REPORT OF THE VIRGINIA ECONOMIC DEVELOPMENT PARTNERSHIP AUTHORITY AND VIRGINIA PORT AUTHORITY

Inland Port Study: Feasibility Analysis of Locating an Inland Port in the Commonwealth (2022 Appropriation Act, Item 125.Q.)

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Virginia Inland Port, Front Royal

Inland Port Study

Feasibility analysis of locating an inland port in the Commonwealth

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Executive Summary

Item 125 Q of Chapter 2 of the 2022 Acts of Assembly, Special Session I (the 2022-24 Biennial Budget) directed the Virginia Economic Development Partnership (VEDP) and the Virginia Port Authority (Port of Virginia) to assess the feasibility of locating an inland port in the Central Virginia Planning District (formerly known as Region 2000), the Mount Rogers Planning District, and the City of Bristol (which falls within the Mount Rogers Planning District). From August through October 2022, VEDP and The Port of Virginia contracted with the firm Moffatt & Nichol, a global infrastructure advisory firm with extensive experience in the economics of inland ports and intermodal freight, to conduct the feasibility assessment. This study is prepared by VEDP and The Port of Virginia but relies heavily on analyses, insights, and recommendations provided by Moffatt & Nichol, consisting of both public data and data that is confidential due to its competitive nature. Moffatt & Nichol conducted a confidential analysis that included company interviews and a sites analysis for each region.

The study team also held community meetings in the three study areas to engage stakeholders on the assets, challenges, and opportunities within each region for intermodal development. A summary of findings from the assessment is described below. The detailed report that follows explores each of these items in greater detail.

By definition, an inland port is an intermodal facility for the transfer of containers from truck to rail and the inverse. An inland port is connected to a maritime port (The Port of Virginia, in this instance) and is dedicated to supporting and growing import/export freight. It can be a regional driver of economic growth by attracting businesses that require intermodal rail movement to a region, leveraging the convenience of trucks for the short haul with the competitive economics of rail for the long haul.

VEDP Virginia Economic Development Partnership

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According to Moffatt & Nichol, there are two overarching determinants of whether an inland port is feasible: market demand and the availability of a site on which to develop the facility. Not every condition on the market or the physical side must be met exactly, but too many diversions or departures from the requirements would prevent the successful development of an inland port. This report will detail the primary market-driven and physical requirements for a successful inland port, how each region stacks up against those requirements, steps the regions can take to improve their position, and alternative development opportunities.

Moffatt & Nichol individually assessed the Central Virginia Region and the Mount Rogers/Bristol Region on their potential market feasibility. The market feasibility assessment leveraged Freight Analysis Framework (FAF) data, jointly generated by the Federal Highway Administration (FHWA) and the U.S. Bureau of Transportation Statistics (BTS), aligned against U.S. Bureau of Economic Analysis (BEA) population data. In addition to market feasibility, Moffatt & Nichol conducted a manufacturing/industrial-derived demand analysis through confidential interviews to determine the viability of an inland port in each region.

Based on the analysis of both the market feasibility and manufacturing/industrial-derived demand, Moffatt & Nichol determined that, at this time, the Central Virginia region does not currently have the demand to justify the development of an inland port. While this assessment details current demand, this study acknowledges that the region could take steps to attract and grow companies that would increase the freight demand in the region. At this time, the Central Virginia region is best positioned to pursue other rail-centric development opportunities to attract industries dependent on rail and grow freight demand.

The analysis conducted by Moffatt & Nichol determined the Mount Rogers/Bristol region meets enough market-driven and physical conditions to warrant additional assessment. It is also recommended that the Mount Rogers/Bristol region continue to pursue other rail-centric development strategies to grow target industries that would be future users of an inland port facility.

Relevant to both Central Virginia and Mount Rogers, an effort should be undertaken to pursue strategies that will cultivate growth in target industry sectors most attractive to the regions. The top priority for any industry growth strategy is to develop attractive sites ready for immediate investment when the opportunity arises for a company to locate or expand in the region. Such a strategy can be costly and requires that local and regional officials be willing to secure, invest in, and market attractive industrial sites. To be successful, they must be willing to play the long game. Especially for rail-centric industrial development, sites should be identified, protected, and enhanced along the routes of both of Virginia's Class I rail carriers, CSX and Norfolk Southern (NS). Building a robust rail-and-freight-centric economic engine entails a broader industry view that encompasses intermodal and other non-intermodal market opportunities that, with careful planning and regional collaboration, can yield long-term success and growth in the region. VEDP would be essential in partnering with stakeholders in the regions to pursue target sectors for development and identify project-ready sites for prospects.

If a region decides to pursue an inland port, coordination with The Port of Virginia will be necessary moving forward. The commercial and market nature of an inland port requires that the port drive decisions about additional market assessments. The port is in the best position to consider what market space an inland port could occupy and how an inland port could extend its market reach. Since the inland port would be a Port of Virginia entity, the port would be best able to guide its physical layout. VEDP would be essential in targeting business investment for regional development and identifying sites for projects. VEDP would also be in the best position to determine how to market the availability of an inland port as an additional tool in the economic development strategy of the region and Commonwealth.

The Business of Rail Intermodal

The Business of Rail Intermodal

The requirements described in later sections for determining the feasibility and site requirements of an inland port facility are based heavily on the market dynamics of the intermodal rail business. This section outlines the factors that enable railroads to compete in this market and what makes intermodal sites, equipment, and operations unique in the railroad business.

Defining the Intermodal Business Segment for Railroads

Intermodal in the railroad business means something very specific: It is the movement of containers and trailers on and off trains. For example, when a trucker states that one of their units is intermodal, that means that it will travel or has traveled a portion of its movement via rail. Even the equipment used by truckers for intermodal freight is a specific type of container that sits on a chassis for the purpose of rail movement rather than a trailer attached to its wheels. Additionally, all intermodal moves require a truck move at each origin and final destination. Intermodal moves originating or terminating directly on-dock at a port, even when the rail is located immediately on-dock, often require at least one hostler[1] move.

Approximately 92% of intermodal moves today are done using containers, as opposed to trailers. Truck trailers are more prevalent for cargo moved domestically. Traditional truck trailers have wheels that are attached to the cargo compartment. Intermodal containers differ from truck trailers because they are detached from a wheel bed so they can be placed on a specialized chassis pulled by a truck tractor or placed on an intermodal railcar. At 27% of all revenue, intermodal today is the largest single commodity carried by railroads in the United States.[2]

Railroaders and Truckers Collaborate in Intermodal

In transportation, over-the-road describes the trucking space competing with rail. While railroads and truckers collaborate extensively in the market as partners in the intermodal space, this separate term "over-the-road" is often used to describe when rails are competing with trucks for the movement of freight.[3] Many years ago, some traditional trucking firms transformed into intermodal companies, such as J.B. Hunt and Schneider. This transition means that most of the equipment owned and managed by these truckers are intermodal containers that move on a truck chassis when on the road and can also be lifted onto intermodal railcars for long-haul distances. This conversion from strictly over-the-road, traditional trucking to intermodal allows companies like J.B. Hunt and Schneider to benefit from the lower costs of rail for long-distance. In addition to reducing costs, it allows the companies to maintain their direct customer service touch of careful pickup at the origin and delivery to the destination. Intermodal-focused trucking model also means more flexible lifestyle choices for truck drivers (i.e., driving shorter distances).

J.B. Hunt is an example of a traditional trucking company that has shifted its business model from over-the-road movements to more intermodal-oriented service.

For railroads, intermodal operates only on portions of a given railroad's overall network, which differs from traditional railroading. Intermodal is a market-to-market business, while traditional railroading can consist of a network of local trains that travel around a given region (i.e., picking up one or more railcar shipments at multiple businesses and gathering cargo for long-haul trips). Intermodal is uniquely point-to-point and generally not moved through distribution hubs like large classification yards in traditional railroading.[4]

There is always a non-rail option for the Beneficial Cargo Owner (BCO)[5] on every intermodal move, which makes intermodal facilities, like inland ports, attractive to railroad companies. While there is generally a truck option for most merchandise, the economics of many commodities, such as steel coils, kaolin, or grain, make rail more attractive than trucks. As a result, these commodities generate higher relative demand for rail versus truck in those market spaces. Intermodal, on the other hand, because of how the cargo is loaded into containers, always has a viable non-rail alternative (as it can move over-the-road). Therefore, intermodal operations are deregulated because shippers always have an alternative if they are not satisfied with the rates or service conditions offered by the railroad.[6]

Because of this market-based, competitive reality, intermodal has historically been a low-margin business for railroads. Through recent technology and service offerings, the railroads have substantially increased their profit margins on intermodal. Still, it remains a highly competitive business and much more service-sensitive than other markets in which railroads compete.[7] The potential profitability of any intermodal service opportunity is, therefore, heavily scrutinized by the railroads. How service is handled, how terminals are worked, and how much capacity is afforded to the more service-sensitive intermodal trains to operate across the rail network are key to success in the intermodal business for a railroad. Since intermodal involves an additional transfer of cargo, compared with pure over-the-road origin to destination truck movements, the intermodal move via rail will typically be at a transit time disadvantage relative to over-the-road. Also, every cargo manipulation incurs additional costs, which will have to be borne by the parties involved in the movement, whether the customer, the railroad, or the port. Thus, railroads make an effort to reduce the number of times the cargo needs to be handled. To achieve minimal manipulations of cargo, intermodal facilities require a specific terminal layout/design that allows cargo at rest to remain at rest until the next departure via truck or rail.[8]

International/Domestic Intermodal Market Segmentation

The rail intermodal market is generally divided into two overarching components, international and domestic.[9] While domestic is today somewhat larger than international, international intermodal service developed earlier as a business. Domestic and international intermodal are distinct businesses for the railroads.[10] When a railroader refers to domestic, they are also referring to the equipment used in transporting domestic goods, and the same holds true for international. For intermodal equipment, the containers for domestic are a different size than those for international and are not interchangeable. The majority of domestic moves occur in larger 53-foot containers. International intermodal is moved in containers of 20-foot, 40-foot, and 45-foot length. Although most international containers are 40-foot (referred to as FEU—forty-foot equivalent unit), the standard unit of measurement in the maritime container business is TEU—twenty-foot equivalent, with one forty-foot container equating to two TEUs.[11] In the rail business, the railroads typically refer to intermodal containers as units, not TEUs, and they count how many units are moved, international or domestic.

A 45-foot container sits atop a 40-foot container

In addition to container sizes, the rail service associated with domestic intermodal is generally different from international intermodal rail service, with the railroads running separate trains or networks for each market component. This is relevant because in assessing market demand for any intermodal facility, domestic freight in the region cannot be served by an inland port or international intermodal facility and does not contribute to the profitability potential of an inland port.

International containers (ISO[12] 40-foot containers) often arrive at maritime terminals and are drayed[13] to a facility where their contents are unloaded and reloaded into larger 53-foot domestic containers for inland distribution.[14] When any 53-foot container is moved via rail, the railroad considers this a domestic move. This applies to all product, including imports or exports, which has been transloaded from 40-foot containers to 53-foot containers near maritime terminals at any maritime facility in Canada, Mexico, and the United States.[15]

Standard international intermodal containers come in two heights, 8.5 feet high and 9.5 feet high.[16] Certain segments of track or rail routes are cleared for a high-cube doublestack, which means that you can stack two 9.5-foot boxes and still clear all overhead obstructions along that route.

