size and amplitude of the distribution, but it was fairly predictable in nature. The only 'special events' might be one Santa Claus trip, and the occasional train robbery special. *Markets could generally be predicted as a percentage of existing tourism visitation, combined with an at-capacity fall season. Demographics were largely a mixed family group with a significant senior, bus-market component.*

Today, ridership estimates become a blending of factors, but possibly the most significant is observing the actual performance of established excursion railroads in the region, some of which have operated for decades. In terms of actual results (both ridership totals by year and riders by month) they are the most reliable indicator of market performance. This is publicly available data submitted by operating railroads to the Federal Railroad Administration, and is a far better data source than most estimated trail use statistics not based on similar ticket sales. Furthermore, it establishes rational limits on expectations not tied into pure demographics, but actual results of established attractions. This data can be researched back into the 1980's for nearly every currently operating railroad in the United States.

It's a new world order..

In 1984 the first of several major changes hit the market – Thomas the Tank Engine series on PBS, aimed squarely at the 5-year old and under market. In 1995, Britt Allcroft, a British company, licensed the rights to have a replica, full-sized (but unpowered – more of a towed caboose) "Thomas" locomotive available to host railroads to have a "Thomas the Tank Engine" event, and the railroad excursion world changed forever. The replica "Thomas" (delivered by flatbed truck) with the host railroad's cars and a host railroad locomotive pushing it, produced record capacity weekend crowds usually as a two-weekend event. The "Thomas Event" ridership could, and did, produce more riders over a single week than the railroad might otherwise see in an entire summer season, and a 'small' Thomas event was typically 25,000 riders, with Strasburg having one epic September draw of over 75,000. The demographics of Thomas were squarely aimed at young children and their parents, grandparents, and extended family.

Britt Allcroft later became HIT! Entertainment, which in turn was sold to Mattel, and the corporate level marketing leverage of the event has continued nonstop with six locomotive replicas travelling the US in somewhat a circus style. Along with the locomotive, an entire event was created with activities, costumed show characters, and of course, an entire circus tent (or several) full of "Thomas the Tank Engine" toys and accessories, of which the host railroad gained additional percentage revenue. One excursion railroad operator referred to his Thomas event as "Woodstock for 3-year olds".

As long as the live-action Thomas series ran on PBS, the ridership of this event was referred to within railroad circles as "Thomas the little blue Bank engine" for the incredible ridership and

revenue it produced for the host railroad that successfully negotiated an event. It was evidently clear looking at ridership statistics when a Thomas event was hosted due to an otherwise inexplicable attendance peak during the year that didn't fit the time-honored demand curve.

This revelation in potential market created what is now generally referred to today as 'event based' ridership. No longer would excursion railroads be content with a simple, nostalgic, whistle-blowing trip across the countryside. There was more ridership, revenue, and success to be created with a themed ride, no matter how contrived, and the better the themed special event the better the bottom line and attendance might be. Regular 'excursion' trips would still be scheduled, but the real ridership growth would now be based on the events model. And the 'events model' had a much further geographic draw, and could be targeted at segmented demographics.

By the mid 90's, virtually every railroad was adding Easter, Mothers Day, Fathers Day, Veterans Day, 4th of July, and Christmas trains, in addition to the usual schedule. Dinner trains were experimented with, but limited in ridership as a usual railroad dining car only can handle 44 seats and operating costs were high. Stand-alone dinner trains in the 90's had more failures than successes, with the only guaranteed successes as an added service on existing schedules. Near-theatre events like Murder Mysteries began, based on 'Murder on the Orient Express' genre.

The Polar Express

The second, and even bigger, market shock to hit the event market was the gradual introduction of "Polar Express", beginning with simple readings of the Chris van Allsburg children's book on board a Christmas special event. But when the animated "Polar Express" movie was released in 2004, the world changed for excursion railroads in an even more dramatic fashion. Following the "Thomas" licensing model to host railroads, Warner Brothers, in conjunction with a startup company "Rail Events" (a division of the Durango & Silverton narrow gauge railroad) licensed all rights to the movie, the book, the term "Polar Express", and created a standardized-format licensed special event to any host railroad that could sign a contract, meet minimum standards for equipment, quality, parking, and handle surge capacity crowds, and also deal with a percentage-based royalty contract to manage, advertise, and promote the event to the exacting quality standards of Rail Events.

"Polar Express" is for all intents and purposes, a live 'Broadway Show' event on a moving train, with many actors, dancers and music, all following the story line of the animated movie, and more loosely, the book. While not an exact parallel to the animated movie, it immediately exploded the demand market in the Internet era, using conventional advertising, social media, and internet to promote and sell tickets. Rail Events (working with Warner) closely controlled the marketing, as well as the licensing, for a significant percentage of gross, and also inspected and audited the quality of the event to make sure standards were met. Rail Events also limited licensed venues so that only one operation in a target market was a licensee, virtually assuring their success – if you were the selected partner in a defined regional area.

Bluntly put, "Polar Express" set new ridership records that have yet to be equaled, and immediately pushed the entire industry into targeting Christmas as not just one or two special trains, but the highest demand period of the entire year. Struggling operations suddenly were awash in seat demand. While the operating costs for the host railroad can be stunningly high – requiring paid actors, a "North Pole" set along the tracks, and a gross contract percentage to Rail Events that is a hard pill to swallow for many – the public no longer objected to a $40-and up ticket price for the same coach seat that usually went for $10 without it. Online ticket sales resulted in mid-summer sellouts of a November-December scheduled event.

And unlike any other event, "Polar Express" made the scenery out of the window instantly irrelevant on a nighttime run. A decorated and lit "North Pole" had to be created at the end of the run (based on elapsed performance time, not distance), but other than that, what was important was on the inside of the railroad car. Then too, the best runs and the highest demand was in early evening for a primarily family-oriented activity with small children encouraged to come in pajamas. When the ride was over, sleepy children and parents typically stayed overnight, particularly when the draw distance typically exceeded 50 miles out from a metropolitan area. That resulted in local economic impacts boom, as thousands of passengers flooded local lodging for what would normally be one of the least-active periods of the year. The overnight stays from Polar rapidly exceeded 50% in most areas.

The railroads that didn't have a licensed "Polar Express" event caught on rapidly, and created alternate themed events and even 'look alike' events barely skirting the licensing, with Christmas-themed trains. While not necessarily getting the same ridership levels, it was rapidly discovered that a well-promoted themed Christmas season program outperformed almost any other annual program. Railroads discovered that they literally owned the market between Thanksgiving and Christmas as the most popular time, and when they didn't have to compete with summertime activities for the same recreational customers. And the staying power of "Polar" has been remarkable, as it has turned into a family standard event now with little slowing of demand – as the animated movie continues to be a seasonal standard driving interest in the train itself. It should be noted that despite COVID, any railroad heavily invested in Christmas-themed trains has seen sustained ridership growth, and those and are not have seen static or declining attendance.

The Polar Express Impact Nationwide

The overall impact of this dramatic theme-based program shift continues, and the nationwide impact is pronounced across the entire nation. In many cases, such as the Texas State Railroad, "Polar" ridership is responsible for 60% of the annual ridership – which is 60,000 riders out of 100,000, all happening in essentially a five-week period. That requires multiple daily trains, 14 operating cars, multiple ready locomotives, changes in the parking lots, stations, utilities, restrooms, staffing, and even two Santa Claus on each train to simply handle the flood-level volume over at least five weeks. That operational impact is repeated now on virtually any railroad that tries "Polar" or any other major Christmas season activity.

The success of "Polar" also spawned any and all attempts to do additional licensed, event-based theme trains that could have similar results. This has resulted in licensed events ranging from PBS characters to Peanuts to "Little Engine that Could" to a never-repeated attempt to do a live-action "Lone Ranger" event. Colorado-based Rail Events continues to lead the pack on developing alternate activities; some have endured, some have been withdrawnafter market tests, and some have continued in limited use – Licensed "Polar" locations now include 40 railroads and railroad museums, but the number of Christmas-themed event trains is now almost universal across any railroad that can operate in the winter season. One huge potential still remains unreachable – multiple attempts to license "Hogwarts Express" have met with refusal from Warner Bros. (licensing all train rights to Universal's theme park in Florida), but "wizard" train events barely skirting copyright violations have emerged in multiple locations with varying degrees of success. "Hogwarts" remains protected, but "Wizards" is a generic term.

It has now become more typical, and nearly universal, for every scheduled train to have some kind of a 'theme event' name tied to it, based on holidays, characters, commemorations, special groups, local food and wine, on-board theatre, and whatever imagination and creative minds can even try, becoming as experimental as the "Princess Express" at the Northern Central Railroad in Pennsylvania. The end result is that the '2 PM train to Endtown' is now less than 20% of the demand market, where the "Veterans Special" with reenactors on board may sell out the very same train on the same day. This fact then becomes a completely different demographic, seasonal, and target market from parallel trail activity, as it is impervious to weather, has virtually no competition impact (rail or trail today?), and has completely different impact on the local and regional hospitality industry from anything else. While there is some overlap, the rail event market tends to focus on families with small children, the retiree market, upscale local food and beverage events, etc., rather than the typical local trail user for exercise, or the longer-distance trail user/group in better physical condition. The only proven market overlap (and now typical in a rail-with-trail situation) is using the railroad for bike ferry services for one-way journeys on the trail during the summer season. So rather than raw demographics, the segmented draw of each new rail event attraction becomes additional local economic impact event rather than competing against existing strong local tourism events.

For any new excursion rail proposal, and certainly including this one, it is now assumed that with any decent marketing and promotional basis by the operator, the peak excursion market demand is now the 4th Quarter – when October foliage and Christmas specials can be operated. The summer vacation season is no longer the peak ridership demand.

In turn, this major event-based 4th quarter market creates a significant problem for forecasting ridership demand, because it is not truly demographic based, and has its own demand separate from attraction competition, and doesn't use trail market analysis. The only demographic question is if it is within a 150-200 mile radius of a major population center. When this market is accurately forecast, it is based on projected system capacity – how many trains, how many cars, how many seats, and how many days can the operation produce during the season? This forces the forecast results back on the effectiveness of the operator, not necessarily the location of the activity and conventional tourism draw.

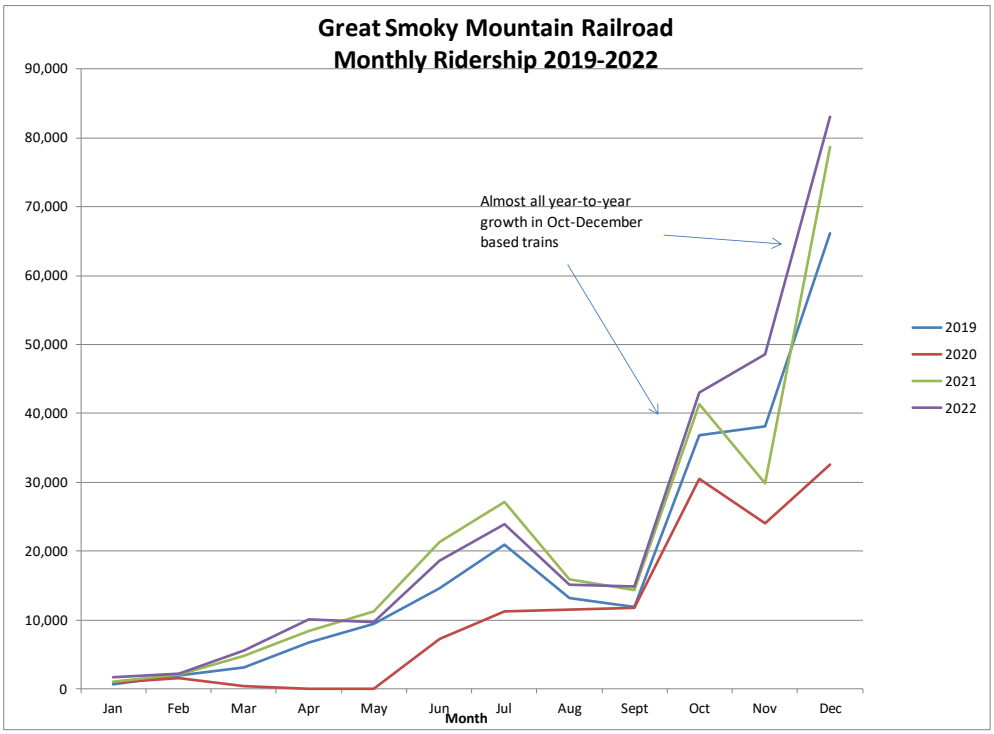
Individual Railroad Results

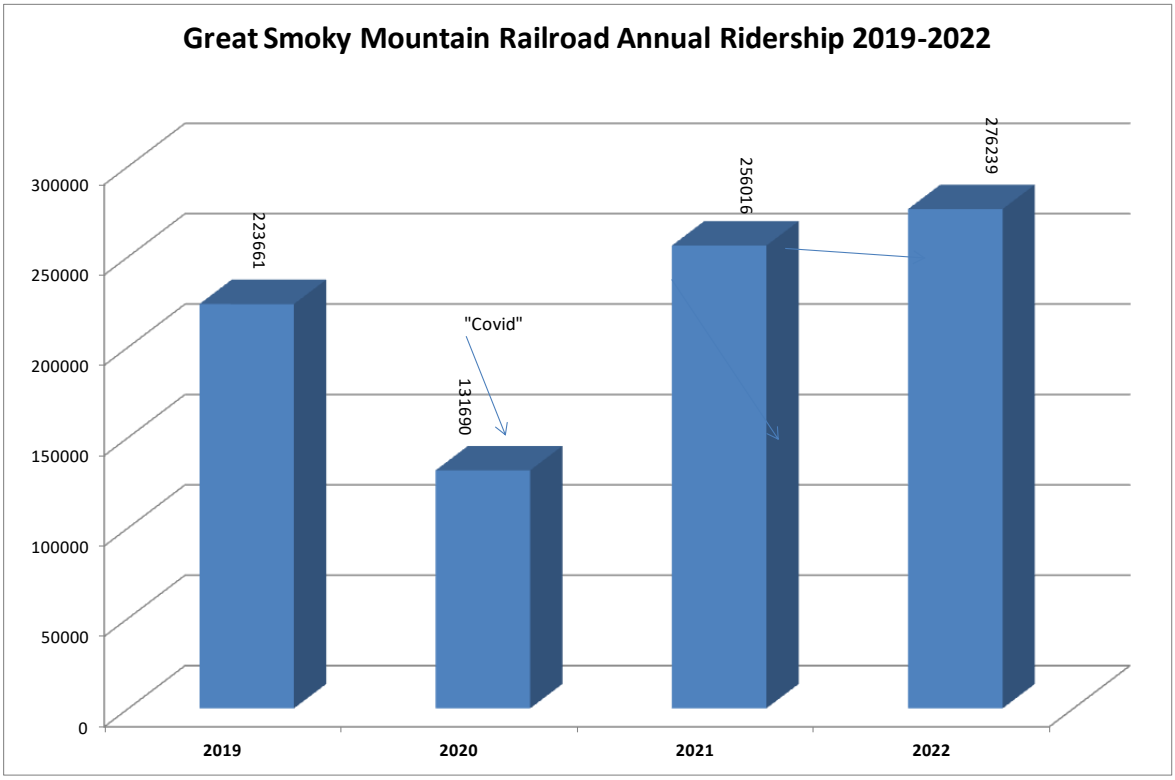
Seven of the nearest regional excursions are shown to examine this growing trend. Three of the Seven – Western Maryland Scenic, Potomac Eagle, and Great Smoky Mountain – have significant Christmas themed events along with a passenger car fleet that is high capacity and can handle surge crowds. A recent startup, the Buckingham Branch (aka Virginia Scenic Railroad) only has limited one-car capacity in 2022, but still shows a similar strong Christmas capacity demand during the first full year of operation. Two of the others – the Cass Scenic / West Virginia Central (essentially under same management) have limited or no Christmas season operations. The seventh, Strasburg Railroad (Strasburg, PA) has non-licensed Christmas trains but a hugely successful "Thomas" event season that results in random ridership peaks any month it is operated.

In any case, the success (or lack of) developing an effective events program determines ridership in the current market era.

1. Great Smoky Mountain Railroad, Bryson, NC

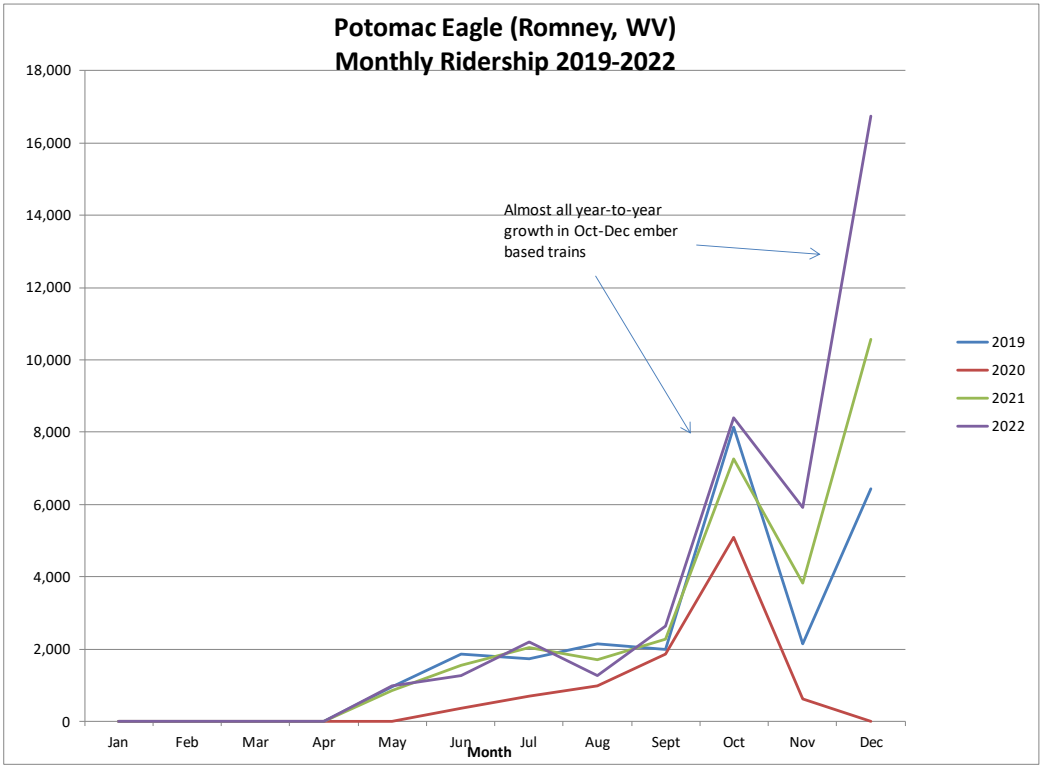
Extremely strong Polar Express market, record ridership and growth

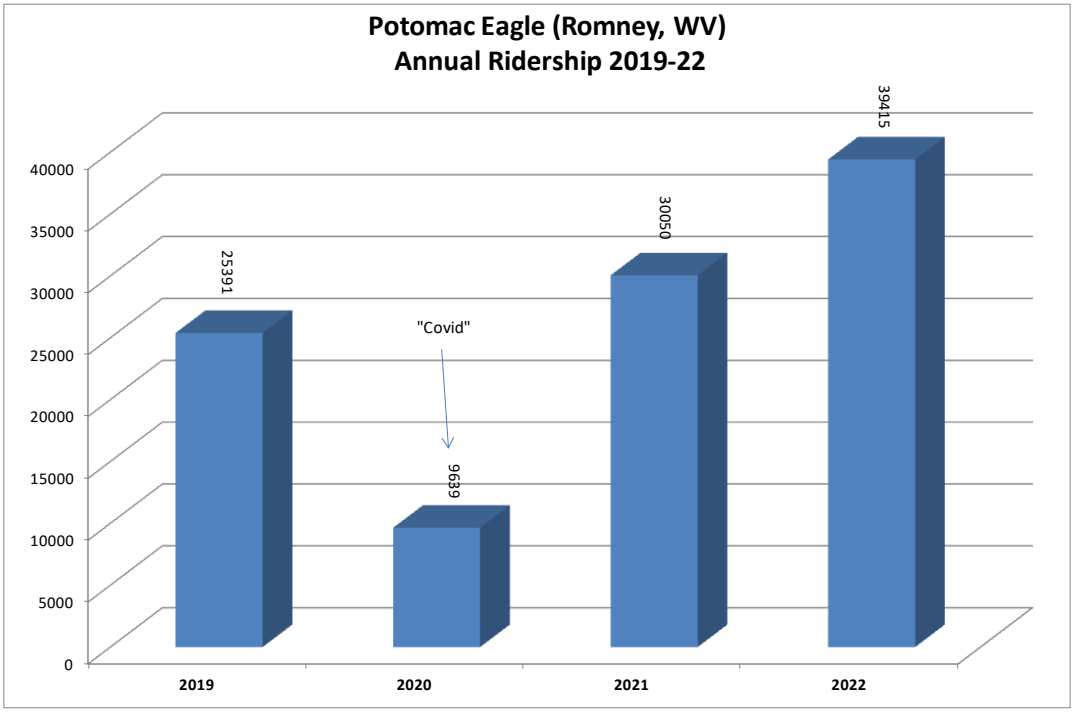




2. Potomac Eagle, Romney, WV

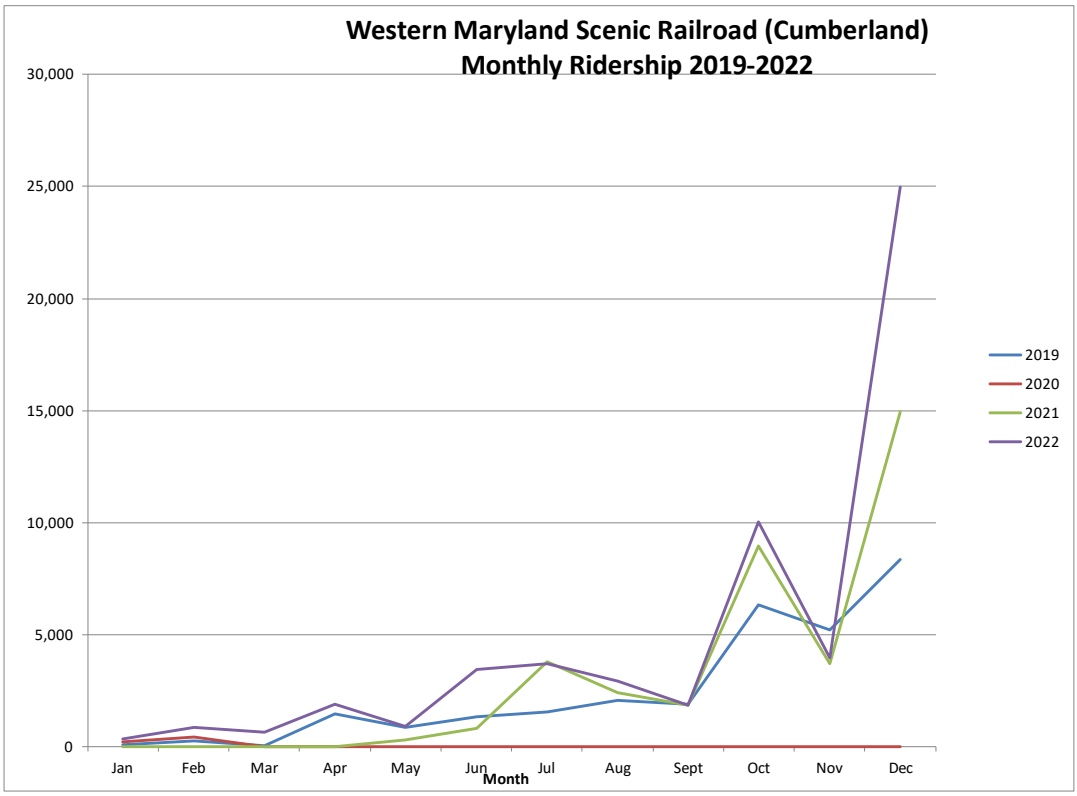
New operator and marketing plan with heavy 4th quarter foliage and Christmas

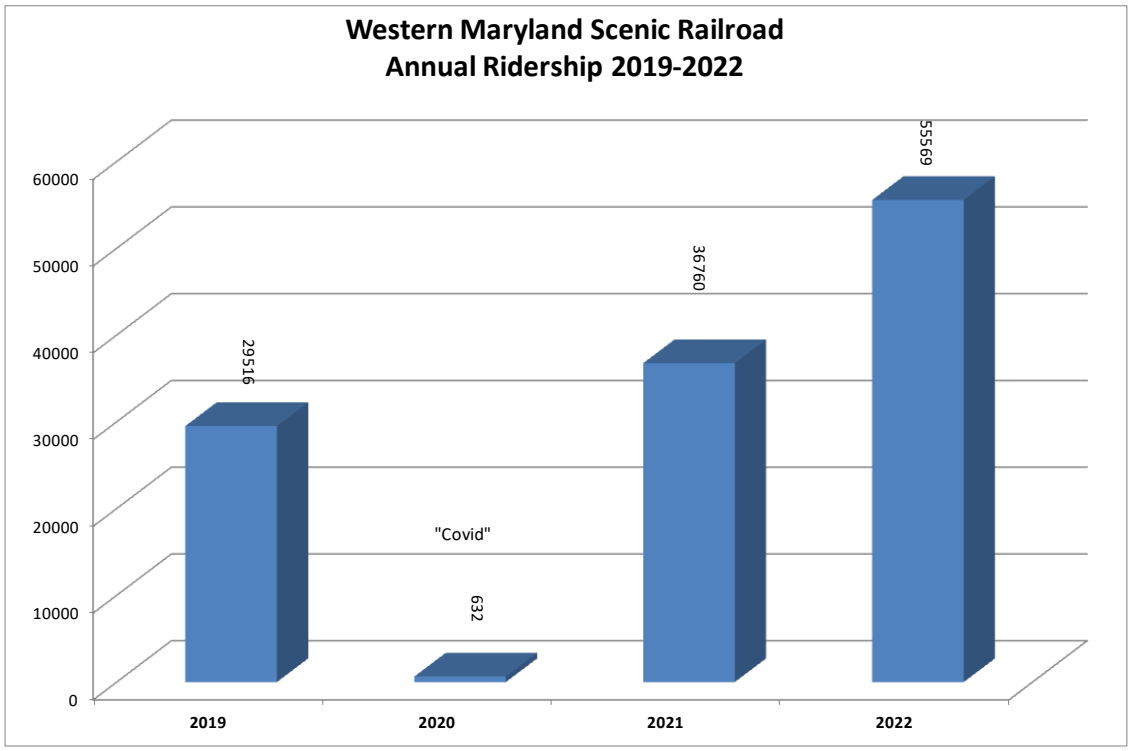




3. Western Maryland Scenic Railroad, Cumberland, MD

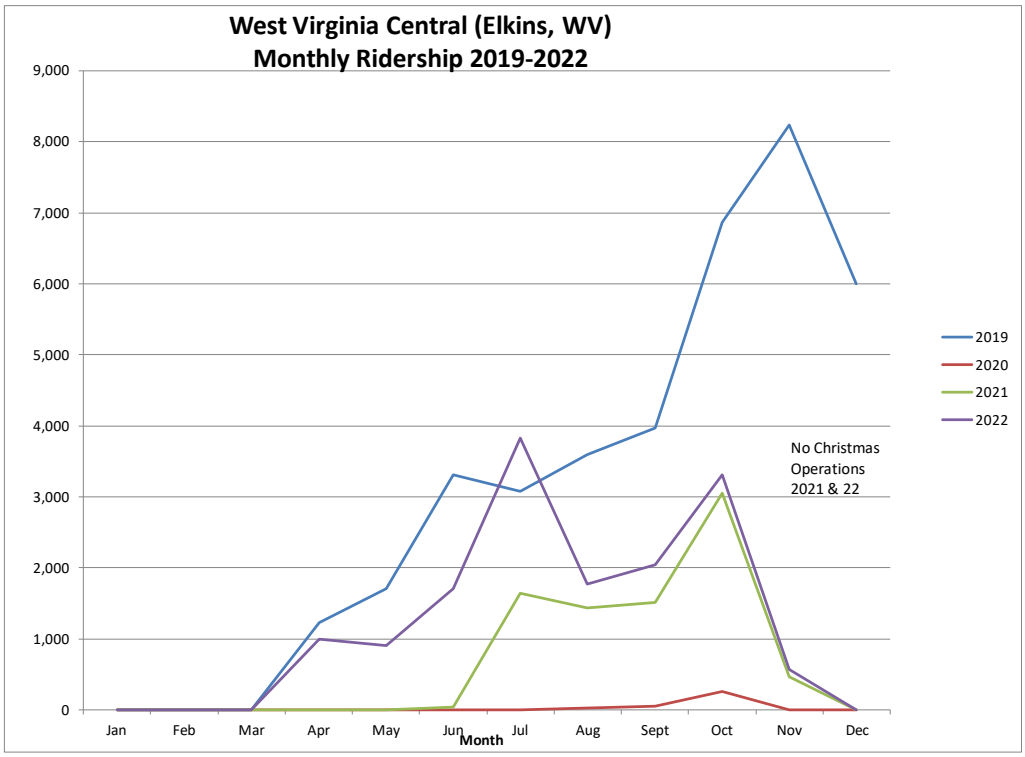
New General Manager, resumption of steam program, strong Christmas ridership

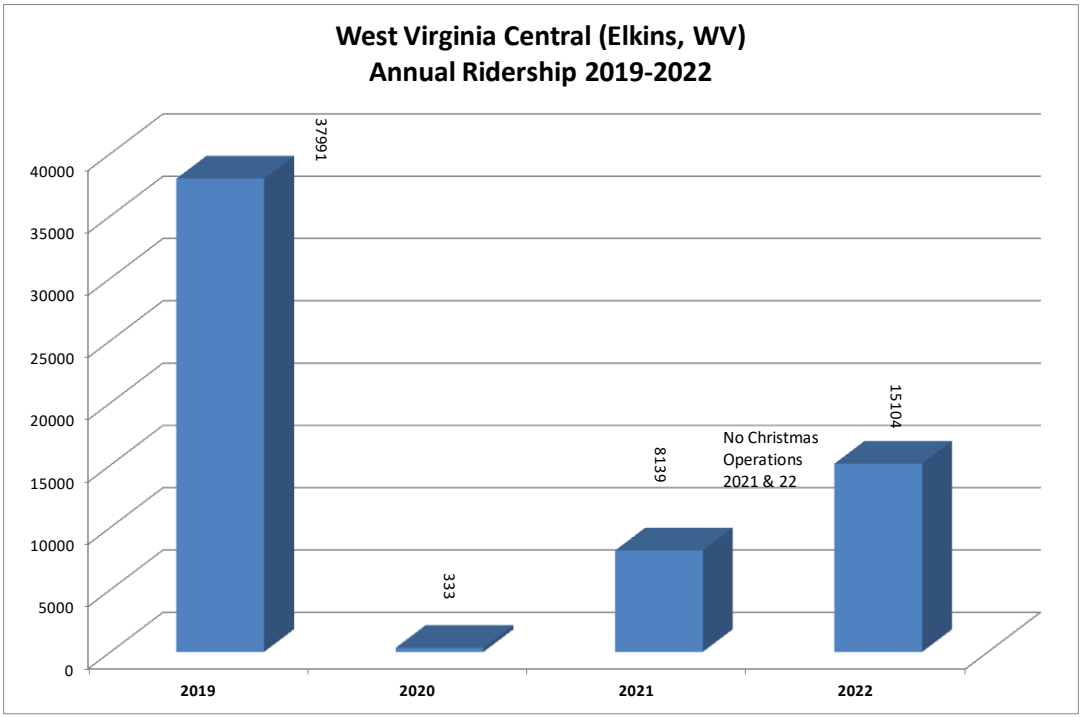




4. West Virginia Central, Elkins, WV

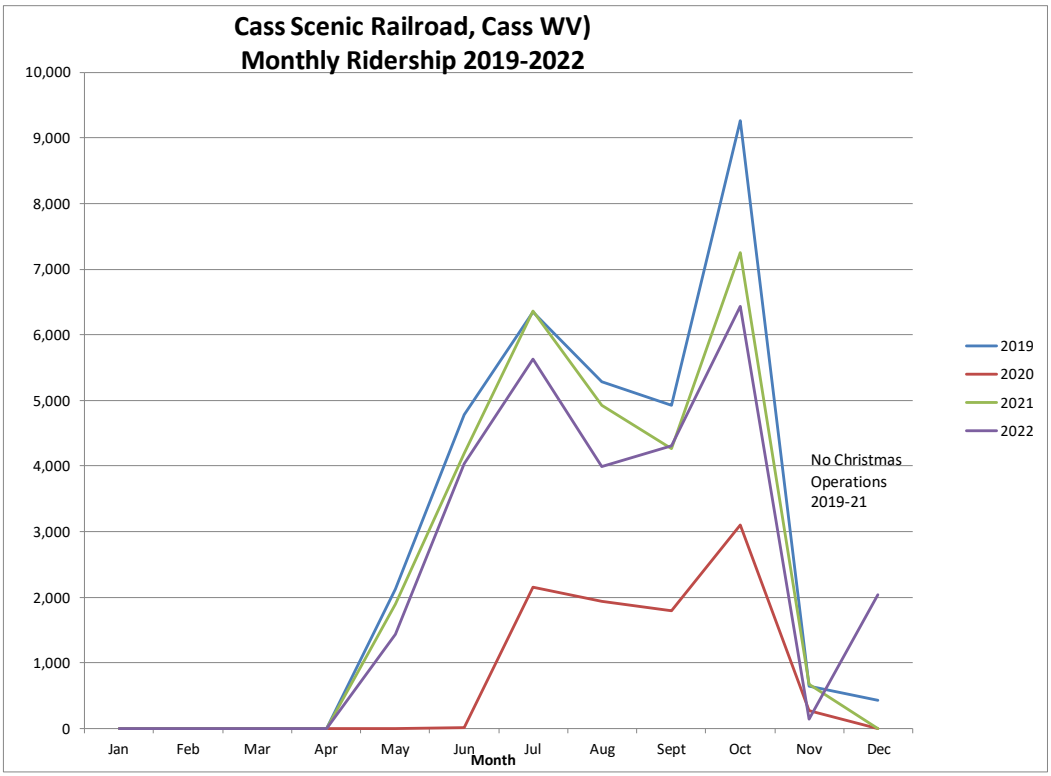
Shutdown of Christmas operations resulted in significant ridership loss