Each container moved on a railroad handled at an intermodal terminal/ramp, whether inbound or outbound, represents a lift when either loaded or unloaded from the railcar. In the business, one will also often see intermodal terminals referred to as ramps. Inland ports, typically owned and controlled by a marine port (and not a railroad), are one type of intermodal ramp. The number of lifts is the standard capacity measurement for an intermodal yard or inland port.

International intermodal is somewhat less service-sensitive than domestic. A container that has been on the water for three weeks can typically allow a few extra days in transit to arrive at its final destination. A domestic intermodal move is more service- and time-sensitive.


Doublestack moving on an intermodal train

A railroad's economic viability is key to the feasibility of any inland port proposal. Ultimately, intermodal rail competes on service and price. To be competitive, it usually needs to price below an over-the-road truck movement, which requires an inland port to meet several conditions so that the railroad can clear operational financial hurdles for the service. An inland port that allows the railroad to meet its financial thresholds to be competitive with over-the-road movements in the intermodal market will be successful.

Factors that Allow for Success in the Intermodal Rail Market

Multiple factors dictate if a railroad will be profitable on a given service,[17] the most important being the length of haul and density/volume. Because of the competitive market nature of intermodal, the longer the length of haul, the more likely a railroad can compete against the over-the-road option. The longer the length of haul, the greater the distance over which the additional necessary cargo manipulation, and its associated costs, can be subsumed within the rate structure for the overall move.[18] However, there is no length of haul so short it cannot be compensated for via sufficiently large volumes in a defined lane.[19]

Historically, conventional industry wisdom was that rail intermodal could not effectively compete against over-the-road carriers at distances below 750 miles. In more recent years, railroads, especially both eastern carriers, have successfully been moving substantial intermodal freight at distances of only 500 miles and, in very specific circumstances, have succeeded in structuring profitable services at short distances of 200 to 500 miles.[20] At 236 rail miles, the Inland Port at Greer is notable for short-haul rail intermodal success. The more recent Appalachian Regional Port located in Murray County, Georgia, northwest of Atlanta, is another example of short-haul success at 388 rail miles. This facility was developed by the Georgia Port Authority and is served by CSX railroad.

East Coast ports continue to gain market share from West Coast ports. Shippers and controllers of freight have shifted some traffic to the east, given the disruptions that have occurred on the West Coast. This shift likely commenced with the labor disruptions of 2000 and, more recently, U.S. tariffs against China and economic shifts from the COVID-19 pandemic, resulting in massive supply chain bottlenecks. Moffatt & Nichol is currently projecting a continued modest market share shift for the near-to-mid-term from the West Coast to the East Coast and the Gulf.

Steamship vessel size has continued to grow. Currently, vessels in the 16,000 TEU range are calling on East Coast ports. Vessel owners are therefore motivated to optimize the cargo they are moving. As vessel size grows, more cargo must be stowed onboard to maximize vessel profitability. This has meant that more discretional cargo[21] is being loaded on vessels calling on the East Coast. East Coast ports and their supply chain partners, in this instance Eastern rail carriers CSX and Norfolk Southern, have needed to penetrate further inland as a response to this change in ocean traffic patterns.

A region's balance of imports and exports is relevant to an inland port effort. Where lanes are balanced (loads vs. empties; inbound vs. outbound), railroads are more efficient, and costs are reduced. For example, a region that produces a great deal of containerized products but consumes little, or imports little, is challenging because it requires empty containers to be brought back to the region at a net cost to the parties involved in the move. Someone needs to absorb the cost, ultimately most likely the customer. A situation can also exist where a region is inbounding all its input products from domestic or regional sources but then exporting a large proportion of its output. In this instance, equipment is still imbalanced for the international move. Said a different way, the payload pays the freight. The ideal situation has payload moving in both directions. If the container needs to be repositioned a great distance for its next load, that empty move (repositioning the "empties") is a cost that someone in the supply chain will need to bear.

Norfolk Southern Train, Radford

Equipment management represents an additional factor that railroads consider. Most international containers are owned or controlled by the steamship lines. In times of supply chain stress, steamship lines may seek to force transloading intermodal containers near the port to secure empty containers which can more quickly be delivered back overseas, particularly to Asia, to reload. Provision of adequate container supply to inland locations, particularly low-volume ones, can be challenging for the ports and their steamship line customers. Similarly, managing chassis locally near the port and inland locations is another important element in the supply chain since chassis are required at both ends. Ideally, chassis are not loaded with a container atop, waiting long periods for their next move, whether on the road, rail, or ship (i.e., a loaded chassis waiting for too long with its sitting container is a chassis that is not earning money). This wait time represents additional capital costs. Chassis supply is key and, ideally, is fluid, not stationary.

Rail equipment varies, and marrying up the correct equipment with the characteristics and volume of demand in a given lane is critical for the railroad. A railroad incurs operating costs without generating revenue whenever it moves empty rail equipment, making lanes that are heavily imbalanced challenging. The rate charged on the headhaul move, the demand-derived move that carries the payload, must be sufficiently lucrative to cover the costs of the empty backhaul move. This reality is relevant for all the players in the supply chain.

Rail Intermodal: A Market-to-Market Business[22]

Rail Intermodal is market-to-market and is identified by lanes. In the case of The Port of Virginia, service is strictly controlled; each Class I railroad (CSX and Norfolk Southern) offers a handful of intermodal lanes to the port and provides service from the port's facilities in Hampton Roads to those specific destinations and back. Any inland port attached to The Port of Virginia must make sense not only from a demand perspective but also from the rail carrier's operating network. To the extent an inland port can fit logically into an existing train plan without major modification or disruption, the more likely it will succeed.

Who Controls the Freight?

In intermodal, the overwhelming majority of the freight is controlled by third parties. This holds true for both domestic and international intermodal businesses. Most international container traffic is managed through steamship lines as the third-party supply chain providers. It is the aggregating steamship line that holds the contract with the railroad. Thus, generally speaking, the railroad sees the steamship line as its customer while respecting and understanding the ultimate BCO.[23] Due to the involvement of third-party shippers, shifting business to a new inland port would be a multi-step process to achieve.

Additionally, if a given shipper considering an inland port wishes to shift their traffic to a Port of Virginia-inland port, it would also be necessary that the shipper's steamship line was calling at The Port of Virginia to and from the target market of the shipper. Thus, different friction points exist, such as contractual obligations, which must be managed over time to effectuate the successful launch of an intermodal ramp. This takes time to effectuate.

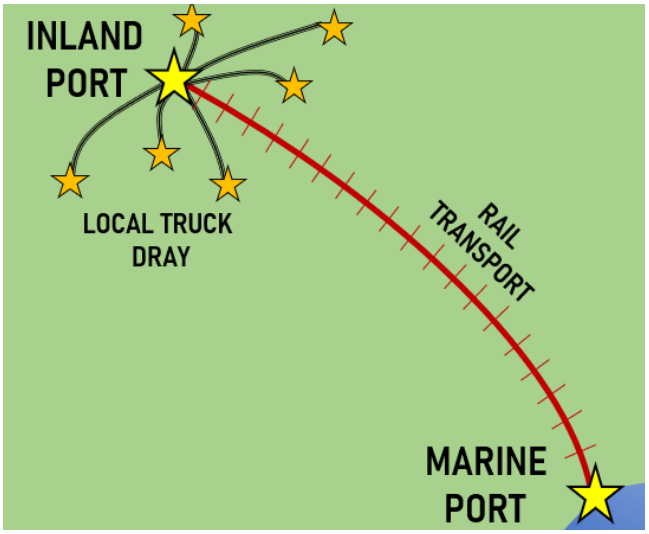
Market Reach

The catchment region for an intermodal ramp can be fairly large geographically, especially in regions where there are not many intermodal ramps.[24] A rail carrier will avoid establishing intermodal ramps too close to one another to avoid cannibalizing traffic already available to the given railroad. However, competing railroads may place competing facilities within the same geographic space.

What is an Inland Port?

What is an Inland Port?

A rail-served intermodal inland port is a facility in which maritime containers are transferred from chassis pulled by truck tractors and placed on trains. By definition, an inland port is connected via its serving rail carrier to an actual marine port. Specialized lift equipment is required at the inland port to transfer the containers, also called units or loads, from the truck chassis onto the railcars. The railcars, themselves, are specialized rail equipment used exclusively for the intermodal business of moving containers. The type of intermodal rail equipment used will vary by the type of business, including whether the business is international, as in this study, or domestic, and by volume of business.



Thus, an inland port is a type of intermodal terminal or ramp. The majority of intermodal ramps served by railroads are owned and operated by the railroads. Usually, the railroads contract out the operations. An inland port is owned and controlled by an actual marine port. The port authority also handles and oversees the operation of an inland port, including its pricing (which it will assess after consultation with its serving railroads, truckers, and, of course, customers).

Every rail intermodal move requires manipulation of the containers at both ends of the move. At the marine port, containers are moved from the ship and loaded on the railcar, which may involve a marine terminal truck for a short-haul move from the shipyard to the railcar. After the rail moves cargo inland, a local truck is required to move a container from the inland port to its final destination, which is typically the final customer. This local truck move is referred to as a dray, either from the inland port to the final destination or from its point of origin to the inland port. Often, the local dray trucker delivers the container to the inland port, where it is left on its chassis awaiting the next train. A container can also be lifted off its chassis and stored on the ground, or in a ground stack, for later placement onto the train.[25]

Rail moves are typically cheaper for shippers over long-haul distances and have a softer environmental impact. Intermodal facilities, like inland ports, allow a shipper to have the benefit of direct service from a trucker yet still utilize rail for the long-haul portion of the cargo movement.

As with all rail intermodal facilities, inland ports are measured by the number of lifts[26] they can handle per year. Every lift represents an element of cost as it represents additional physical manipulation of the cargo. Ideally, the trucker would be able to have the container lifted immediately onto a railcar, but this is not always achievable. Idle containers in the yard represent a considerable expense in time, occupied real estate, and equipment for the parties involved.

The above represents an overview of the inland port business. This report will briefly describe some inland ports to provide context for the feasibility of establishing an additional inland port in the Central Virginia or Mount Rogers/Bristol regions.