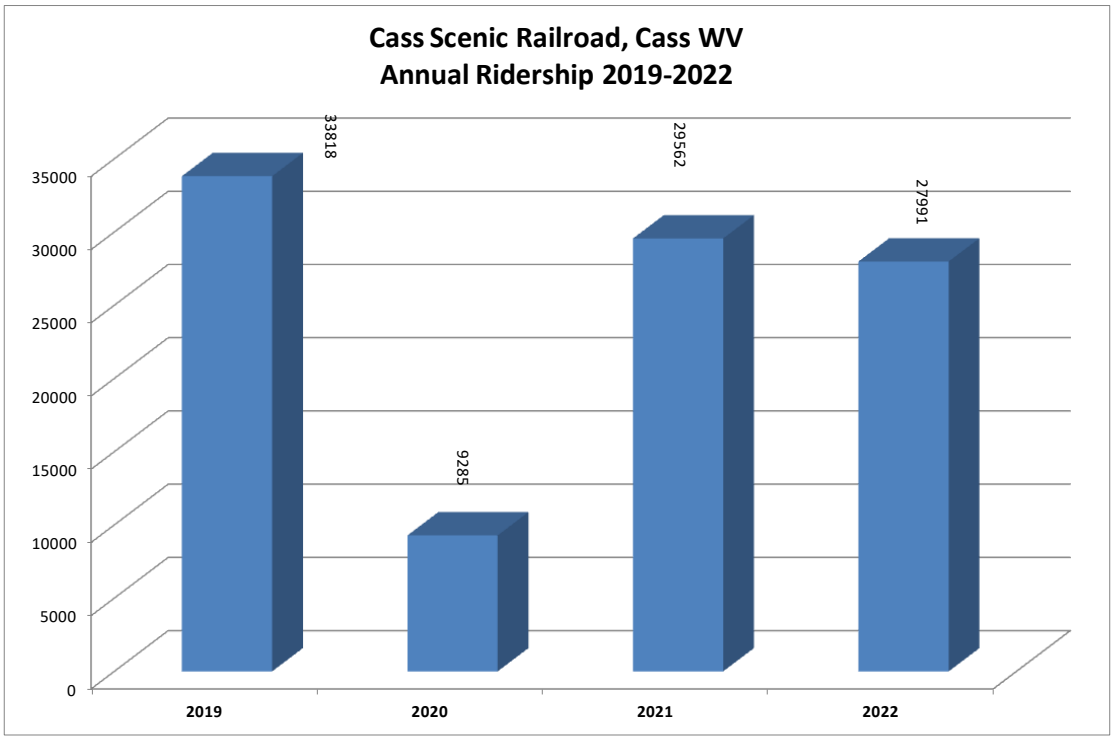




5. Cass Scenic Railroad, Cass, WV

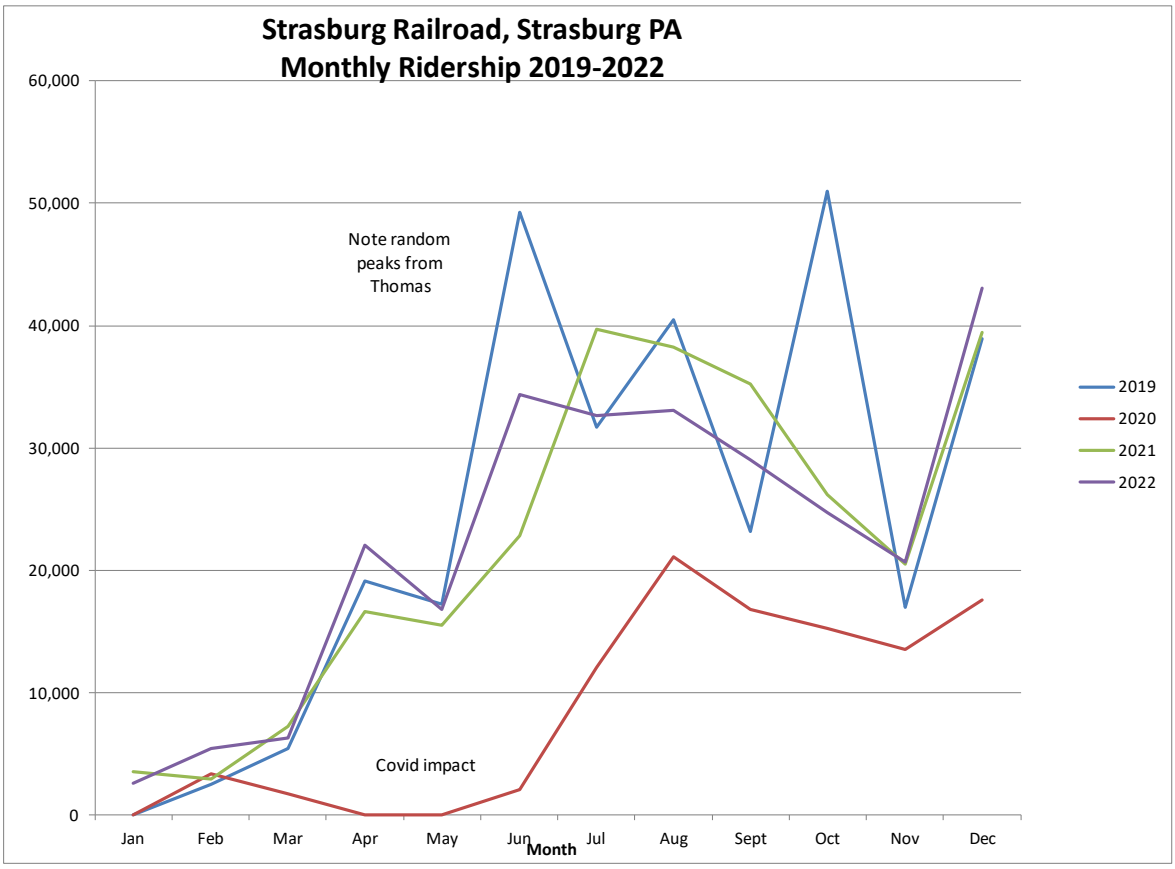
Near-recovery from Covid assisted by a tentative Christmas program

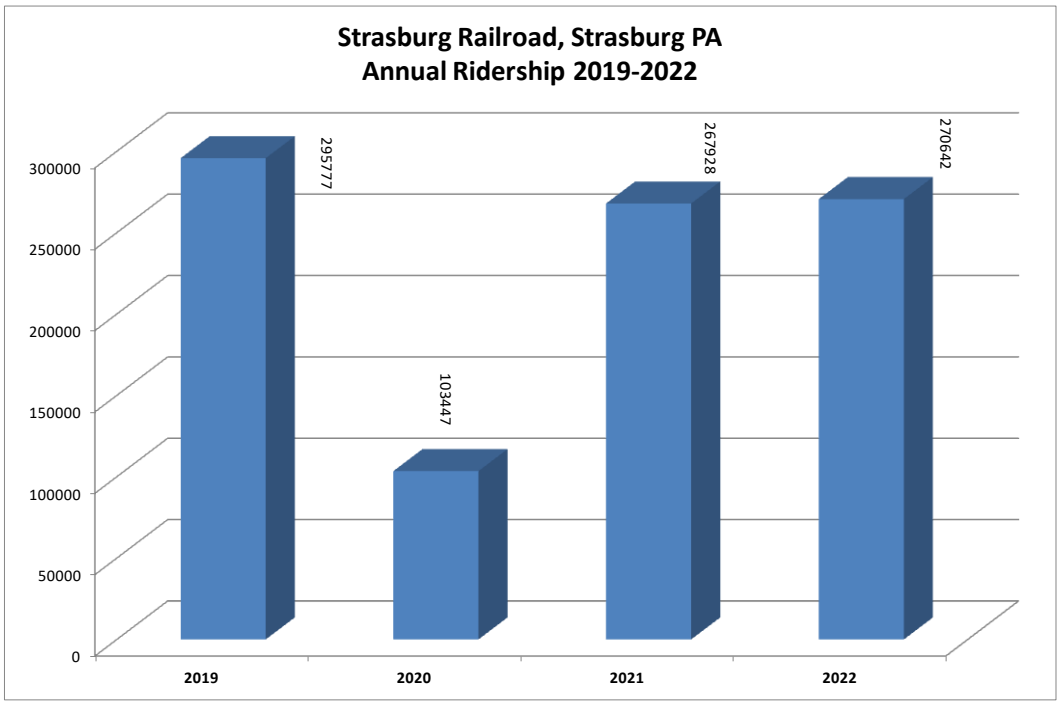




6. Strasburg Railroad, Strasburg, PA

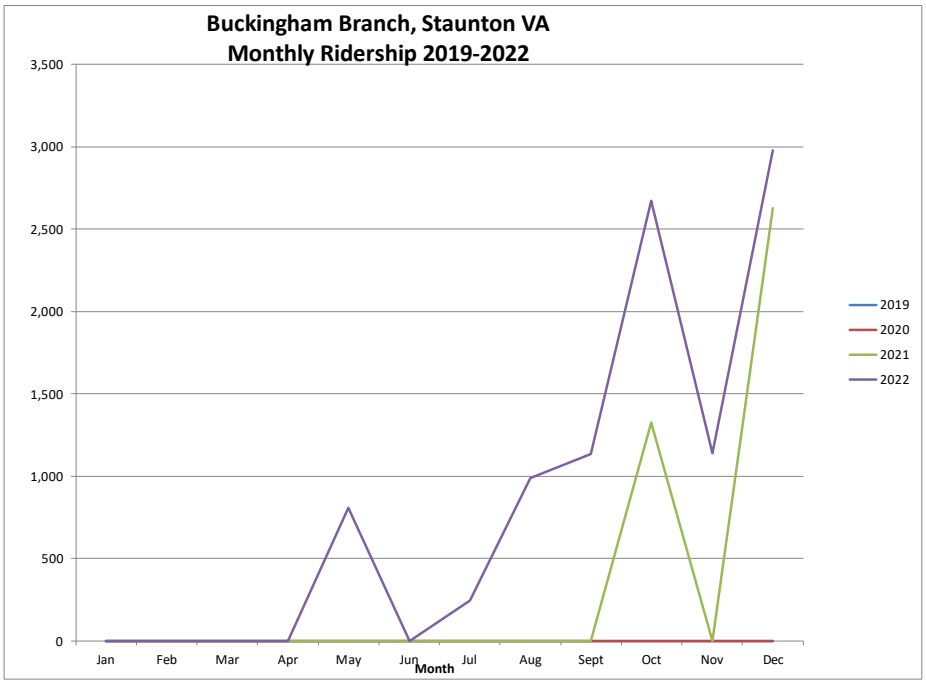
Long-time national ridership leader demonstrates power of Thomas the Tank Engine



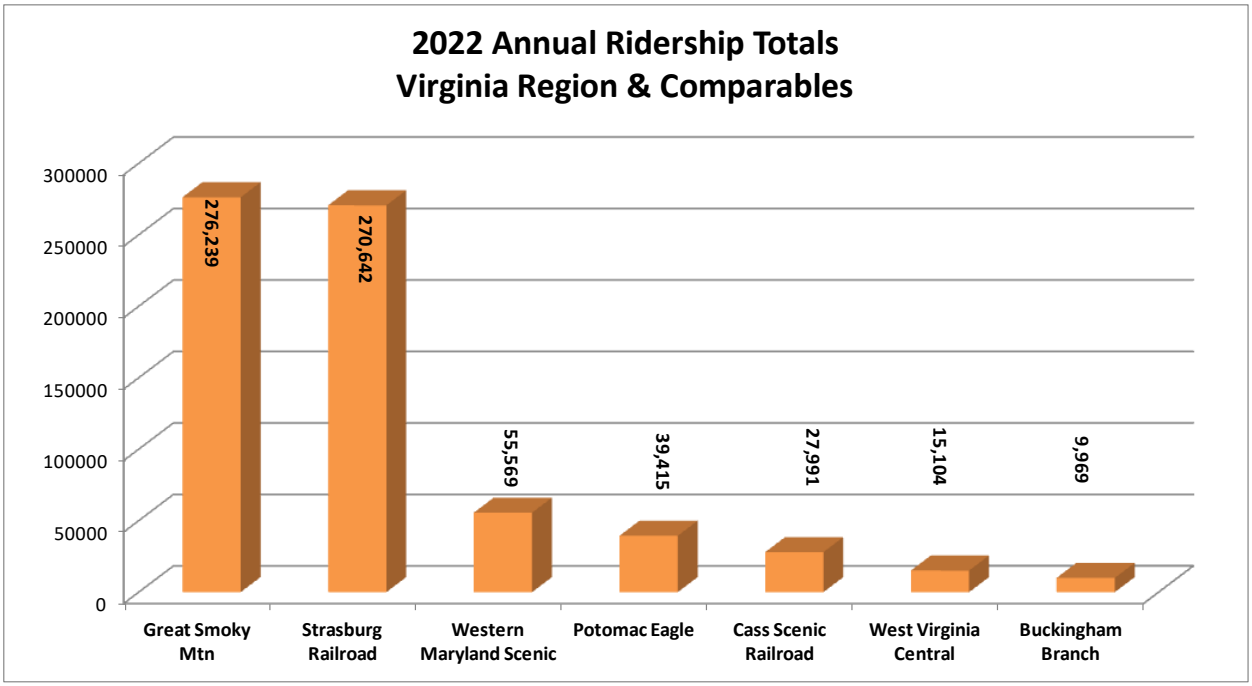


7. Buckingham Branch Railroad, Staunton, VA

Startup with very limited capacity but shows the predicted demand curve

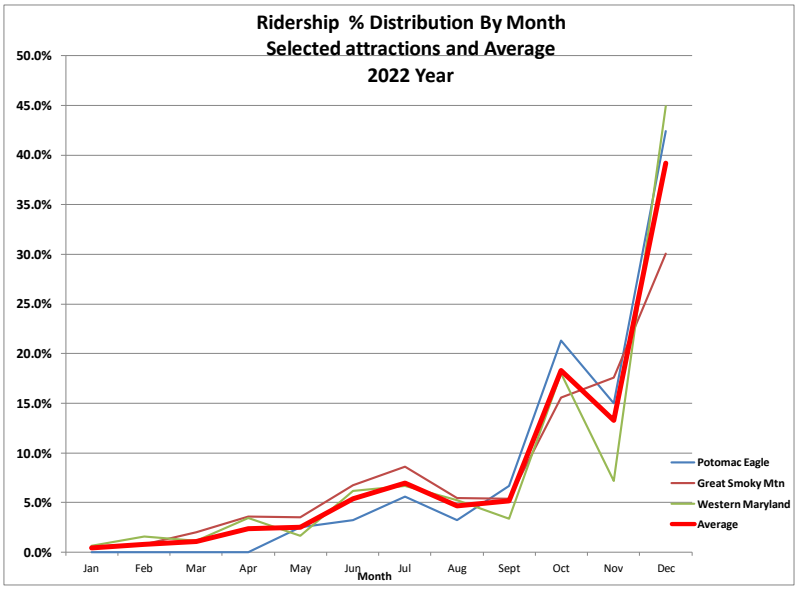


Virginia Region 2022 Ridership Totals



Results and Conclusions

Based on the regional railroads that do have a strong 4th Quarter draw, those lines were plotted as to 'percent of riders per month' rather than total riders, and the results for all were amazingly similar. This pattern was averaged to develop a ridership demand curve for the Shenandoah operation.



This projection, when applied to a target annual ridership, can be literally broken down to month/week/operating days to determine how demand affects the number of needed equipment assets, days of operation, and trips per day can be projected to assist with an operating budget forecast.

The number of riders is best estimated by seeing actual ridership results of regional operations. While the highest attendance numbers nationally now exceed 200,000 riders per site, a median ridership of operations (volunteer, museums, dual-use railroads) still hovers under 30,000. Those results closely form the upper and lower guardrails of any projection. Despite any assumptions to the contrary, a 100,000 annual ridership is actually remarkable, but any truly focused operation can exceed 30,000. Percentage of demographics is relatively useless now based on the target tourism market despite the claim by Strasburg that they predictably attract 3.5% of the annual Lancaster County PA visitation statistics and usually fall in line with that – until the events market took over. Now the proximity to a metro area within a 2-3 hour drive range and the events market effectiveness forms the forecast.

Another assumption that has proven false is the 'lineal' growth of projected ridership. On the contrary, the 'new and different' impact of a startup operation attracts new riders (given decent publicity) in the first two years of operation. The ridership results in year 2 (after the operation is stabilized and is known) are usually the highest number, with it actually dropping to what is a 'plateau level' at year 3 and beyond. Therefore, the projected ridership and operating budget needs to be developed on this proven phenomenon, not the full-sellout condition that often

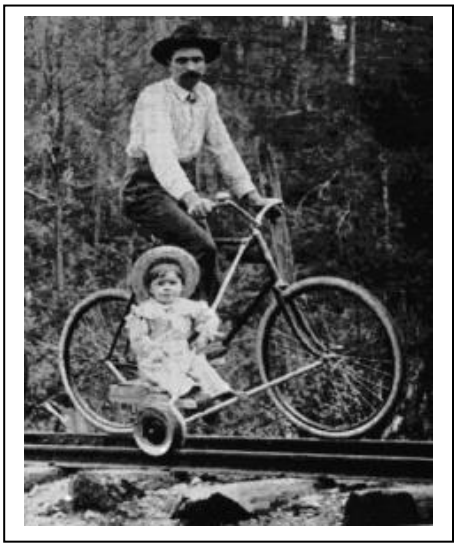
happens in late year 1 and year 2. The 'plateau level' is then used for budget and impact purposes.

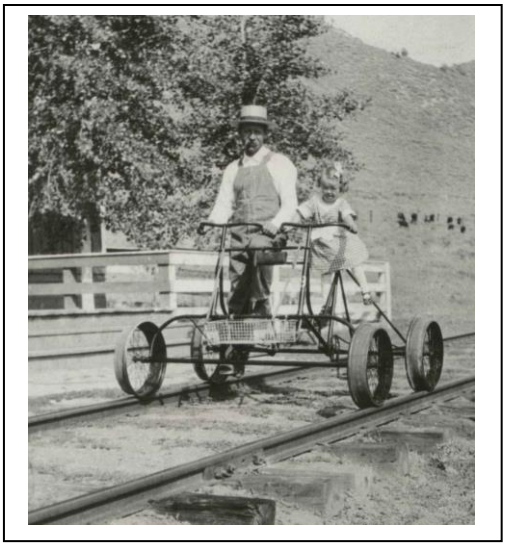
Given the same numbers and demographics presented in the trail study, the rail market agrees that this is a significant and proven potential. Traffic data, comparable attractions, and overall population combine to provide a suitable market for a sustainable operation at what should be a 75,000 annual level – assuming that an operator properly develops a competitive and attractive 4th quarter event market. It may be exceeded, and without that marketing skill, it may fall well below that, but for budget and impact purposes this projection falls in an achievable average. The potential upside from that becomes limited by peak event capacity (seats, trips, and operating days). That number is then distributed and used to project the operating schedule, capacity, and financial plan of the excursion program as it stabilizes at that plateau ridership level. It should also be noted that the previous ridership estimates conducted in 2000-2002 period concluded a 63,000 startup market, with a 86,000 second year peak – well before the explosion of the 4th quarter market nationally. And this 75,000 is an additive, not a diversion, to the potential trail market due to the differences in target demographic markets, peak demand schedule, and all-weather operations for rail.

If the railroad would be successful in securing a franchise agreement with Rail Events, and to a lesser extent Mattel (Thomas), and had the equipment and facilities to handle surge crowds, the five-year buildout could be far more riders during the 4th quarter. However, at this point that would be speculative and not wise to develop an operating and capital budget on that basis.

Railbike Potential

Railbikes are one of the oldest ideas in railroading that have made a completely different recurrence today. Dating back to the 1800's, various human-powered pedal vehicles were rather common to allow workers, and even civilians, to use railroad tracks for transport when dirt roads were nearly impassable. These pedal-powered (and sometimes arm-powered) vehicles were christened 'velocipedes' and were actually fairly common. That history forms the basis for grandfathering the concept in today's world as a 'maintenance vehicle'.





However, despite the history, the practicality of a human-powered rail vehicle brought into the current era was not without fits and starts. Stone Consulting's 1996 feasibility study of the CSX Bergoo Line (which would become the West Virginia Central) included an analysis of "railbike opportunities". At that time, while the concept had theoretical merit, the hardware was generally limited to imitations of historic four-wheel velocipedes and lightweight outrigger/guide wheel modifications of conventional bicycles. Stone Consulting considered the general concept viable, but the availability of hardware, and the safety factors of the equipment, left the idea as infeasible at that time. The upright models with direct chain drive were no longer manufactured, and the 'outrigger' styles were inherently unstable, and left the rider in a position unable to reach the ground with their feet to dismount or maintain balance. A rider had to deliberately lean to the side on an outrigger. Injury was inevitable.

Stone Consulting even purchased a new railbike for track inspection purposes in 2002, and used it on a limited basis for field work. It was too heavy to transport by one person, had difficulty with grades and vegetation, and did not have an adequate braking system on grades.

New Hardware Emerges

Approximately 11 years ago, overseas interest in using pedal-powered vehicles on abandoned or retained rail lines for recreation resulted in some new thinking on how to accomplish the task. European and Asian manufacturers experimented with various designs.

Within the United States, the first commercial use of these new-age railbikes for a marketed and well-promoted tourism operation was started by a new company "Rail Explorers". Their first sites within the United States began where they operated as a contractor on existing lines – typically directly to a currently-operating excursion railroad.

What made this effort different was the hardware, and the business approach. First, the new railbikes were like nothing previously seen in the United States. The imported Korean-built vehicles were four wheels and in a low recumbent design rather than upright, keeping the center of gravity low. Mudguards covered the wheeltreads, and a safety steel mesh across the bottom of the vehicle kept vegetation clear of the rider and also prevented accidents from dangling feet catching under the vehicle while in motion. Braking systems were hydraulic rather than friction. As they were all-steel, they were too heavy to easily derail, steal, or damage.

This equipment design approach is obviously far safer than any previous pedal-powered attempt, keeping the rider low and near the ground, so that even if their equipment were to derail, the likelihood of overturning is minimal. The additional safety features of the wheel and chain covers, and the steel mesh floor, are apparently unique to this design. The approximate weight of the vehicles is in the 300-lb range, so they are heavy enough to stay on the rails rather than be dislodged by rider movements, and weight discourages theft.

With 2-seat and 4-seat versions, the new 'railbikes' were introduced to the Adirondacks in 2015, operating over the Adirondack Scenic Railroad out of Saranac Lake, NY. The concept was an immediate success. A second operation was started with a limited summer season in Rhode Island. In 2016, Rail Explorers did a limited season on the Wilmington & Western in Delaware. Rail Explorers bid on, and was awarded, an operating contract over the county-owned Delaware & Ulster track in Ulster County NY (Phoenicia – Cold Brook) in 2016, but the County was unable to repair the washed-out trackage in time for the 2017 operating season. In 2017, Rail Explorers did a full season out of Rhode Island on the Newport and Narragansett Bay Railroad. Rail Explorers also operated out of Boulder, NV during the winter of 2017-2018, trucking the equipment to a warmer winter host site. This site is no longer in operation due to contract renewal impass.

By 2017, two other locations were hosting similar-design equipment; a group of ex-Rail Explorer employees began operating over the northern portion of the Saratoga & North Creek Railroad as "Revolution Rail Co.". This operation was well-received at North Creek. The equipment there consists of at least 10 lighter-weight dual and quad vehicles with urethane wheels on a lightweight aluminum bar frame, minimal guards, and no floor mesh.

This same equipment appeared to be used at two locations in Oregon as "Railriders", one in Joseph Branch and one in Bay City, as affiliated organizations. These sites were in operation in 2016 and 2017. While some TripAdvisor comments have been negative on specific site and equipment criticisms, overall reaction was 85% favorable. Other than seat comfort and durability, no negative comments were noted on this equipment. Internet reports from the Heritage Rail Alliance indicated that these bikes were designed and built themselves, and that each location had roughly 10 bikes.

Since 2017, the number of 'railbike' sites has virtually exploded nationwide. One of the biggest developments in the concept was the acceptance of the railbikes as 'maintenance vehicles' by the FRA, which exempted the track they ran on from conventional track standards for passenger trains, as well as exempting the vehicles from conventional equipment standards. To the FRA, they are most similar to a track speeder, or a hi-rail truck, or a rail mounted track maintenance vehicle. That in-house ruling by the FRA launched the viability of the program nationwide. By 2023, while there is some rumbling of some kind of new FRA regulation, it has not yet been formally announced. It should also be noted that passengers are NOT reported on FRA Form 55, as they are technically not 'rail passengers'.

The ability of these operations to utilize a track that has been preserved in place, yet not operated in conventional rail service, can present a unique recreation opportunity. As the reported attendance numbers have continued to grow, the potential for these operations to impact a community much in the same way as a conventional excursion railroad has been repeatedly confirmed.

The Shenandoah Potential

Any assumption of ridership and additional economic impacts also has some assumptions about 'where' it would take place, and if any significant spending is necessary to develop a location. Sample locations exist for comparison, and our assumptions on economic impact are based on criteria developed by railbike operators combined with our own observations of successful railbike locations.

Finding ideal sites within the state is relatively limited by ownership, geography, and economic factors. Railbiking has some serious location factors must be evaluated:

- ⊗ Grades: Ideally near-flat, but railbikes have been developed with electric assist motors, and have also been one-way operations with a 'tow tractor' to haul empties back to origin (Frostburg-Cumberland on Western Maryland Scenic).

- ⊗ Grade Crossings: As they are too light, railbikes cannot reliably activate grade crossing circuits. Paid staff must hand-flag or hand-trigger any grade crossing devices, and shepherd a tight railbike convoy across each public grade crossing. The low profile makes them difficult to spot at many locations. The fewer grade crossings, and less traffic, the better.

- ⊗ Vegetation: Even on an abandoned line, vegetation must be strictly controlled through either actual mowing or a weed spray program even more demanding than heavy rail operations. Weeds drag on the bikes, and create hazards to leg injury.

- ⊗ Operational Conflicts: Railbikes must be dispatched wherever any potential conflict with other rail equipment is present just as if it were a maintenance vehicle on the track. The heavy rail dispatcher controls access, not the bike operator.

Currently, Virginia has no operating railbikes in the entire state, and the closest operations are in Cumberland, MD (Western Maryland, with "Tracks and Yaks"), and in Berlin, MD – with the same operator. The Frostburg-Cumberland is a 'downhill all the way' 18-mile coast with shuttle bus return (towing the bikes back uphill the 2%+ grades). Berlin is a 2023 startup on relatively flat farmland over a 6 or 13 mile trip.

It is very notable, that at least for Tracks and Yaks, the experience pricing is well in excess of a typical excursion coach ticket – priced per bike:

	Tracks & Yaks Ticket Pricing	
	Cumberland, MD	Berlin, MD
2 seat short trip	$99.00	$99.00
4 seat short trip	$169.00	$159.00
2 seat long trip	$119.00	$119.00
4 seat long trip	$199.00	$199.00
	Rail Explorers Ticket Pricing	
	Cooperstown, NY	Lexington, KY
2 seat long trip	$95.00	$90.00
4 seat long trip	$175.00	$160.00
	Revolution Rail Ticket Pricing	
	North Creek, NY	Kennebunkport, ME
2 seat short trip	$90.00	$60.00
4 seat short trip	$160.00	$100.00

So while the capacity and ridership may be less than a train, the ability of a higher-priced experience to support a paid staff (with a payroll, advertising, and operating budget) remains – which translates into more economic impact.

Unlike heavy rail equipment, the railbike is a relatively portable, and rapidly deployable, excursion alternative that can be deployed in various locations at various times, and is not restricted by existence of shops, servicing, fueling, storage, or storage facilities. Operating costs of the equipment are comparatively zero, other than the tow vehicles where necessary. Ticketing, restrooms, and minimal facilities can even be provided by conventional construction-trailer type vehicles, minimizing capital costs.

The potential for railbiking on the Shenandoah project is widespread, as there are specific features that lend themselves to this activity on the rail corridor:

The entire line is relatively flat, without serious grades.

The scenery – particularly over the bridged portions of the line, meets rider expectations.

Grade crossing issues do exist – but vary over the line based on location. 6-7 mile pieces of railroad with minimal crossing interference do exist.

Any portion of the track that is not yet rehabbed to full FRA Class 1 status can be used, and with proper dispatching control, any line segment can theoretically be used by the railbike convoy.

For now, trackage held by publicly-held corporations such as CSX, NS, Watco, and Genesee & Wyoming is not realistic to consider. Shareholder-held right-of-way has such high insurance requirements, and a general unwillingness to be distracted with recreational use of corporate property. A great deal of energy and time can be spent to arrive at the inevitable 'no' answer. If that track is later secured under public or non-corporate control, the scenario for an individual line segment instantly changes.

Rail Explorers Criteria:

"Our wish list for NEW REX Divisions:

1. Ideally a location which is a round trip will keep overheads and logistics simpler.

2. Longer trip options like the 18 mile 'Into the Wild" we had in Saranac Lake.

3. No houses adjacent to railroad.

4. Within a 2 hour radius of a major tourist hub.

5. Operating season ideally 12 months/ year."

Mary Joy Lu, Rail Explorers

Shenandoah Line Locations?

Redevelopment of the rail line will likely leave the center section (Bowman-Toms Brook) area with lighter rail as the longest portion to rehab to full service. This section would still require extensive clearing and vegetation control, but is highly scenic. Portions of the line that have minimal grade crossing interference and at least one major bridge are present between:

Fishers Hill and Toms Brook (roughly 4 miles)

Woodstock – Edinburg (roughly 4 miles)

The rider experience on these shorter, but scenic, sections is also expecting that an 'out and back' operation is feasible due to lower grades.

The longest section of the railroad that has fewest major grade crossings (but no high scenic bridges) remains the south portion of the railroad between Shenandoah Caverns and Timberville – as long as 8 miles.

Generic Railbike Impacts

The economic impact footprint left by Rail Explorers is not great compared to a standard tourist rail operation, but, then again, Rail Explorers is not what one might call a standard activity.

The biggest variable in economic impact calculation that is <u>not</u> included in our assumptions is restoration of an available railroad grade itself to operational condition. At some locations, it

may be necessary to fill washouts, and in nearly all previously mentioned locations, the removal of brush, trees, and drainage corrections is assumed, and to a high standard that will not obstruct movement. But, unlike a conventional rail attraction, the necessity to have specific federally-mandated track quality standards to support heavy equipment does not apply – as the single biggest capital investment line item is typically for tie replacement. Some spot tie replacement can typically be assumed, and even some bridge repairs (particularly to bridge timbers) may be necessary – but it is not the same effort as reconstruction of a corridor to support 100-ton loads from a typical diesel switcher locomotive or structural repairs to a bridge. On the other hand, the track may be virtually ready-to-go with no changes necessary – as present on most existing locations where bikes now operate.

The primary equipment budget is the purchase of railbikes – there is no budget for a period steam locomotive or coaches. Franchised events featuring character-engines (Thomas and Friends) nor an re-enactment of an animated Christmas tale are not the basis for visitation. Instead, it offers tourists the opportunity to get on an "exercise bike on wheels," pedal for six miles and pay for the experience – at an average per-seat price well in excess of a typical railroad seat price. This pay-for-ticket experience drives the payrolls, unlike a trail project.

Major capital items that may be included include a 'turntable', a semi-permanently installed hydraulic lift between the rails at two locations to spin the bikes around as they cannot be pedaled backwards, and a rafting-style shuttle bus to transport passengers for one-way trips or to accommodate any passenger that tires from the physical activity back to base. A 'tow vehicle' that is typically a Fairmont-style motor car is also budgeted to tow empty bikes, patrol track in advance of trips, and do light corridor maintenance.

Each location has proven to need its own sales location/business office and also have restroom facilities. Rail Explorers has concluded that the easiest and quickest method to achieve this is by leasing office-style trailers and portable restroom facilities direct to the site. Site development costs for parking are considered capital costs specific to this activity.

A railbike operation requires very little external support. By most measurements it is a low-cost operation. It can prove a benefit to an area where it operates that is equal to, and in some cases possibly more – than an operating excursion railroad.

Unlike a great number of smaller excursion railroads in rural markets, it is a for-profit, tax-paying entity that does not rely on volunteers. All employees are paid. It is essentially a labor intensive operation and the employees do not necessarily require high-tech skills; again, the business parallel is most closely related to a whitewater rafting outfitter.

The operation does not require a heavy fuel – coal or oil – supply or cost. The potential for a pollution spill is non-existent, allowing use in sensitive environments. There are minimum energy requirements since the customer provides the power to the wheels. In addition, there are minimum maintenance costs. Each bike has only a handful of "working parts" – a sliding seat, a bicycle chain-pedal drive and ball-bearing wheels. Depending on the grades and distance, a shuttle bus system may be used.

And, lastly, there are very few minimum Federal/State rail standards to be met. Virtually any stretch of relatively flat rail will meet its needs. While the enterprise still needs significant liability insurance, the regulatory influence is still primarily in the hands of the operator to assure a customer-safe environment. In Virginia, the most expensive annual expense is likely to

be annual brush clearing and vegetation control as it must not be damaging to either the viewscape or leaving residual herbicides behind. Rail safety procedures still involve customer safety briefings, and staff accompany the group as guides, as well as providing safety flag protection at any public grade crossings. Federal training and train crew certification for operations do not apply and it does not require a trained/certified engineer, conductor or dispatcher.

Virginia Input Data

There are four basic input groups to determine economic impact for any rail-related project, including railbikes.

- Capital budget for track, equipment, and structures.
- Railroad operating budget to determine payrolls, purchasing, and local spending.
- Ridership data, including overnight stay impacts from specific event programs.
- Visitor spending statistics.

The capital budget portion is the permanent or semi-permanent features of the operation that would be financed by the operator, as a likely startup investment.

RAILBIKE OPERATIONS CAPITAL EXPENSES
Base on 20,000 riders - minimal base
Seasonal operations - Virginia

Vegetation control		Expensed - not capitalized	
Restroom/Office facility		8 months	
(office trailers)	$2,700 month		
Optionally - fixed location			*$65,000*
(permanent facility)			
Equipment:			
Railbikes	25 units		
	$18,000 each	$450,000	
Shuttle Bus		$20,000	
Speeder/tow vehicle		$5,500	
			$475,500
Expenses from assets:			
Depreciation		10 year SL	$47,550

The operational pro-forma covers the likely operational budget for determining economic impact –as well as a projected attendance.

The Freight and Resulting Business Impact

The most difficult impact to examine and actually quantify remains the result of re-introducing rail freight services to the valley. It has been decades since end-to-end freight services have been established; because of that any industry that was truly dependent on rail either didn't locate there, closed, or established their logistics with trucking. This region is different from most as it has the perfect 'range' from eastern markets and ports, and it is the equivalent to a railroad main line for a significant existing truck hauls nationwide. It has excellent existing and potential transload and warehousing opportunities.

The history of the railroad linked to Class 1's such as CSX and Norfolk Southern left it as a parallel, and unloved, system appendage dating back to its original construction. Much of the industrial development of the valley was, by choice, done right beside the tracks. Industrial park property always preferred rail access if for no other reason than it increased the potential land value.

While it was standard practice to assume direct rail delivery to a railside industrial property was the only market even 15 years ago, the current freight market is much more creative, flexible, and yet extraordinarily difficult to forecast, particularly for this property. It will be greatly dependent not just on the ability to reopen track to the rather small number of remaining direct on-track customers, but to develop logistical-based transportation services encompassing rail, truck, and warehousing capability to the region. The good news is that those skills are literally 'where the action is' in shortline railroading, and the extreme growth of the shortline transload business nationwide is testimony to the difference that local marketing and frequent service can develop – the exact opposite direction of the parent Class 1 railroads marketing and service focus.

Shenandoah County is also blessed with developable land, industrial parks beside the railroad and some inexplicably vacant existing industrial properties that were dependent on rail in the past. Similarly, the ability of a local business (including agriculture) to remain competitive based on transportation costs has increased simply related to increased trucking costs, fewer drivers, and some previously unheard-of abrupt bankruptcies in large national and regional trucking firms such as Yellow[8], lessening competitive pricing competition in that transportation sector.

A recurring theme in our investigation was also the deliberate goal and strategy of Norfolk Southern to not pursue new opportunity on the line even when local shippers attempted rail use and requested rate pricing. Service was abruptly cut to multiple customers; pricing requests were not responded to, and the separation of the line above Woodstock due to 'bridge issues' remains suspect after inspection. In fairness, the thin ranks of NS marketing staff have been cut thinner in the relentless push for shareholder profitability, and projected carload volumes that

[8] https://www.reuters.com/business/autos-transportation/us-trucking-firm-yellow-files-bankruptcy-after-loading-up-debt-2023-08-07/

are attractive to a shortline operator simply are now ignored by any large Class 1 carrier, not just NS.

For this study, other than the impact of a basic freight operating budget, no economic impacts are loaded or forecast for the potential impact of lower transportation and commodity prices in the valley, the direct employment and stability of the impacted businesses, and the indirect impacts of that business stability. It's an intuitively known positive result, but so dependent on indeterminate variables as to deserve separate mention but not prediction.

Redevelopment of rail service also makes existing industrial property more valuable, as it makes all freight costs subject to rail competition. As rail tends to dominate the 500-mile-plus market either for intermodal or direct shipment, it extends the reach of local companies to compete in entirely new areas. This also applies to inbound commodities that are currently too expensive to source beyond truck range.h

Our study indicated strong local need for both inbound and agricultural commodities, and a surprisingly strong market in regional propane linked to the poultry industry that is typically rail transloaded – somewhere. What other opportunities may emerge? Interviews with the potential rail operator will divulge what they see based on their own experience, and will provide better insight.

Freight Traffic Analysis

The current absence of freight traffic on the Norfolk Southern "B-Line" actually originates back to the original construction history of the railroad. Although the line itself occupies a strategic valley that 'should be' a preferred low-grade geographic main rail link between Pennsylvania, Maryland and points south, the railroads that connected it dating back to the Civil War were built in piecemeal and disconnected corporate fashion rather than a strategic city-to-city link – separating the tracks into distinct ownership sections that persist to the current day and have obstructed natural efficiency.

Over the years both the Baltimore and Ohio and Southern Railway exercised control of the railroad as a transportation corridor that never really lived up to its potential. B&O sponsored it, had it as part of their system, then leased it to the Southern, and eventually sold it. But neither B&O nor Southern had strategic linkages further south or west that resulted in regional or national through freight development via the Valley. It became a branch line because of it, despite the easy grades.

As envisioned in the 1800's, and on paper, it's just as direct and low-grade a rail route as can be found between Washington DC and Cincinnati, but is also paralleled just to the east by the original (and competitive) Norfolk & Western Hagerstown-Roanoke main line. Southern Railway controlled the "B-Line" between Manassas and Staunton, but effectively dead-ended at Staunton for any further points west, routing only by connecting to Chesapeake & Ohio, another competitor. That Southern vs. N&W corporate rivalry also led to today's rather awkward and inefficient track crossing at Front Royal, where two former competitors crossed with no intention of ever developing an efficient freight interchange. Baltimore & Ohio (to evolve into CSX) came in from Harpers Ferry, but dead-ended at Strasburg Jct. No through traffic of significant volumes was ever interchanged. Similarly, passenger service was limited to local trains throughout its history rather than an intercity corridor.

Therefore, no single-owner freight system with unified control and destinations ever historically controlled the valley, and the railroad – despite easy grades, heavy bridge construction, and a diverse agricultural economy, was effectively stifled. It never developed into the 20th century as other regional lines did. Even when Southern Railway and Norfolk & Western merged into Norfolk Southern, the encirclement at both ends with competitive CSX connections made it into a redundant route to the new company. The "B-Line" operation base still came from Manassas, despite the Front Royal connection.

That history led to the current situation, but what was once the curse of the railroad may now become it's salvation. The proliferation of shortline railroads since the widespread abandonment of branchlines following the creation of Conrail in 1976 has created a multitude of ownership alternatives and holding companies that have managed to rescue lines that could have been abandoned and scrapped, and have yet emerged to be far better at serving their communities than the larger railroad corporations ever were. Success stories abound, but one of the key advantages today is the ability to not be completely captive to just one major rail line connection and interchange in the future. For this railroad in the modern age, the potential

connections to the north to CSX, and the existing south and east connections to Norfolk Southern, makes this a prime target to shortline companies that know how to negotiate for the best freight rates with two competitive connections rather than a single captive one. If NS does not provide adequate connections and pricing, an alternative may exist in the future.

And that current situation simply cannot be overstated. While some commodity movements will naturally only move in one direction with one carrier, new business opportunities, industrial development, and transloading opportunities are wide-open when the alternative location is a one rail connection with a carrier that can still effectively control your pricing for local service.

This has become increasingly common and has two forms as rail carriers have decreased; one is the insistence of a 'switch carrier' charge on a waybill, where a flat rate per car (or no more than a couple alternatives) is tacked onto the waybill of the Class 1, so that the shipper sees the shortline only as a cost-added service. (The time-honored alternative is an 'interline settlement' when an end-to-end freight rate is calculated, and then the Class 1 carrier and the shortline privately negotiate the rate proration (division) for each commodity/car movement). The fixed-cost switch charge approach, while quicker, easier, and more responsive, exposes the shortline carrier to competition from transloading services sponsored direct from the Class 1. An interline settlement results in one transportation price shown to the customer with the splits undisclosed.

But with two connecting railroads potentially available, they may bid against each other, and changing priorities, management approaches, and pricing strategies often result in one railroad or the other offering significantly better price, service, and responsiveness, and it often changes over time as well. So any track, virtually anywhere, that even potentially has the ability to have two Class-1 connections, is a prime target for new shortline railroad creation. It should be noted that the Virginia Inland Port (VIP) at Front Royal only has a single-railroad service partner rather than two so essentially no price competition exists by rail. It's essentially a 'take it or leave it' approach, no matter how it is presented.

Both Class 1's, at various times, have leaned their pricing strategy toward per-car profitability rather than sufficient volume activity to cover fixed costs on a given line segment. The fewer carloads, the higher the profit margin has to be on the remaining cars, leading to a rather vicious upward pricing circle. Both major railroads can be accused of this at times, but currently the pricing model in use at NS (computing their own 'baseline' trucking costs model rather than an actual on-the-table competitive bid) has been accused of pricing rail entirely out of the market where it should naturally have a 20% discount against trucking costs. This philosophy hits any shortline connector with a baseline rate that when combined with their charge, may now be noncompetitive with truck on a cost-only basis. With only one carrier, this effectively stops traffic movement. With two connecting carriers and different strategy and pricing approaches, it's an entirely different situation. In rail, as in other business situations, competition lowers prices. But in rail, changing management philosophies periodically either push hard to develop shortline customers and traffic, or push equally hard to ignore them.

The second major advantage for the "B-Line" is its proximity to the I-66/I-81 junction at Strasburg. This interstate highway connection works north to Harrisburg, PA and south to

Roanoke; I-66 works east-west to Washington, DC. Strasburg, VA is already emerging as a distribution point. The tentative steps by both Wal-Mart and Amazon to utilize the ex-Johns Mansville plant facility even on a limited basis also testify to the value of distribution space in this corridor even without rail.

It is also obvious by surveying the valley that both the historic and modern-era industrial development has gravitated around the railroad corridor, only to have the railroad cease service. The largest and most significant existing industrial enterprises in the entire valley are located adjacent to the railroad. Due to pricing, lack of service, and lack of attention, all of these enterprises can capture the inherent price advantages in rail access, let alone a competitive pricing advantage. Preserving employment in the valley involves keeping these enterprises as competitive as possible with the best transportation available. Simply put, rail extends both inbound supply lines and outbound markets from the 250-mile radius to the 1000-mile radius.

The hard truth in estimating freight volumes on the line is that it is highly dependent on not just online customers within Shenandoah County (which is still surprisingly diverse) but the strategic position of the railroad against the interstate corridor, and the ability of a shortline freight operator (corporation) to build it into a logistical hub for distribution well beyond the County. Traffic from the west that is heading east has historically hit a distribution 'wall' in the mid-Atlantic, leading to the creation of enormous distribution centers in Harrisburg, PA, York, PA, and now to a lesser extent in Virginia. The object is to get within an 8-10 hour truck range of the major population centers in the east, but without direct rail delivery into the congested rail terminals along the coast. Traffic that comes in by rail is unloaded, possibly warehoused, and distributed by truck to anywhere within range. The traffic is not limited to shipping containers; the surprising growth in 'intermodal/transload' is lumber, bulk commodities in covered hoppers, tank car (foodstuffs), metals, etc. Because rail can provide quantities that typically equal 3 truckloads, bulk-break and storage space is critical – which points to a full-scale logistics operation rather than just a railroad moving cars and walking away. This potential volume is not readily visible but the geographic positioning within a logistics system at competitive pricing is. According to the Bureau of Transportation Statistics, the average distance of rail remains at 10X the distance of trucking; 640 miles rail vs 64 miles truck – also greatly impacting the marketing range and mix of competitive commodities.

Class 1's such as NS and CSX simply are not interested in the retail-level marketing of rail services in the current era. Marketing staff and budgets have been slashed and getting rate quotations for anything less than 100-car moves are often not even responded to. Shortline operators focus on the retail part of the business, and the responsiveness and aggressiveness of the approach explain how traffic can immediately explode as soon as a line is converted. The NS conversion of the Delmarva Peninsula lines in Maryland to shortline control is a highly similar story also serving a major agricultural/industrial area with no through strategic linkages and heavy transload experience from the new operator.[9]

[9] https://www.carloadexpress.com/2020/05/delmarva-central-selected-for-2020-aslrra-business-development-award/

Conventional rail traffic analysis depends on existing volumes and existing manufacturers with sufficient inbound or outbound volume to justify a typical railcar loading that runs on a 286,000 lb. railcar, or a lading of roughly 130 tons; at least assuming 3X the net capacity of a normal 35-ton tractor trailer load (80,000 lb max on a combination). That per-carload payload is a significant amount of anything, but for comparison the 3X rule is a handy guide. A railcar also has a significant advantage for cubic volume as a 53' x 108" x 13' dry box has 3800-4000 cubic feet vs. as 68' 286-capacity current boxcars (Trailer Train TBOX-series have 7500 cubic feet of space. These larger and newer boxcars have surprisingly regained a significant market share in dry goods transport as part of the transload equation. While not direct dock-to-dock, big shippers unloading to transload centers by boxcars have become far more common than ten years ago. Similarly, refrigerator cars with on-board GPS to monitor temperature and location have regained some sensitive food transport corridors with a payload well in excess of any truck. And with liquids, typical standard tank cars are built to lengths based on the specific gravity of the load with heavier liquids getting smaller (shorter) cars, but most products are still handled in approximate 33,000 gallon cars compared to a 11,600 gallon maximum for a tank truck. So for rail to be efficient and cost beneficial, not only size and distance, but volume matters.

Rail continues to dominate transportation on commodities that degrade with excessive handling, anything transported in covered hopper cars, all high volumes, and all manner of hazardous materials transported by tank car. It has become increasingly common to observe merchandise trains almost entirely consisting of covered hoppers and tank cars as the rail system consistently holds priority in those markets.

Standard ISO quality grading guidelines (particularly for plastics) reduce score for every time materials are exposed to mode-shift, air handling, etc. as they contribute to fines, contamination, and accidental mishandling. Foodstuffs can also be subject to contamination resulting from too much handling between carriers.

Finally, new industrial site development always favors rail if for no other reason than it also tends to drive trucking prices down, simply by being in the available transportation mix. While this may not be good news for the railroad or even result in actual carloads, it is always good news for local industrial development that is marketing available sites. Those that have active rail sites invariably are 'first pick' even if the actual need for rail is completely unknown at purchase time. This hidden boost to economic development is untraceable, but any conversation with plant site decision makers will confirm it.

Hazardous Materials Transport

While this line has no recent history of accidents or incidents, the potential for future usage cannot be simply ignored as irrelevant and would naturally be a community concern. Two commodities that are likely to be rail handled are propane – for heating purposes particularly for the agricultural industry, and various liquid and solid fertilizers for the agricultural industry. These will be governed not only by required federal track standards, but also by the underlying federal speed restrictions by track class, and further controlled by car placement rules and far

shorter train length. This line would likely be operated at no more than 25mph (FRA Class 2), and at FRA Class 1 (10mph) during the initial line rehab.

Rail remains the safest transportation alternative despite the publicity surrounding high-profile, but unusual, incidents. "Truck-related hazardous materials incidents caused over 16 times more fatalities from 1975 to 2021 – 380 for truck, compared with 23 for rail", according to the Bureau of Transportation Statistics and the actual hazmat statistics of rail vs. truck show the true numbers behind hazmat incidents in rail vs. truck, despite the fact that far fewer, if larger, rail incidents often command national rather than local headlines.[10]

Hazardous materials incidents and property damage by mode

	Year	Incidents	Total Damage	Average
Highway all incidents	2010	12,658	$ 63,678,051	$ 5,031
Highway all incidents	2021	22,372	$ 32,519,026	$ 1,454
Rail all incidents	2010	747	$ 7,342,259	$ 9,829
Rail all incidents	2021	378	$ 11,319,834	$ 29,947

Highway count vs. rail	2010	***17 times more incidents***
	2021	***59 times more incidents***
Rail vs. highway damage (average)	2010	***2.0 times more damage***
	2021	***20.6 times more damage***

As can be seen, the number of highway hazmat incidents has increased dramatically even if the damage per incident is lower but when it does happen, the accident cost by rail is higher. Rail incident counts have actually significantly dropped. As the number is actually fairly low for all modes, any single incident like East Palestine, OH in 2023 tends to skew statistical damage numbers significantly. The bottom line is that while an accident is far less likely to occur on a nationwide basis for rail than truck, a single rail accident tends to attract far more attention simply due to the mass and volumes involved.

The East Palestine accident also proved something undeniable that physics when applied to railroading is not always your friend; as a 45+ mph, 150 car+ train coming to an emergency stop as a result of a derailment can have very high consequences for severe freight car damage even if the hazmat car is not the actual source of the incident. In comparison, a low-speed, short freight train that is typical on almost any shortline in the US simply does not have the same kinetic

[10]Table and data from https://data.bts.gov/stories/s/Freight-Transportation-Safety/vu39-vtqh/

mass to generate the same structural damage to the train cars. This simple fact is why train length and speed, not just lading and rail mode, has come under direct federal GAO scrutiny as a result[11]. "Economically, the report finds that longer trains result in higher average cost per incident, while the average cost per train car decreases for train accidents as train length increases."[12] Further regulation affecting all carriers is highly likely addressing this issue. That issue alone mitigates concerns here. Tank car design and rail safety have steadily improved, but train speed and increased length are ongoing concerns, particularly on the large Class-1 systems.

Freight Interchange Connections

Interchanging freight with Norfolk Southern presents some rather unique situations, compared to most shortline rail freight projects.

Front Royal/Riverton

The distance between the Shenandoah River Bridge in Front Royal and the NS main line is only 364 feet and roughly intersects the north-south main at a 90-degree angle, yet on a main line curve. Historically, this was two separate railroads (Norfolk and Western vs. Southern Railway) so the need for a 'friendly interchange' for freight was minimal – Southern ran roughly east-west out of Manassas, VA and Norfolk & Western ran north-south. The crossing was an operational inconvenience for both and necessitated a custom-build diamond crossing on that curve. That diamond was later damaged, removed, and stored on the property as a result of a derailment in 2020. The only connections to the NS main line were east of that diamond, meaning using existing connections toward Manassas – not toward Strasburg.

That means that using current track geometry, the removed diamond would have to be replaced. NS is likely to resist this, as all conventional design bolted diamonds require extensive maintenance due to pounding and vibration, and this one in particular has a reputation of being involved in an expensive derailment – justified or not. However, as of the time of this report, the original diamond, in dismantled condition, is still on site.

There are three possible solutions to this situation to allow a direct NS connection to the north-south main line, yet deal with the maintenance and restoration of a conventional (and custom) track diamond:

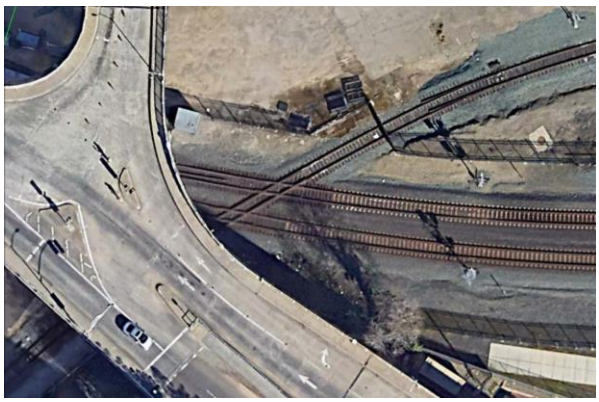
1) Replacement of the existing diamond, with a maintenance agreement that prorates cost on an activity basis;
2) Replace the diamond with a flange-bearing (also known as OWLS (one way low speed)) diamond that would minimize or eliminate maintenance on the main line connection in exchange for the high cost of initial custom design and installation. Examples are below.
3) Remove the southeast leg connection turnout to replace it with a southwest turnout; allowing a 350' radius curve (effectively 16 degree) to connect the NS Shenandoah line to

[11] https://www.gao.gov/assets/gao-19-443.pdf
[12] Alliance for innovation and infrastructure: https://www.aii.org/new-rail-report-offers-policymakers-insight-into-train-length/

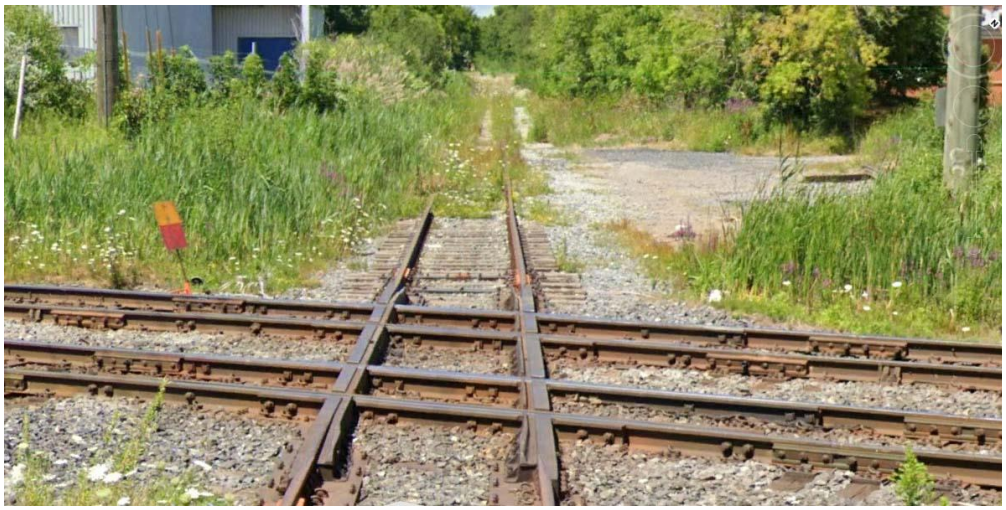
the bridge approach from the southwest. This is a significantly sharper curve than is recommended for current design and would violate NS industrial track design standards of 12 degrees minimum. It could only be done if NS was not putting any activity on this connection (i.e. the shortline carrier would move cars south under NS rules and dispatching to the 3-track yard in Front Royal south of Kendrick Ln. for interchange). The turnout would require far less maintenance than a diamond, but a 16-degree curve would likely restrict some equipment, including large steam locomotives. Curves as sharp as 20 degrees (292 ft. radius) can actually still accommodate most equipment.

One Way Low Speed Diamond examples: (branch line over heavy traffic main line):

1) Sacramento, CA (California State RR Museum lead over UP/Amtrak main line)

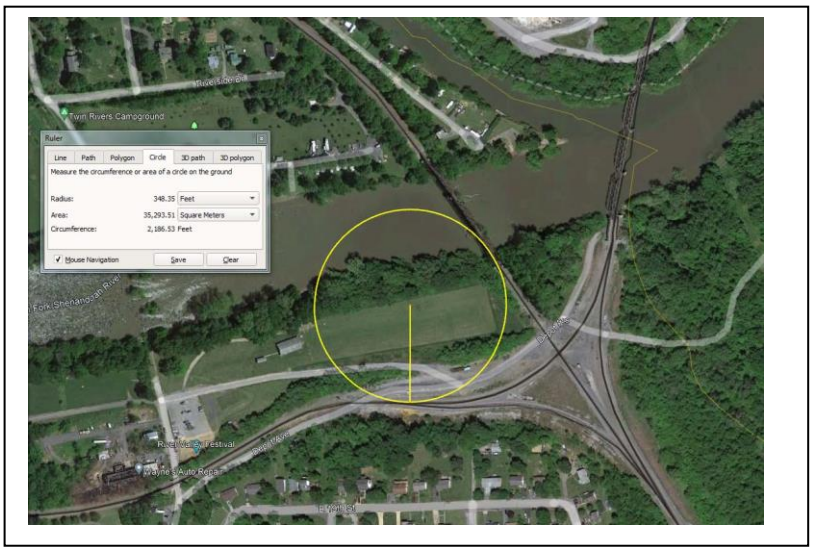


2) Brampton, ON (ex-CP Orangeville Line over CN/VIA main line)



3) Thomaston, IN (Chesapeake & Indiana shortline crossing of NS main line)

Geometry check of an alternate Front Royal/Riverton connection:



The likely 'end of track' at the NS connection at the bridge would still leave no obvious place for car placement for interchange given the current geometry. The easiest location for both railroads for car exchange would be just south of this connection at Front Royal, where an existing passing track and a third car storage track exist. This passing siding allows runaround moves, and the double-ended storage siding exceeds 2900' in length.

It should be noted that the frequency of service on the north-south main line provides better interchange possibilities than the 'east-west' Manassas line, which would have infrequent service. There is a 'wye' track on the Manassas line and a storage track (truncated at Commerce Ave.) that could be used for freight interchange if NS insists on car placement on that alternate

line. Interchange directly to the main line, with 5-day per week switching and avoiding local terminals, would likely save at least one day of transit time of all freight traffic with NS.

Broadway

While Broadway does not have all the geography and geometry challenges of Front Royal, it is effectively on the end of an NS branch line, with one significant customer at that location. It currently gets 5-day per week service out of Harrisonburg. Traffic is then routed to and from Shenandoah Yard (Shenandoah, VA) for interchange to the north-south main line. If the timing of V93/V94 is consistent, interchange at that location would likely add one day of transit time as opposed to Riverton.

Class III railroads have increasingly been 'dictated to' by their carrier on the interchange point, or service schedules to those interchange point become so erratic and irregular that they become untenable. This is true in Northwest PA, where both NS and CSX have effectively closed Erie, PA as a gateway for G&W Buffalo & Pittsburgh, instead forcing interchange north to Buffalo rather than west to Erie, which would appear far more direct – if existing through train patterns actually allowed pickup at Erie. As Buffalo is a major yard, routing to that location is actually faster than what would appear to be the most geographic, and shortest, interchange route. But on a map, it makes no obvious sense.

This 'frequency of service' with the connecting carrier will be critical, and will not be fully known until an actual operator/operating plan is devised with NS. NS factors in yard switching charges at every terminal in their pricing, which is another unknown factor at this point. Reducing terminals and switching efforts by changing interchange points will reduce rates, only if this model is understood.

Broadway also has no obvious or existing 'yard' for interchange, although cars could be placed at the end of track past the grade crossing north of Broadway, if the shortline was allowed into Broadway by NS to access the passing siding.

Strasburg

Strasburg has not been an active and sustainable interchange point with CSX for nearly 30 years. Until the new feed mill was constructed, service was irregular and erratic on the line below the large quarries at Oranda. While the exact reasons the interchange was not viable in that era is unknown, it is likely that neither NS nor CSX was interested in short-hauling the other by interchanging at that location, resulting in the closure of the interchange and the complete removal of the track, with significant tree growth now in the area and partial rail removal. The interchange is currently completely removed and not viable. While this may be a highly desirable connection in the future it is not in the initial operating plan and will also be subject to the ability of NS to provide acceptable interchange and rate alternatives over time.

Volume Projections

The current analysis of the potential line traffic is a combination of multiple factors. The basic facts of the line are that while 'rail freight traffic is nonexistent', the actual customers and potential freight traffic on the line are quite significant, with a number of diversified businesses large enough to consume and produce railcar sized quantities of material if service and pricing can be developed by a more responsive and creative entity than NS:

1) Existing on-line, rail-adjacent customers that have been effectively forced to transload from their locations rather than have direct service, resulting in higher costs and lack of competitiveness
    a. Shenandoah Caverns: Georges Foods, Inc.
    b. Bowman Andros – multiple local facilities adjacent to rail (Mount Jackson)
    c. Cargill – Timberville – large facility adjacent to rail
    d. Pilgrims – Timberville – large facility adjacent to rail
2) Existing on-line customers that have altered their business plans specifically for lack of direct rail service but may return, as facilities still exist
    a. Masco Cabinetry (Shenandoah Caverns, next to rail, inbound materials)
    b. Howell Metal (New Market) inbound metals in raw stock
3) New transload opportunities
    a. Lumber and construction materials – a typical transload service for all shortlines
    b. Other construction materials (rock, gravel)
    c. Distribution centers with existing high-quality rail access already in place–
        i. Square footage at Strasburg (Donnely Printing building for lease)
        ii. Square footage at Johns Mansville facility for lease
4) Existing commodity flows that have yet to be captured and are currently truck-supplied (note the similarity to the Delmarva Peninsula / Carload Express experience)
    a. Propane (home and agricultural heating – high consumption volume)
    b. Inbound grains (poultry feed into the 50-mile corridor without rail service)
    c. Fertilizers – agricultural (seasonal inbound) (Valley Fertilizer Mt. Jackson)
5) Vacant facilities that already have direct rail service if reopened
    a. Shenandoah Caverns – vacant industrial warehouse property
6) Industrial Park Access
    a. Northern Shenandoah Industrial Park development sites adjacent to rail

Future Growth Example

The potential for growth with an experienced operator looking to actually develop rail traffic by being responsive and proactive can be demonstrated in many areas, but one of the most dramatic exists on the 4.5 mile Strasburg Railroad in Pennsylvania, long recognized as a leading heritage tourist railroad with 300-400,000 riders per year. The freight business was limited to an annual handful of cars transloaded at Strasburg, and a freight car movement was an unusual event.

The Lancaster, PA area has a similar distribution, industrial, and agricultural characteristics to the Shenandoah valley. Inbound and outbound agricultural materials dominate, but lumber, plastics and various industrial freight have been direct handled by NS, Conrail and Pennsylvania Railroad since the 1850's. The now Amtrak owned 'main line', however was downgraded for freight service resulting in an NS operated local out of Lancaster, and the conversion of the main line to higher speed passenger service made local freight switching service and main-line switches increasingly difficult to sustain and NS marketing was apparently nonexistent.

As an experiment, and now a proven result, Strasburg campaigned local businesses with transload services rather than dealing with an on-site industrial siding and direct NS service off the main line. In one case, the industry was directly served on the NS main line, but Amtrak/NS response and service were not competitive. The true changeover happened after 2010, when the one bridge to Strasburg was upgraded to 286K weight limits.

Strasburg, PA transload yard (2019)

Although chartered as a common-carrier, freight carloads had dropped to near-zero after the one online customer closed in 1976, and only one transload customer remained[13]. "By 2008, traffic was down to about 10 cars a year". Removing the weight limit problem and capitalizing on the poor marketing and service of Norfolk Southern resulted in constructing a new freight transload facility at Strasburg east of the passenger station. Initial traffic was inbound plastic pellets, and outbound chicken meal. This Strasburg site, coincidentally, is monitored real-time at https://www.youtube.com/watch?v=coVy-NeAdoU as well as the companion camera at the NS interchange at Paradise (new transload yard location).