Highlighted Inland Ports

Highlighted Inland Ports

Table 1: Characteristics of inland ports

Inland Port	Maritime Port	Serving Railroad	Highway	Distance from Port (miles)	Acreage	Annual lifts and/or capacity	Anchor Tenant/ Target Market
Greer, SC	Charleston	NS	I-85	236	100 total (50 Developed)	160,234 lifts (2021)	BMW
Dillon, SC	Charleston	CSX	I-95	150	40 (inside a 3,400-acre industrial park)	29,412 lifts (2021); 116,000 capacity	Multiple
Front Royal, VA	Norfolk	NS	I-66/I-81	220	161	31,282 lifts (2021); 78,000 capacity	Multiple
Appalachian Regional, Crandall, GA	Savannah	CSX	I-75/US 411	388	42	50,000 capacity	Carpet industry; GE Appliances
Cordele, GA	Savannah	CSX	I-75	185	40 (expansion opportunity)	20,000 capacity	South-central GA
Prichard, WV (closed)	Norfolk	NS	US 52	485	90	Reached 1,100 lifts	Not in operation
Gainesville, GA (planned)	Savannah	NS	I-85/I-985	325	104	150,000 planned capacity	Atlanta Metro; growth area

Table 1 selects seven existing or planned inland ports as illustrative examples. There are a few others and a myriad of intermodal ramps serving both international or domestic markets. The seven selected are all in the eastern United States, served by the two major Class I railroads in the East (CSX and Norfolk Southern), and connected to an east coast port (either Virginia or its east coast competitors, Charleston and Savannah).

Where available, the table provides actual lifts recorded for a specified year; otherwise, it lists solely the built or planned lift capacity. Principal anchor tenants are also highlighted where that information was available.

HIGHLIGHTED INLAND PORTS:

Inland Port Greer • South Carolina

The South Carolina Ports Authority facility located in Greer/Spartanburg, South Carolina, is what some might consider the poster child for a successful inland port. In collaboration with the serving railroad, NS, the South Carolina Ports Authority proposed to BMW that the auto company consider moving its containers via rail intermodal to the Port of Charleston. All three organizations had established working relationships. BMW was already using the Port of Charleston to ship the plant's vehicles overseas. NS had collaborated with BMW and the state years earlier in site work related to BMW's initial selection of Greer. More importantly, NS was already handling BMW's export-finished vehicle traffic. The company was exporting approximately 70% of its finished vehicles overseas, which moved via NS rail to the Port of Charleston.

Greer is a chief example demonstrating the market dynamics that allow a railroad to serve an inland port over a short length of haul where shipping over the road is financially competitive compared to direct truck over-the-road. Greer shows that no rail haul is too short if it can be compensated by a sufficiently large amount of committed traffic. At about 236 rail miles from the Inland Port Greer to the Port of Charleston, the short length of haul is extremely challenging economically from a railroad perspective. In the instance of the Inland Port Greer, BMW was willing to commit 24,000 annual lifts to the proposed inland port. It is key to note that BMW committed to actual numbers along a set timetable, not merely expressed an interest in using the inland port were one to be established. The commitment was also married to rate and service conditions negotiated by the port and the railroad, including proposed lift fees at the inland port.

Inland Port Greer's facility in South Carolina

An identified anchor tenant was the triggering concept for the proposed inland port. From there, the parties sought to establish the inland port as close as possible to BMW since the company would supply the bulk of the inland port's container traffic. Inland Port Greer is just under five miles from the auto plant. The facility also sits fewer than five miles from an interchange on Interstate 85, allowing efficient access to other potential customers.

Based on the BMW agreement, the South Carolina Ports Authority was able to craft a financial structure for Inland Port Greer that was feasible. Had BMW not committed its traffic, justifying an inland port in Greer would have been challenging. With BMW's lift commitment and a decision to move forward to launch, other manufacturers and product distributors were able to use the facility. Importantly, the Inland Port Greer is located in the Upstate region of South Carolina. South Carolina is a heavy manufacturing state, and its manufacturing base historically has been concentrated in its Upstate region. Thus, the BMW commitment and placement of the facility in Greer succeeded due to the volume strength of the anchor tenant, the concentration of other shippers, and, at that time, the absence of other nearby international intermodal ramps. This last element meant that the catchment reach for Greer was fairly wide geographically, and some users today still transport cargo more than 150 miles to the ramp.

Greer far exceeded its projected annual lifts from year one, and its 160,000 lifts in 2021 constitute a significant intermodal volume. Both the facility and the railroad's mainline have been expanded based on Greer's successes. This expansion has been supported by competitively-secured federal transportation grants.

Today, in the broader geography, NS and CSX have intermodal ramps in Charlotte, and the Georgia Port Authority (GPA) is establishing an inland port in Gainesville, Georgia, which NS will serve. CSX operates two GPA-owned intermodal ramps in Georgia, including in Murray County in northwest Georgia and Cordele in central Georgia, south of Macon.

HIGHLIGHTED INLAND PORTS:

Appalachian Regional Port • Georgia

The Appalachian Regional Port (ARP) in the hamlet of Crandall in Murray County, Georgia, sits a few miles north of Chatsworth and 20 miles from Interstate 75, which is further from an interstate than typical for an intermodal ramp. It is approximately seven miles south of the Tennessee state line and northwest of the very important Atlanta market. Intended initially to attract Volkswagen (VW) business from VW's Chattanooga plant, the ARP has been successful with a combination of some modest VW business and especially the regional volume density afforded by the carpet and flooring business in the region. For example, the facility sits seven miles from the Mohawk Industries plant. In part, thanks to the availability of intermodal rail, this region of Georgia attracted a new GE Appliances facility nearby, which is now planning an expansion.

CSX is the rail carrier serving ARP. The mainline serving the inland port is not CSX's primary route in the region. However, reliable CSX service has proven adequate for extending the market reach of the GPA through this relatively small inland facility.

Year-over-year growth at ARP has been steady. Total actual lifts in 2021 were about 35,000, with an anticipated volume of 40,000 for 2022. With a current annual lift capacity of 50,000, it is reasonable to anticipate a planned expansion to 100,000 lifts. With only about two million greater population than Virginia, Georgia is 39% larger physically than Virginia, at over 59,000 square miles. Notably, the Atlanta metro region is the third largest market east of the Mississippi, a driver of much economic activity for the state and, logically, a key market element for GPA. Because of its geographic location and close market relationship relative to Atlanta, GPA occupies a somewhat different market space than The Port of Virginia. GPA has a multi-inland port strategy that includes ARP and the CSX-served Cordele facility in central Georgia, south of Macon, and the planned Gainesville ramp, northeast of Atlanta, which Norfolk Southern will serve.

As in the case with Greer, the ARP has been able to attract BCO traffic from relatively substantial distances.

The Appalachian Regional Port facility in Crandall, Georgia

HIGHLIGHTED INLAND PORTS:

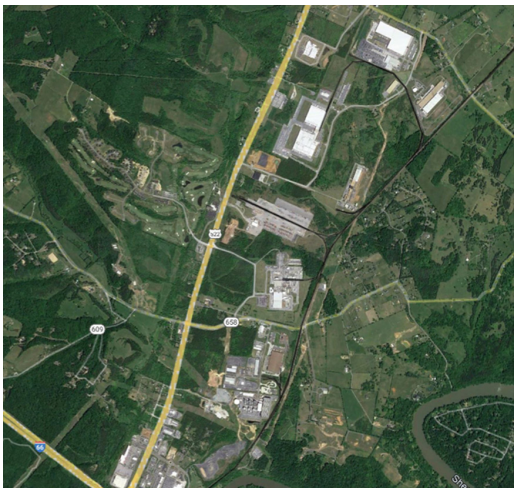
Virginia Inland Port (VIP) • Front Royal

The Virginia Inland Port at Front Royal

When first conceived in the late 1980s, the Virginia Inland Port (VIP) at Front Royal in northern Virginia was envisioned as a means by which The Port of Virginia might siphon container traffic moving on the interstate to other ports (e.g., Baltimore) and induce the traffic to move to Hampton Roads via rail. The facility opened in 1989.

Due to its broader relationship with The Port of Virginia, NS agreed to provide service to Front Royal, which sits two miles away from an interchange on Interstate 66. The original concept of attracting Baltimore's port traffic did not initially materialize in the market. There was only one large shipper already located in the region: Dupont. Their facility was in close proximity to the Front Royal Inland Port, but its volumes were not significant. However, with the existence of the ramp and continued service by the rail carrier, several other distributors, along with a few manufacturers, located in the region over time due to the availability of reliable rail intermodal service connected to The Port of Virginia.

After its initial 20 years, the volumes generated by VIP grew to a point where the operation began to prove remunerative to the rail carrier, largely thanks to the new distribution and other businesses attracted to the ramp. While the Virginia Inland Port at Front Royal's roughly 35,000 annual lifts is a sizable number, it is still modest compared to most intermodal facilities served by Class I railroads.



The Virginia Inland Port sits approximately two miles from an I-66 interchange and has attracted multiple shippers to the area.

HIGHLIGHTED INLAND PORTS:

Heartland Intermodal Gateway • West Virginia

Heartland Intermodal Gateway, located in Prichard, West Virginia, is an inland port that is no longer in operation. This facility was pursued by the State of West Virginia and located within easy reach of Huntington and, potentially, Charleston. The facility was made possible by the tunnel clearances provided by the Heartland Corridor, connecting Columbus, Ohio, and The Port of Virginia.

The facility was designed and launched despite not having identified adequate demand. Although some shippers expressed interest, none were committed in advance, and the demand profile never generated anything near the 20,000 lifts that would represent a successful launch. Located on the NS line, the railroad provided service three days a week for a couple of years. Still, traffic did not materialize and the facility was forced to close as it could not sustain its operating costs.

The Heartland Intermodal Gateway in Prichard sits south of Kenova, West Virginia, along the Big Sandy River

Ideal Market Conditions for a Successful Inland Port

Ideal Market Conditions for a Successful Inland Port

In considering the market conditions necessary to launch a successful inland port, it is important to recognize that not every condition needs to be met perfectly for a region to succeed. However, the prospects of success for a proposed facility become more challenged as more conditions are not present and/or cannot be generated or induced. The inverse also holds true: the potential for commercial success increases with the number of conditions met at a proposed location.

The primary market-driven factors for a railroad to be an interested partner and, therefore, for an inland port to be feasible are listed below. These factors are consistent with the background provided earlier with respect to the intermodal market:

- **Length of haul –** A length of haul above 250 miles is preferable for the serving railroad (competitive versus over-the-road truck movement)
- **Volume –** Identification of a minimum of 20,000 lifts per year is a key threshold to demonstrate the market demand necessary to engage a Class I railroad
  - The volume must be international, import/export, not just domestic-driven demand
  - Shippers/BCOs must be willing to commit traffic, not just express interest in intermodal service
- **Location –** Proximity to an interstate highway is important as intermodal is a truck-and-highway dependent service
  - Location on a rail mainline that already carries intermodal freight, preferably with the marine port in question
- **Freight Demand –** Freight demand must be dense, concentrated, and not geographically dispersed
  - Freight demand is initially concentrated in a small number of shippers and not dispersed amongst a large number of shippers
  - Traffic is generally balanced, imports versus exports and empties versus loads
- **Available Additional Properties –** Developable property is reasonably proximate such that additional generation of demand can locate near the inland port

As stated above, not all conditions need to be met. The case study examples show that some shortfalls can be ameliorated through the development process. Still, too many shortfalls suggest that the regional economic growth strategy should focus on alternative growth opportunities, such as growing import/export market density, developing a rail-centric distribution and logistics hub, or pursuing other cutting-edge logistics opportunities.