The growth in solicited traffic has expanded to the point that the congestion on the railroad between freight and excursion passenger operations justified construction of a new, 3.3million, six-track transload yard at the NS interchange at Paradise, from a Pennsylvania Rail Freight grant. GM Hagar: "We lost one customer to a new facility on a Class 1, but grew five, bringing the customer base to 16, 15 of which are transload partners"….."Our car count averages around 500, and we project a 50% increase this year" (2024).

This emphasis on marketing and service is typical, not unusual, but emphasizes that the railroad itself didn't expand miles, develop new on-track carload ability, or attract direct rail customers to new sidings – it focused purely on transloading the build the business given the skill of the shortline railroad staff.

The projection of freight volumes on the Shenandoah similarly hinges almost solely on the ability of an experienced operator to develop pricing, service, and car supply to tap the regional

[13] Trains Magazine October 2023 "The Strasburg Railroad you don't know" pages 14-21

potential. Any solicited final Request for Proposals from a freight operator partner will require, and submit, freight projections based upon the operator experience that can be compared against actual results in the field. While there are some logical projections based on agricultural and propane movements, the true volumes will be based on the ability to leverage the distribution corridor potential of the I-81 corridor.

These differences may be dramatic. An operator that is already partner or even an owner with a logistical services subsidiary company that sees transloading with final truck delivery will have significantly different traffic projections than one that has no such experience. Likewise, any operator that has existing logistical and traffic experience with originating commodities destined for the Shenandoah County market (feedstocks, fertilizers and fuel) will have a substantial advantage in developing traffic compared to one that does not.

Existing customers with traffic projections supplied (confidential subject to rate disclosure). These customers include those that had existing rail traffic that is no longer delivered, but currently diverted to truck, or have expressed direct interest on moving to rail via transload:

Propane and fuels	230 carloads/yr	
Fertilizers, various	80 carloads/yr	
Agricultural feed	390 carloads/yr	
Inbound waste fat feedstock	250 carloads/yr	(based on 50% rail existing volume)
Outbound waste fat feedstock	200 carloads/yr	(based on 50% rail existing volume)
Base activity	1,150 carloads/yr	

Unlike a direct plant switch, customers requesting a transload must have an intermediate truck delivery, so siding location is far less important. Facilities are critical, along with easy truck access, service frequency, and on-demand car switching that only a responsive shortline can provide. Given the length of the railroad and the proximity to existing distribution systems and I-81, commodity-specific transloads for commodities, the potential distribution map extends over a 5-hour, likely 300-mile zone of inbound commodity should attract an additional 1,000-2,000 cars over a 10-year growth period.

Revenues will be subject to whether the railroad is identified as a switch carrier, multiple rate switch carrier, or interline. As the fertilizers and fuels typically get much higher rates than agricultural feed, a flat switch charge would result in either overcharging for feeds or undercharging for the higher rate commodities.

Service Plan

The physical condition of the railroad places the initial plan of basically a limited access freight service plan on both ends; i.e. Strasburg-Front Royal, and Shenandoah Caverns (or to the nearest accessible customer requesting service) connecting to the south, leaving the heavily overgrown and lighter-railed segment for rehabilitation, although it is highly useful for the railbike program. Both NS interchange points (Broadway and Front Royal) would be necessary.

It should be noted that for freight service, the Strasburg-Front Royal portion is now serviceable even as excepted track although spot tie replacement may be required. The requirement for FRA Class 1 track standards is to facilitate initial excursion service, but freight can be run on excepted track as long as hazmat restrictions are understood (number of cars, commodities, etc.).

This will require at least two locomotives, but a single crew can still facilitate 2-3 day per week freight service by alternating ends; i.e. south end 2 days per week and north end two days per week. Both interchanges would be with NS and be required, and initial freight services would be minimally scheduled. This would leave significant work windows open for track and bridge rehab as well.

Completion of track rehab in the more deteriorated section (which would primarily be a function of tie and bridge deck work) will take at least an additional year – pushing full north-south rail freight connectivity into year 2-3.

Once the track rehab is completed, a full-rail end-to-end service plan could still be implemented as a daily bidirectional operation possibly originating out of Strasburg Jct. – perhaps the most logical place to locate a semi-industrial location for locomotive and equipment storage, and maintenance. At that point, either or both interchanges with NS could be preserved, but the most likely interchange will be based on NS service, preferences and rates rather than natural geographic movement.

Grade Crossings

The Grade Crossing Program

While an initial count of total crossings and physical condition of the grade crossings was done during the initial track inspection in March of 2023, the further development of the operating plan for both excursion and freight services development has further focused what will be actually necessary for the grade crossing restoration program for rail use and full rail operation.

While there are a significant number of total crossings, over half the total are private crossings that are essentially at the permission and agreement with the operating railroad, and that have existing contractual agreements with the railroad for maintenance and upkeep. The railroad may put these crossings back in service with the cooperation of the landowner, and expenses may be billed back as an agreement allows. These crossings typically are one or two lane asphalt or timber crossings, and none have active warning devices, although minimal DOT private crossing identification and signage is required. If the crossings have been removed or paved over and are still desired to be used, they are restored at the property owners expense.

Private crossings do not necessarily require state DOT/PUC approval and are strictly a private agreement between railroad and landowner, and are also not eligible for Section 130 grade crossing funds. Private crossings are identified in the FRA records primarily as a safety monitoring tool to identify private grade crossing accident locations. Closed private crossings are not subject to the same DOT permission to reopen as a public crossing is. It should also be noted that trains are not required to sound horns at private crossings under federal law.

The other half are public crossings, in various states of condition from 'ready to go' to paved over, some rail removed, six formally closed within FRA records, and many requiring extensive rehabilitation to use for railroad purposes again. But like everything else in this line segment, conditions vary widely based upon how long the track has been out of service, the community the crossings are in, and the underlying condition of the track structure. Some six public rail crossings have been formally closed in the FRA database, and will require state DOT authority and application to reopen to legal FRA rail use status. Others, particularly in the middle section between Strasburg and Shenandoah Caverns, have been effectively closed possibly without formal DOT/FRA notification by paving, rail removal, or both. If permission was not obtained from NS to remove or pave over the rails (and the crossing is not shown as closed in FRA records), the municipality may be responsible for crossing restoration by their preemptive action. The piecemeal status of the grade crossing status would indicate that municipalities were aware of the closure process, have followed it in some cases, but not necessarily in others. Communities should have documentation to identify these actions. The railroad, not the community, is responsible for updating the FRA grade crossing records as needed. Absence of correct information in the FRA database does not necessarily mean that any closure, paving, or removal was done without authorization.

The crossing safety concerns are equally important for trails, as even a trail is considered to be a legal highway crossing requiring signage on both the trail and the highway, even if lights and gates are not involved. Some states may require an additional side or overhead flashing pedestrian warning light on high traffic areas, and in some cases, even require a pedestrian crossing stoplight even if the track only requires a passive crossbuck protection. Trails designation or inclusion does not automatically remove the grade crossings from cost or consideration and possible safety signalization. In some cases, a conventional overhead stoplight has been used to control both pedestrian movement and train protection, activated either by pushbutton or train activity, as done in downtown Arcade, NY.

Railroad, PA Northern Central Railroad / York County Rail Trail crossing with parallel trail and track use – passive crossbucks and active flasher for pedestrian traffic. All crossings on this project have pedestrian signage and/or flashers.

Arcade, NY downtown crossing of Arcade & Attica Railroad with pedestrian crossing; passive rail crossbucks with active traffic signals protecting both pedestrian and rail track crossing. Railroad equipment action triggers stoplight circuit.

Restoration Costs – Signal Cabinets

The most nebulous issue for cost estimating is the condition of the electronics within the signal cabinets that control the flashing lights and gate mechanisms. Because of the absence of distant insulated rail joints at every crossing, it would appear that NS had converted the crossings to second-generation proximity detection devices prior to discontinuance of service. Signal cabinets are intact, and no vandalism of the electrical cables, or broken locks was evident in the March 2023 track inspection. Because these are padlocked cabinets in NS ownership, there is no way to properly inspect the interior of the cabinet to see if critical electrical materials and circuits have been removed to maintain other active signal systems on NS – cannibalizing these unused units for parts. Based upon rumor and informal information, it is likely that this has occurred. The other nebulous issue is the condition of the lights and gate mechanisms; current safety standards indicate that the flashing light standards are now a 12" LED style rather than a 9" round housing with an incandescent bulb. As most of the flashing lights were canvas bagged as out of service, it is unsure of the light style, but it is safe to assume that all the light units themselves (not the masts) would have to be upgraded to current DOT standards. These upgrades, but not the repairs for missing parts, would be eligible for Sec. 130 funds.

At this point, the cost of replacing the 'internals' of the cabinets, which are now likely solid-state systems for the proximity detectors rather than old-style relays, can only be compared to cost of new installations and testing, and an educated guess as to what percentage of circuitry has been 'borrowed' from the cabinets since NS ceased operations. Only NS can open the cabinets to perform an internal inspection to determine what, if anything is now missing.

<u>For the purposes of cost estimating at this point, it is being assumed that none of the signal cabinets are serviceable in 'as is' condition, so the numbers expressed tend to be a worst case scenario estimate until proven otherwise.</u>

The general cost of devices – including even the passive signs at the crossbuck-only locations, has been added into each public crossing, as many of the remaining signs and devices are obsolete due to regulatory changes, damaged, or missing. Total costs for signage (even crossbucks) are therefore in a similar worst-case cost scenario.

Reopening and Repairing all Grade Crossings

First, the initial operating plan and physical condition of the railroad itself has revealed that a phased rebuild will be necessary, and that track and facilities conditions dictate what portions of the railroad can be reopened first for excursion and limited freight services almost immediately. Restoration procedures with track and bridges are not consistent, and neither are crossing conditions. Because the railroad was taken out of service in sections over time, rather than an end-to-end discontinuance, the rehab cost by site significantly varies.

Any area with proposed railbike operation will need track and paving reopening resolved, but crossing warning devices (gates and lights) cannot be activated by railbikes even if operational – they are hand-flagged across a crossing convoy style in a group. That means that the intermediate areas proposed for that during startup have no priority on immediate reinstallation of gate and light devices for train use.

Therefore, given freight, passenger and railbike considerations, crossing rehabs are broken into three distinct zones rather than a one-time mass end-to-end rebuild. Essentially, this is the reverse action of NS in originally taking portions of the line out of service over the last 25 years. These portions consist of the following:

Phase 1 immediate operations – 'north and south end' 37 public crossings, 1 currently closed:

1) Riverton (Front Royal) to Toms Brook. *MP B51 – B68; 17.8 miles;*
    a. Limits of welded 132# rail, last in service up to 2021 to Strasburg Jct., good tie condition.
    b. Strasburg Jct. most logical location for equipment restoration/shops long term.
    c. Significant transload facility at ex-Donnely printing plant warehouse in Strasburg.
    d. 1 public crossing closed at Mt. Hebron Rd., fewer initial crossing issues except cabinets.
2) Valley Fertilizer site south to Broadway *MP B85.4 – MP B99.5 (14.2 miles);*
    a. Limits of welded 100# rail; fair to good tie condition; rehab necessary but not extensive.
    b. Existing freight customer already requesting service to Shenandoah Caverns.
    c. Requested freight service to Valley Fertilizer site.
    d. Industrial park location at Shenandoah Caverns with vacant land and building.
    e. Southern county tourism potential.
    f. No public crossings closed and fewer initial crossing repairs likely except cabinets.

Phase 2 operations – restore service to ex-Johns Mansville plant area. *MP B68 – B77 (8.4 miles);* 18 crossings, 2 currently closed on FRA records

1) Toms Brook to ex-Johns Mansville plant (transload lease building prime freight target)
    a. Includes high bridges for excursion operations and passing siding for return trips.
    b. Lighter jointed rail, heavier vegetation but in service through early 2000's.
    c. Significant tie replacement needed.
    d. Crossing rehab needed on several sites including rail pulled from crossings, pave-overs including major crossing redo at Woodstock.

Phase 3 operations – reconnect middle section of railroad

1) Johns Mansville plant to Valley Fertilizer *MP B85.4 – B77 (8.9 miles)*; 10 crossings, 3 currently closed on FRA records.
    a. Most significant track, grade crossing, tie replacement and vegetation growth.
    b. Necessary for end-to-end service and efficient interchange.
    c. At least five crossings paved over and/or rail removed; three legally closed.

Although the total number of out-of-service crossings is high, when broken down into operating section, and the number of crossings that actually require attention for lights and gates, the phased numbers become much more manageable. Unlike some other factors, crossing rehab may be delayed except in cases of closure or paving over the rail surface, with the 'worst first' until the actual track rehabilitation and tie replacement arrives on scene.

For these initial startup zones, the grade crossing impacts are comparatively low. This approach reduces the number of crossings necessary for rehab in initial stages to manageable levels and recognizes that the electrical detection portion of the crossings in such designated areas is irrelevant for railbiking.

Track and Paving Surface Restoration

Each crossing on the railroad – which includes 65 public and 66 private crossings for a total of 131 total – was verified via Google Earth, geo-tagged for location in a .KMZ file, and measured for surface length. The 65 public crossings were reviewed against initial field data, and calculated for complete replacement cost *if a full and complete capital rehab was performed.* A second field inspection was conducted in September 2023 to verify the additional crossing conditions identified in this investigation, along with appropriate comments. **This was then further revised to determine what repairs were necessary for immediate operations on a phased location basis – focusing on paved-over, closed, and out of service locations.**

Several things need to be considered for individual crossing restoration. Many crossings are currently serviceable in 'as is' condition, including significant rehab work done with concrete slab replacements in four locations. Those may be considered usable unless the rail pattern

weight is changed as a result of track rehab upgrading the rail within the crossing itself, which would result in a higher rail surface. It should be considered, however, that reconstruction of the adjacent track also presents the opportunity to deal with the crossings and rather than a piecemeal and delayed approach, consider them as a long-term capital upgrade like the track itself. This is essentially a judgment case by location, and can be driven by funding limits over a multi-year program.

Many crossings are initially serviceable with minimal work, but when a subsequent tie restoration program is considered, should be rebuilt as part of the track rehab program. The same is true with the sections of the railroad that are considered for rail upgrading replacement – replacing the lighter jointed rail will have a secondary impact of requiring grade crossing surface reconstruction because the new rail is generally at least half an inch higher than the old. This is particularly true in Phases 2 and 3.

The crossings that have been either taken out of service or been paved over present an immediate impediment to operation – *but that impacts only one crossing in Phase 1*. That allows time to address the crossings that actually will require DOT/PUC action to legally reopen in Phase 2 and 3 and will entail time delays.

It should be noted that on some paved-over crossings, it was field-observed that the new pavement level is now noticeably higher than the railhead. Rather than attempt to lower the new road surface, it is recommended to re-align the track vertically during rehabilitation to meet the new road surface level with a rebuilt crossing. This is a particular issue in the Woodstock crossing (four lanes with heavy traffic) that now has approximately four inches of asphalt over the existing railhead.

Estimated Costs

The separation of the railroad into three distinct phases of operation and restoration, along with estimating the costs of initial resurfacing and signage/device replacement, were identified by each crossing and are in a following spreadsheet to this section.

Totals by operating section, for both surfacing and signals were estimated as follows:

PUBLIC CROSSING TOTALS
Initial repair and replacement costs

By Zone		Xbucks	Lights	Gates	Resurface Cost	Signal Cost	Total
Phase 1		17	14	6	$1,155,003	$2,036,500	$3,191,503
Phase 2		12	3	3	$1,329,003	$914,000	$2,243,003
Phase 3		4	4	2	$864,002	$973,500	$1,837,502
Total	65	33	21	11	$3,348,008	$3,924,000	$7,272,008

Operating through grade crossings until devices are repaired

While not typical, even fully restored flasher and gate systems may refuse to activate when a train approaches due to electrical failure, broken bond wires, or other malfunctions; older systems also may fail to release flashers and lights to normal if sufficient road salt is between the rails to mildly complete a detection circuit and a railroad is forced to temporarily deactivate a crossing. Indicator lights on the edges of the signals are visible to the train crew to know if the lights are working properly. But if they aren't working, or designated as *out of service*, what happens then is actually codified in Federal law under 49CFR 234.105 – Activation Failure[14]:

"Upon receipt of a credible report of warning system malfunction involving an activation failure, a railroad having maintenance responsibility for the warning system shall promptly initiate efforts to warn highway users and railroad employees at the subject crossing by taking the following actions:

***(a)** Prior to any train's arrival at the crossing, notify the train crew of the report of activation failure and notify any other railroads operating over the crossing;*

[14] https://casetext.com/regulation/code-of-federal-regulations/title-49-transportation/subtitle-b-other-regulations-relating-to-transportation/chapter-ii-federal-railroad-administration-department-of-transportation/part-234-grade-crossing-safety/subpart-c-response-to-credible-reports-of-warning-system-malfunction-at-highway-rail-grade-crossings/section-234105-activation-failure

(b) *Notify the law enforcement agency having jurisdiction over the crossing, or railroad police capable of responding and controlling vehicular traffic; and*

(c) *Provide for alternative means of actively warning highway users of approaching trains, consistent with the following requirements (see appendix B for a summary chart of alternative means of warning):*

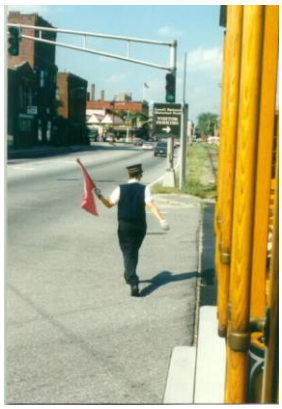
> ***(1) (i)*** *If an appropriately equipped flagger provides warning for each direction of highway traffic, trains may proceed through the crossing at normal speed.*
> ***(ii)*** *If at least one uniformed law enforcement officer (including a railroad police officer) provides warning to highway traffic at the crossing, trains may proceed through the crossing at normal speed.*

(2) *If an appropriately equipped flagger provides warning for highway traffic, but there is not at least one flagger providing warning for each direction of highway traffic, trains may proceed with caution through the crossing at a speed not exceeding 15 miles per hour. Normal speed may be resumed after the locomotive has passed through the crossing.*

(3) *If there is not an appropriately equipped flagger or uniformed law enforcement officer providing warning to highway traffic at the crossing, each train must stop before entering the crossing and permit a crewmember to dismount to flag highway traffic to a stop. The locomotive may then proceed through the crossing, and the flagging crewmember may reboard the locomotive before the remainder of the train proceeds through the crossing.*

(d) *A locomotive's audible warning device shall be activated in accordance with railroad rules regarding the approach to a grade crossing."*

49 C.F.R. §234.105



In practice, that means that if a set of flashers or gates isn't working – or were never installed in what would appear a recognizably high risk situation - the railroad isn't shut down, but manual flagging must take its place. That can be done by either a crew on the ground shadowing the train and protecting crossings, or by the train stopping and dismounting a crew member to 'stop and flag' the crossing. While that adds delay to train movements, it doesn't stop them. This may also be a voluntary safety measure such as Lowell, MA NPS (left) does for equipment moves across city crossings that are not protected with flashers or traffic signals.

Federal DOT Section 130 Grade Crossing funding

The federal grade crossing funding known as Section 130 is given to the state DOT's nationwide to implement. This is a Federal/Local match where the match has been raised from 80/20 to 90/10; the railroad is responsible for maintenance and utilities after the devices are installed. It has been an extremely successful program.

While it is clear that funding is available and that the crossings (and device updates) are eligible for this project, the selection criteria at the State level is based on statistical analysis and award

of funding based on history of the crossing; i.e. basically, just how dangerous it is, combined with train and traffic frequency analysis. This table from the *VDOT "VIRGINIA GRADE CROSSING STATE ACTION PLAN*[15]" (2022) indicates the scoring factors with any line that has been out of service for a period; there is now basically 'no history' of crossing accidents to support remedial action:

Table 1 Required State Action Plan Elements and Additional Risk Factors

#	Required Element	Location
(i)	Have experienced at least one accident/incident within the previous 3 years	Pg. 18
(ii)	Have experienced more than one accident/incident within the previous 5 years	Pg. 18
(iii)	Are at high-risk for accidents/incidents as defined in the Action Plan	Pg. 54
	Specific strategies to improve safety over at least four years	Pg. 56
	Provide an implementation timeline	Pg. 56
#	**Minimum High-Risk Factors**	**Location**
(A)	Average annual daily traffic	Pg. 36
(B)	Total number of trains per day	Pg. 36
(C)	Total vehicle collisions during previous 5-year period	Pg. 18
(D)	Number of main tracks at each crossing	Pg. 40
(E)	Number of roadway lanes at each crossing	Pg. 40
(F)	Sight distance	Pg. 52

This 'spending based on history', *rather than recognizing risk factors in advance*, is not unusual for Virginia. Basically, until the line is placed back into service in a fashion, and may actually have an actual accident history, it will not score high enough in the evaluation criteria to be funded for improvements. While train and traffic counts and poor visibility enter into the scoring, the actual accident history tends to prioritize action.

In some cases, an obviously unsafe crossing based upon previous conditions, or changes in highway traffic flow and train frequency would obviously seem to constitute a crossing hazard. But most states continue to apply the similar scoring criteria as Virginia, awarding new flashers or gates to crossings *after* a serious accident has happened.

What this means for this line is that for all intents and purposes, any Section 130 money will depend on either that scoring criteria rising as the result of incidents, high traffic, and or high train counts, or other direct action by the Virginia DOT in absence of scoring standards and as a policy decision from field observations.

It should also be noted that a trail-only alternative would not be eligible for this funding, but the parallel trail projection devices may be included as part of the rail device detection.

[15] https://www.virginiadot.org/business/resources/vhsip/Virginia_RailCrossingPlan_Final_-_02.10.22.pdf

Parallel Trail Construction

A trail – and just what is it?

One of the open debates on this project is the consensus definition of 'trail'. While it would seem to be obvious, the implied definition of 'trail' is just as vague as saying 'road'. Are you meaning a dirt road, a driveway, a two-lane, or an interstate highway?' The definition of 'trail' to various groups, individuals, and stakeholders can mean entirely different things.

From a technical and design standpoint, there are various kinds of 'trails', but the generic description remains:

Trail *- this is defined as "a pedestrian route developed primarily for outdoor recreational purposes. A pedestrian route developed primarily to connect elements, spaces, or facilities within a site is not a trail."*[16]

Within that wide definition, that encompasses different trail standards that have been commonly accepted.

In legislative language; "Recreational Trail" means a thoroughfare or track across land or snow, used for recreational purposes such as— (A) pedestrian activities, including wheelchair use; (B) skating or skateboarding; (C) equestrian activities, including carriage driving; (D) nonmotorized snow trail activities, including skiing; (E) bicycling or use of other human-powered vehicles; (F) aquatic or water activities; and (G) motorized vehicular activities, including all-terrain vehicle riding, motorcycling, snowmobiling, use of off-road light trucks, or use of other off-road motorized vehicles.[17]

This is still a relatively broad definition – that is not necessarily understood – particularly the 'including wheelchair use" and "off road motorized vehicles" part in the same sentence. It excludes neither by definition or design.

While a 'pedestrian trail' may be soft-surface and be nominally five feet wide, with minimal design limitations on grades, vertical clearances, and shoulders, the definitions in practice become progressively more complicated – and expensive, not necessarily by choice, but now determined by funding source with requirements.

What does become more restrictive is a second definition; that being "Accessible" Trail. This definition combines the definitions of ADA accessibility (minimal grades usually not exceeding 2%) and also lanes, markings, shoulders, and design standards that allow bicycle operations up to 25mph. The width footprint of such an accessible design trail, rather than being a pedestrian trail, rapidly expands to 10-to-12 foot width with an additional two feet for shoulders. It also

[16] US Access Board: https://www.access-board.gov/aba/ Section F106 Definitions
[17] Source 23 USC § 206(a)(2)

includes guard rails, lane markings, and generally a hard surface, and defined curve and geometry very much like a highway. By trail standards, this effectively becomes an 'interstate highway' intended to be operated at speed, and allow passing of bikes with pedestrians in opposite directions in the lanes.

While the funding methodology may dictate an accessible trail design, it is important to note that this funding source issue, rather than community needs or standards, dictates this design issue, and effectively raises the resulting construction cost and complexity. If the actual need and underlying funding source is reconsidered, flexibility increases, costs decrease exponentially, and much conflict can be avoided. It is important to understand that the design flexibility along with actual community needs then becomes the issue, rather than design being dictated by funding source. Without this funding restriction, a community is free to design their own trail, to their own needs. Given this flexibility, in-town trails may be paved and accessible where width is available, but more difficult areas have the potential for designs that can negotiate more difficult terrain and restrictions. A trail may be constructed in sections, evolved forward, and still provide the kind of benefits that local stakeholders expect and need.

Saranac Lake, NY recreational trail

Ashokan rail-trail, Ulster Co. NY. Note width, extensive guard rail system for higher speed

This approach was most dramatically exercised by Clay County, WV, where local interests [18] constructed a 'walking trail' along the length of the Buffalo Creek and Gauley Railroad with local volunteers and resources for an 8-mile distance of under $10,000, using donated materials, a "Bobcat" excavator to clear the way, and planking over the existing railroad bridges for dual access as the only rail traffic is railbikes. This project has now evolved into a full railbike with trail project, receiving FEMA funding for a post-flood reconstruction of both the track and improved trail over the entire distance now with a crushed stone surface. The trail design does not exclude biking, but the design definition allowed the track to remain for railbiking activity.

Buffalo Creek (Dundon, WV) railbike and walking trail (pre-flood) – no heavy rail activity – now Rail Explorers as of 2024

[18] Buffalo Creek Watershed Association, Clay County, WV. https://wvrailtrails.org/rail_trail/buffalo-creek-rail-trail/

Meanwhile, State, rather than federally funded, bicycle trails in Pennsylvania simply pave or gravel to the original crosstie width, with no requirement for shoulders or guardrails, and increase slope to bridges if necessary to increase stream flow clearances.

Most remarkably, the locally-funded waterfront trail in Astoria, OR has established a full rail-with-trail corridor by simply decking over nearly two miles of original pile trestles for dual use by trails, bicycles, and a full-sized vintage trolley system on a frequent 30-minute schedule[19]. While this is a highly unusual methodology, it has been in successful operation since 1999. While it is widely considered that decking over bridges for dual rail and trail use is infeasible, this operation continues to be an example of how creative and local control can produce a far more inexpensive and realistic solution, when low speed, visibility, and stopping distances of rail equipment are considered to actually keep the operation safe.

Astoria, OR trail with planked-over rail bridges for dual use.

The Kingston, NY "Trolley Trail" runs side-by-side with the Kingston Trolley Museum track to Kingston Point in the Hudson River, one of the most spectacular views in the east for both. This track is actively operated for a railroad museum as well as City parkland on a very narrow right-of-way cut out for the trail.[20]

Kingston, NY rail with trail (operated museum track with parallel walking trail along Hudson River)

One of the other basic problems of accessible trail design is the that fact that in a standard single-track railroad right-of-way built in the late 19th Century, three essential facts rapidly emerge:

- The track gauge was, and is, 4' 8 ½". Ties are nominally 8'6" to 9' wide, with a variable ballast shoulder going directly to a ditch line parallel to the track ideally at a 2:1 slope. This means the track structure, along with the ballast, is normally far narrower than the accessible trail design with two 10' lanes and two 2' shoulders. Putting in an accessible trail on a single-track historic right-of-way may require additional excavation of the subroadbed down to find a wide-enough cross section to fit the trail design that nominally needs 14' of total width over shoulders. This, in turn, makes drainage, culverts, and other structures possibly necessary to modify as well. As can be expected, this can greatly increase construction cost as well as trigger environmental reviews resulting from additional excavation, much as a parallel trail would also entail.

- Given the late 1800's construction standards, most railroad embankments were simply constructed to the angle of repose of the local material instead of a current engineering

[19] https://members.oldoregon.com/list/member/astoria-riverfront-trolley-873
[20] https://kingstongreenline.org/kingstonpointrailtrail

standard of a 2:1 slope. The steepness of the slope, along with the drop to any adjacent vegetation, stream, or trees may dictate the construction of new guardrails – as the design speed for an accessible trail is for bicycles at speed. *"the "Width and Clearance" section…recommends, "A minimum 1.5-m (5-foot) separation from the edge of the path pavement to the top of the slope is desirable when the path is adjacent to canals, ditches, or slopes steeper than 1:3. Depending on the height of embankment and condition at the bottom, a physical barrier, such as dense shrubbery, railing or chain link fence may need to be provided.[21]"*

- This construction of guardrails (42" to 54" high) alongside the trails can actually be more expensive on a per-foot basis than the actual trail surface construction, and become a long-term maintenance issue as well. The emphasis here is that this cost and design standard is dictated as a result of full AASHTO Federal design standards on accessible trails where federal funding is involved. But, if state/local funds are exclusively used, it is at the design discretion of the locality and the engineer to make those decisions.

One of the other misconceptions about rail-to-trail conversions is that the sale of the rail materials at salvage values can pay for trail construction. While this may have been actually true 25 years ago, the redetermination of used railroad ties as hazardous materials reversed that equation dramatically, even if the creosote is a distant memory. While the steel rails themselves still have value even at scrap prices even when removal costs are applied, the ability to either leave the deteriorated ties within the right of way (for natural disintegration) and sell any salable ties for rail or landscape use has now been severely restricted, or even to sell the burnable ties for power cogeneration. As only a handful of states now have surviving wood cogeneration facilities that can accept any materials that were once creosoted, the ties have now entered the disposal stream as landfill materials, or at minimum, material that has to be removed and treated as part of a controlled waste stream even if it ultimately ends up in cogeneration by the disposal company. The cost of this disposal ranges on area, but recent experience indicates that crosstie disposal on a line that has been out of service to have non-reuse quality ties can be estimated over $10-$13 a tie with a minimum of 3000 ties per mile - which can equal $30,000- or more per mile. But, if the same project is used as a rail-with-trail corridor preserving active railroad rights, used ties may be actually left on the right-of-way without the disposal costs. This is a recognized cost savings adjustment of keeping rail in place.

This does not negate the viability of a trail project, but does require that the projected costs be realistically examined.

Another significant misconception about rails with trails is the assumed minimum clearances between a preserved and active railroad track and the adjacent trail surface. This distance, contrary to some assumptions, is not defined in AASHTO standards, but left to the engineers discretion. This is actually appropriate, because the speed, density, and use of the adjacent rail line <u>should</u> determine that separation. It should not, however, be considered to be a blanket

[21] *DETERMINATION OF APPROPRIATE RAILING HEIGHTS FOR BICYCLISTS NCHRP 20-7 (168*

design designation used to effectively preclude placing a trail adjacent to a track simply because it is still in active service for any use. The safety and design considerations of 70-mph commuter line with 30-minute headways, or a busy Class 1 mainline with 100 car freight trains passing at speed, and a parallel pedestrian trail is not the same as a 10-mph line with one to two trains per day. While adjacent rail and trail activity can be a safety issue in some locations with heavy train use, the actual safety records of shortline and excursion rail-with-trail lines with directly adjacent parallel trails and tracks – including the Great Allegheny Passage at Cumberland, MD, and the York County Trail in York, PA, speak to the reality of a low-speed rail usage parallel to a relatively high-use trail. Neither the separation distance or a barrier are present in either of these highly active trail projects. Therefore, the 'engineers discretion' in defining the separation distance – ***if any*** – should be closely reviewed.

Another major consideration is both time and season. Unlike trail use, rail use for excursions would likely be the highest in the 4th quarter of the calendar year and are not weather-dependent. Also unlike trail use, rail operations including excursions may be conducted at night – which was the prior practice of Norfolk Southern on the "B" line when the Johns Mansville plant was still in operation. Peak usage times and conflicts between rail and trail do not necessarily coincide, and will be under local management and control.

It is worth noting that on any active, federally-regulated railroad track (excursion or freight), all grade crossing or on-property accidents and incidents must be reported to the Federal Railroad Administration, the agency responsible for determining safety standards nationwide as recommended to various states DOT's and railroads. This creates a public, and searchable, database of incidents and accidents including pedestrian and bicycle collisions going back decades. A Stone Consulting research project in 2019 for a client revealed that two significant 'bicycle-train' collisions with a fatal results had happened in Santa Fe, NM, on a bike trail (beside a highway) crossing (not a parallel occupation) between a commuter train and bicyclists in 2014. Both accidents resulted from cyclists that did not hear the warning signs or heed the crossing gate lights. *The relative absence of reported incidents, particularly on the parallel rails with trails, remains.*

These facts are intended to facilitate discussion about the balance that can be, and has been achieved between rail and trail interests to achieve the mutual goals of both. Rather than a vague concept, it is an established fact that can be seen in the field, and has been in practice long enough to view for practicality in other locations.

Line Abandonment Procedure

The trail-only feasibility analysis fully acknowledges, but does not fully discuss, the Federal regulatory procedure that must be followed for the abandonment of a rail line and conversion to a trail.

The time-honored basis for rail abandonment dating to the 1930's under ICC rules (where the line is active but losing money) and involves an extremely complicated filing now with the US Surface Transportation Board, placing a significant burden on the railroad attempting the abandonment. Due to the complexity of a standard abandonment, it has largely been replaced by the "Exempt" abandonment, where a line has to be certified as out of service with no overhead traffic, service, or request for freight service for at least two full years. That allows an expedited process to proceed to abandonment, with highly shortened calendar schedules.

But, it is still abandonment, and may be contested for a variety of reasons. The most significant one is that any responsible entity that can demonstrate both financial responsibility and sufficient evidence to justify resumption of common-carrier freight service can purchase the line (or even a portion of the line) for scrap value. This process is called "OFA" for Offer of Financial Assistance, and is widely used to transfer lines to local government and shortline railroad control to preserve freight service. Multiple successful shortline operations have been started, and abandonments stopped, through this process – including the Colebrookdale Railroad in Pennsylvania, George's Creek in Maryland, and the Chesapeake & Indiana in Indiana.

The OFA filing process forces, if nothing else, a significant 'all stop' in the abandonment process while the valuation and purchase offers are evaluated. The host railroad is forced to determine an offering price, which is of both the land and the track assets, requiring multiple certified appraisals, taking significant delay. The purchaser may also do their own appraisals, resulting in an entirely different offer – which are presented to the STB to evaluate. The STB may rule and decide on competing sales and purchase price, but it is not binding and may, in some cases, be referred to federal or state court, particularly on real estate deed language.

One of the key valuations is always the quality of title of the land, because only fee-simple land actually has negotiating value in the STB valuation process. Condemnations and right-of-way agreements are reversionary to the original property owners, and while interim trail status may protect that status, it does not impact the underlying value of owned real estate. The title search by appraisers for a significant length of track with literally hundreds of land parcels may take months, and the qualifications of the appraisers are equally in question by the STB. In some cases, the land titles may be rejected by the STB as so subject to state land title rules that they cannot be resolved at the federal level – again, more significant delay. Land titles sometimes dating to the 1850's (as would be present here) written in dipped ink pen may contain language that only state courts can interpret as to intent at original time of writing.

The track assets must be separately valued, and documented as well, by on-site inspections, and if possible, backed up by actual purchase quotes from rail dealers or scrappers. The high value with the best documentation is held by the STB to prevail, but "Net Liquidation Value" also

includes the cost of lifting the rail, and disposing of the railroad ties usually at landfill prices. Bridges are not typically valued as scrap as they remain in place for trail conversion.

Environmental – and Historic Review

Environmental conditions are also part of the STB process, which would normally seem to have no obvious application for railroad abandonment, but the "Section 106" Historical and Cultural Review is considered as part of the environmental process. This allows basis for appeal and consideration for trail consideration, but only if the track itself is considered part of the historic fabric of the procedure. Given that the rail line itself supported several major Civil War battlefield events specific to this line, this could be a legitimate issue in this case where it would not normally be a major consideration.

The Section 106 environmental review process has proven to be a significant issue – particularly when the abandoning entity chooses to misrepresent, minimize, or gloss over the statement that no significant historic impact will result. The most recent evidence of this can be found in the 2023 STB abandonment petition of the Lowville & Beaver River Railroad (10.6 miles) where the owning railroad was found to be misrepresenting the historic nature of the property, pending trail conversion. The entire abandonment was stayed as of January 24, 2024 pending review by the New York State Historic Preservation office. As a result, no track can be lifted, and no trail can be developed until the historic nature of the railroad is fully disclosed and resolved.[22]

Even when a line is no longer a common carrier subject to STB process, and strictly an excursion operation, historic preservation law may apply. New York State's attempt to remove the Adirondack Railroad between Saranac Lake and Lake Placid for trail conversion was met with a two-year battle that ultimately ended up in New York State Supreme Court, where the court sided with the railroad in that 'planning to mitigate did not constitute mitigation' and the track structure itself was part of the historic preservation. New York State and the Adirondack Scenic Railroad ultimately agreed on a $19.1 million rehab of the railroad *south* of Tupper Lake as a negotiated settlement to remove the track to Lake Placid for a trail.[23]

And if the OFA is found valid..

If the purchasing entity is proven to 'show us the money', and also show firm evidence of a need for common-carrier freight service, the STB will force the railroad owner to sell to the new entity at the STB-ruled price to preserve service. While this can still be appealed in Federal court it is rarely done. If the OFA process is successful, there will be no trail conversion – the railroad continues as a railroad. Only when the OFA process is either not taken or rejected may trail conversion proceed on as 'interim trail usage'. The OFA evaluation process may not be bypassed in any manner by trail interests. It is also of mention that however economically viable and desirable excursion services may be, they are of no weight in an STB determination and evaluation – only common-carrier freight (and rarely, interstate passenger) activity is evaluated.

[22] AB_180_0_X THE LOWVILLE & BEAVER RIVER RAILROAD COMPANY--ABANDONMENT EXEMPTION--IN LEWIS COUNTY, N.Y.
[23] https://www.uticaod.com/story/news/politics/state/2018/04/24/state-declines-to-appeal-adirondack/12576035007/

One example of the extreme delay can be seen in STB Docket AB 1296 X where the R. J. Corman Company has attempted to abandon a branch line in Tennessee. Intended as a quick expedited abandonment and trail conversion, it was appealed by local shippers, the state, and an existing shortline railroad through the OFA process. Started in February of 2020, *66 legal filings later*, it is still open as a proceeding blocking trail conversion and has not been completely decided.

In some OFA processes, only a portion of the abandoned line is still viable – such as an OFA placed by the Mendocino Railway on a 12-mile portion of a 100-mile section of track in California. This OFA was ultimately rejected due to the quality of offer financing, not the demand for freight service, but it would have effectively cut the trail application in half with no further appeal process.

Because of the extreme legal costs, delays, prolonged press coverage, and other political considerations, the number of railroad abandonments has actually decreased as railroad companies find it easier to simply sell, lease, or continue owning branches. Only until all efforts have failed to lease or sell a line is an owning company likely to file for abandonment. Conrail's attempt to abandon their ex-Erie Lackawanna main line in the early 1990's across Western NY was a complete failure with heavy political consequences, and the end result was that the subsequent "Clearfield Cluster" coal lines were simply sold to R. J. Corman in 1994 at discounted NLV price rather than risk the political fallout a second time. These lines slated for removal are still operated today as an active railroad when Conrail had fully given up on it, revitalized by an active ethanol facility. Norfolk Southern, in particular, has embarked on a lease program for branches to selected friendly partners rather than attempting abandonments.

It must be emphasized that the "B-line" is inactive, but it has not been filed for abandonment, leaving that to others – any purchase or conversion prior to abandonment absorbs the burden of the entire proceeding to the purchasing entity.

Given the fact that no fewer than seven shortline railroad companies expressed an interest in obtaining an operator RFP if ever made available for the 'B-line', the potential for OFA interest in this line is very high. The acquiring companies all have existing rail operations, the experience and ability to deal with OFA proceedings, and sufficient financial resources to generally qualify as bonafide offers subject to STB review.

But - if no abandonment?

A 'rail with trail' option that allows both interests to simply proceed as partners in the corridor is an immediate solution for all involved parties without undue legal cost and delay, loss of funding, or contentious public debate. As long as the track is present and the opportunity for common-carrier freight service remains intact, no actual abandonment proceeding would need to be filed – which would likely expedite actual parallel trail construction for one to two years even during an expedited abandonment application process – if any OFA, historic designation, or environmental filing is done by any party.

Funding Alternatives

One of the key points on the entire rail-with-trail project is the discussion of funding alternatives for rehabilitation of the corridor to meet the needs and expectations of both parties for a successful project.

While there is no necessary expectation on the part of trail proponents for a self-funding project or participation by private industry expecting a return on investment on the trail portion of the project, that is not equally true on the rail portion. The transformation of branch lines into for-profit operations – whether full ownership of land and assets, or through the use of an operating contract, works on the expectation of creation of a for-profit system. Even for a not-for-profit, the only real difference is the expectation of distribution of any positive cash flow back into the property, or given back to the investors. In both situations, a positive cash flow from operations is necessary to sustain the enterprise.

But for the construction portion of the rail project, the capital expenditures can be significant, and this project is no exception. The mechanisms to allow both public and private reinvestment on the railroad are many and diverse, and the funding mechanisms are both long standing and evolving, known by many acronyms, but still following basic frameworks.

It needs to be emphasized that with a handful of national exceptions, no rail entity receives or expects an operating subsidy from a political entity simply to keep operating. The grant programs are almost exclusively for long-term investments in track, bridges, equipment, and facilities that cannot be funded out of operating income, and have a defined life expectancy. The operating expenses must be funded from operating income, so the entity behaves like a business even under public control.

Private Investment

While a full private investment for acquisition and rehab has been seemingly dismissed in advance, the number of shortline conglomerate entities – both privately and publicly held – has continued to grow and prosper. The supply of available railroad branches, however, has slowed to a trickle now that the track abandonment glut post-Conrail has subsided. In order to grow revenue to show a growth path to current and potential investors, these entities have often outright purchased or long-term-leased properties that were either marginal on existing traffic or significantly overpriced against appraised value. The ability of these entities to raise private capital through their own debt structures and stock sales should not be underestimated. The catch is, however, two-fold for this project. First, nearly all of these entities are risk-averse in direct proportion to their size, which means that the bigger they are, the more likely they are to view any excursion passenger activity (or parallel trail activity) as too high a liability risk and demand excessive insurance liability coverage that renders and entire project infeasible purely from insurance coverage cost.

The second major issue is control. With private investment, any lease (or operating contract) looks to a long term presence on the property; in the current tax era, at least 25 years for an operating contract where any expectation of capital improvement by the operator is part of an understanding. That relates directly to the ability to depreciate asset value for tax purposes against a taxable profit. And, in many states, any public ownership of the corridor for such an operating contract is limited by state law to a lower ceiling of years. While an operator still may be interested in an operating contract, they will not be interested in in-ground improvements that are 'wasted investment' should they be constrained to a 5 or 10 year contract. Track maintenance may be a negotiated cost, but actual capital improvements such as upgrading buildings, constructing transload sites, replacing rail, or constructing facilities is a non-starter on a short-term contract with a for-profit operator.

There are still for-profit entities that are purchasing entire railroads that are primarily excursion operations with either minimal freight or a promise of freight on the horizon. In September 2023, Patriot Rail (shortline holding conglomerate) purchased the Hobo Railroad and Winnipesaukee Scenic Railroad (Meredith, NH) – both on state-owned track with an operating lease, but virtually no freight traffic.[24] This is the only known current instance of a shortline holding company purchasing an excursion-only entity without track ownership where there is currently no freight traffic to speak of.

Nonprofit Ownership

Somewhere in the middle between full private and full public ownership is the purchase and control of a line by an IRS nonprofit entity. This deserves consideration because it is proving to be a rather viable approach in certain circumstances where a return on investment is unlikely to meet the expectations of profit to a private investor group, have better access to almost all available state and federal grants, and for the most part, preserve local control and independent management. Where excursion activity is more significant than freight, it is much more likely to be successful. The ability of the nonprofit to control liability exposure and resulting insurance cost rather than a for-profit corporation is often a determining factor in this decision.

Hybrids on top of for-profits exist, particularly in the formation of a nonprofit to take control of any assets that may be eligible for grant funding, steam locomotives in particular. While private entities may have no such pathway for grant application, transferring ownership of an asset to a nonprofit removes that barrier. The freight side may be a for-profit with an associated nonprofit operating excursions, but actually under the same management relationships. An operating example is the Arcade & Attica railroad in New York State, where the track is owned by an IDA, the freight operator and passenger operator are for-profit, yet the steam locomotives are owned and receiving grants under an associated nonprofit.

[24] https://www.railwayage.com/freight/short-lines-regionals/patriot-rail-assumes-ownership-of-hobo-railroad-winnipesaukee-scenic-railroad/

Nonprofits also have the ability to largely separate themselves from the pitfalls of direct political control, with their own board of directors, and a stand-alone mentality that can outlast any elected political body and the funding uncertainties that entails.

The Grant Funds

A key focus on grant funding is understanding the pronounced difference between funding for freight/industrial projects and excursion/history/tourism projects. These are usually completely different funding sources from the top-down, and only in certain circumstances have any overlap at all. Only a handful of states (such as New York) allocate rail project funding with no prejudice against excursion projects applying for the same funding pool as freight. The same applies for Federal projects in the essential definition of the purpose of the grant funds. As this railroad encompasses both functions, it is important to understand what projects qualify and don't qualify for each focus area.

The other general statement to understand is that many Federal grant funds – particularly enhancement funding – are actually federal but administered and selected at the state level, and may look like a state grant when the money is actually sourced from Federal Highways, and is subject to full Federal procurement rules, bidding, nondiscrimination policies, prevailing wage, etc.

Virginia

Virginia has two specific rail grant programs (state funded) that are available to this project, as long as they involve common carrier freight and industrial development:

1) Virginia Department of Rail and Public Transportation (DRPT) "The Freight Fund" grants. The purpose of the grants falls well within the overall purpose of project rehab for this line, as long as it involves common carrier freight activity – which would include all track, bridges, equipment facilities, etc. The grant application period starts Dec. 1 of each year.[25] There is a variable match required between 30-50% that is reflected in application scoring. The 'meet multimodal goals' purpose of the fund would specifically be met through the transload functions of this project. All entities, including government, non-profit, and for-profit companies may apply. No online press releases or funding notices have been found, so information of maximum grant size, projects actually funded, or number/location of grants was not discovered. The "Freight Fund" is a DOT budget percentage limited (7%) feature that was only enabled in 2020 and may have not yet had any actual awards publicized.

[25] https://drpt.virginia.gov/wp-content/uploads/2023/07/drpt-freight-rail-grant-funding-and-procedures.pdf

2) Virginia Department of Rail and Public Transportation (DRPT) "Rail Industrial Access (RIA)" Program. This is a specific program "to connect new or expanding businesses to the freight railroad network. A grant of up to $450,000 may be requested. Funding requires a 30 percent match by the applicant."[26]. Virginia accepts applicants throughout the year. This grant is also available direct to railroads, as well as industrial businesses, etc. It should be noted that the grant size limits effectively prescribe this program to siding construction, which would also include any transload facilities. DRPT has publicized 8 such grant awards in the state for 2022[27] and all were for rail siding construction to industrial parks and existing rail facilities.

Federal-State Grants

Historically, the "Intermodal Surface Transportation Efficiency Act" colloquially known as 'ISTEA' had a 10% funding set-aside for 'transportation enhancements', which indirectly had an enormous impact on the excursion and tourist railroad industry as well as the creation of trails. While this is part of Federal transportation funding, it is parceled out to state DOT's and effectively administered by state DOT's.

The original 2012 authorization language in the bill certainly specifically directs and facilitates trail construction, and has been largely responsible for significant trail construction projects since its original passage. But within the same bill, now re-authorized last as "MAP-21" but an amended and reauthorized enhancement procedure more under the direct control of the states remains the language eligibility for the following:

"TRANSPORTATION ALTERNATIVES.—The term 'transportation alternatives' means any of the following activities when carried out as part of any program or project authorized or funded under this title, or as an independent program or project related to surface transportation:

"(C) Conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other nonmotorized transportation users.

'(E) Community improvement activities, including— "(i) inventory, control, or removal of outdoor advertising; ***"(ii) historic preservation and rehabilitation of historic transportation facilities;***

That inclusion has led to the eligibility of many projects for excursion railroads, where buildings and even equipment restoration have been funded under enhancement funding. The only removed eligibility language between ISTEA, SAFETEA, and MAP-21 was the removal of "establishment of transportation museums". The definition of "Historic" has been that the facility must be eligible for National Historic Register status, or at least State Historic Register status, if not already on it. This "Historic" definition is interpreted by the individual State Historic Preservation offices. In the past, entire rail corridors, such as the Chesapeake and

[26] https://drpt.virginia.gov/our-grant-programs/rail-industrial-access-ria/
[27] https://www.railwayage.com/mw/drpt-issues-rail-industrial-access-program-grant/

Indiana Railroad, have been purchased with ISTEA funds, as they connected an existing transportation museum to the outside world for demonstration purposes. ISTEA-style funding has, in many cases, also funded the restoration of register-eligible historic equipment, stations, and sites over the years. Funding for these projects has been truly significant, with many grants over the $1M amount; funding in reasonable amounts to actually achieve significant project implementation.

ISTEA and its successor language bills have been re-authorized over several subsequent administrations as part of the US Transportation bill. The dollar value to individual states varies as part of the total percentage of the transportation bill, and enhancement funding as a percentage of that. The major change in MAP-21 is that states are free to not even accept enhancement funding, and apparently also able to change their own funding/award criteria that may effectively differentiate from the Federal guidelines. California, for instance, folded all available enhancement funding into a statewide bonding issue fund that only funded trail construction, and did not offer separate grant applications directly into the Federal funding criteria.

The effectiveness of the program for funding this project greatly depends on the willingness of the state DOT administering the funds to consider such historic transportation facility funds as a portion of the overall enhancement program for their state. State DOT's are not mandated to include such projects even though the Federal funding guidelines clearly include it. And, all Enhancement funding is directly linked to the passage (or lack thereof) of the next US Transportation bill, or re-authorization, which has often become a political target from one or both sides.

This is a major funding issue for this program, as the corridor itself is certainly historic due to its direct involvement in Civil War logistics, and it also meets the trail funding criteria guidelines. As much of the trail construction funding nationwide has been allocated through Enhancement funding, it is important to underline that the eligibility of these funds would also include the rail corridor itself. All of these grants include a local match, but local match participation has been, at times, very creative in terms of donated services, property, and other project assets. And, like most grants, it is reimbursement-based, requiring that the applicant front the funds and then apply for reimbursement after the material or services have actually been paid.

As state DOT's administer these funds, it is sometimes difficult to determine if grant funding is actually via Enhancement Funding and it's guidelines, or a direct state DOT program. Clear understanding of the funds source is highly recommended.

Direct Federal Funding

25 years ago some efforts were made, through congressional earmarks, to add specific rail transportation and preservation projects where grant and/or loan programs were to be distributed directly to applicants without ever involving the state DOT structure. The administration of these individual projects was initially piecemeal, but eventually awarded to

the Federal Railway Administration (FRA). This was actually a very awkward delegation, as the FRA is primarily a rail safety agency, and as one official once commented "we're not a bank". However, over time the agency has evolved into two major rail funding programs administered by the FRA, RRIF and CRISI.

RRIF (Railroad Rehabilitation and Improvement Financing)

The original large FRA federal rail funding vehicle was known as RRIF, and set the procedural stage for direct federal funding of rail projects rather than through state DOT control:

"The RRIF program was established by the Transportation Equity Act for the 21st Century (TEA-21) and amended by the Safe Accountable, Flexible and Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU), the Rail Safety Improvement Act of 2008, and the Fixing America's Surface Transportation (FAST) Act. Under this program the Department of Transportation is authorized to provide direct loans and loan guarantees up to $35.0 billion to finance development of railroad infrastructure. Not less than $7.0 billion is reserved for projects benefiting freight railroads other than Class I carriers.

The RRIF program is in its essence, a subsidized, low-interest loan program, not a grant. And as a loan program, it behaves completely differently than a grant format. RRIF was notable for having large dollar amounts for projects and had relatively few awards due to the complexity of the program, requirement for collateral or guarantees. However some, like Amtrak, have managed to virtually drain the entire fund allocation in certain years.

RRIF is very much of a conventional loan, with several twists in it as of the current guidelines. Collateral is either required via an asset pledge and appraisal of existing assets (including existing track), and a unique feature that the actual loan is not triggered until a particular loan line item is already constructed and completed, making it a hybrid 'reimbursement loan'. This can actually be an advantage as the interest costs do not accumulate on the actual loan amount until the project is actually completed and hopefully earning utility. However, you need a substantial credit line with another lender to do a single multi-million project before the completed line item is then converted to a RRIF subsidized loan amount, and in that regard, it functions like a reimbursable grant.

Collateral rules are unique to RRIF, including provisions that scrap rail be valued on a six-month rolling average rather than a specific date, and not all assets are eligible for collateral. One notable borrower used the entire value of a subsidiary railroad for collateral for rehab of a second property. On the sale of the first property to another entity, the entire RRIF loan was called ('unexpectedly'), due to lack of remaining collateral resulting in a cash flow crisis that ultimately led to the bankruptcy of the entire organization. Loan guarantees are accepted from public entities; one recent $40M+ RRIF award was achieved by loan guarantees by county government rather than collateral.

RRIF has been successfully used for excursion railroad projects; namely the construction of the turntable and facilities at Bryson City, NC for the Great Smoky Mountain Railroad. That RRIF loan has been paid and retired. Until recently, RRIF rules for award were so restrictive that the total number of loans over the original program was under 20, but have been continued and marginally relaxed. Current RRIF recipients include a combination freight and excursion rail program that Stone Consulting is providing engineering services for; RRIF line items include the upgrade of excursion passenger facilities, underlining the ability to use this vehicle for projects that are otherwise ineligible in other programs.

TIGER (BUILD)

The TIGER (Transportation Investment Generating Economic Recovery) grant program was the first, and perhaps most difficult, direct federal grant program to attract widespread attention from the entire US rail community in the 2009-2019 funding timeframe. The funding depth was significant, and the eligibility criteria wide enough that it became widely known, if not widely used. The TIGER program did successfully award significant rail projects totaling over $112 million in 2015[28]

TIGER grants were applied to at the federal level, and the experience from both the shortline and excursion rail camps were that few if any were actually awarded and funded although many were applied for. TIGER's success as a program was questioned by several reports, and the statistics of the program through 2019 display the difficulty of actually receiving a grant award vs. the available funding, with the average grant vs. application percentage never exceeding 24% after 2012[29].

CRISI

The most recent – and potentially equally large –current direct federal grant program and now administered by the FRA, is the Consolidated Rail Infrastructure and Safety Improvements Act program known as "CRISI". This program has shown to be of sufficient size and flexibility to be a prime candidate for this project, despite some significant criticisms in its structure and implementation. It essentially has replaced TIGER, and has many of the same features.

"*The purpose of the CRISI Program is to invest in a wide range of projects within the United States to improve railroad safety, efficiency, and reliability; mitigate congestion at both intercity passenger and freight rail chokepoints to support more efficient travel and goods movement; enhance multi-modal connections; and lead to new or substantially improved Intercity Passenger Rail Transportation corridors.*"[30]

[28] https://railroads.dot.gov/sites/fra.dot.gov/files/2019-11/TIGER%20Fact%20Sheet.pdf
[29] https://crsreports.congress.gov/product/pdf/R/R45916
[30] https://www.federalregister.gov/documents/2022/09/02/2022-19004/notice-of-funding-opportunity-for-the-consolidated-rail-infrastructure-and-safety-improvements

Like RRIF, CRISI is applied to and administered by the FRA. As this is a relatively large, and also new, grant program, the exact mechanics and process are still being established, and actual reimbursements for costs have not yet been publicized. But in general terms, it is a conventional reimbursement grant format that is specifically targeted at rail projects in general, and is currently the funding vehicle for two major programs with Stone Consulting.

The FRA is essentially undermanned as an agency to administer such a large and complex grant program, and has hired engineering and consulting firms to provide direct technical services during the program implementation. Those firms, as contractors to the FRA, administer direct administration of the project with FRA staff participation.

At the current time, railroads are steadily applying for, and receiving, grant awards under this program, if not actual funding. However, like all 'grants', it is also based on reimbursement, and getting to the reimbursement stage requires more effort and time for actual reimbursement than any similar grant program to date and is still not fully based on experience.

Based upon confirmed client projects, CRISI grants have been applied for, and received by, operations with combined rail excursion and rail freight purposes, with line items for both as part of the grant application. No prejudice against either excursion-only or combination projects has been observed.

The first major restriction on awarded grants – as confirmed by Stone Consulting, is that the project must clear – in advance – all provisions of the National Environmental Protection Act (NEPA), including community impacts and historical clearances. No actual funding agreement will be finalized until NEPA has been cleared even if the grant has been awarded. As this NEPA process includes Sec. 106 Historic clearances, determination by FRA staff has involved in-advance clearance of such issues that would normally be irrelevant in a railroad rehab grant or loan, such as the critical replacement of a deteriorated wooden trestle by a modern steel span capable of supporting modern freight loads that may be considered "historic" and require public hearings and project mitigation. In addition, full environmental clearances for stormwater, endangered species survey, permitting disturbance, etc. must be finished and cleared before the actual grant document is signed. This, in essence, has meant that substantial engineering and permitting services and costs be done before any actual guarantee of the grant as 'awarded' will ever be done. This has, according to the FRA, effectively added a full year to the process of allowing significant, track/bridge infrastructure projects to even start. As many of the FRA staff are effectively new hires for this program, actually familiarity of FRA staff with standard rail practices has been questioned as well.

The second significant change impacting the actual grant is firm limits on both budgeted line items on the contract, and reimbursement on the completion of an actual line item. While this process has yet to be observed in practice, the usual practices of percentage of completion for line item reimbursement appear to still be under discussion as to FRA funding policy. It has been made clear, however, that if a specific line item is found to be infeasible, declined over budget overrun, or subsequently removed from the program, that funds cannot be reallocated to

other line items in the same grant – which was not necessarily true of similar federal grant programs. In railroad projects where additional costs, undiscovered defects, and material cost increases are rampant, this places substantial risk on the grant applicant to be committed to line item completion before reimbursement may be applied for, even with significant cost overrun a potential against cost estimates that have cost-aged during the prolonged NEPA process. Reimbursement costs per line item, rather than total cost per grant as approved reimbursement, have yet to be seen in practice.

Despite these shortcomings, the CRISI program would appear to be one of the most viable federal level grant applications for this project for a mixed excursion and freight project. Specific project line items that can be cost-predicted, do not have clear environmental concerns in advance, and can rapidly clear the NEPA process should be considered.

Grade Crossing Safety – Section 130 Funding

One very popular and heavily used 'grant' is the FRA Section 130 funding, which is distributed to the states and administered by the various state DOT's. The object is to increase grade crossing safety with improved devices, closures, or physical separation of track and highways. The Virginia DOT report "Virginia Grade Crossing State Action Plan" summarizes the program as follows:[31]

"Since 1974, the FHWA's Railway-Highway Crossings Program (Section 130) has provided funds to states for the elimination of hazards at highway-rail crossings. Today, FHWA and other Federal agencies continue to support states to promote safety improvements at or near public highway-rail grade crossings."

"Section 130 of Title 23, United States Code, codifies the Federal Highway Rail Crossings Program (commonly referred to as the Section 130 Program—S130) and specifies the way funds apportioned from this program may be used by state DOTs. The Program is funded as a setaside from the funds apportioned for the Highway Safety Improvement Program (HSIP) under 23 U.S.C. 148.

Safety improvements are implemented along with the rest of the HSIP.

This funding was continued under the Moving Ahead for Progress in the 21st Century Act (MAP-21) and under the Fixing America's Surface Transportation (FAST) Act. The funds are apportioned to states by formula. S130 projects are funded at 90 percent Federal share in accordance with 23 USC 130(f)(3). The FAST Act increased the set-aside amount for each fiscal year. In addition, the Consolidated Appropriations Act of 2016 (Public Law 114-113) provided a one-time increase for fiscal year 2016.

Section 130 funds are apportioned to states by a set formula.

[31] https://www.virginiadot.org/business/resources/vhsip/Virginia_RailCrossingPlan_Final_-_02.10.22.pdf

Infrastructure and Investment Jobs Act.

The Infrastructure and Investment Jobs Act (IIJA), signed into law in November 2021, brings some significant changes to the Section 130 program. Overall Federal funding for the Section 130 program increases to $245 million (nationally) in the first year, significantly higher than the levels seen with the FAST Act. The Federal share for projects is increased from 90 to 100 percent ***and clarifies that the replacement of functionally obsolete warning devices is an eligible expense.*** *The permissible amount of state incentive payments at-grade crossing closures is raised from $7,500 to $100,000, and the set-aside for compilation and analysis of data is increased as well from 2 percent up to 8 percent. The IIJA also has a new FRA program called "Railroad Crossing Elimination Grant Program" that will be funded at $600 million annually on a national basis. Grants shall be awarded for projects that make improvements to highway and pathway rail crossings, such as eliminating highway-rail at-grade crossings that are frequently blocked by trains, adding gates or signals, relocating track, or installing a bridge. The program would improve the safety of communities and the mobility of people and goods. At least 20 percent of grant funds are reserved for projects located in rural areas or on Tribal lands."*

The grade crossing issues are discussed in a separate report section, but the key issue that verges on grants in this case is that the track approach and detection circuits are often a weak link in any grade crossing situation. Historically, this was done by welding short pieces of heavy cable between jointed rail sections to ensure electrical conductivity on the approach tracks so that a train completed the detection circuit. As these cable connections ('bond wires') age and deteriorate, repair and replacement has become expensive enough that simply replacing the jointed rail with welded rail on the same approach distance is actually less expensive than welding on the replacement bond wire cables. This effectively is a short-distance track improvement project, up to 1000' on either side of a crossing, that can substantially impact track rehabilitation costs by full replacement of ties and rail. One shortline in Maryland has effectively rehabilitated 41% of their total track mileage by replacing the crossing approach circuits in this manner, 2000' at a time, and having it covered by Sec. 130 improvement funds.

Stone Consulting considers the Sec. 130 program the first obvious 'go to' for available funds, but with a note that at the state DOT level, crossing awards are typically done by historic data analysis – including train frequency, vehicle counts, and actual accidents at crossings. This means that you are far more likely to get crossing funds after an accident than before as funds are typically prioritized as reactive, not preventative, even when it is predicted in increased train or vehicle traffic, and obvious crossing configuration hazard. In Pennsylvania, 'new' crossing devices at a crossing that previously had only passive warnings are a sure indication that a significant accident or fatality happened at that location. The railroad may apply, but the DOT will make the decision on where Sec. 130 funds are actually used.

Shortline Tax Credit Program

Although not really a 'grant', the Shortline Tax Credit Program easily becomes one in the hands of a talented rail administrator. This IRS program provides a tax credit to operating freight shortlines on a per-mile basis for basic track maintenance costs to be credited against federal tax liability.

This credit – which had been subject to congressional session renewal and was made permanent in 2021[32] – involves 50% of all track maintenance expenses on a shortline freight railroad on a per-mile basis capped at $3500/mile, decreasing to 40% in 2023. On a 50-mile line such as this, that could amount to $175,000 per year if 40%, but if the line is not a profitable enterprise with taxable income, would appear to have no particular value if the entity is running at a loss or is not subject to Federal tax.

But unlike any other tax credit, this shortline tax credit is both salable and transferrable, so that it has cash value. In essence, this is a marketable asset and a potential indirect cash operating subsidy, even if limited. This is essentially a 'shadow currency', and companies have even been formed to market unused tax credits for a discount to other shortline railroads that do have taxable income and need the credits.[33]

The "45G" IRS tax provision now appears to be unique in nature, so as long as an organization is paying for track maintenance, they have some potential for an effective rebate against those costs. This would not apply to an excursion-only operation, but there does not appear to be any limit on the mileage in freight service against total miles in maintenance.

Foundation Grants

While it is highly local and regional, some specific and notable grants have been secured – particularly for excursion rail equipment and operations – by local, national and regional foundation grants. This is particularly of note for this project given the highly historic nature of the line, spanning two worlds of both railroad and Civil War history, where the railroad was an integral part of the battle for the valley and a supply line.

These grants tend to be very much under the control of individual funding agencies and donors, and are very difficult to either predict or quantify until an actual project is designated, costed, and announced in a donor campaign. However, even national organizations have been known to step up and finance some notable rail operations, such as the Microsoft Foundation financing the Friends of the Cumbres & Toltec Scenic Railroad for becoming the operator for the C&TS Historical Commission in Colorado and New Mexico in 2001. This grant was one of the largest known private foundation grants to an excursion operation, and leveraged the 'Friends' into becoming the actual not-for-profit operator of the railroad today.

[32] https://www.iasoybeans.com/newsroom/article/short-line-railroad-tax-credit-made-permanent
[33] https://www.eknrail.com/45g-tax-credits/

Class 1 railroads such as Union Pacific and BNSF both have foundations that have donated cash and even equipment, as well as property, to on-line communities and projects for rail preservation and historic preservation. However, these two foundations are very territory-centric; i.e. only to existing on-line communities.

Norfolk Southern does have a foundation, but it's work is relatively limited to grants to nonprofit organizations to online communities inclusive of first responders, libraries, and even historical foundations. While it is possible, it is not likely a significant element.[34]

CSX does have a foundation that makes relatively open-entry eligibility for nonprofits and communities for various projects, but the amount of the awards appear to be capped at $1000-$5000 each.[35]

These various local and regional foundation grants can be targeted by project, but it is also significant to understand that defined purpose, results, and publicity of the fund participation are key elements to any foundation gift, and that almost without exception, they are only given to nonprofit or government entities.