A region that does not meet the market requisites for an inland port can still adopt an aggressive rail-centric and site-centric economic development strategy if it has the right business environment, is well-served by a railroad, and can identify viable rail-served competitive sites. This rail-centric, site-based strategy can still be connected to a marine port for import/export activity but is less constrained in mixing domestic and international business as its product (inbound or outbound) will not be moved via containers but via other rail equipment types. The site's characteristics are somewhat less exacting than the requirements for an intermodal ramp (see next page) but still require substantial effort. Further, while not an intermodal project, a well-conceived rail industrial park can include capacity reserved for transload activity. These are locations where the physical transload of product is done from truck to rail at the site, moving from a traditional truck and loaded onto a traditional railcar. This is called a multimodal operation. As such, this multimodal operation allows local shippers and BCOs to combine the short-haul convenience of trucks with the long-haul, more competitive rail rate (resulting in a smaller carbon footprint).

There are other relevant factors for success, such as land costs and labor pool size, but these other factors are essential and relevant to most economic development initiatives in a given region and are not limited to pursuing a successful inland port.

The farther the inland port is from Hampton Roads, the more likely the rail move can compete and make a profit. As indicated earlier, a shorter haul can be compensated by large amounts of existing cargo demand. A distance shorter than 500 miles requires very careful specific assessment to determine its success. A distance less than 250 miles can be successful if an international freight demand of at least 20,000 annual lifts specifically for intermodal is achieved.

Ideally, an inland port should be in close proximity to a rail line already in intermodal use connected to The Port of Virginia. It is more costly for a railroad to go out of its current international network route, especially for a nascent intermodal operation that generates only modest freight traffic.

In order to reach the most minimal thresholds, a proposed inland port strategy must have identified at least 20,000 annual lifts. Generally, in smaller operations with about 20,000 annual lifts, the site should be designed to allow the containers to rest on their chassis in the ramp or the terminal to avoid having to ground the containers, which would force additional cargo manipulation and added costs.

Additionally, the fewer number of shippers necessary to reach a 20,000 minimal threshold for the initial number of committed lifts, the more likely deals can be negotiated such that the facility will successfully launch.

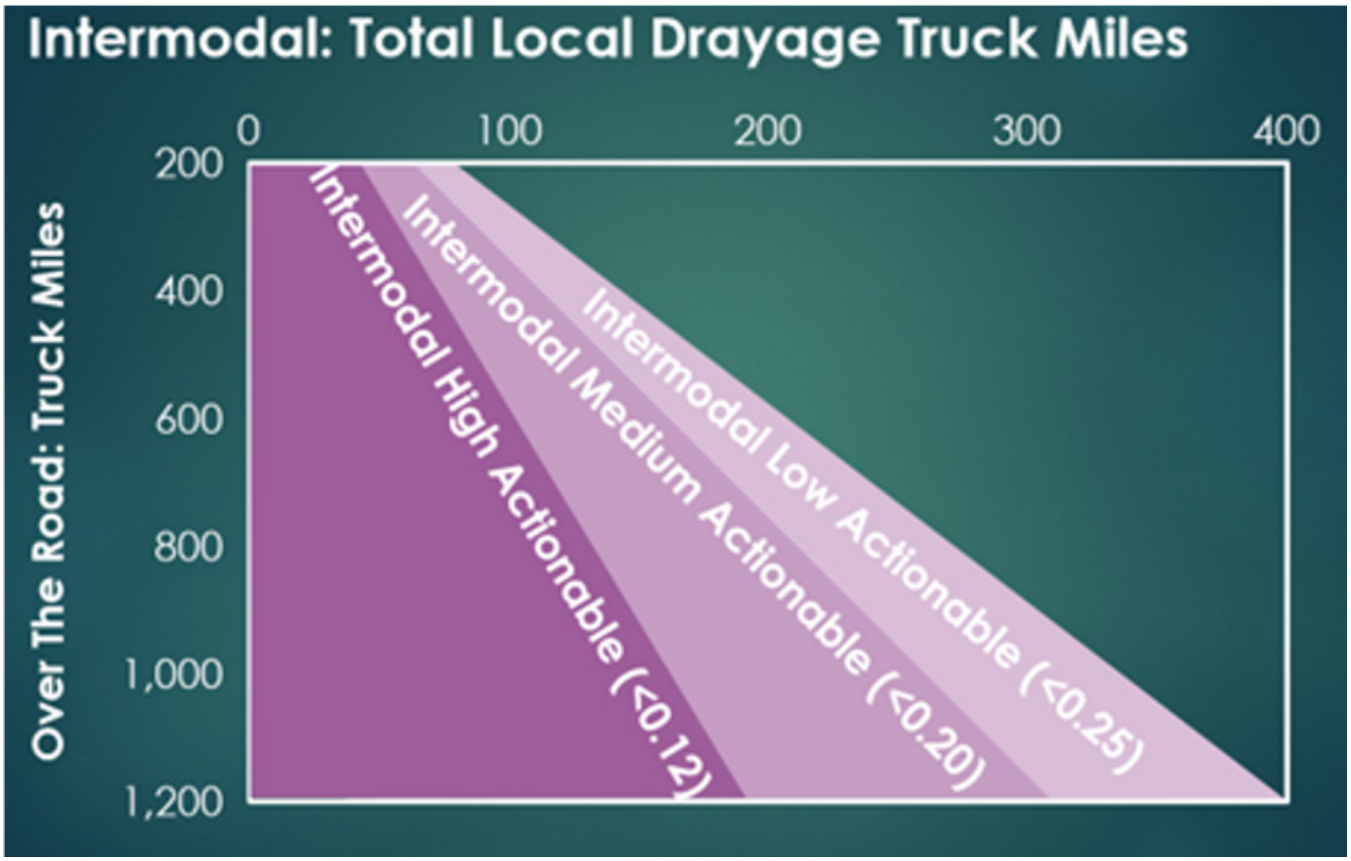
After identifying lift commitments of a narrow set of existing companies or growing and attracting a sufficient set of rail-centric distribution companies that can supply at least 20,000 container lifts per year, a further, more detailed assessment of developing an inland port would be warranted. If this further study determined that an inland port could be successfully established, the size of the facility would be defined by an annual lift capacity.[27]

Anything smaller than 20,000 annual lifts would not be economically viable for a railroad. Identification of 20,000 annual lifts must constitute actual demand that can be committed by companies. Demand at this level should be adequate for a railroad to be interested in further study of an inland port's potential, and they would expect additional discretional volume to be attracted to the facility.

Because of the different equipment required for moving 40-foot international containers compared with a 53-foot domestic container, all identified lift demand for an inland port must be for import and export traffic only, not domestic. Additionally, a key element of cost, including for the port, is the balance between imports and exports.[28] If an intermodal ramp is seriously out of balance for inbound moves versus outbound moves, it will be challenging to balance container equipment. The Port of Virginia would be in the best position to advise on what level of imbalance their business model can sustain or how they otherwise would address such a challenge.

Interstate highway access is important to an intermodal ramp for its ability to unlock more distant geographical markets that could utilize the inland port.[29] The railroads can see a lack of interstate as a challenge because it could limit the potential lift demand of the inland port. Trucks must easily access the inland port from long distances, which is especially important in the larger catchment area to gather adequate freight volume. Absent an interstate, the ramp needs to rely on a proximate limited access highway as similar to an interstate as possible. The closer to an interstate, the better. However, there are exceptional examples in this respect, such as Georgia's Appalachian Regional Port, which is 20 miles from the nearest interstate and located on a two-lane portion of US Route 411.

Graph 1: The greater the dispersion of the freight, the less likely to accumulate at an inland port, but qualified by the length of the rail haul.*



Finding multiple parcels/lots of developable property near inland ports is extremely important. In addition to the inland port facility's site, other developable properties nearby (mostly not rail-served) should be identified to attract and grow potential users. There is no hard minimum, but this factor should be evaluated when comparing potential site locations for an inland port. Having additional developable property accommodates the proximate economic growth of shipping-oriented firms, which induces additional freight demand that will bolster the longer-term market success of the facility.

To the extent possible, the facility should locate where demand is most densely concentrated. The greater the distance of the supporting truck moves and the more dispersed the demand profile, the less likely shippers will use the facility. The longer dray is not only a factor of time but also cost: the given shipper must assess their total costs for the move, not just the facility charges and the rail rate.

The graph above provides an illustrative framework demonstrating the likelihood that a BCO to use an intermodal facility based on the distance to a destination port and local drayage to the intermodal facility. A given facility's degree of market reach and the local tolerance for dray distance can be graphed as shown below but will vary enormously due to a variety of factors. For example, a local dray will happily travel a couple hundred miles in Wyoming to load onto a railcar at an intermodal facility; in northern New Jersey, drayage tolerance on distance would be magnitudes lower.

*Numbers are illustrative

Ideal Physical/Technical Conditions for a Successful Inland Port

Ideal Physical/Technical Conditions for a Successful Inland Port

The ideal location for an inland port will meet most or all the following conditions. As with the market preferences described above, not every condition needs to be met precisely. However, the more departures from requirements, the less likely a facility is to achieve success. Some unmet requirements can be overcome, but this generally is at a high cost to the developer. For example, a site could be in an area with limited flat land, but significant funds would be needed to grade the site.

This study looked at the characteristics of a modest inland port with a typical facility capacity of 50,000 annual lifts. These characteristics include:

- Approximately 100-acre site, which is not landlocked (i.e., the land is proximate to additional land developable for shippers); a smaller site may function but must be perfectly linear
- Flat land
- Located on a straight section of railroad mainline that carries intermodal business, preferably with the target port; the rail mainline should have adequate rail capacity, including clearance for containers moving in rail high-cube doublestack configuration
- Adjacent, serving railroad tracks must be level with the site and with minimal approach and departure grades
- Rectangular site that sits contiguous and not perpendicular to the rail mainline with at least 9,000 feet length for the rail
- No at-grade crossings for the full length of the track
- Site lays with the serving rail mainline on one side; the access/egress roadway on the other

For an inland port, an identified site should be approximately 100 acres. Facilities below 100 acres are possible, and perhaps even 70 to 80 acres can work efficiently, but a property too small will make the operation unworkable. Additionally, the location of an inland intermodal port facility should not be on acreage that would be "outgrown" in a short period of time. The site location must not be landlocked or inordinately restricted from potential future expansion by nearby, pre-existing built development or blocking roadways or topography.