Sponsorships

A number of excursion railroad entities have managed to secure paid sponsorships for specific projects that would otherwise be unobtainable. While there is sometimes negative reaction to the direct for-profit sponsorship of a program or project on a nonprofit entity, it should be noted that the results are certainly worth mentioning within funding alternatives as they can have significant impact.

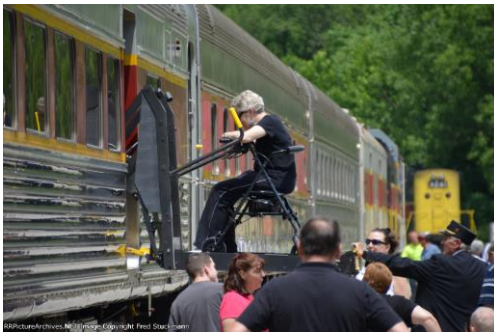
Perhaps the most sponsorship-active excursion operation in the United States continues to be the Cuyahoga Valley Scenic Railroad (CVSR) between Cleveland and Akron, OH. As a nonprofit entity operating over NPS-owned trackage in the Cuyahoga National Recreation Area, it has faced challenges both political and structural in negotiating aggressive fundraising instead of an operating or grant subsidy. CVSR has elevated sponsorships to a significant level.

CVSR has had a two-pronged approach for decades on securing corporate and private donations and sponsorships:

- ⊗ The CVSR board is primarily comprised of local corporate board managements rather than volunteers or railfans, that can facilitate community donations

[34] http://www.nscorp.com/content/dam/nscorp/get-to-know-ns/foundation/Local_Discretion_Grant_Guidelines.pdf
[35] https://www.csx.com/index.cfm/community-investment/charitable-investments/community-service-grants/

- ⊗ The CVSR purchased a classic 1940's Budd observation car, the St. Lucie Sound, specifically as a charter vehicle for private corporate parties, board members, and fundraising. It's success has been rather remarkable in that area.



Historically, CVSR has picked up sponsorships by allowing corporate placement of branding and advertisement even on locomotives, but the most remarkable proof of sponsorship muscle was the purchase, rehab, and construction of the "Invacare", a full ADA-accessible Budd combine with a retractable ADA lift in the baggage section that can be deployed anywhere on the railroad without high platforms. Invacare, Inc. totally funded the program in exchange for naming the car for the corporation and allowing advertising materials for their medical and nursing home services in the car. This project was worth well over $300,000 to CVSR and remains an outstanding example of private sponsorship funding on a nonprofit.

CVSR continues to be an example of how the nonprofit and corporate world can merge to provide ongoing sponsorship opportunities – and freely pursue them even with the constraints of operating within the NPS confines of a national park.

The current 2023 posted events include Key Bank now sponsoring the winter 2023 Polar Express operations, and the disclosure that CVSR has a full-time development director – just as any other nonprofit would have.[36]

CVSR with "Goodyear" sponsorship – 1996 – no longer painted in this scheme.

[36] https://www.cvsr.org/about/community-engagement/

Operational and Management Structure Alternatives

Historically, railroads, as a for-profit corporation, obtained a state charter that gave them construction and property condemnation rights, raised capital, and simply built and operated their own railroad. A great number were immediately refinanced and absorbed into larger systems, and the reformation of railroad systems has never really stopped for 150 years.

The "B-Line" is currently owned and was operated by Norfolk Southern, which itself is a merger of Norfolk and Western with Southern Railway in 1982. That merger put what had been two previously competitive railroads in the area under the same tent, which particularly stands out at Riverton/Front Royal. The NS merger did nothing to improve the strategic role of the line in question and if anything lessened competitiveness for freight traffic.

NS expanded greatly in 1998 with the acquisition of half of Conrail. The bidding war with CSX resulted in what many have regarded as payment over market value for many ex-Conrail properties, resulting in likely inflated book values. As a result, particularly in ex-Conrail territory, NS has leased, rather than sold, excess routes and lines rather than recognize a real estate value loss if actually sold. On lines like the "B-Line", that predate Conrail, outright line sales are far more likely. Previous lease arrangements typically orchestrated by NS do not apply in this case.

This is a crucial point because if NS retains any underlying control or ownership in the transaction, they still remain in the liability path as an owner. On a leased line, this means they still have the right to dictate insurance terms and control negotiations over interchange rights, passenger use, rates, etc. On any line with either parallel trail occupation, or excursion train operations, the liability insurance overhang that NS requires for their public corporation protection may go as high as Amtrak levels - $250 million in coverage. On a practical basis, most excursion railroad coverage limits rarely exceed $10 million, and the highest national coverage ever confirmed is $50 million, for a multi-state, multi-operation excursion owner. <u>This single issue remains the key one in understanding that if any trail or excursion activity is to result, NS must make a clear sale, not a lease, of the entire line, including real estate.</u>

During the massive retrenchment and abandonments beginning in the 1970's of the American rail network, many states and communities stepped forward to attempt to preserve their local freight lines, organized as State DOT's, rail authorities, and Industrial Development Agencies. These public entities purchased the lines for scrap value and then competitively leased operating rights to for-profit shortline rail companies springing up at the time. New for-profit rail companies bought some lines, and the entrepreneurial spirit of business re-emerged. 50 years later the original owners have consolidated many of the smaller lines into regional and national holding companies, with the champion being Genesee and Wyoming, with over 140 various shortlines that are owned, leased, or have operating contracts – turned public, and they were taken private by Brookfield Investments. Small railroads have become profitable big business again, and with the energy devoted to marketing and individual lines, actually prospered. Industrial and traffic growth rates of shortlines far exceeded the large systems.

Against this same backdrop emerged literally hundreds of tourist, museum, and excursion railroads operating over branch lines under public, nonprofit, or leased ownership. The variety of arrangements is wide, and based upon local and regional situations, political structures, and the original method used for purchasing the line. The arrangements vary widely, but these are not conceptual approaches as examples of each one can be found as successful operations. The key, in many cases, is the need to preserve the railroad asset through local, rather than corporate control, and to contain the liability insurance costs and exposure so that excursion operations are financially feasible for community benefits.

The actual mechanics of how shortline freight and excursion railroads manage to prosper over shared trackage and responsibilities takes many organizational and operational forms, some of which are below:

Direct purchase of the line for freight and excursion; for-profit basis:

Structure: Existing or newly formed corporation that raises capital to directly purchase a branch for a negotiated private offer or dictated STB price through the Offer of Financial Assistance (OFA) method. Requires extensive private capitalization. Entity can wholly control real estate, insurance, and operations – if through STB, must include common-carrier freight continuation.

Examples: American Heritage Railways (Colorado, North Carolina); Patriot Rail recent acquisition of Hobo Railroad and Winnipesaukee Scenic Railroad (2023)[37].

Advantages: Speed of transaction, ease of transfer of control via STB if non-OFA. Control of trail access and design results from property ownership.

Disadvantages: Expectation of profitable returns and sufficient cash flow to retire debt from acquisition; continuous pressure on profitability and service. Must prove to STB ability to finance transaction if purchased through OFA method.

State agency purchase of line with direct operational control:

Structure: State agency purchases line from railroad and assumes ownership and full operational control via a state agency.

Examples: West Virginia State Rail Authority; South Branch Valley Railroad

Advantages: Extensive funding available for rehab and operations; ability to control liability limits for any contracted excursion operator. Long-term view of property condition, capital expenses. Funding for critical repairs more easily accessible in case of natural disaster.

Disadvantages: Prolonged political climate exposure to budgets literally as a line item in annual state budget. Operating budget subject to annual political review rather than business climate needs. Continuous examination to privatize.

[37] https://www.railwayage.com/freight/short-lines-regionals/patriot-rail-assumes-ownership-of-hobo-railroad-winnipesaukee-scenic-railroad/

State agency purchase with leased operator(s):

Structure: State agency purchases line from railroad and owns property but leases operational rights to freight and/or excursion operator. Operator pays contractual fee.

Examples: West Virginia State Rail Authority with West Virginia Central; Cass Scenic; Buffalo Creek & Gauley with Rail Explorers railbike franchise.

Advantages: Extensive funding available for rehab and operations; ability to control liability limits for any contracted operator

Disadvantages: Contractual limits governed by state law effectively require periodic contract rebidding; short contract terms mean operators have no incentive to invest in property or facilities.

Local agency purchase with direct operational control:

Structure: City, county or other agency purchases line and assumes ownership and full operational control including train operations, staff, maintenance.

Examples: (very unusual) City of Prineville Railway (OR)

Advantages: Complete local control of railway operations, staff, service

Disadvantages: Subject to local agency budgets, political considerations, agency subject to full FRA/Railroad Retirement considerations. Effectively "Railroad Department" within a municipality.

Local agency purchase with operator lease for freight and/or excursion:

Structure: County/City/local agency purchases railroad, competitive bidding for profit or nonprofit operators; subject to state law for contracting authority. Operator pays fee to agency and/or sinking fund for capital match projects. Most common arrangement nationwide.

May be separate excursion and freight operators

Examples: SEDA-COG Council of Governments; SEDA-COG Railway Authority (PA) (agency); City of Lebanon, OH (City control with contract excursion operator).

Advantages: Access to state and local funding sources and grants; may be independent board or under direct elected political control. Retain property rights for long term preservation.

Disadvantages: Likely contractual limits on operator contract duration make private operator reluctant to do either capital maintenance or improvements. Detailed operating agreement required, financial disclosures. Periodic requalification of operator via open bid process subject to state law.

Nonprofit owner with full excursion and freight rights:

Structure: Nonprofit organization takes ownership of all property and assets and also forms a subsidiary corporation to legally handle freight operations (affiliated for-profit also subject to railroad retirement for employees).

Examples: Tennessee Valley Railroad Museum (Chattanooga, switches VW plant), California State Railroad Museum (Sacramento Southern); Boone & Scenic Valley Railroad (transload and car storage services).
Advantages: Focus on excursion operations; full control of liability insurance levels. Able to command control of full railroad property and operational preemption under federal law rather than local ordinances. Freight may or may not be stand-alone profitable but can be very lucrative given right environment.
Disadvantages: Extensive FRA regulation and cost as a fully regulated freight carrier. IRS complications on stand-alone for-profit affiliated company to nonprofit.

Nonprofit owner with full excursion and contracted freight rights:

Structure: Nonprofit organization takes control of all property and assets and contracts with a shortline freight carrier to provide all regulated rail activity and possibly operational authority of excursion trains; nonprofit retains all marketing and sales control. Carrier is separately corporately organized and under contract.
Examples: Oil Creek & Titusville Historical Society with OCTL lines (freight carrier); Colebrookdale Railroad Preservation Trust with Eastern Berks Gateway Railroad (freight carrier contract).
Advantages: Nonprofit access to grants; less political exposure than Authority/Agency. Useful when excursion operations dominate over freight activity but freight activity required. Nonprofit controls all public visible activity with freight carrier in background. Operator contract may be significantly longer as not subject to state procurement.
Disadvantages: Regulatory 'split' may confuse management responsibility for track and regulatory authority; clear lines of management must be maintained.

The nonprofit forming a subsidiary freight carrier is an approach that is often looked at by existing nonprofits as either an opportunistic situation to gain additional revenue if a local customer on their line requests service, or if the nonprofit is under substantial pressure to local interests to divest themselves of property rights and needs the formation of a common-carrier freight operation to legally claim federal preeminence over local laws and ordinances. It still remains unusual, but can be highly lucrative if the process of forming a stand-alone subsidiary and becoming a fully regulated freight carrier can be justified by the revenue from freight operations. Common-carrier protection of the right-of-way and prevention of 'nuisance ordinances' can be motivation enough to run freight at a loss if necessary.

The nonprofit with full excursion and contracted freight rights option involves some other details that are worth mentioning; particularly in the Oil Creek model. In their case, the Historical Society owns all property, buildings, and excursion equipment. The freight operator, Oil Creek and Titusville Lines, is under a long-term contract and owns the locomotives, and supplies all railroad crew members as a regulated carrier, and is also responsible for all 'under the frame' maintenance of excursion cars and track standards. The nonprofit owner does not deal with either Railroad Retirement or the FRA for any

regulatory matters and can have paid employees as well as volunteers, but they are not regulated railroad employees. The freight carrier pulls the excursion trains for a negotiated per-train fee, much as if it were a special freight car move and is billed accordingly. The nonprofit owner does all excursion marketing, ticket sales, development of volunteer on-board staff. These removes virtually all the regulatory burden onto the freight partner and lets the nonprofit focus on the retail and promotional end of the excursion railroad, and receive all ticket and concession revenue. This model has worked successfully on the Oil Creek and Titusville since 1987, with both the freight carrier and the nonprofit excursion operator showing positive cash flows.

Economic Impacts

The trail-only proposal for the corridor has developed an economic impact analysis based upon construction costs, and visitor impacts assuming development of the entire corridor over time. That analysis is not being challenged, although much of the underlying data at a granular level was not in the report, such as assumed overnight stay percentages and per-visitor spending.

As a result, this analysis is literally considered to be an 'add-on' to the existing trail project impacts, as the presence of a parallel, end-to-end trail is also assumed.

Trails in general have been challenged to document projected visitations after construction. In contrast, excursion and rail operations are just the opposite, subject to actual paid attendance and freight car movement records on a federally mandated level. The FRA requires all railroads connected to the general system to record train miles, passengers, and all accidents in order to develop baseline safety statistics on a national basis. Trails are under no such reporting requirement, and it has been challenging for trails to document projected visitations, as well as visitor origins and assumed overnight stays.

As in the trails analysis, the selected tool for economic impact analysis was IMPLAN, a requested software analysis method that is licensed and used nationally. Inputs are factored as events, direct spending by industry type and region, and forecasted visitor numbers. Dollars are forecasted on 2022 performance as dollar-value impacts with future inflation added in. The base impact region was defined statewide as "Virginia", with "Shenandoah County" selected for impact purposes to use regional impact constants, although it is recognized that it is at minimum a 3-county region.

IMPLAN assumes total impacts on direct, indirect, and implied totals – i.e. a three level impact. IMPLAN, like other economic impact analysis tools, uses a multiplier factor based on direct budgets times a multiplier effect as the initial direct spending moves through the entire regional economy. The goal in this analysis is to make the additive projected impact as near-similar to the original trail methodology as could be done with available data.

Construction Impacts

As in the trails-only option, the biggest initial economic impact is the construction of the project. It consists of the following, over a minimum three-year period consisting of cost factors in addition to the basic trail construction:

1) Rehabilitation of the track structure – mostly consisting of required tie replacements to allow 25mph operations.
2) Grade crossing repairs to restore all crossings back to open rail use, including an assumption that virtually all of the grade crossing electronics must be replaced.
3) Repairs to the bridge structures for rail use.
4) Additional engineering, permitting, environmental and inspection costs.

The creation of 'rail with trail' creates the following additional construction costs that are fully acknowledged:

1) Parallel trail construction with an additional per-mile cost of $1 million per mile to grade and construct a parallel recreational trail within the existing right-of-way.
2) Projected costs to cantilever a minimum 8' wide pedestrian walkway on the bridges beside the track structure.
3) Additional engineering, permitting, environmental and inspection costs.

Construction costs are used as baseline figures for impacts, as adding in additional contingencies only serve to inflate total impact and employment when those are subjective at best. Impacts then, are conservatively estimated as a result.

Two additional rail-exclusive impact factors are included as they are likely to have local impact:

1) Construction of a pre-engineered locomotive storage and shop building.
2) Purchase and/or assembly of railbikes that involve local materials and labor.

There are additional capital costs (such as equipment purchases) that are likely to be done as an operating entity that do not have local economic impacts, and are also funded by third parties not subject to funding assumptions here. As an example, bringing a $250,000 locomotive in for use on the line results in operational budgets, but no economic impact of actually building a locomotive.

The additional construction costs used as a base over the initial construction are highest in the first year (highest trail construction miles) and decline into year 3 – but arrive at a total construction bill for impact purposes of just over $104 million for the entire 50-mile project.

One considerable savings is a known factor for this alternative (but not part of the impact analysis) in that unlike a trail, crosstie disposal is not required for an operating railroad. If the track is left, the remains of unusable ties are not required to be removed and landfilled as hazardous waste. At $13 a tie estimated disposal cost, this is projected to be a $1.8 million savings by itself.

Operating Costs

Unlike a trail, an excursion and freight railroad is an operating business. While there may be some volunteers involved in small-scale museum type operations or on-board guide service, the size and scope of this project assumes a staffed organization of no less than 25 employees for the rail operation at plateau ridership, and potentially a similar likely number of contracted services employees for meal services and entertainment functions that peak in the 4th quarter. The railbike operation projects a small number of full time employees for management and

marketing, but staffs up operations in a manner nearly identical to a whitewater rafting seasonal staff to accompany the tour groups for a likely staff size of 13.

As the railroad comes back to operation in sections, the operating expenses and impacts do in the same way, with an annual expense budget starting at $665,000 and developing into a plateau level operating budget (including assuming track maintenance post-construction) of $3.1 million per year. This factor – the total budget of running a business – is the sustaining economic impact factor. When combined with visitation it becomes unique to this proposal.

The ticket and freight revenues, while necessary for a pro-forma estimate of the business prospects, do not produce economic impact. Spending does, and these kinds of business-related spending budgets do greatly impact a region as everything from supplies to utilities to crossties is purchased regionally.

Visitor Impacts

As in the projected ridership section, number of visitors is based on an assumed plateau ridership level of 75,000 per year as a rational base – which is largely dependent on the success of events-based programming that pulls riders from a greater distance. A successful operator may well exceed that, but for impact purposes that number was used for the plateau impact projections, and prorated down over the five year period to only 11,250 for Year 1 startup to the five year level of 75,000. At this point, aside from significant changes, ridership and impacts tend to fluctuate only with general economic activity.

Both rail and trail must accept that the raw number of visitors do not necessarily directly produce impacts. The goal for both is developing a destination attraction that results in an overnight stay, which produces the true 'big bang' results in local and regional employment in the existing hospitality industries in the valley. Local users, particularly on trails, and local rail riders living in the nearby towns, may produce little or no additional economic impacts that aren't already there for this regional impact analysis.

An excursion railroad operation greatly impacts overnight stays by the length of the run, schedule of runs, and in particular, the potential 4th quarter holiday schedule. As Christmas operations are often run later into the evening (such as Polar Express), the likelihood of producing an overnight stay is much higher as a result. In many existing operations overnight stay percentages from Polar Express and similar have exceeded 50%, resulting in visible crushes of business to local motels and restaurants. But as this potential is just that, forecasting that high an overnight stay impact is potentially an exaggeration.

To do that on a factual basis, you need to arrive at an assumption of two factors – first, what the likely percentage of overnight stays is, and what the likely visitor spending is. In absence of visitor intercept surveys for this specific project, the number used was from the 2022 visitor impact study for Virginia[38]; "Virginia Tourism Economic Impact" that used a figure of 39.6% for overnight stay percentage, and per-visitor spending dollar amounts of $232.08 for overnight visitors, adding lodging, transportation, food and retail spending together. This number is

[38] Source: https://www.vatc.org/wp-content/uploads/2023/08/Virginia-Tourism-Economic-Impact-2022.pdf

within rational levels of actual intercept studies that Stone Consulting has done of other excursion rail operations in the past, and is sufficiently conservative to use for impact analysis.

Finally, unlike the projected visitor impacts of the trails-only alternative that is seasonally dependent, the visitor impacts of the rail+trail project have a much longer season. It is likely to peak the ridership impacts of the 4th quarter, not the existing prime vacation season where virtually every recreational opportunity offers a competitive alternative to being on a destination trail. This spreads the hospitality season longer for the entire region, and is not weather dependent. Capacity of the existing hospitality system is extended – one of the most significant features of this alternative.

Tax Impacts

IMPLAN also projects tax impacts based on specific state and local tax structures, and the location of the attraction. This is factored as State, Federal, and Local tax impacts, including special tax districts that are impacted. This is a standard feature of IMPLAN and is directly comparable to any similar impact analysis for the trails-only portion. As would be imagined, the most significant impacts in that area are payroll taxes, local and state sales taxes, and various lodging fees and charges.

SHENANDOAH RAIL WITH TRAIL OPTION
IMPLAN SUMMARY OUTPUT OF ADDITIONAL ECONOMIC IMPACT

Rev. 3-26

	Dollar Year	Notes	Employment	LaborIncome	ValueAdded	Output
YEAR 1	2025	Heavy construction	306.45	$ 22,976,741	$ 45,903,264	**$ 96,850,665**
YEAR 2	2026	construction	205.48	$ 13,923,365	$ 22,785,558	**$ 54,232,900**
YEAR 3	2027	construction	206.74	$ 12,832,516	$ 20,032,277	**$ 45,335,422**
YEAR 4	2028	Peak year operations	143.34	$ 7,013,057	$ 11,377,303	**$ 21,403,980**
YEAR 5	**2029**	**Plateau level**	**140.03**	**$ 6,912,923**	**$ 11,202,675**	**$ 21,080,554**
Five year Total			**1,002.02**	**$ 63,658,602**	**$ 111,301,077**	**$ 238,903,522**

SHENANDOAH RAIL WITH TRAIL OPTION
IMPLAN SUMMARY OUTPUT OF ADDITIONAL TAX IMPACT
Rev. 3-26 w/trail cost adj

	Dollar Year	Notes	SubCountyGeneral	SubCountySpecialDistrict	County	State	Federal	Total
YEAR 1	2025	Heavy construction	$ 427,770	$ 626	$ 994,903	$ 1,804,859	$ 5,943,514	$ 9,171,672
YEAR 2	2026	construction	$ 265,883	$ 350	$ 723,407	$ 1,182,064	$ 3,400,639	$ 5,572,343
YEAR 3	2027	construction	$ 207,008	$ 341	$ 619,913	$ 1,000,078	$ 2,649,932	$ 4,477,273
YEAR 4	2028	Peak year operations	$ 77,668	$ 22	$ 411,608	$ 673,713	$ 1,558,027	$ 2,721,038
YEAR 5	**2029**	**Plateau level**	**$ 75,333**	**$ 22**	**$ 398,424**	**$ 655,760**	**$ 1,536,303**	**$ 2,665,841**
Five year Total			**$ 1,053,663**	**$ 1,361**	**$ 3,148,254**	**$ 5,316,474**	**$ 15,088,416**	**$ 24,608,168**

Project Summary – Rail with Trail Additional vs. Existing Costs

Analysis of this project with additional costs of the rail plus trail alternative – plus the existing and assumed costs of the trail project that have been accounted – can be estimated for total budget purposes. Those previous costs had previous impacts and are not included in our estimates. It is also noted that property acquisition, by definition, is a legal exchange of title and does not, by itself, produce economic impacts.

This is a multi-year project, and also eligible for various grants beyond the initial applications, but a likely order of magnitude total is as follows:

SHENANDOAH RAIL WITH TRAIL OPTION
Projected Trail + Rail with Trail Capital costs
Rev. 5-30

Rail with Trail (this report and new construction impacts)
Assumed trail-only costs (part of previous analysis and previous impact)
Property purchase from NS

Rail Operation	$ 25,955,980	*impact*	
Parallel trail	$ 51,765,000	*impact*	
Trail Bridge construction *(including B51-61)*	$ 26,707,335	*impact*	$ 104,428,315
Parking - trail heads	$ 7,500,000		
Corridor safety	$ 2,500,000		
Trail crossings	$ 5,000,000		
Corridor purchase	$ 23,000,000		$ 38,000,000
Total likely capital costs			**$ 142,428,315**

SUMMARY COST ESTIMATE (BRIDGES 86.10 thru 97.60) Phase 1 Operational Plan AND (BRIDGES 86.10 thru 97.60) Phase 1 Operational Plan

BRIDGE NO.	Description	Phase 1 Rail Operations Bridge Rehabilitation for Rail Service	PHASE 2 (2) Trail Construction	Total Cost
-	Mobilization and Demobilization (10%)	$570,500.00	$897,500.00	$1,468,000.00
-	Erosion and Sedimentation Pollution Control (5%)	$285,300.00	$448,800.00	$734,100.00
62.80	Single Span over UNT	$314,200.00	$0.00	$314,200.00
63.90	Four Span over South Fork Run/Battlefield Road	$709,500.00	$772,500.00	$1,482,000.00
65.40	Single Span over Snapps Run	$144,900.00	$100,000.00	$244,900.00
66.70	Three Span over Highway 651	$630,900.00	$213,500.00	$844,400.00
67.60	Twelve Span over Tom's Brook/Private Road	$765,000.00	$1,382,000.00	$2,147,000.00
	Phase 2 and 3 between these mileposts			
86.10	Single Span over Bank Street	$473,400.00	$369,500.00	$842,900.00
86.20	Three Span over Mill Creek/Bryce Boulevard	$413,000.00	$1,034,000.00	$1,447,000.00
87.80	Single Span over UNT	$175,500.00	$247,050.00	$422,550.00
87.90	Single Span over UNT	$170,400.00	$132,650.00	$303,050.00
89.80	Six Span over Holman's Creek	$555,600.00	$1,057,400.00	$1,613,000.00
94.30	Seven Span over Unnamed Drainage Channel	$280,550.00	$855,900.00	$1,136,450.00
94.35	Two Span over Unnamed Drainage Channel	$135,600.00	$356,600.00	$492,200.00
95.40	Single Span over Unnamed Drainage Channel	$11,175.00	$190,000.00	$201,175.00
95.71	Single Span over Unnamed Drainage Channel	$78,000.00	$269,300.00	$347,300.00
97.36	Two Span over Honey Run Creek	$284,000.00	$1,029,000.00	$1,313,000.00
97.60	Four Span over North Fork Shenandoah River	$562,800.00	$965,600.00	$1,528,400.00
	CONSTRUCTION SUB-TOTAL =	$6,560,325	$10,321,300	$16,881,625
	CONTINGENCY (25%) =	$1,640,081	$2,580,325	$4,220,406
	ESCALATION (3) =	$1,767,239	$7,113,030	$8,880,269
	CONSTRUCTION TOTAL =	$9,967,645	$20,014,655	$29,982,300
	ENGINEERING (DESIGN/PERMITTING/BIDDING) =	$1,495,147	$3,002,198	$4,497,345
	CONSTRUCTION ADMINISTRATION & INSPECTION =	$996,765	$2,001,465	$2,998,230
	TOTAL ENGINEERING AND CONSTRUCTION =	$12,459,556	$25,018,319	**$37,477,875**

(1) Phase 1: Includes all work required to place railroad bridges back in service for railroad loading.
(2) Phase 2: Includes construction of trail at each bridge site as indicated here-in. This work will be done under normal operation of the railroad.
(3) Escalation: Includes escalation equal to 5% over 5 years for Phase 1 and 10 years for Phase 2.

IMPACT TOTALS WITHOUT CONTINGENCY/ESCALATION	Track	Trail
Raw Estimate construction	**$5,704,525**	**$8,975,000**
Mobilization	**$570,500**	**$897,500**
E&S	**$285,300**	**$448,800**
Engineering at .15	**$855,679**	**$1,346,250**
Admin & inspection @.10	**$570,453**	**$897,500**

SUMMARY COST ESTIMATE (BRIDGES 68.20 thru 76.40) Phase 2 Operational Plan

BRIDGE NO.	Description	PHASE 2 Rail Operations Bridge Rehabilitation for Rail Service	PHASE 2 (2) Trail Construction	Total Cost
-	Mobilization and Demobilization (10%)	$302,100.00	$550,500.00	$852,600.00
-	Erosion and Sedimentation Pollution Control (5%)	$151,100.00	$275,300.00	$426,400.00
68.20	Single Span over Jordan Run	$43,800.00	$520,000.00	$563,800.00
71.60	Twenty-two Span over Pugh's Run	$1,400,000.00	$1,213,700.00	$2,613,700.00
74.00	Single Span over UNT	$90,600.00	$50,000.00	$140,600.00
75.00	Single Span over UNT	$175,500.00	$247,050.00	$422,550.00
76.40	Thirteen Span over Narrow Passage Run	$1,310,400.00	$3,473,500.00	$4,783,900.00
	CONSTRUCTION SUB-TOTAL =	$3,473,500	$6,330,050	$9,803,550
	CONTINGENCY (25%) =	$868,375	$1,582,513	$2,450,888
	ESCALATION (3) =	$935,701	$4,362,419	$5,298,120
	CONSTRUCTION TOTAL =	$5,277,576	$12,274,981	$17,552,558
	ENGINEERING (DESIGN/PERMITTING/BIDDING) =	$791,636	$1,841,247	$2,632,884
	CONSTRUCTION ADMINISTRATION & INSPECTION =	$527,758	$1,227,498	$1,755,256
	TOTAL ENGINEERING AND CONSTRUCTION =	$6,596,970	$15,343,727	**$21,940,697**

(1) Phase 1: Includes all work required to place railroad bridges back in service for railroad loading.
(2) Phase 2: Includes construction of trail at each bridge site as indicated here-in. This work will be done under normal operation of the railroad.
(3) Escalation: Includes escalation equal to 5% over 5 years for Phase 1 and 10 years for Phase 2.

IMPACT TOTALS WITHOUT CONTINGENCY/ESCALATION

Raw Estimate construction	**$3,020,300**	**$5,504,250**
Mobilization	**$302,100**	**$550,500**
E&S	**$151,100**	**$275,300**
Engineering at .15	**$453,045**	**$825,638**
Admin & inspection @.10	**$302,030**	**$550,425**

SUMMARY COST ESTIMATE (BRIDGES 78.60 thru 87.90) Phase 3 Operational Plan

BRIDGE NO.	Description	Phase 3 Rail Operations Bridge Rehabilitation for Rail Service	PHASE 2 (2) Trail Construction	Total Cost
-	Mobilization and Demobilization (10%)	$95,700.00	$173,900.00	$269,600.00
-	Erosion and Sedimentation Pollution Control (5%)	$47,900.00	$87,000.00	$134,900.00
78.60	Single Span over UNT	$150,000.00	$100,000.00	$250,000.00
78.90	Seven Span over Big Stoney Creek	$472,700.00	$1,144,200.00	$1,616,900.00
84.40	Single Span over UNT	$168,000.00	$247,050.00	$415,050.00
84.50	Single Span over UNT	$165,500.00	$247,050.00	$412,550.00
	CONSTRUCTION SUB-TOTAL =	$1,099,800	$1,999,200	$3,099,000
	CONTINGENCY (25%) =	$274,950	$499,800	$774,750
	ESCALATION (3) =	$296,267	$1,377,769	$1,674,036
	CONSTRUCTION TOTAL =	$1,671,017	$3,876,769	$5,547,786
	ENGINEERING (DESIGN/PERMITTING/BIDDING) =	$250,653	$581,515	$832,168
	CONSTRUCTION ADMINISTRATION & INSPECTION =	$167,102	$387,677	$554,779
	TOTAL ENGINEERING AND CONSTRUCTION =	$2,088,772	$4,845,962	**$6,934,733**

(1) Phase 1: Includes all work required to place railroad bridges back in service for railroad loading.
(2) Phase 2: Includes construction of trail at each bridge site as indicated here-in. This work will be done under normal operation of the railroad.
(3) Escalation: Includes escalation equal to 5% over 5 years for Phase 1 and 10 years for Phase 2.