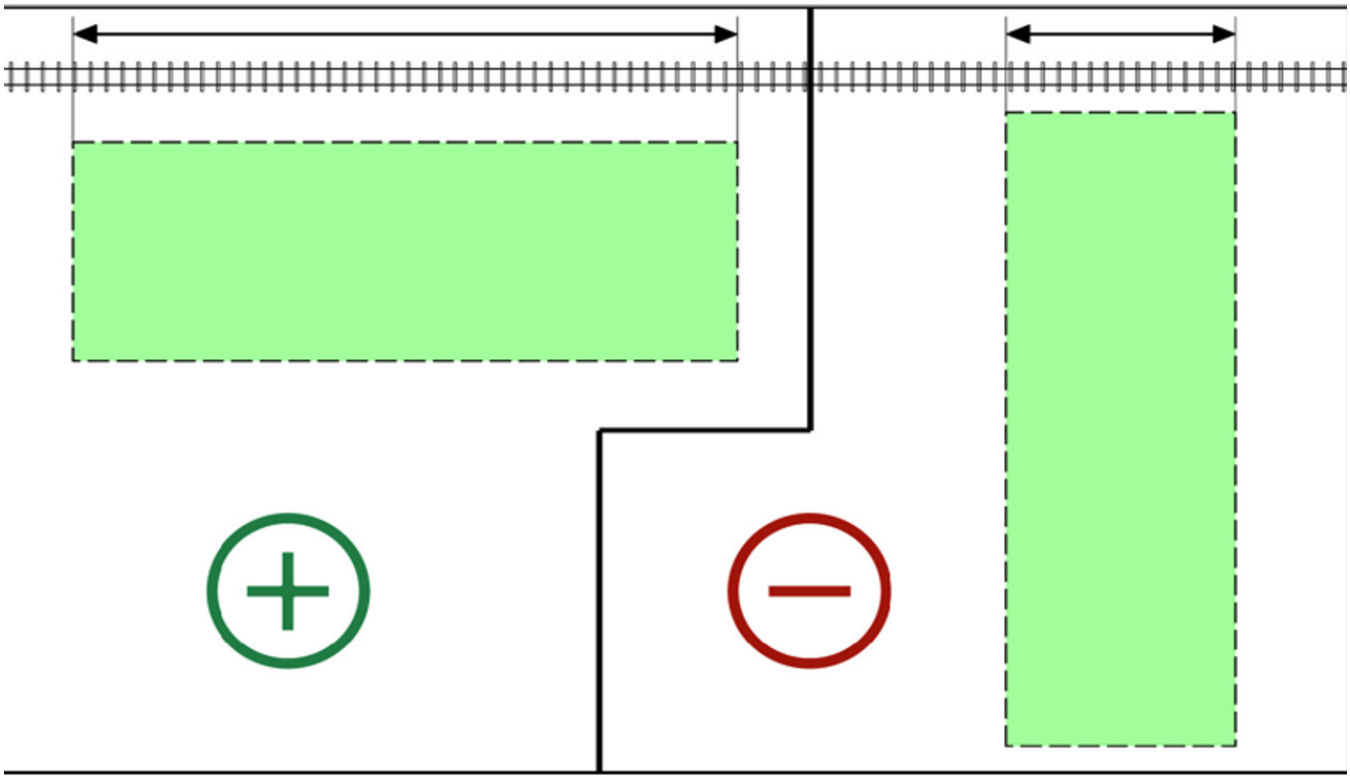
The property for the ramp should be relatively flat; the more topographically challenged a property is, the greater the amount of fill and grading that will be necessary. No amount of excess topography is too great, but a high cost may warrant a reconsideration of the site or the project. Even what appears like a modest amount of "roll" on a property can translate into millions of dollars for site preparation. The investors in the facility will need to determine their financial capacity. The grading cost, for this reason, should be assessed early on in the site determination process.

The site must be located on a mainline that is ideally already serving intermodal business to the target port. Once a site is identified, the railroad must incorporate the site and some estimated level of service, or frequency, into its train operating plan and ensure that it has adequate rail capacity on the mainline to efficiently serve the site. There is no mainline capacity challenge that cannot be fixed with money, but the ideal site will not require additional mainline rail capacity.[30] The container trains must also be able to move in a doublestack configuration on these lines. Additionally, the inland port facility should not be located proximate to where the rail mainline has a curve; the longer and straighter the mainline at the point of the facility, the more efficient.

The most grade a freight train can efficiently accommodate is 2.5 percent, compensated. To keep the combined resistance of grade and curve from overwhelming trains, grades are compensated by being reduced on curves, so resistance remains constant. An efficient intermodal ramp will have an on/off grade for the serving railroad lower than 2.5 percent. Relatively flat land is a necessity for a potential site.

For a modest intermodal facility with a 50,000 annual lift capacity, the property needs to sit contiguous to the rail mainline, allowing for a 3,000-foot-long facility. This contiguous location of the property relative to the rail line is essential such that a train can make a headhaul move into and out of the facility regardless of its traveling direction to avoid switching back and forth. Additionally, a train operating in and out of an intermodal ramp cannot extend onto the rail mainline, obstructing through-rail traffic as it works the given intermodal ramp.

Figure 1: An ideal property for an inland port cannot sit in a perpendicular or otherwise oblong direction relative to the mainline



In order to properly switch[31] a facility, 3,000 feet of track is optimal on each end of the facility, meaning 3,000 feet to enter the facility and 3,000 feet to exit at either end. With a minimum of 3,000 feet for the facility itself, the ideal location is at least 9,000 to 10,000 feet in length. As with other ideal conditions, specific circumstances will need to be assessed. If a facility locates where there is a double mainline track, there is likely a lower requirement for 3,000 feet to enter or exit. If a facility locates on a lower-density mainline,[32] operating circumstances can be more forgiving.

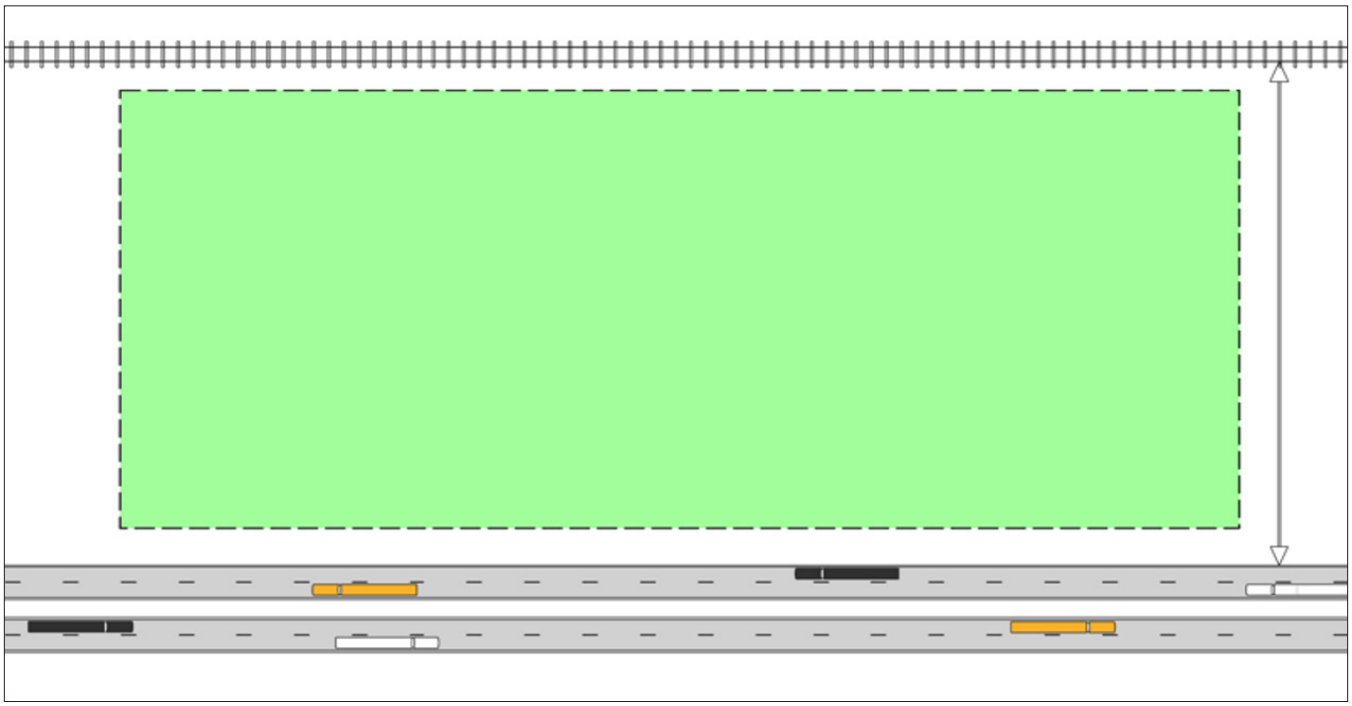
An inland port cannot be located in proximity to grade crossings. Truck versus rail conflicts must be avoided with regard to facility access and inside facility operations. Access/egress to and from the facility cannot be inhibited by grade separations representing any conflict between roadway and train movements.

The ideal ramp configuration has highway access on one side and the contiguous rail on the other. Rail/truck conflict for access/egress must be fully eliminated. In instances where rail and highway run on the same side with the property or site on the other, the roadway will need to be elevated for access, presenting a design issue and an element of capital cost.

In addition to the site requirements noted above, the inland port should be built relative to current, and near-term expected demand. It should be configured in such a manner as to be expandable but without incurring unnecessary costs in advance of market demand. Providing too much capacity in advance of demand is a recipe for financial stress for an inland port.

Lastly, ongoing operating costs are important and are often overlooked when establishing an intermodal ramp. Additional assessments would be needed to determine ongoing costs for any potential inland port before an inland port facility can be developed.

Figure 2: The ideal ramp configuration has highway access on one side and the contiguous rail on the other



Economic Impact of an Inland Port

Economic Impact of an Inland Port

As a component of the study, Moffatt & Nichol hired Insight Research Corporation (IRC) to undertake an analysis of the economic impact of a modest-sized inland port facility.

IRC established a series of assumptions reviewed and approved by Moffatt & Nichol. Those assumptions start with the delivery of a 50,000 annual lift capacity facility on a 100-acre lot, which costs a total of $55 million ($5 million in the first year for engineering, followed by two years of construction costing $50 million). This illustrative total cost of $55 million includes the equipment needed to operate the inland port but does not include the cost of the land.

In this scenario, the facility opens in year four and handles 15,000 annual lifts in its first full year of operation, growing to 25,000 by year six and 45,000 by year ten.

The following economic impact described is for a modest-sized generic inland port.[33] In the analysis, IRC assumes that the market threshold and physical requirements for a facility have been met. This approach is illustrative only and assumes that the market conditions for both regions are virtually identical. The market conditions would vary considerably between the two regions, and actual numbers would also be driven by the site selected.

IRC also makes the following assumptions: in the first year of full operation, the inland port would attract a 100,000-square-foot manufacturing facility near the newly opened port. Over the first ten years, two more manufacturing plants of the same size land in the given region, along with two warehouse/distribution operations of 450,000 square feet each.[34] IRC assumes none of these investments would occur in the absence of the inland port.

This analysis is illustrative in nature. Actual performance will vary, potentially a great deal, depending on the selected placement and local market dynamics. For example, the economic impact will depend on the business cycle and whether an inland port opens during a recession or economic expansion period. Performance would also be impacted by the effectiveness of economic development tactics to attract business investment.

Over a 20-year period, the cumulative economic impact is estimated to be $1.75 billion. This analysis defines economic impact as the benefit to the general economy of a defined rail prospect catchment study area, calculated using multipliers from the U.S. Bureau of Economic Analysis (BEA) specific to the Commonwealth. This impact would be driven by all areas of new expenditures for construction, payroll, maintenance, and operating activities of both the public and private sector investments.

The analysis estimates a total of 1,370 permanent new jobs would be generated by the operations of the inland port facility alone, with 675 jobs directly at the inland port and 695 indirect jobs.[35] As the port facility and the five new businesses (or expansions) are being built, an estimated 1,363 construction (temporary) jobs are generated. The IRC analysis does not attempt to estimate the permanent employment impact.

Tax revenues are another component depending on local tax rates. Therefore, those estimates will be site-specific and would be a component of a site-specific study.

Methodology of the Inland Port Market Demand Feasibility Analysis

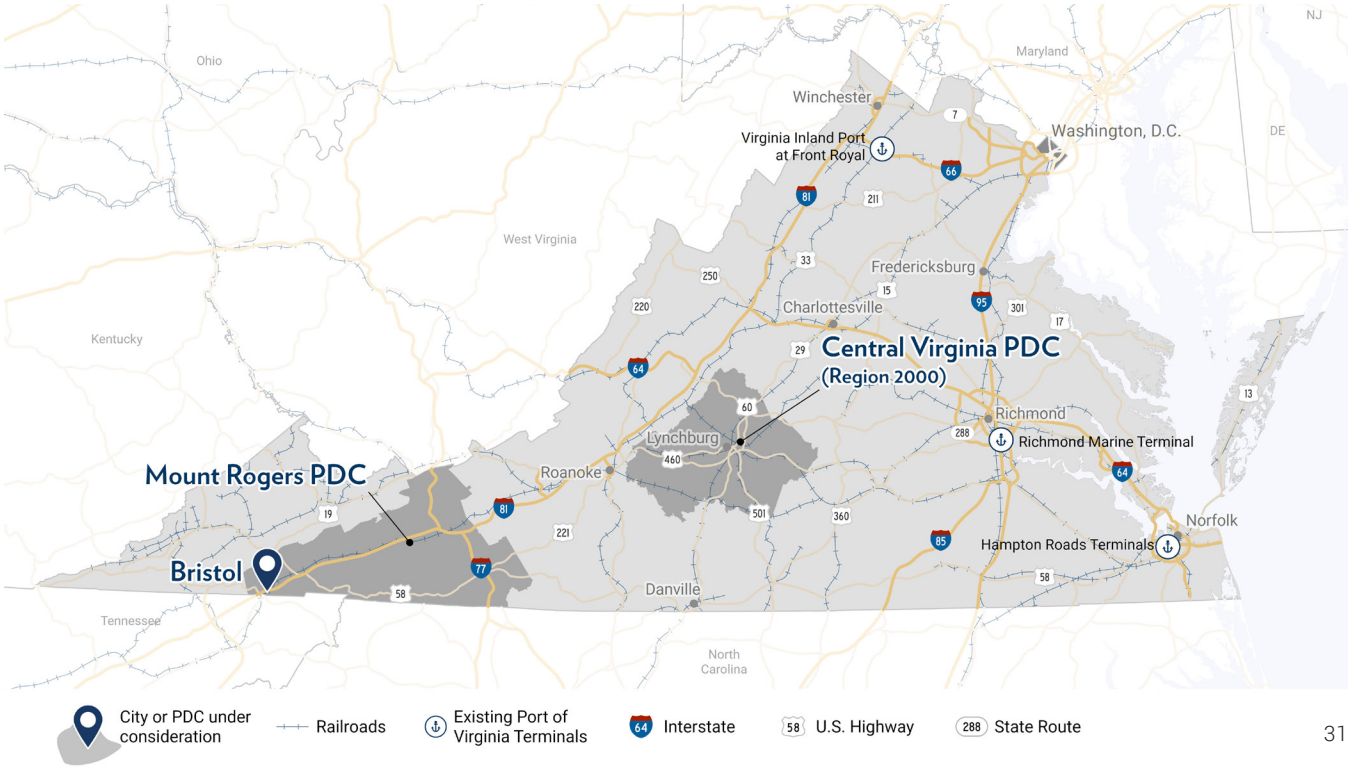
Methodology of the Inland Port Market Demand Feasibility Analysis

Item 125 Q of Chapter 2 of the 2022 Acts of Assembly, Special Session I (the budget) included the Central Virginia Planning District (formerly known as Region 2000), the Mount Rogers Planning District, and the City of Bristol as areas to determine the feasibility of locating an inland port. Each region was analyzed independently based on market reach. The City of Bristol was incorporated within the overall Mount Rogers region assessment, as Bristol does not constitute a separate freight market.

To assess the demand-level feasibility of an inland port, Moffatt & Nichol ran Freight Analysis Framework (FAF) data using BEA assumptions to test macro-demand. The FAF data is published by the Federal Highway Administration (FHWA). The data attempts to capture a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. The FAF integrates data from a variety of sources incorporating multiple commodity types, including data from the Commodity Flow Survey (CFS) and international trade data from the U.S. Census Bureau. The FAF is produced through a partnership between the U.S. Bureau of Transportation Statistics (BTS) and FHWA, both agencies of the U.S. Department of Transportation.

Moffatt & Nichol ran the FAF data capturing movements between the two respective regions and East Coast ports running from Savannah through the Port of New York/New Jersey, which included The Port of Virginia. Moffatt & Nichol also ran the FAF data against each region's population and market assumptions drawn from BEA data.

Figure 3: The study regions named in Item 125 Q Chapter 2 of the 2022 Acts of Assembly, Special Session I



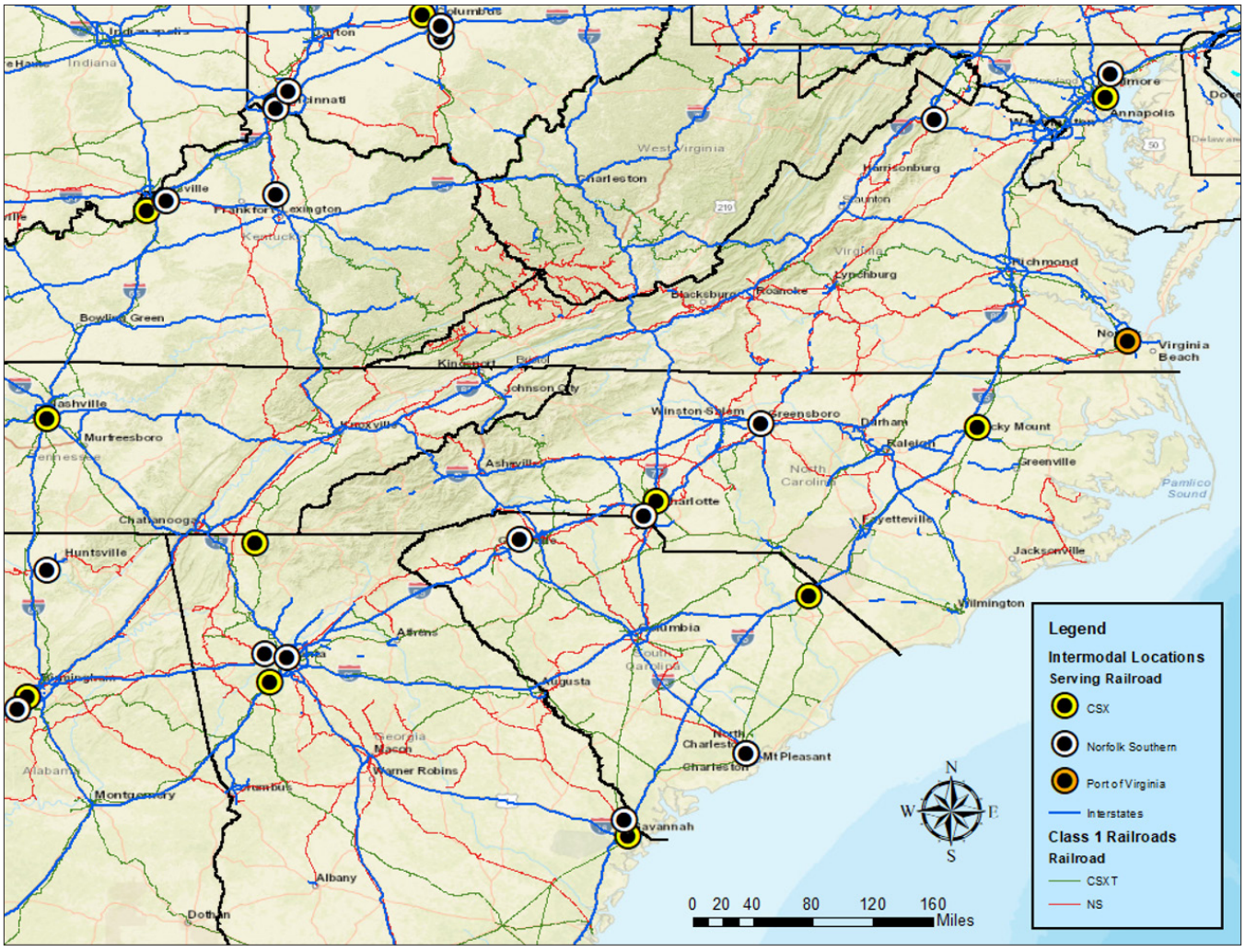
Results of the Inland Port Market Demand Feasibility Analysis and Recommendations

Results of the Inland Port Market Demand Feasibility Analysis

Meeting the market demand is essential to demonstrate the feasibility of an inland port. The ability to identify 20,000 lifts annually is an absolute minimum to make an inland port economically viable for the Class I railroads and for the railroad to be an interested partner. The short length of haul is a huge challenge against a pure truck move to The Port of Virginia. Therefore, the freight demand must meet certain criteria described more fully above.

Both the Central Virginia and Mount Rogers/Bristol regions are relatively low in population, with low population density. Moffatt & Nichol's initial review of the publicly-available data as described above indicated that based on population-derived consumer demand, neither region had adequate freight demand to meet the 20,000 annual lift threshold that would make an inland port economically viable for the Class I railroads.