IMPACT TOTALS WITHOUT CONTINGENCY/ESCALATION

Raw Estimate construction	**$956,200**	**$1,738,300**
Mobilization	**$95,700**	**$173,900**
E&S	**$47,900**	**$87,000**
Engineering at .15	**$143,430**	**$260,745**
Admin & inspection @.10	**$95,620**	**$173,830**

TIE COUNT SUMMARY

Rev. Day	4/14/2023 Sheet	Zone	Crossing Location	Milepost	Rail	100 TIE SAMPLE TOTALS Remaining Life 20+	10-15	5-10	1-5	Total good ties	Defective ties	22" 2880 ties per mile Target track class	Additional adds	Goal %	Add per mile	Per Section	Tie action	Brush/tree Conditions	Rail conditions	Tie cost / section $ 95.00
			Railroad start (rails separated)	99.6																
1	1	1 South	Broadway Lee St.	99.5	100# W	0	1	7	32	40	60	FRA 2	FRA1 count	42%	812	81	additional ties	Clear	Very good	
			headed north		1936															
1	2	1 South	Memorial Park Drive	97.82	100#W	0	2	13	33	48	52	FRA 2	FRA1 count	42%	812	1365	additional ties	Clear	Very good	
1	3	1 South	Evergreen Valley Dr.	96.75	100#W	5	8	14	23	50	50	FRA 2	Partial	42%	500	535	additional ties	Light	Very good	
					1930															
1	4	1 South	Shenandoah Caverns	89.5	100W	0	3	5	18	26	74	FRA 2	FRA1 count	42%	812	5889	additional ties	Light	Very good	
		Valley Fertilizer - end of welded		**85.4**																
		In service to Shenandooh Caverns - ?																		
		ZONE TOTAL	Broadway to Valley Fertilizer	**14.2**	*miles*	5	14	39	106	164	236					7870	additional ties			$ 747,663
		ZONE AVERAGE		4	*counts*	1	4	10	27	41	59					554	per mile			
												NOTE: 80# rail with heavy tie program - option is 115# relay full rebuild this area								
1	5	2 South	Mt. Jackson plant	85.4	80AS	0	1	11	28	40	60	FRA 2	50% new	42%	1400	5740	additional ties	heavy	Fair on 80	
1	6	2 South	Conicville Rd. Mt. Jackson	84.84	80AS	1	8	16	22	47	53	FRA 2	50% new	42%	1400	784	additional ties	heavy	Fair on 80	
2	16	2 South	Woodstock Rt. 42 Res. Rd.	74.6	85AS	0	3	25	27	55	45	FRA 2	34% new	42%	1000	10240	additional ties	heavy	Fair on 85	
		ZONE TOTAL	Shen to Johns Mansville	**8.9**	*miles*	1	12	52	77	142	158					16764	additional ties			$ 1,592,580
		ZONE AVERAGE		3	*counts*	0	4	17	26	47	53					1884	per mile			
												NOTE: 80# rail with heavy tie program - option is 115# relay full rebuild this area								
2	6	1 East	Johns Mansville Xing	76.5	80	0	0	30	26	56	44	FRA 2	50% new	42%	1400	2660	additional ties	Light	Fair on 80	
			(last service area)																	
2	7	1 East	Harman Road	69.68	80	0	13	14	17	44	56	FRA 2	50% new	42%	1400	9548	additional ties	Medium	Fair on 80	
		ZONE TOTAL	Johns Mansville to Toms Brook	**8.4**	*miles*	0	13	44	43	100	100					12208	additional ties			$ 1,159,760
		ZONE AVERAGE		2	*counts*	0	7	22	22	50	50					1453	per mile			
	Phase marker		**Toms Brook WELDED RAIL END**	**68.1**																
2	8	1 East	Hillcrest Dr. Toms Brook	67.55	132W	1	8	10	12	31	69	FRA 2	FRA1 count	42%	812	1730	additional ties	Medium	Very good	
2	9	1 East	Mt. Hebron Rd.	66	132W	1	9	10	27	47	53	FRA 2	FRA1 count	42%	812	1259	additional ties	Medium	Very good	
		ZONE TOTAL	Toms Brook to Fishers	**4.2**	*miles*	2	17	20	39	78	122					2989	additional ties			$ 283,983
		ZONE AVERAGE		2	*counts*	1	9	10	20	39	61					712	per mile			
2	15	2 East	Fishers Hill @ depot	63.9	132W	0	4	24	37	65	35	FRA 2	10% new	42%	280	588	OK FRA 1	Medium	Very good	
2	14	2 East	Strasburg Jct	62.5	132W	0	12	22	34	68	32	FRA 2	10% new	42%	280	392	OK FRA 1	Medium	Very good	
		ZONE TOTAL	Fishers to Strasburg Jct	**1.4**	*miles*	0	16	46	71	133	67					980	additional ties			$ 93,100
		ZONE AVERAGE		2	*counts*	0	8	23	36	67	34					700	per mile			
2	13	3 East	Strasburg park rd. west	60.43	132W	0	8	33	27	68	32	FRA 2	5% new	42%	144	298	OK FRA 1	Clear	Very good	
			(yard limits)																	
2	12	3 East	Howard Cave East (Private)	58	132W	4	33	27	12	76	24	FRA 2	5% new	42%	144	350	OK FRA 1	Clear	Very good	
2	11	3 East	Bucks Mills Road Xings	55.48	132W	5	6	19	28	58	42	FRA 2	20% new	42%	576	1452	OK FRA 1	Clear	Very good	
2	10	3 East	Riverton W. end bridge	51.2	132W	1	16	34	21	72	28	FRA 2	5% new	42%	144	616	OK FRA 1	Clear	Very good	
			Railroad end	50.3	(bridge)															
		ZONE TOTAL	Strasburg Jct to Bridge	**12.2**	*miles*	10	63	113	88	274	126					2716	additional ties			$ 258,005
		ZONE AVERAGE		4	*counts*	3	16	28	22	69	32					223	per mile			

TIE COUNT SUMMARY

						100 TIE SAMPLE TOTALS						22"		2880 ties per mile							
Rev.	4/14/2023		Crossing			Remaining Life				Total good	Defective	Target	Additional	Goal	Add	Per	Tie	Brush/tree	Rail	Tie cost / section	
Day	Sheet	Zone	Location		Milepost	Rail	20+	10-15	5-10	1-5	ties	ties	track class	adds	%	per mile	Section	action	Conditions	conditions	$	95.00
		Total mileage		*49.3*	*49.3*		18	122	270	381	791	709	1500				**43,527**	ties			**$**	**4,135,091**
		Total Samples			*17*		1.2%	8.1%	18.0%	25.4%	52.7%	47.3%					30.7%	percentage of replacement total				
		Estimated tie population			141,984													***80# and 85# section only***			***$***	***2,752,340***
		Tie Totals by grade - all																***Balance of tie rehab***			***$***	***1,382,751***

Phase 1 totals:

	Riverton-Toms Brook 50.3-68.1			17.8 *miles*												6685	ties			$	635,088
	Broadway - Valley Fertilizer 99.6-85.4			14.2 *miles*												7870	ties			$	747,663
				32 *miles*												14555				$	1,382,751

Phase 2 Totals

	Toms Brook - Johns Mansville			8.4 *miles*												12208	ties			$	1,159,760

Phase 3 Totals

	Johns Mansville - Valley Fertilizer			8.9 *miles*												16764	ties			$	1,592,580
Total				49.3												**43527**				**$**	**4,135,091**

Startup Phase 1 / Phase 2 / Phase 3	PUBLIC FRA LIST	PRIVATE FRA LIST	County	City	DOT Crossing#	Street	Milepost	Type	Device / Sign Protection	PUBLIC CROSSING TOTALS Passive	Lights Only	Gates & Lights	FRA Status	Last Rev. Date	Surface	Replacement	Condition	2023 Photo 23 / 0006	Feet Wide	Resurface Cost	Signal Cost	Total Cost
Warren		X	WARREN	RIVERTON	714430J	PRIVATE ROAD	B 0051.36	Private	Signs				OPEN		GRAVEL?		TWO TRACKS		14			
Ex-Harrisburg Division	X		WARREN	FRONT ROYAL	714431R	WINCHESTER STREET	B 0051.470	Public	Signs	X			Open		ASPHALT	CONCRETE PANEL	TWO TRACKS		44		11500	
	X		WARREN	FRONT ROYAL	714432X	DUCK STREET	B 0051.550	Public	Signs	X			Open	10/01/2023	ASPHALT				24		11500	
		X	WARREN	FRONT ROYAL	714434L	PRIVATE HORNSTEAD DR	B 0053.100	Private	Signs				Open		GRAVEL				12			
		X	WARREN	FRONT ROYAL	714435T	PRIVATE	B 0053.200	Private	Signs				Open		ASPHALT??		DOES NOT LOOK LIKE PRIVATE		18			
		X	WARREN	FRONT ROYAL	714436A	PRIVATE	B 0053.820	Private	Signs				Open		GRAVEL				14			
		X	WARREN	FRONT ROYAL	904692R	PRIVATE	B 0053.990	Private	Signs				Open		GRAVEL				15			
		X	WARREN	FRONT ROYAL	714437G	PRIVATE	B 0054.150	Private	Signs				Open		GRAVEL				14			
		X	WARREN	FRONT ROYAL	714438N	PRIVATE ROAD	B 0054.400	Private	Signs				Open		GRAVEL				14			
		X	WARREN	FRONT ROYAL	714439V	PRIVATE ROAD	B 0055.130	Private	Signs				Open		GRAVEL				14			
		X	WARREN	FRONT ROYAL	904693X	PRIVATE ROAD	B 0055.200	Private	Signs				Open				NOT VISIB LE					
	X		WARREN	FRONT ROYAL	714450V	BUCKS MILL ROAD	B 0055.480	Public	Signs	X			Open	10/01/2023	Asphalt/Timber			Yes	18			
		X	WARREN	FRONT ROYAL	714490T	PRIVATE	B 0055.570	Private	Signs				Open		GRAVEL		MAY NOT BE ACCESSIBLE		16			
	X		WARREN	FRONT ROYAL	714451C	BUCKS MILL RD	B 0055.910	Public	Signs	X			Open	10/01/2023	Asphalt/Timber				18			
		X	WARREN	FRONT ROYAL	714452J	PRIVATE ROAD	B 0056.070	Private	Signs				Open		GRAVEL				16			
	X		WARREN	FRONT ROYAL	714453R	RICHARDSON ROAD	B 0056.820	Public	Signs, Lights		X		Open	10/01/2023	Asphalt/Timber				40			$101,500
		X	WARREN	FRONT ROYAL	714454X	PRIVATE ROAD	B 0057.010	Private	Signs				Open		GRAVEL				12			
	X		WARREN	STRASBURG	714455E	RICHARDSON ROAD	B 0057.370	Public	Signs	X			Open	10/01/2023	Asphalt/Timber				16			
		X	WARREN	STRASBURG	714456L	PRIVATE ROAD	B 0057.890	Private	Signs				Open		GRAVEL		AMERIGAS	YES	18			
		X	WARREN	FRONT ROYAL	714457T	PRIVATE ROAD	B 0057.890	Private	Signs				Open		DUPLICATE							
		X	WARREN	FRONT ROYAL	714458A	PRIVATE ROAD - Howard Lane	B 0058.080	Private	Signs				Open		GRAVEL				12			
		X	WARREN	FRONT ROYAL	714459G	PRIVATE ROAD	B 0058.180	Private	Signs				Open		COULD NOT FIND							
WARREN COUNTY		X	WARREN	FRONT ROYAL	714460B	PRIVATE ROAD	B 0058.470	Private	Signs				Open		COULD NOT FIND							
SHENANDOAH COUNTY		X	SHENANDOAH	STRASBURG	714462P	PRIVATE ROAD	B 0059.760	Private	Signs				Open		GRAVEL				10			
	X		SHENANDOAH	STRASBURG	714463W	QUEEN ST/PARK RD	B 0060.430	Public	Signs, Lights, Gates			X	Open	10/01/2023	ASPHALT		GOOD CONDITION		48			
		X	SHENANDOAH	STRASBURG	948180W	PRIVATE INDUSTRY	B 0060.548	Private	Signs				Open		Gravel/Timber		GOOD CONDITION		56			
	X		SHENANDOAH	STRASBURG	714464D	S.FUNK STREET	B 0061.010	Public	Signs	X			Open	10/01/2023	Asphalt/Timber		2 TRACKS		30/2			
	X		SHENANDOAH	STRASBURG	714465K	KING STREET	B 0061.180	Public	Signs, Lights		X		Open	10/01/2023	CONCRFETE		NEW	YES	72			$101,500
	X		SHENANDOAH	STRASBURG	714466S	WASHINGTON STREET	B 0061.320	Public	Signs, Lights		X		Open	10/01/2023	CONC OR ASPH		48' CONC OR ASPHALT		48			$101,500
	X		SHENANDOAH	STRASBURG	714468F	N FORT STREET	B 0061.700	Public	Signs	X			Open	10/01/2023	Asphalt/Timber		16' ASPHALT		16			
	X		SHENANDOAH	STRASBURG	714469M	CAPON STREET	B 0061.800	Public	Signs	X			Open	10/01/2023	Asphalt/Timber				24			
	X		SHENANDOAH	STRASBURG	714470G	BEACON STREET	B 0061.950	Public	Signs	X			Open	10/01/2023	Asphalt/Timber				22			
		X	SHENANDOAH	STRASBURG	714471N	PRIVATE ROAD	B 0062.340	Private	Signs				Open		ASPHALT		ASHALT		20			
	X		SHENANDOAH	STRASBURG	714472V	JUNCTION RD	B 0062.600	Public	Signs, Lights, Gates			X	Open		Asphalt/Timber	CONCRETE PANEL		Yes	24	$150,000	$161,500	
	X		SHENANDOAH	STRASBURG	714473C	GREEN ACRE DR	B 0063.100	Public	Signs, Lights, Gates			X	Open		Asphalt/Timber		Gates removed, missing		18		$161,500	
	X		SHENANDOAH	STRASBURG	714475R	LOCUST GROVE RD	B 0064.850	Public	Signs	X			Open	02/01/23	Gravel?/Timber				18			
		X	SHENANDOAH	STRASBURG	714476X	PRIVATE ROAD	B 0065.070	Private	Signs				Open		GRAVEL				10			
		X	SHENANDOAH	TOMS BROOK	714478L	PRIVATE	B 0065.500	Private	Signs				Closed		GRAVEL		LOOKS LIKE IT IS USED		14			
		X	SHENANDOAH	WOODSTOCK	714479T	PRIVATE ROAD	B 0065.780	Private	Signs				Open		GRAVEL				12			
	X		SHENANDOAH	WOODSTOCK	714480M	MT HEBRON RD	B 0066.040	Public	Signs, Lights		X		Closed 2019	03-2019	Asphalt/Timber			Yes	24			$101,500
		X	SHENANDOAH	WOODSTOCK	714481U	PRIVATE ROAD	B 0066.280	Private	Signs				Open		GRAVEL				10			
		X	SHENANDOAH	WOODSTOCK	714483H	PRIVATE ROAD	B 0066.880	Private	Signs				Open		GRAVEL				12			
		X	SHENANDOAH	WOODSTOCK	714484P	PRIVATE ROAD	B 0067.150	Private	Signs				Open		GRAVEL				10			
	X		SHENANDOAH	TOMS BROOK	714485W	HILLCREST DR	B 0067.400	Public	Signs	X			Open	02/01/23	GRAVEL				14			
	X		SHENANDOAH	TOMS BROOK	714486D	HILLCREST DR	B 0067.550	Public	Signs	X			Open	02/01/23	GRAVEL			Yes	14			
	X	20 26	SHENANDOAH	WOODSTOCK	714488S	BROOK CREEK RD	B 67.88	Public	Signs, Lights		X		Open		Asphalt/Timber				24			$101,500
																				$150,000	$853,500	
Phase 2		X	SHENANDOAH	WOODSTOCK	714491A	PRIVATE ROAD	B 0068.480	Private	Signs				Open		?		LOOKS LIKE NO LONGER IN USE		?			
	X		SHENANDOAH	WOODSTOCK	714492G	RITENOUR RD	B 0068.840	Public	Signs	X			Open	10/01/2023	ASPHALT		80# starts here / compacted gravel covering whole xing		15		11500	
	X		SHENANDOAH	WOODSTOCK	714493N	MAURERTOWN MILL	B 0069.34	Public	Signs, Lights		X		Closed 2014	08-2014	ASPHALT		PLANT CLOSED		24			
	X		SHENANDOAH	TOMS BROOK	714494V	FEHR LANE	B 0069.490	Public	Signs, Lights, Gates			X	Closed 2019	08-2019	Concrete panel		132# xing, 100 to 80# appr, Gates removed, missing		36		$161,500	
	X		SHENANDOAH	WOODSTOCK	714495C	HARMAN RD	B 0069.680	Public	Signs	X			Open	10/01/2023	Asphalt/Timber	Asphalt/Rubber			18	$54,000	11500	
		X	SHENANDOAH	WOODSTOCK	714496J	PRIVATE ROAD	B 0069.830	Private	Signs				Open		GRAVEL				10			
	X		SHENANDOAH	WOODSTOCK	714497R	SAUMSVILLE RD	B 0070.240	Public	Signs, Lights		X		Open	02/01/23	Asphalt/Timber	Asphalt/Rubber	Heavy upgrades required	YES	20	$60,000	$101,500	
		X	SHENANDOAH	WOODSTOCK	714498X	PRIVATE ROAD	B 0070.550	Private	Signs				Open		GRAVEL				10			
		X	SHENANDOAH	WOODSTOCK	714499E	PRIVATE ROAD	B 0070.700	Private	Signs				Open		GRAVEL				10			
	X		SHENANDOAH	WOODSTOCK	714500W	JESS SINE RD - B 0071.12 NOT	B 0071.940	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber	Asphalt/Rubber	bad xing timbers, Checked inventory for signs		18	$54,000	11500	
		X	SHENANDOAH	WOODSTOCK	714501D	FARM THIS IS JESS SINE RD	B 0071.12	Private	Signs				Closed 2013				NOT FOUND					
		X	SHENANDOAH	WOODSTOCK	714502K	PRIVATE ROAD	B 0071.310	Private	Signs				Open				NOT FOUND					
		X	SHENANDOAH	WOODSTOCK	904695L	PRIVATE ROAD	B 0071.730	Private	Signs				Open		GRAVEL		IN WOODS		10			
		X	SHENANDOAH	WOODSTOCK	714503S	PRIVATE ROAD	B 0072.260	Private	Signs				Open		GRAVEL			YES	10			
		X	SHENANDOAH	WOODSTOCK	714504Y	FARM	B 0072.400	Private	Signs				train traffic		ASPHALT				15			
		X	SHENANDOAH	WOODSTOCK	736252L	PRIVATE B 72.68 NOT	B 0072.800	Private	Signs				Open		GRAVEL				12			
	X		SHENANDOAH	WOODSTOCK	714505F	NORTH STREET	B 0073.120	Public	Signs, Lights, Gates			X	Open	10/01/2023	Asphalt/Timber	Asphalt/Rubber	Gates removed, laying nearby	YES	42	$126,000	$161,500	
	X		SHENANDOAH	WOODSTOCK	714506M	WALNUT ST	B 0073.290	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber	Asphalt/Rubber	formally 2 tracks, deteriorating timber		42	$126,000	11500	
	X		SHENANDOAH	WOODSTOCK	714507U	LOCUST ST	B 0073.350	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber	Asphalt/Rubber	timber ok		23	$69,000	11500	
	X		SHENANDOAH	WOODSTOCK	714508B	WEST COURT ST	B 0073.390	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber	Asphalt/Rubber	2 rotten timbers		46	$138,000	11500	
	X		SHENANDOAH	WOODSTOCK	714509H	HIGH ST	B 0073.540	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber	Asphalt/Rubber			36	$108,000	11500	
	X		SHENANDOAH	WOODSTOCK	714510C	Massanutten Heights	B 0073.610	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber	Asphalt/Rubber	several rotten timbers		38	$114,000	11500	
	X		SHENANDOAH	WOODSTOCK	714511J	Benchoff Drive	B 0073.730	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber				25		11500	
	X		SHENANDOAH	WOODSTOCK	714512R	CEMETERY RD (RT 758)	B 0074.100	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber				24		11500	
	X		SHENANDOAH	WOODSTOCK	714513X	FAIRGROUND RD	B 0074.550	Public	Signs	X			Open	10/01/2023	ASPHALT/Timber				24		11500	Not listed on original invent
	X		SHENANDOAH	WOODSTOCK	714514E	W RESERVOIR RD	B 0074.630	Public	Signs, Lights, Gates			X	Open	10/01/2023	Concrete	CONCRETE PANEL	4 lanes, paved over, gates removed	Yes	75	$225,001	$161,500	Open but paved over
	X		SHENANDOAH	WOODSTOCK	714516T	HOOVER RD (605) 75.36	B 0074.630	Public	Signs, Lights		X		Open		RUBBER/ASPH	CONCRETE PANEL	2 lanes, paved over, rails intact		35	$105,000	$101,500	Open but paved over
	X	18 10	SHENANDOAH	WOODSTOCK	714519N	JOHN MANSVILLE RD, RT 837	B 0076.840	Public	Signs	X			Open		Asphalt/Timber	CONCRETE PANEL	truck road, needs lights, maybe gates	Yes	24	$150,000	$100,000	
																				$1,329,003	$914,000	
Phase 3		X	SHENANDOAH	EDINBURG	714520H	PRIVATE ROAD	B 0076.990	Private	Signs				Open		GRAVEL				12			
	X		SHENANDOAH	EDINBURG	714521P	LANDFILL RD	B 0077.200	Public	(WAS SIGNS)	X			Closed	09/2010	??	CONCRETE PANEL	Paved over, needs signs, lights, gates	Yes	35	$105,000	$161,500	

			X		SHENANDOAH	EDINBURG	714522W	FARM	B 0077.34	Private	Signs				Closed		NOT VISIBLE				12			
			X		SHENANDOAH	EDINBURG	714523D	PRIVATE ROAD	B 0077.53	Private	Signs				Closed		NOT VISIBLE							
			X		SHENANDOAH	EDINBURG	714524K	PRIVATE ROAD	B 0077.67	Private	Signs				Closed		NOT VISIBLE							
	X				SHENANDOAH	EDINBURG	714525S	TAYLORTOWN ROAD, RT. 813	B 0077.990	Public	Signs	X			Open		Asphalt/Timber	Asphalt/Rubber	Asphalt dripped into flangeways		38	$114,000	11500	
			X		SHENANDOAH	EDINBURG	714526Y	PRIVATE ROAD	B 0078.480	Private	Signs				Open		GRAVEL				12			
								PAVED OVER TRACK	**B 0078.87**								**ASPHALT**		**not paved over, crossing closed by guard rails**		**46**			
	X				SHENANDOAH	EDINBURG	714527F	STONEY CREEK BLVD, SR 675	B 0078.900	Public	Signs, Lights		X		Closed/FRA	08/2019	Asphalt/Rubber liners		needs updated system, 132# in, approaches stair stepped	Yes	48		$161,500	
			X		SHENANDOAH	EDINBURG	714529U	PRIVATE ROAD (MAPLE LN.)	B 0079.710	Private	Signs				Open		ASPHALT				20			
			X		SHENANDOAH	EDINBURG	714530N	PRIVATE ROAD	B 0079.900	Private	Signs				Open		ASPHALT				28			
	X				SHENANDOAH	EDINBURG	714531V	BOWMANS CROSSING/SOUTH MIDDLE RD	B 0080.730	Public	(WAS SIGNS)	X			Closed/FRA	11/2010	unk	CONCRETE PANEL	Paved over, needs signs and lights	Yes	35	$105,000	$161,500	
	X				SHENANDOAH	EDINBURG	714532C	ROLLING HILL LN	B 0081.950	Public	Signs	X			Open		Asphalt/Timber	Asphalt/Rubber			24	$72,000	11500	
								PRIVATE	B 0082.42	PRIVATE							GRAVEL		NO RECORD OF THIS CROSSING		12			
								PRIVATE	B 0082.85	PRIVATE							GRAVEL		NO RECORD OF THIS CROSSING		12			
	X				SHENANDOAH	EDINBURG	714533J	BELGRAVIA RD	B 0082.770	Public	Signs, Lights		X		Open		Asphalt/Timber	Asphalt/Rubber	timbers rotten, rough surface and road appr.	Yes	20	$60,000	$101,500	
			X		SHENANDOAH	EDINBURG	714534R	PRIVATE ROAD	B 0083.420	Private	Signs				Open									
								PRIVATE	83.67															
	X				SHENANDOAH	MT JACKSON	714536E	HAWKINS ROAD	83.88	Public	Signs, Lights		X		Open		Asphalt/Timber	Asphalt/Rubber	Asphalt on rails		20	$60,000	$101,500	
			X		SHENANDOAH	MT JACKSON	961404X	INDUSTRY CROSSING	CW 0084.090	Private	Signs				Open				NO INDICATION OF CROSSING					
			X		SHENANDOAH	MT JACKSON	944381Y	INDUSTRY CROSSING	CW 0084.130	Private	Signs				Open		ASPHALT				20			PAVED OVER
	X				SHENANDOAH	MT JACKSON	714537L	AVONDALE ROAD/BOWMAN	CW 0084.410	Public	Signs, Lights		X		Open		Asphalt/Timber	Asphalt/Rubber	Rails cut, laid nearby, paved over	YES	35	$105,000	$101,500	
			X		SHENANDOAH	MT JACKSON	714538T	PRIVATE ROAD	CW 0084.580	Private	Signs				Open		GRAVEL				12	$0	0	
	X				SHENANDOAH	MT JACKSON	714539A	CONICVILLE BOULEVARD	CW 0084.840	Public	Signs, Lights, Gates			X	Open		Concrete	CONCRETE PANEL	Rails cut, laid nearby, paved over	Yes	65	$195,001	$161,500	
			X		SHENANDOAH	MT JACKSON	714540U	PRIVATE ROAD	CW 0084.880	Private	Signs				Open		GRAVEL				12	$0	0	
			X		SHENANDOAH	MT JACKSON	714541B	FARM CROSSING	CW 0085.060	Private	Signs				Open		GRAVEL				12	$0	0	
	X	10		13	SHENANDOAH	MT JACKSON	714542H	NELSON STREET - SR 1314	CW 0085.260	Public	Signs, Lights, Gates			X	Open		ASPH/TIMBER	CONCRETE PANEL	PAVED OVER, 09/2023	YES	16	$48,000		
																						$864,002	**$973,500**	
Startup Phase 1			X		SHENANDOAH	MT JACKSON	714543P	VALLEY FERTILIZER RD	CW 0085.340	Private	Nothing				Open		ASPH/TIMBER	Asphalt/Rubber	Paved over, needs signs	YES	26	$78,000	$25,000	
	X				SHENANDOAH	MT JACKSON	714544W	CROSSOVER ROAD SR 1324	CW 0085.750	Public	Signs, Lights		X		Open		Asphalt/Timber	Asphalt/Rubber	PAVED OVER, 09/2023	Yes	24	$72,000	$101,500	
	X				SHENANDOAH	MT JACKSON	714545D	DEPOT STREET	CW 0085.910	Public	Signs	X			Open		Asphalt/Rubber liner	Asphalt/Rubber	PAVED OVER 09/2023, 2 tracks	YES	104	$312,001	11500	
	X				SHENANDOAH	MT JACKSON	714546K	WALKWAY	CW 0085.950	Public	Signs	X			Open		ASPH/TIMBER		TWO TRACKS	YES	24			
	X				SHENANDOAH	MT JACKSON	714547S	ORKNEY DRIVE (SR 1324)	CW 0086.170	Public	Signs, Lights		X		Open		Asphalt/Timber	Asphalt/Rubber	PAVED OVER, 09/2023		30	$90,000	$101,500	
	X				SHENANDOAH	NEW MARKET	714552N	WISSLER ROAD (SR 720)	CW 0087.810	Public	Signs, Lights		X		Open		Asphalt/Timber	Asphalt/Rubber	asphalt in flangeways, on rail; timbers need attn soon		20	$60,000		
	X				SHENANDOAH	NEW MARKET	714553V	CAVERNS ROAD (SR 730)	CW 0088.680	Public	Signs, Lights, Gates			X	Open		ASPHALT		TWO TRACKS	Yes	60			
			X		SHENANDOAH	NEW MARKET	714554C	FARM CROSSING	CW 0088.810	Private	Signs				Open		GRAVEL				14			
			X		SHENANDOAH	NEW MARKET	714557X	FARM CROSSING	CW 0089.210	Private	Signs				Open		GRAVEL				14			
			X		SHENANDOAH	NEW MARKET	714558E	FARM CROSSING	CW 0089.550	Private	Signs				Open		GRAVEL				12			
			X		SHENANDOAH	NEW MARKET	714559L	FARM CROSSING	CW 0090.050	Private	Signs				Open		ASPHALT?		APPEARS TO BE NOT IN USE		16			
	X				SHENANDOAH	NEW MARKET	714560F	QUICKSBURG ROAD (SR 767)	CW 0090.270	Public	Signs, Lights		X		Open		ASPHALT				21		$101,500	
			X		SHENANDOAH	NEW MARKET	714561M	RESIDENCE CROSSING	CW 0090.450	Private	Signs				Open		ASPHALT?				14			
			X		SHENANDOAH	NEW MARKET	714562U	RESIDENCE CROSSING	CW 0090.580	Private	Signs				Open		ASPHALT?				14			
	X				SHENANDOAH	NEW MARKET	714563B	JIGGADY ROAD (SR 736)	CW 0091.140	Public	Signs, Lights		X		Open		Asphalt/Timber				14		$101,500	
Shenandoah County	X				SHENANDOAH	NEW MARKET	714565P	RIVER ROAD (SR 617)	CW 0092.100	Public	Signs, Lights		X		Open		ASPHALT				24		$101,500	
Rockingham County			X		SHENANDOAH	NEW MARKET	714566W	FARM CROSSING	CW 0092.380	Private	Signs				Open		GRAVEL				15			
			X		SHENANDOAH	NEW MARKET	714567D	RESIDENCE CROSSING	CW 0092.790	Private	Signs				Open		GRAVEL				12			
	X				SHENANDOAH	NEW MARKET	714568K	NEW MARKET DEPOT RD (SR 728)	CW 0093.120	Public	Signs, Lights		X		Open		Asphalt/Rubber		good surface	YES	44		$101,500	
			X		ROCKINGHAM	NEW MARKET	714570L	FARM CROSSING	CW 0093.820	Private	Signs				Open		GRAVEL				16			
	X				ROCKINGHAM	NEW MARKET	714571T	RIDGE ROAD (SR 616)	CW 0094.190	Public	Signs	X			Open		ASPHALT		good surface	YES	24			
			X		ROCKINGHAM	TIMBERVILLE	714572A	FARM CROSSING	CW 0094.660	Private	Signs				Open		ASPHALT?				18			
	X				ROCKINGHAM	TIMBERVILLE	714574N	LOHR LANE (SR 874)	CW 0095.240	Public	Signs	X			Open		ASPHALT		good surface		25			
			X		ROCKINGHAM	TIMBERVILLE	714575V	RESIDENCE CROSSING	CW 0095.580	Private	Signs				Open		ASPHALT				40			
			X		ROCKINGHAM	TIMBERVILLE	960793C	PRIVATE ROAD	CW 0095.820	Private	Signs				Open		ASPHALT				16			
			X		ROCKINGHAM	TIMBERVILLE	714576C	RESIDENCE CROSSING	CW 0095.890	Private	Signs				Open		ASPHALT				14			
	X				ROCKINGHAM	TIMBERVILLE	714577J	EVERGREEN VALLEY ROAD	CW 0095.990	Public	Signs, Lights		X		Open		ASPHALT		good surface, south west signal mast struck, leaning. All equip present	Yes	22		$101,500	
			X		ROCKINGHAM	TIMBERVILLE	714578R	FARM CROSSING	CW 0096.380	Private	Signs				Open		ASPHALT?				14			
			X		ROCKINGHAM	TIMBERVILLE	714579X	RESIDENCE CROSSING	CW 0096.810	Private	Signs				Open		GRAVEL				10			
	X				ROCKINGHAM	TIMBERVILLE	714580S	N MAIN STREET (SR 42)	CW 0097.230	Public	Signs, Lights, Gates			X	Open		Asphalt/Rubber	CONCRETE PANEL	132# in, 100# appr, apshalt cracking, rail head badly fractured by snowplow	YES	46	$138,000	$161,500	
	X				ROCKINGHAM	TIMBERVILLE	714581Y	MEMORIAL PARK DRIVE (SR 1530)	CW 0097.820	Public	Signs	X			Open		ASPHALT		good surface	YES	24		11500	
	X				ROCKINGHAM	TIMBERVILLE	714582F	MCCAULEY AVE (SR 800)	CW 0098.040	Public	Signs, Lights		X		Open		Asphalt/Rubber		Lights are old, dusty, worn out, surface is ok	YES	26		$101,500	
	X				ROCKINGHAM	BROADWAY	714583M	LEE STREET (SR 259)	CW 0099.500	Public	Signs, Lights, Gates			X	Open		Asphalt/Rubber	CONCRETE PANEL	132# in, 100# appr., surface asphalt cracking, rail head looks lightly struck, not fracture	Yes	85	$255,001	$161,500	
		17	X	17	ROCKINGHAM	BROADWAY	714584U	CREEKSIDE DRIVE	CW 0099.600	Private	Signs				Open		ASPHALT		Looks good	YES	18			**Total**
																						$1,005,003	**$1,183,000**	

197	65	**65**	66	66		**PUBLIC CROSSING TOTALS**					
					By zone	Xbucks	Lights	Gates			
Phase 1		**37**		**43**		**17**	**14**	**6**	$1,155,003	$2,036,500	$3,191,503
Phase 2		**18**		**10**		**12**	**3**	**3**	$1,329,003	$914,000	$2,243,003
Phase 3		**10**		**13**		**4**	**4**	**2**	$864,002	$973,500	$1,837,502
Total	**131**	**65**		**66**		**65**			**$3,348,008**	**$3,924,000**	**$7,272,008**
					Entire line	**33**	**21**	**11**			
					Check	**65**					
CLOSED CROSSINGS ONLY					Closed only	2	3	1			

Shenandoah Proforma
Freight and excursions operations
Operations Analysis Ver 1.2 -
02-May-24