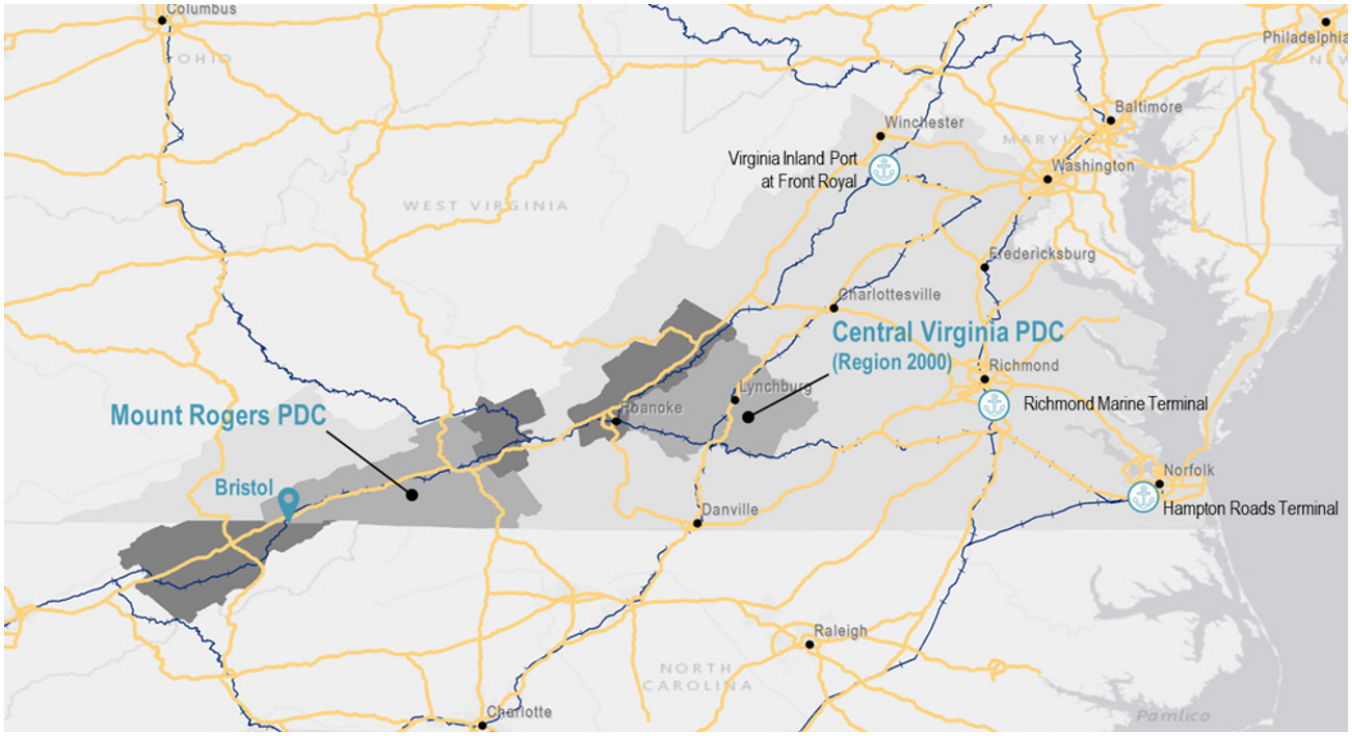
Figure 4: There is a large geography that encompasses both regions without any rail intermodal facility



Since Moffatt & Nichol determined a lack of existing consumer demand that would not justify an inland port in either region, they looked at manufacturing- or production-derived demand.[36] Because of the absence of any existing intermodal facilities in the larger geography surrounding all of central and western Virginia, including regions of adjoining states, it is reasonable to expect that any intermodal ramp located in either region would have a market reach extending beyond these regions as defined in the budgetary language establishing the scope of this study.

For the purposes of including all potential manufacturing-derived demand for an inland port, each region was extended to include geographically proximate areas where shippers would see advantages to using an inland port. Extending the regions more accurately captures the potential market of an inland port since an inland port facility placed in either region would have a broader geographic market reach than the regions defined in the budgetary language establishing the scope of this study. The extended regions have only a modest market overlap with competing, existing intermodal ramps. In the case of the Central Virginia Planning District region, Roanoke County, Roanoke City, Salem, and Botetourt County were added as natural catchment extensions to a Central Virginia-based ramp. In the case of the Mount Rogers region, Giles and Pulaski Counties, and northeastern Tennessee, were added to the region.

Figure 5: The study regions are represented in light gray, and the extended regions included in the analysis are in dark gray

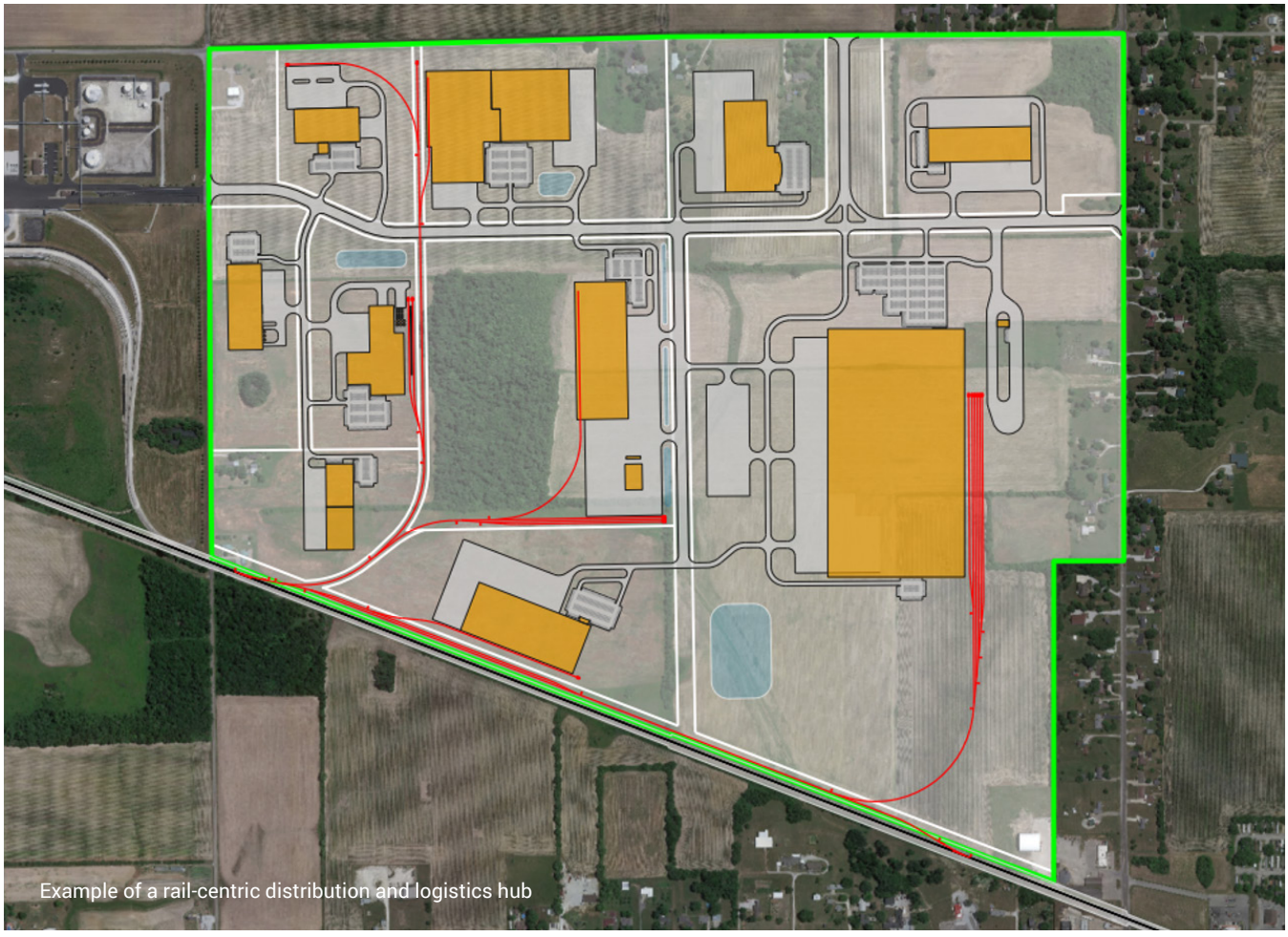


Based on this data analysis of manufacturing/industrial-derived demand, Moffatt & Nichol determined that the Central Virginia region does not currently have the market demand to financially justify the development of an inland port. While this assessment details current demand, this study acknowledges that the region could take steps to attract and grow companies that would increase the freight demand in the region. At this time, the Central Virginia region is best positioned to pursue other rail-centric development opportunities that would enable the region to secure the long-term market demand needed for an inland port.

Additionally, the analysis conducted by Moffatt & Nichol indicates the Mount Rogers/Bristol region demonstrates enough market-driven and physical conditions to warrant additional assessment. It is also recommended that the Mount Rogers/Bristol region continue to pursue other rail-centric development strategies to grow target industries that would be future users of an inland port facility.

While this study looked at the feasibility of an inland port at present, additional strategic conversations and analysis should be made by each region to determine if pursuing an inland port is the most effective path to encourage the growth of key sectors in their region. In addition to medium- and long-term considerations around developing an inland port, it is important to note there are several paths forward for the regions to support rail-centric industry development. These include developing strategies to grow import/export market density, developing rail-centric distribution and logistics hubs, or pursuing other cutting-edge supply chain-driven opportunities.

In particular, it would make sense for the region to undertake a comprehensive site review to position Central Virginia to compete for rail-based industry and manufacturing. Many regions can compete for truck-based opportunities, but Central Virginia has robust rail and could pursue a targeted strategy to secure companies that require rail service. Adequate sites for such opportunities are much more limited. Further, the region could include multimodal, transload elements within a rail-centric, site-specific economic development strategy.



Example of a rail-centric distribution and logistics hub

If a region decides to pursue an inland port facility, coordination with The Port of Virginia will be necessary moving forward. The commercial and market nature of an inland port requires that The Port of Virginia drive decisions about additional market assessment based on specific customer targets. The port is in the best position to consider what market space an inland port could occupy and how it could extend its market reach. Since the inland port would be a Port of Virginia entity, the port would be best able to guide its physical layout. VEDP would be in the best position to market the availability of an inland port as an additional tool in an economic development strategy.

It is important to note that one region's development of an inland port does not disqualify the other region from developing an inland port later if adequate demand exists. This is because the likely market reach for an inland port in each region probably would not extend into the other's inland port market.

While this study looked at the feasibility of an inland port at present, additional strategic conversations and analysis should be made by each region to determine the most effective path to cultivating industrial, manufacturing, and distribution/logistics clusters and growing other key sectors in the region. The following section will detail specific assets and recommendations, including information on other types of intermodal facilities, rail-centric development, and innovative logistics investments each region could consider.

Assets and Recommendations for the Central Virginia Region

The Central Virginia Planning District, centering around the City of Lynchburg, has many assets and opportunities, starting with attractive communities and an excellent quality of life. This study is complementary to other, more conventional reviews of economic attractiveness. It is not intended to replace other factors such as labor pool, academic institutions, educational opportunities, and training programs. These other factors are present and robust in the region. The current assessment focuses solely on the market demand factors and physical characteristics of an inland port. Thus, any observations in the current report should be complemented with other economic and regional factors and public policies intended to bolster the same, and findings here not be viewed in isolation from those broader regional features.

While an interstate is generally preferred, US Routes 29 and 460 run through the region and provide the most robust highways. As noted previously, being above 250 miles from a marine port is desirable. The City of Lynchburg sits approximately 200 roadway miles from The Port of Virginia's Norfolk International Terminal (NIT). The Town of Bedford, the farthest population center in the region from The Port of Virginia, is approximately 220 miles from NIT. However, as stated before, distance preferences can be offset by adequate demand.

Both NS and CSX, the two Class I railroads that serve The Port of Virginia, are present in the Central Virginia region. The CSX mainlines running through the Central Virginia region do not currently handle any intermodal traffic. The region sits on the Heartland Corridor of the NS railroad. This very robust, high-capacity rail line is cleared for high-cube doublestack, which NS uses to serve The Port of Virginia, connecting it to inland markets.

Central Virginia's regional economic development organization, The Lynchburg Regional Business Alliance, identifies five target industries where strategic efforts are focused. Those industries include Food and Beverage, Steel and Metals, Nuclear Technology, Wireless Infrastructure and Communication, and Financial and Business Support Services. Of those target industries, Food and Beverage and Steels and Metals are the industries most likely to leverage rail opportunities. The region would benefit from pursuing a rail-centric site development strategy tailored to the needs of those industries in particular. Site development is a high-cost strategy that can yield significant economic benefits for regions willing to play the long game. Especially for industries that are frequent rail users like Food and Beverage and Steel and Metals, sites should be identified, protected, and enhanced along the routes of both Class I rail carriers, CSX and NS. Building a robust rail-and-freight-centric economic engine entails a broader industry view that encompasses intermodal and other non-intermodal market opportunities that, with careful planning and regional collaboration, can yield long-term success and growth in the region.

The region also is served by the Lynchburg Regional Airport. Airports present additional opportunities for export-oriented industries to move cargo. Some Food and Beverage and Wireless Infrastructure and Communication subsectors utilize air freight to move their products. Leveraging the regional airport to attract companies that move cargo by air could be another strategy for the region to consider. While an assessment of air freight is outside the scope of this report, if the region is interested in the potential to expand target industries that prioritize international air freight facilities, it is recommended that the region pursue such a strategy after further study.

If considering this strategy, it is important to note that promoting airports for increased cargo usage often requires the airport to have advanced facilities for air freight. Elements required for international air freight facilities include road access, a 24/7 customs operation, on-site customs brokers, a common-use cargo facility, a main-deck loader, and widebody passenger operations. As with intermodal facilities, a feasibility assessment and clear business development plans tailored to the airport are key to determining if such a strategy is recommended. The steps of developing an airport with robust international freight capabilities include assessing the regional market demand, setting specific capacity targets, and then marketing to companies, such as Air Carriers (all-cargo and passenger) and Air Freight Forwarders, that would serve freight customers at the airport.

Assets and Recommendations for the Mount Rogers/Bristol Region

The Mount Rogers Planning District/Bristol region has many assets and opportunities, starting with attractive communities and an excellent quality of life. This study is complementary to other, more conventional reviews of economic attractiveness. It is not intended to replace other factors such as labor pool, academic institutions, educational opportunities, and training programs. These others are present and robust in the region. The current assessment focuses solely on the market demand factors and physical characteristics of an inland port. Thus, any observations in the current report should be complemented with other economic and regional factors and public policies intended to bolster the same, and findings here not be viewed in isolation from those broader regional features.

The Mount Rogers/Bristol region is served by Interstate 81 and 77, which cross the region in Wytheville. Wytheville sits approximately 355 roadway miles from The Port of Virginia's Norfolk International Terminal (NIT). Bristol, Virginia, is just over 400 miles from NIT.

The NS mainline running through the region carries container traffic connecting to The Port of Virginia. The NS line in question is a high-capacity rail line and is fully cleared for high-cube doublestack. CSX is not physically present in the Mount Rogers region; its lines run through portions of Virginia west of this region.

While the region is served by three general aviation airports, the region does not have an airport for commercial aviation at this time and is served by the Tri-Cities Airport in Tennessee and Roanoke Airport.

The Mount Rogers/Bristol regional economic development organization, Mount Rogers Regional Partnership, identifies five target industries where strategic efforts are focused. Those industries include Plastics and Advanced Materials, Food and Beverage Processing, Automotive and Transportation Equipment, Information Technology, and Warehousing and Distribution. All of those industries, with the exception of Information Technology, are likely to leverage intermodal opportunities. For those industries, the region should continue to pursue a site development strategy. Site development is a high-cost strategy that can yield significant economic benefits for regions willing to play the long game. Especially for industries that are frequent rail users like Automotive and Transportation Equipment, sites should be identified, protected, and enhanced along the NS mainline present in the region. Building a robust rail-and-freight-centric economic engine entails a broader industry view that encompasses intermodal and other non-intermodal market opportunities that, with careful planning and regional collaboration, can yield long-term success and growth in the region.

Given the results of the manufacturing/industrial-derived demand analysis completed by Moffatt & Nichol, the development of an inland port is one opportunity that should receive further consideration as part of the broader regional economic strategy. This feasibility assessment is the first step of a larger undertaking that could be conducted with additional feasibility and site-specific assessments in conjunction with The Port of Virginia and Class I rail providers in the region. The outcomes of additional assessments and coordination between various stakeholders will determine whether or not an inland port can be actualized in the region.

Conclusion

Conclusion

The report provides each region with a broader understanding of the intermodal market and how investments in the intermodal space, particularly when it applies to inland ports, can be justified. At this time, the feasibility analysis by Moffatt & Nichol determined that the Central Virginia region does not meet the demand threshold that would justify the investment for an inland port, however, the Central Virginia region would be well-served to pursue other rail-centric development opportunities that would enable the region to build long-term market demand and allow the region to compete in the rail space for economic development projects. The feasibility analysis by Moffatt & Nichol indicates the Mount Rogers/Bristol region sufficiently meets market-driven and physical conditions to warrant additional assessment. Any further efforts to pursue an inland port will require significant coordination with The Port of Virginia. In the medium-and long-term, both regions should consider an aggressive site development strategy that involves rail-centric site locations, development of other types of intermodal or multimodal facilities, and/or pursuit of innovative logistics investments to strengthen import/export-oriented industries prioritized by each region.

Endnotes

Endnotes

[1] A hostler is an off-public-road tractor used in rail yards or on docks for moving containers to position and reposition.

[2] Traditional railroaders often speak in terms of commodities, which makes sense to laymen when speaking to chemicals or forest products. In this sense, all intermodal containers are the same from the railroad's perspective, albeit in different sizes, even though they actually carry multiple, different commodities inside.

[3] In the rail business, for example, people say that "rail competes against over-the-road" versus saying that "rail competes against trucks."

[4] Note that block swapping, positioning railcars on the train, may occur in specific circumstances for operational efficiency

[5] Beneficial Cargo Owner (BCO): the party that ultimately owns the product being shipped.

[6] Because there is always a viable non-rail alternative for intermodal, it was de jure excluded from potential regulation when the Staggers Act, which largely deregulated rail, was enacted in 1980. In other commodity sectors, the Staggers Act allows for potential regulation when certain, more narrowly defined conditions exist. In contrast, the legislation recognized that a container or trailer could always move via truck; therefore, no rail regulation on rates would ever be necessary. If not satisfied with the rates or service conditions offered by the railroad, the shipper of a container or trailer could always turn to over-the-road trucking. Thus, the railroad could never generate a market-abusive situation for the shipper. The "market" for containers and trailers clearly extended beyond a market in which rail was closer to being the sole defining character. By definition in the statute (Staggers), a railroad could never be "abusive" toward the shipper or BCO since the shipper always had viable options.

[7] Service-sensitive generally means shorter transit times and a need for higher reliability, meaning, narrower service or delivery windows within which to determine performance.

[8] Cargo at rest can also incur cost—for example, the capital costs associated with the occupied real estate.

[9] There is a third component, premium, which refers to shipment moves for companies like FedEx, UPS, and USPS. As the name implies, premium is the most service-sensitive, with short transit times and very tight service or delivery windows. Premium trains are accorded the highest priority.

[10] In the industry, domestic intermodal includes all of North America. It does not recognize borders between the United States, Canada, and Mexico. Traffic originating and terminating in all three countries moving in domestic boxes are domestic moves.

[11] In the trade and business press, one will typically read how many TEUs were handled by a given port in a given month or year. The same standard is usually the case for the steamship lines that call on maritime ports.

[12] International Organization for Standardization

[13] A dray is the term for any localized truck move

[14] A very rough rule of thumb is that one can reload three international containers into two 53-foot domestic containers.

[15] In the industry, domestic intermodal includes all of North America.

[16] Containers 9.5 feet in height are referred to as a high-cube

[17] A service in the railroad business is often referred to as a product or a service product.

[18] It is this reason, for example, that we see the huge market share held by rail versus road in the LA to Chicago market lane (approximately 80% market share). Another example of how distance drives the market use of rail can be seen by comparing the rail/road ratio of inland container moves for East Coast and West Coast ports. Containers arriving at west coast ports have a greater distance to travel, with many of them being transported across the Rocky Mountains to the Midwest or East Coast. Approximately 70% of inland destination moves for containers arriving on the west coast travel rail intermodal inland, compared to about 20% of inland destined containers moving over east coast ports.

[19] In the railroad industry, a lane refers to the city pair, origin/destination, connected via rail. Unlike traditional railroading, which gathers traffic from multiple specific beneficial cargo owners distributed over a local region using local trains ("locals"), intermodal traffic is from major market to major market. In this case, every city pair is a separate lane. For example, Richmond, VA, to Birmingham, AL, is a separate lane from Richmond, VA, to Huntsville, AL.

[20] Note, this distance is relatively short for railroad intermodal, as opposed to other business segments.

[21] Discretional Cargo: cargo that could have moved over Western ports into the interior of North America

[22] Traditional railroading is an aggregation business in which local trains ("locals") pick up individual railcars or small numbers of railcars, which are aggregated in local yards into blocks. Those blocks of cars are moved to larger yards, in which trains are built for longer-haul movement. Those inbound trains move to classification yards in which blocks moving in the same general direction are reconfigured into outbound trains which have collected or aggregated all the blocks from various local origins. A typical individual shipment (an individual, loaded railcar) moves through more than one classification yard ("class yard"), adding new blocks to the trains at each class yard. Most shipments move through several on their journey.

[23] In traditional railroading, the given railroad typically deals directly with the BCO of the freight, the actual owner, who is the customer of the railroad.

[24] Typically, the railroads package multiple destinations in a single contract, including in response to this framework as proposed by their steamship line customers.

[25] When this happens, the container is said to be "grounded."

[26] Lift: moving a container off a truck onto a train, or the inverse, from a train onto a truck chassis, constitutes one lift

[27] The lift capacity would be projected based on some outyear determination of shipper product volume.

[28] This factor matters to the railroad and the port. An individual customer could still use the inland port for purely exporting their goods or purely importing.

[29] Typically, references by the railroads to the intermodal facilities they serve prominently indicate the number of miles to the ramp's serving or connecting roadway and the character or nature of the roadway.

[30] A railroad mainline can sustain up to a certain number of trains and a certain amount of freight. Beyond the current capacity of the mainline, additions must be made to handle increased capacity. These additions often require significant fixed capital costs to bring the mainline capacity up to a new capacity threshold. There are no incremental costs that can be incurred to increase mainline capacity. Additionally, capacity additions on a railroad, like an additional passing siding, are often located at some great distance from the site location. In what is mostly a single-track railroad in the US overall, and in Virginia as well, the number and length of the passing sidings dictate the amount of mainline capacity. Intermodal trains are very long, typically 10,000 to 12,000 feet in length, sometimes longer.

[31] Switching: when a train drops off blocks of railcars, picks up blocks of railcars, or otherwise rearranges the railcars

[32] Lower-density mainline: a line handling lower volumes of freight

[33] IRCs computations were provided in 2022 dollars; therefore, not adjusted for inflation

[34] If additional development is slower to unfold, the returns will fall short of the projected forecasts.

[35] Direct employment refers to full time employment of persons on-site and on the payrolls of these businesses, while indirect employment, occurring throughout the defined study area, is generated by the purchase of goods and services by the businesses and their employees.

[36] Production-derived demand: freight demand from manufacturing and industrial type activity

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