	Excursion and Freight Operations - Plateau level Integrated freight and excursion budget (1 operator) Full year operation with paid employees						Railbike operations - additive Controlled by nonprofit - separate Seasonal Operation					
	Count	calc/ea	Wks	Trips	RT mile/trip	Annual	Count	Rate	Wks	Trips	RT miles	Revenue Annual
Passenger Revenue					Strasburg-Shen							
					52						10	
Excursion - base operations	**23456**			266			**20000**					
Adult	*17897*	$25.00				$447,423	*20000*	$40.00				$800,000
Open car 10%	*2346*	$27.00				$63,331	*0*	$0.00				$0
Child 17%	*3988*	$20.00				$79,750	*0*	$0.00				$0
Group 5%	*1173*	$23.75				$27,854	*0*	$0.00				$0
School 2%	*399*	$8.00				$3,190	*0*	$0.00				$0
Fall specials	***10763***						***0***					
Adult	*8212*	$30.00				$246,354	*0*	$0.00				$0
Open car 5%	*538*	$35.00				$18,834	*0*	$0.00				$0
Child 17%	*1830*	$20.00				$36,593	*0*	$0.00				$0
Group 5%	*538*	$28.50				$15,337	*0*	$0.00				$0
School 2%	*183*	$8.00				$1,464	*0*	$0.00				$0
Local Events/festivals	***0***						***0***					
Adult 75%	*0*	$5.00				$0	*0*	$0.00				$0
Child 25%	*0*	$3.00				$0	*0*	$0.00				$0
Christmas	**35785**		*License fees in Programs*				**0**					
Adult 50%	17892	$35.00	*Unlicensed assumed*			$626,237	0	$0.00				$0
Child 50%	17892	$25.00	*Unlicensed assumed*			$447,312	0	$0.00				$0
Thomas TBD	0		Unlikely			$0	0					$0
Dinner Train With meal	**5000**	$50.00	If operated (55/45 avg)			$250,000	**0**	$50.00				$0
TOTAL TICKET SALES	**75003**	$30.18	weighted avg.			**$2,263,678**	**20000**					**$800,000**
Retail sales , Gross	**$4.00**	Sales at office site			$300,014		**$2.00**				$40,000	
less: COGS % or actual			60%		($180,008)				60%		($24,000)	
Per Rider/visitor net	**$1.60**				$120,006		**$1.60**				$16,000	
Per Rider Net Income Retail						$120,006						$16,000
Freight Revenue												
Revenue from Freight Operations							*No freight operations this scenario*					
2-tier switch charge basis agr/haz												
Petroleum/Plastics	310	$ 800.00	$ 248,000									
Agricultural	840	$ 600.00	$ 504,000		$ 752,000							
Shortline tax credit 50	40%	$ 3,500	$396,139	max	$ 175,000							
Car hire (owned cars)	0	$ -	$ -		$ -							
Transload and storage fees					$ 125,000							
Car Storage					$ 10,000							
TOTAL FREIGHT REVENUE	1150	$ 653.91				$ 1,062,000						
Membership Activities												
Donations & Misc.	Fund drives and fundraising					$0						$0
	Only if nonprofit sponsor											
Total Revenue						**$3,445,684**						**$816,000**
OPERATING METRICS	*Ridership base total*					***75,003***						**20,000**
	Reported excursion train miles including deadhead					***9,205***						
	Psgr / train mile					***8.15***						
	Rev. per train mile					***$245.92***						
Train Operating Expense												
Hauage Fee Option does not apply												
Number of trips 445	Per trip basis		$0		$0							
Train Crews (2) + dispatcher	Annual FT				$247,000		PT on site manager				$27,000	
Benefits	RR ret				$89,948		Benefits				$9,450	
Additional Wkly track insp	Addtl wks	0	$450		$0					0	$0	
Locomotive fuel - freight	*25 mile trip average*		$30.00		$195,000							
Locomotive fuel - excu	*See fuel tab*				$140,812		Vehicle fuel				$2,000	
Lube Oil/Sand/Other					$14,081	$686,841						$38,450
Operating Expenses - Continued….												
Track Maintenance - annual												
Track Inspector	Annual FT				$48,000		Track maintainer				$45,000	
Benefits	RR ret				$21,696		Benefits				$15,750	
Signal maintainer	Annual FT				$55,000						$0	
Benefits	RR ret				$24,860						$0	
Signal utilities monthly		32	$ 200.00		$6,400			0	$50 mo		$0	
Brush Cutting - annual					$50,000		Contractor				$25,000	
Bridge Inspection - annual	*Contract*				$45,000							
Track inspections - freight basis	*FT labor*	0	$450		$0							
Track crew - ties & rail	*2 FT + insp.*				$96,000						$0	
Benefits					$43,392						$0	
Tie purchases 150000	*total ties*	5%	$ 80.00	ea	$600,000		*contract*	1%	$ 100.00	ea	$ 75,000	
						$990,348						$160,750
Excursion Program Expenses												
Licensing fees	No license fee assumed			0%	$0						$0	
Car hosts and entertainment	Direct labor				$134,400		PT Escorts direct labor				$112,320	
Benefits					$14,784		Benefits				$12,355	
Dinner Train caterer/food	all service costs		5000	$25	$125,000	$274,184				0	$0 $0	$124,675
Equipment Maintenance												
Equipment shop labor	Manager and assistant				$98,000		Bike repair				$22,500	
Benefits					$18,900		Benefits				$7,875	
Locomotive maintenance	2+1	3	$25,000		$75,000		Bike parts	30	$400		$12,000	
Coach maintenance	average	6	$10,000		$60,000			0	$0		$0	
Diner maintenance	average	2	$15,000		$30,000							
Shop Utilities	Annual est.				$7,000							
Shop supplies & materials	Purchases				$4,600						$1,000	
Car Cleaning	Wks/yr	41	$460		$18,860	$312,360						$43,375
Buildings & Grounds												
Maintenance	Station upkeep				$5,000		Station upkeep				$5,000	
Station Rental	parking lot use?		$0 day		TBD		parking lot use?				TBD	

Shenandoah Proforma
Freight and excursions operations
Operations Analysis Ver 1.2 -
02-May-24

	Excursion and Freight Operations - Plateau level Integrated freight and excursion budget (1 operator) Full year operation with paid employees						Railbike operations - additive Controlled by nonprofit - separate Seasonal Operation						
	Count	calc/ea	Wks	Trips	RT mile/trip	Annual	Count	Rate	Wks	Trips	RT miles		Revenue Annual
Sewage (retention tanks)	Town services				TBD			Town services				TBD	
Utilities	Station allocated expense				$3,500	$8,500		Station allocated expense				$3,500	$8,500
Administration													
General Mgr.	Full time equivalent (may be 2 PT pos)				$75,000			Full time				$75,000	
Benefits					$26,250			Benefits				$26,250	
Marketing	Professional required				$65,000			Full time				$52,000	
Benefits					$22,750			Benefits				$18,200	
Retail	Part time mgr+2 PT clerks				$53,120			Part time + assistant				$43,520	
Benefits					$5,843			Benefits				$4,787	
Other Admin.	Professional services				$10,000			Professional services				$10,000	
Benefits						$257,963							$229,757
Other Administration													
Advertising, brochures, web	$2.00	rider			$150,007			$1.00	rider			$20,000	
Office Rental												TBD	
	$0				$0								
Misc. Office postage & supplies					$5,000			Supplies				$5,000	
Train Radios					$5,000			Radio gear				$5,000	
FRA compliance & training	prequal cre	1000	8		$8,000							$0	
Phones, Internet, Cell	Web/Facebk setup/maint				$12,000							$6,000	
Credit Card processing fees	Avg fee	4.0%	80% sales	2,563,692	$82,038			Fee rate	4.0%	80% sales		$26,880	
Fees and permits	liquor lic (dinner train)				$4,250							$0	
Interest & misc					$1,500							$0	
Insurance:													
Liability on 10M only	Estimated		$64,000					Estimated		$25,000			
Freight Liability	Freight int.		$40,000										
Volunteers	15 est		$3,300							$0			
Workmens comp	RR emp	12	$10,800	FELA (railroad)				Estimated		$5,000			
Equipment	Required?		$0		$118,100	$385,895				$0		$30,000	$92,880
Total Operating Expense						**$2,916,091**							**$698,387**
Net income before debt service	15.37%	margin on sales				**$529,592**							**$117,613**
Debt service load on RR equip	Based on estimate on 1.5M @ 6% 30yr				$107,919			Bikes, shed, etc financing costs				$39,930	
Building and/or Depreciation					$0			based on $550K assets aquire				$0	
Additional Startup Costs					$0	$107,919						$0	$39,930
Total Operating Expense						**$3,024,010**							**$738,317**
Cash Flow from Operations						**$421,673**							**$77,683**
				on sales		12.24%						On sales	9.52%
Projected Operating Agreement with railroad													
Base annual agreement					$10,000							$0	
Firxed percentage payment on ticket					$90,547							$0	
Total Projected Payments	23.84% of net					$100,547							$0
Cash Flow after lease payment	9.3%					**$321,126**							**$77,683**

Economic Impact Input Sheet 1.8

Rev with bridges B51-61 trail added

NORTHERN SHENANDOAH

KNOWN ECONOMIC IMPACT MODEL INPUTS

Major heading	**ADDITIVE TO EXISTING TRAIL COSTS** Description		**IMPLAN NAICS**	Phase 1/Year 1	Source	Phase 2/Year 2	Source	Phase 3/Year 3	Source	Year 4	PLATEAU LEVEL Year 5
MILEAGE	Riverton-Toms Brook 50.3-68.1			17.8							
	Broadway - Valley Fertilizer 99.6-85.4			14.2							
	Toms Brook 68.1 -Mansville 76.5					8.4					
	Mansville 76.5 - 85.4							8.9			
	Total per section/phase			32		8.4		8.9			
TIE DISPOSAL	necessary for trail only construction	2880 ties/mile on 22"		92160		24192		25632			
	Estimated disposal @ $13/tie - per mile	$13.00	$37,440.0	$1,198,080		$314,496		$333,216			
PARALLEL TRAIL	Raw estimate (no bridge distance credit)	$1,000,000 per mile		$32,000,000		$8,400,000		$8,900,000			
NET PARALLEL TRAIL	Trail cost minus tie savings			$30,801,920		$8,085,504		$8,566,784			
CONSTRUCTION	**Tie Replacement program**	**Contractor installed**		$ 1,382,751	*Tie count summary*	$ 1,159,760	*Tie count summary*	$ 1,592,580	*Tie count summary*	0	0
	(Reopen railroad to freight/FRA Class 1 min)			*North & south ends*		*To Johns Mansville*		*Close the middle*		*maintenance*	*maintenance*
	Grade Crossing Repairs	**Paving/Resurfacing**		$ 1,155,003	*Grade crossing inventory 11-1*	$ 1,329,003	*Grade crossing inventory 11-1*	$ 864,002			
	(Reopen railroad to freight/FRA Class 1 min)	**Device Repairs**		$ 2,036,500	*Grade crossing inventory 11-1*	$ 914,000	*Grade crossing inventory 11-1*	$ 973,500			
	Bridges - rail side only w/engr & mobilization			Phase 1		Phase 2		Phase 3			
		Raw Estimate construction		$ 5,704,525	*SV_Bridge_Repair V2 Phase 1*	$ 3,020,300	*SV_Bridge_Repair V2 Phase 2*	$ 956,200	*SV_Bridge_Repair V2 Phase 3*		
	**** NO CONTINGENCY / ESCALATION*	**Mobilization**		$ 570,500	*SV_Bridge_Repair V2 Phase 1*	$ 302,100	*SV_Bridge_Repair V2 Phase 2*	$ 95,700	*SV_Bridge_Repair V2 Phase 3*		
		E&S		$ 285,300	*SV_Bridge_Repair V2 Phase 1*	$ 151,100	*SV_Bridge_Repair V2 Phase 2*	$ 47,900	*SV_Bridge_Repair V2 Phase 3*		
		Engineering at .15		$ 855,679	*SV_Bridge_Repair V2 Phase 1*	$ 453,045	*SV_Bridge_Repair V2 Phase 2*	$ 143,430	*SV_Bridge_Repair V2 Phase 3*		
		Admin & inspection @.10		$ 570,453	*SV_Bridge_Repair V2 Phase 1*	$ 302,030	*SV_Bridge_Repair V2 Phase 2*	$ 95,620	*SV_Bridge_Repair V2 Phase 3*		
	Trail side on Bridges w/engr & mobilization										
		Raw Estimate construction		$ 8,975,000	*SV_Bridge_Repair V2 Phase 1*	$ 5,504,250	*SV_Bridge_Repair V2 Phase 2*	$ 1,738,300	*SV_Bridge_Repair V2 Phase 3*		
		Addtl MP51-61 est 5/30		$ 3,191,520	*Schura 3-30*	$ -				*0*	
	**** NO CONTINGENCY / ESCALATION*	**Mobilization**		$ 897,500	*SV_Bridge_Repair V2 Phase 1*	$ 550,500	*SV_Bridge_Repair V2 Phase 2*	$ 173,900	*SV_Bridge_Repair V2 Phase 3*		
		E&S		$ 448,800	*SV_Bridge_Repair V2 Phase 1*	$ 275,300	*SV_Bridge_Repair V2 Phase 2*	$ 87,000	*SV_Bridge_Repair V2 Phase 3*		
		Engineering at .15		$ 1,346,250	*SV_Bridge_Repair V2 Phase 1*	$ 825,638	*SV_Bridge_Repair V2 Phase 2*	$ 260,745	*SV_Bridge_Repair V2 Phase 3*		
		Admin & inspection @.10		$ 897,500	*SV_Bridge_Repair V2 Phase 1*	$ 550,425	*SV_Bridge_Repair V2 Phase 2*	$ 173,830	*SV_Bridge_Repair V2 Phase 3*		
		Brush Cutting???									
CONSTRUCTION	**Locomotive shop at Strasburg or industrial park**	**Raw Estimate Construction**		$ -		$ -		$ 995,000	HHS estimate Falconer	$ -	$ -
CONSTRUCTION	**Railbike equipment and asset purchases**										
		Equipment purchases		$ 350,000							

Economic Impact Input Sheet 1.8

Rev with bridges B51-61 trail added

NORTHERN SHENANDOAH

KNOWN ECONOMIC IMPACT MODEL INPUTS

x

Major heading	**ADDITIVE TO EXISTING TRAIL COSTS** Description		**IMPLAN NAICS**	Phase 1/Year 1	Source	Phase 2/Year 2	Source	Phase 3/Year 3	Source	Year 4		PLATEAU LEVEL Year 5	
RAILBIKE OPERATION	**Railbike operations by second entity**												
	NOTE: Revenues are not impact inputs!												
	Revenue factor in ProForma is retail purchases: add the 60% COGS for inventory and handling	Retail Purchases		$ -		$ 18,000		$ 24,000		$ 24,000		$ 24,000	
		OPERATING BUDGET											
	Direct labor	Employee labor		$ -		$ 283,005	Late start	$ 377,340	Full payroll 3FT 10PT	$ 377,340	3FT 10PT	$ 377,340	3FT 10PT
		Employee benefits		$ -		$ 71,000		$ 94,667		$ 94,667		$ 94,667	
		Contract services labor											
		Building maintenance		$ -		$ 5,000		$ 5,000		$ 5,000		$ 5,000	
		Vehicle fuel		$ -		$ 2,000		$ 2,000		$ 2,000		$ 2,000	
		Building utilities		$ -		$ 3,500		$ 3,500		$ 3,500		$ 3,500	
		Advertising/Marketing		$ -		$ 20,000		$ 20,000		$ 20,000		$ 20,000	
	Pre-rail operations only	Contract tie insertion railbike start		$ -		$ 75,000	Repairs pre RR	$ 75,000	Repairs pre RR	$ -	complete	$ -	complete
	Intensive track brushwork	Railbike brusk clearing addtl				$ 25,000	maintenance	$ 25,000	maintenance	$ 25,000	maint	$ 25,000	maint
		Equipment maint - parts		$ -		$ 12,000		$ 12,000		$ 12,000		$ 12,000	
		Shop materials		$ -		$ 1,000		$ 1,000		$ 1,000		$ 1,000	
		Office supplies		$ -		$ 3,750		$ 4,000		$ 5,000		$ 5,000	
		Communications		$ -		$ 11,000		$ 11,000		$ 11,000		$ 11,000	
		Card processing fees		$ -		$ 20,160		$ 26,880		$ 26,880		$ 26,880	
		Professional Services		$ -		$ 10,000		$ 10,000		$ 10,000		$ 10,000	
		Insurance		$ -		$ 22,500		$ 30,000		$ 30,000		$ 30,000	
RAILBIKE ONLY	**Ridership est**				**-**		**15,000**		**20,000**		**20,000**		**20,000**
	Percent of plateau				0%		75%		100%		100%		100%
ADDITIVE TO TRAIL ACTIVITY	Total operating budget			**$ -**		**$ 582,915**		**$ 721,387**		**$ 647,387**		**$ 647,387**	
ADDITIVE TO TRAIL ACTIVITY	ASSET ACQUISITION BUDGET			**$ 350,000**									

Economic Impact Input Sheet 1.8

Rev with bridges B51-61 trail added

NORTHERN SHENANDOAH

KNOWN ECONOMIC IMPACT MODEL INPUTS

	Major heading	ADDITIVE TO EXISTING TRAIL COSTS Description		IMPLAN NAICS	Phase 1/Year 1	Source	Phase 2/Year 2	Source	Phase 3/Year 3	Source	Year 4	PLATEAU LEVEL Year 5	
x	**RAIL OPERATION**	**Operating Budget of Railroad Operations** *NOTE: Revenues are not impact inputs!*											
		Revenue factor in ProForma is retail purchases: add the 60% COGS for inventory and handling	Retail Purchases		$ 27,000		$ 72,000		108000		187200	180000	
			OPERATING BUDGET										
		Not purchased	Employee labor		$ 217,880		$ 522,912		$ 697,216		$ 871,520	$ 871,520	12 FT 13 PT
			Employee benefits		$ 67,106		$ 161,054		$ 214,739		$ 268,423	$ 268,423	
			Contract services labor										
			Track inspection		$ -		$ -		$ -		$ -	$ -	direct labor
			Signal inspection		$ -		$ -		$ -		$ -	$ -	direct labor
			Entertainers		$ -		$ -		$ -		$ -	$ -	direct labor
			Car cleaning		$ 4,715		$ 9,430		18860		$ 18,860	$ 18,860	
			On board catering		$ 31,250		$ 62,500		$ 125,000		$ 125,000	$ 125,000	
			Bridge Inspections		$ 22,500		$ 27,000		$ 45,000		$ 45,000	$ 45,000	
			Building maintenance		$ 2,000		$ 5,000		$ 5,000		$ 5,000	$ 5,000	
			Training - compliance		$ 2,000		$ 4,800		$ 6,400		$ 8,000	$ 8,000	
			Fuel		$ 100,744		$ 134,325		$ 235,068		$ 335,812	$ 335,812	
			Other consumables		$ 4,224		$ 5,632		$ 9,857		$ 14,081	$ 14,081	
			Building utilities		$ 10,500		$ 10,500		$ 10,500		$ 10,500	$ 10,500	
			Signal utilities		$ 3,200		$ 3,200		$ 4,800		$ 6,400	$ 6,400	
			Advertising/Marketing		$ 30,001		$ 60,003		$ 120,006		$ 150,007	$ 150,007	
			Tie purchases		$ -	*Rebuilding*	$ -	rebuilding	$ -	rebuilding	$ 600,000	$ 600,000	
			Contract brush cutting		$ -	*Initial cut*	$ -	initial cut	$ -	initial cut	$ 50,000	$ 50,000	
			Equipment maint - labor		$ -		$ -		$ -		$ -	$ -	
			Equipment maint - parts		$ 66,000		$ 82,500		$ 132,000.00		$ 165,000	$ 165,000	
			Shop materials		$ 1,840		$ 2,300		$ 3,680.00		$ 4,600	$ 4,600	
			Office supplies		$ 2,000		$ 2,500		$ 4,000.00		$ 5,000	$ 5,000	
			Communications		$ 6,800		$ 8,500		$ 13,600.00		$ 17,000	$ 17,000	
			Card processing fees		$ 12,306		$ 32,815		$ 49,222.80		$ 81,382	$ 82,038	
			Permits, fees, taxes		$ 4,250		$ 4,250		$ 4,250.00		$ 4,250	$ 4,250	
			Interest		$ 1,500		$ 1,500		$ 1,500.00		$ 1,500	$ 1,500	
			Insurance		$ 47,240		$ 70,860		$ 94,480.00		$ 118,100	$ 118,100	
			Ridership est			**11,250**		**30,000**		**45,000**	**78,000**		**75,000**
			Percent of plateau			15%		40%		60%	104%		100%
	ADDITIVE TO TRAIL ACTIVITY	Total operating budget			**$ 665,056**		**$ 1,283,581**		**$ 1,903,178**		**$ 3,092,635**	**$ 3,086,091**	
	ADDITIVE TO TRAIL ACTIVITY	Total construction budget			**$ 59,819,200**		**$ 24,588,785**		**$ 18,207,265**		$ 1,294,774	$ 1,294,774	

Economic Impact Input Sheet 1.8

Rev with bridges B51-61 trail added

NORTHERN SHENANDOAH

KNOWN ECONOMIC IMPACT MODEL INPUTS

Major heading	**ADDITIVE TO EXISTING TRAIL COSTS** Description			**IMPLAN NAICS**	Phase 1/Year 1	Source	Phase 2/Year 2	Source	Phase 3/Year 3	Source	Year 4	PLATEAU LEVEL Year 5
x		**Visitor Impact data**										
	Virginia Tourism Study	**Source: https://www.vatc.org/wp-content/uploads/2023/08/Virginia-Tourism-Economic-Impact-2022.pdf**										
	Verify with other studies:	Overnight stay percentage statewide:			**39.60%**	2022 report						
	RAILROAD OPERATIONS ONLY	Overnight stay visitors			**4,455**		11,880		17,820		30,888	29,700
		Day trip visitors (County level impacts only)			**6,795**		**18,120**		**27,180**		**47,112**	**45,300**
		PER VISITOR spending, domestic			**$232.00**		**$232.00**		**$232.00**		**$232.00**	**$232.00**
	Verify with other studies:	Overnight stay percentage statewide:			**39.60%**	2022 report						
	RAILBIKE OPERATIONS ONLY	Overnight stay visitors			-		**5,940**		**7,920**		**7,920**	**7,920**
		Day trip visitors (County level impacts only)			-		**3,588**		**4,784**		**4,784**	**4,784**
		PER VISITOR spending, domestic			**$232.00**		**$232.00**		**$232.00**		**$232.00**	**$232.00**
RAILROAD OPERATIONS ONLY					**State Level Overnight stays**		**State Level Overnight stays**		**State Level Overnight stays**		**State Level Overnight stays**	**State Level Overnight stays**
VISITOR SPENDING	*Line Item page 6*											
Percent breakout	**transportation**	29.4%	$68.13		$303,527		$809,406		$1,214,109		$2,104,456	$2,023,516
Virginia Tourism	**Food & beverage**	28.2%	$65.38		$291,264		$776,703		$1,165,054		$2,019,428	$1,941,757
statewide impact	**Lodging (average lower due to family stays?)**	19.1%	$44.20		$196,901		$525,069		$787,604		$1,365,180	$1,312,673
only	**Recreation (ticket +)**	12.8%	$29.67		$132,176		$352,469		$528,703		$916,419	$881,172
	Retail	10.6%	$24.70		$110,033		$293,421		$440,132		$762,895	$733,553
	Total	100.0%	$232.08									
					$1,033,901		$2,757,068		$4,135,603		$7,168,378	$6,892,671
3-county breakout	*DISCOUNTED ESTIMATES ONLY*				**Non-Overnight**		**Non-Overnight**		**Non-Overnight**		**Non-Overnight**	**Non-Overnight**
Non-overnight	**transportation - 50% overnight**	33.3%	$34.07		$231,478		$617,274		$925,912		$1,604,914	$1,543,186
impacts	**Food & beverage -40% overnight**	25.6%	$26.15		$177,700		$473,867		$710,801		$1,232,055	$1,184,668
Estimate	**Lodging - none**	0.0%	$0.00		$0		$0		$0		$0	$0
60.40%	**Recreation - full (ticket +)**	29.0%	$29.67		$201,601		$537,604		$806,406		$1,397,770	$1,344,009
(Day trips)	**Retail - 50% overnight**	12.1%	$12.35		$83,914		$223,771		$335,656		$581,804	$559,427
	Total	100.0%	$102.24									
					$694,694		$1,852,516		$2,778,774		$4,816,542	$4,631,290
Total 3-county impact - overnights plus day trip visitors					$1,728,594		$4,609,585		$6,914,377		$11,984,920	$11,523,962
	RAIL ACTIVITY ONLY NOT TRAIL OVERLAP											
RAILBIKE OPERATIONS ONLY					**State Level Overnight stays**		**State Level Overnight stays**		**State Level Overnight stays**		**State Level Overnight stays**	**State Level Overnight stays**
VISITOR SPENDING	*Line Item page 6*											
Percent breakout	**transportation**	29.4%	$68.13		$0		$404,703		$539,604		$539,604	$539,604
Virginia Tourism	**Food & beverage**	28.2%	$65.38		$0		$388,351		$517,802		$517,802	$517,802
statewide impact	**Lodging (average lower due to family stays?)**	19.1%	$44.20		$0		$262,535		$350,046		$350,046	$350,046
only	**Recreation (ticket +)**	12.8%	$29.67		$0		$176,234		$234,979		$234,979	$234,979
	Retail	10.6%	$24.70		$0		$146,711		$195,614		$195,614	$195,614
	Total	100.0%	$232.08									
					$0		$1,378,534		$1,838,046		$1,838,046	$1,838,046
3-county breakout	*DISCOUNTED ESTIMATES ONLY*				**Non-Overnight**		**Non-Overnight**		**Non-Overnight**		**Non-Overnight**	**Non-Overnight**
Non-overnight	**transportation - 50% overnight**	33.3%	$34.07		$0		$202,352		$269,802		$269,802	$269,802
impacts	**Food & beverage -40% overnight**	25.6%	$26.15		$0		$155,341		$207,121		$207,121	$207,121
	Lodging - none	0.0%	$0.00		$0		$0		$0		$0	$0
	Recreation - full (ticket +)	29.0%	$29.67		$0		$176,234		$234,979		$234,979	$234,979
(Day trips)	**Retail - 50% overnight**	12.1%	$12.35		$0		$73,355		$97,807		$97,807	$97,807
	Total	100.0%	$102.24									
					$0		$607,282		$809,709		$809,709	$809,709
Total 3-county impact - overnights plus day trip visitors					$0		$1,985,816		$2,647,755		$2,647,755	$2,647,755

Economic Impact Input Sheet 1.8

Rev with bridges B51-61 trail added

NORTHERN SHENANDOAH

CAPITAL BUDGET BY YEAR

			CONSTRUCTION BUDGET YEAR									
	ADDITIVE TO EXISTING TRAIL ESTIMATES		**Year 1**		**Year 2**		**Year 3**		**Year 4**	**Year 5**	**Totals**
			zone 1 N&S	*32 miles*	**zone 2**	*8.4 miles*	**zone 3**	*8.9 miles*			
	Rail Operations	**Tie rehab for 25mph psgr**	$ 1,382,751		$ 1,159,760		$ 1,592,580		$ -	$ -	$ 4,135,091
		Grade crossing rehab for rail									
		Paving	$ 1,155,003		$ 1,329,003		$ 864,002		$ -	$ -	$ 3,348,008
		Devices	$ 2,036,500		$ 914,000		$ 973,500		$ -	$ -	$ 3,924,000
		Locomotive shop	$ -		$ -		$ 995,000		$ -	$ -	$ 995,000
		Bridge rehab for rail									
		Raw Estimate construction	$ 5,704,525		$ 3,020,300		$ 956,200		$ -	$ -	$ 9,681,025
		Mobilization	$ 570,500		$ 302,100		$ 95,700		$ -	$ -	$ 968,300
		E&S	$ 285,300		$ 151,100		$ 47,900		$ -	$ -	$ 484,300
		Engineering at .15	$ 855,679		$ 453,045		$ 143,430		$ -	$ -	$ 1,452,154
		Admin & inspection @.10	$ 570,453		$ 302,030		$ 95,620		$ -	$ -	$ 968,103
	TOTAL RAIL		$ 12,560,710		$ 7,631,338		$ 5,763,932		$ -	$ -	**$ 25,955,980**
	Parallel Trail Construction										
	(addtl cost)	Trail constr. - raw @1M/M	$ 32,000,000		$ 8,400,000		$ 8,900,000		$ -	$ -	$ 49,300,000
		NEPA/Sec. 106 mitigation	$ 1,600,000		$ 420,000		$ 445,000		$ -	$ -	$ 2,465,000
		Est. trail construction	$ 33,600,000		$ 8,820,000		$ 9,345,000		$ -	$ -	**$ 51,765,000**
		Bridge rehab for side trail									
		Raw Estimate construction	$ 8,975,000		$ 5,504,250		$ 1,738,300		$ -	$ -	$ 16,217,550
		Addtl MP51-61 est 5/30	$ 3,191,520		$ -		$ -				$ 3,191,520
		NEPA/Sec. 106 mitigation	$ 448,750		$ 275,213		$ 86,915				
		Mobilization	$ 897,500		$ 550,500		$ 173,900		$ -	$ -	$ 1,621,900
		E&S	$ 448,800		$ 275,300		$ 87,000		$ -	$ -	$ 811,100
		Engineering at .15	$ 1,346,250		$ 825,638		$ 260,745		$ -	$ -	$ 2,432,633
		Admin & inspection @.10	$ 897,500		$ 550,425		$ 173,830		$ -	$ -	$ 1,621,755
		Est bridge construction	$ 16,205,320		$ 7,981,325		$ 2,520,690		$ -	$ -	**$ 26,707,335**
	TOTAL PARALLEL TRAIL		$ 49,805,320		$ 16,801,325		$ 11,865,690		$ -	$ -	$ 78,472,335
	TOTAL PROJECT		$ 62,366,030		$ 24,432,663		$ 17,629,622		$ -	$ -	**$ 104,428,315**
Construction notes:	Railbikes (Likely private capital)	Acquisition	$ 350,000		$ -		$ -		$ -	$ -	$ 350,000
	Rail equipment	Private capital	TBD								
	Tie Disposal (to landfill)	Savings against trail cost (ties stay on ROW)	$ (1,198,080)		$ (314,496)		$ (333,216)		$ -	$ -	$ (1,845,792)

SHENANDOAH RAIL WITH TRAIL OPTION
IMPLAN SUMMARY OUTPUT OF ADDITIONAL ECONOMIC IMPACT

Rev. 3-26

	Dollar Year	Notes	Employment	LaborIncome	ValueAdded	Output
YEAR 1	2025	Heavy construction	306.45	$ 22,976,741	$ 45,903,264	**$ 96,850,665**
YEAR 2	2026	construction	205.48	$ 13,923,365	$ 22,785,558	**$ 54,232,900**
YEAR 3	2027	construction	206.74	$ 12,832,516	$ 20,032,277	**$ 45,335,422**
YEAR 4	2028	Peak year operations	143.34	$ 7,013,057	$ 11,377,303	**$ 21,403,980**
YEAR 5	**2029**	**Plateau level**	**140.03**	**$ 6,912,923**	**$ 11,202,675**	**$ 21,080,554**
Five year Total			**1,002.02**	**$ 63,658,602**	**$ 111,301,077**	**$ 238,903,522**

SHENANDOAH RAIL WITH TRAIL OPTION
IMPLAN SUMMARY OUTPUT OF ADDITIONAL TAX IMPACT

Rev. 3-26 w/trail cost adj

	Dollar Year	Notes	SubCountyGeneral	SubCountySpecialDistricts	County	State	Federal	Total
YEAR 1	2025	Heavy construction	$ 427,770	$ 626	$ 994,903	$ 1,804,859	$ 5,943,514	**$ 9,171,672**
YEAR 2	2026	construction	$ 265,883	$ 350	$ 723,407	$ 1,182,064	$ 3,400,639	**$ 5,572,343**
YEAR 3	2027	construction	$ 207,008	$ 341	$ 619,913	$ 1,000,078	$ 2,649,932	**$ 4,477,273**
YEAR 4	2028	Peak year operations	$ 77,668	$ 22	$ 411,608	$ 673,713	$ 1,558,027	**$ 2,721,038**
YEAR 5	**2029**	**Plateau level**	**$ 75,333**	**$ 22**	**$ 398,424**	**$ 655,760**	**$ 1,536,303**	**$ 2,665,841**
Five year Total			**$ 1,053,663**	**$ 1,361**	**$ 3,148,254**	**$ 5,316,474**	**$ 15,088,416**	**$ 24,608,168**