VIRGINIA INLAND PORT STUDY

Q1 2024 General Assembly Update

Submitted by:

Virginia Port Authority

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THE PORT OF VIRGINIA®

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Report of the Virginia Economic Development Partnership Authority and Virginia Port Authority. (2023). *Inland Port Study: Feasibility Analysis of Locating an Inland Port in the Commonwealth (2022 Appropriation Act, Item 125.Q.)*

Virginia Inland Port Study Q4 2023 General Assembly Update – December 1, 2023

I. EXECUTIVE SUMMARY

This is the second update in accordance with the 2022-2024 Biennial Budget (HB 6001 from the 2023 Special Session I), Item 113 T.4.

This document provides an update to ongoing work associated with the potential for a new inland port facility in the Mount Rogers Planning District and related next steps, for which the Commonwealth allocated additional funds in the 2022-2024 budget to pursue further development.

Readers of this update are encouraged to familiarize themselves with the project's intent by reviewing the initial Inland Port Study ("Inland Port Study: Feasibility Analysis of Locating an Inland Port in the Commonwealth") which was jointly released by the Virginia Economic Development Partnership (VEDP) and Virginia Port Authority (VPA) in January 2023, and the Q4 2023 General Assembly Update by the VPA ("Virginia Inland Port Study: Q4 2023 General Assembly Update.") which was released in December 2023.

This second update:

- Focuses on work accomplished over the most recent past three months, through March 1, 2024.
- Provides information regarding the commercial and operational assumptions for the facility.
- Restates expected progress and milestones that will be achieved in each of the quarterly updates through calendar year 2024.

II. THE OAK PARK SITE, WASHINGTON COUNTY

As noted in the Q4 2023 General Assembly Update, the initial Inland Port Study identified the Oak Park Center for Business and Industry, hereinafter referred to as the "Oak Park site", as the preferred site in the Mount Rogers/Bristol region for development of an inland port.

The site has several positive attributes, as outlined in the prior update, including that it is:

- Located in the densest concentration of existing freight demand in the region.
- Located within one mile from the existing interchange on 1-81 at exit 13.
- Adjacent to a high-capacity railroad mainline that already handles substantial amounts of rail intermodal traffic. Importantly, this includes rail traffic to/from The Port of Virginia.

However, as characteristic of the region overall, the site has significant topography which will entail careful engineering design and grading-related costs (Photo 1).

Photo 1 – Oak Park Industrial Site, NW corner looking NE. NS mainline is beyond the trees to the left.

III. PROGRESS TO DATE

The VPA's design team (internal VPA Engineering supported by hired outside expertise) has been focused on developing the Basis of Concept as the initial step of concept development. Early concept development has been underway as well, with the objective of these initial concepts being to support and illustrate a range of discussion topics pertinent to the Basis of Concept.

Within the Basis of Concept, the operational targets, performance assumptions, and engineering requirements are being identified and consolidated to clarify the objectives and constraints around which concepts are developed. These operational and commercial assumptions have implications for the layout of the facility, which become apparent as draft design concepts are generated to support further discussion toward identifying preferred layouts.

The Basis of Concept development has also been supported by informational discussions with Norfolk Southern (NS), the rail carrier that would serve the facility, to understand their design requirements and operational preferences, with the overall objective being to develop a facility that supports efficient operations for both the VPA and rail carrier.

A. Basis of Concept Business Case Development

At the heart of the concept development, the business case needs to be defined. In port planning terms, the "business case" refers to the spectrum of cargo and attendant level of service demands and include, but are not limited to, defining metrics such as:

- Import demand forecasts (containers per year coming into the site by rail)
- Export demand forecasts (containers per year leaving the site by rail)
- Empty container supply forecasts
- Expected duration for the various cargos to be stored on site (dwell time)
- Number of trains per day
- Seasonal variation in container traffic

As referenced in the Q4 2023 General Assembly Update, the original Inland Port Study was able to identify sufficient existing freight demand to warrant this additional effort now underway. The specific details of that cargo in context to the metrics above, as well as projections of how that demand might grow in the future, are key inputs to determining the infrastructure needed to efficiently and competitively accommodate it. Both the VPA and NS will have to collaborate to determine the optimal rail operating scenario.

The VPA commercial team is working with the design team to refine the gross expected initial freight demand estimates and to ascertain a reasonable growth trajectory following project launch. This commercial review is, of course, derived from confidential business information.

The existing demand that is expected to use the facility in its opening years is overwhelmingly export-oriented, with fairly minimal inbound cargo. These customers currently rely on their existing export drayage operations returning to their plants with

empty containers to fill. As such, the new inland port will need to also provide a supply of empty containers to maximize the attractiveness of the facility to these customers.

Management of these "empties" entails consideration of on-site parking, management of chassis to move the empties to customer locations for reload and, potentially, the rail design layout of the facility itself with respect to the relative ratio of working track capacity versus storage track capacity. The origin of the empty containers remains under discussion but could plausibly come from either The Port of Virginia, hinterland sources, or both.

The VPA commercial team is currently assessing how quickly it anticipates customers will be able to pick up inbound empties relative to dropping off the outbound loads (or, in fewer instances, the inverse). Confidential commercial discussions with potential customers are taking place to better inform the view about container fluidity on the site, which has ramifications for the average "dwell time" for containers on site. Dwell time is the time estimated from when containers are dropped off (either empty or loaded) to when they are picked up. Actual dwell times represent capacity which must be afforded on-site, which again, feeds engineering design decisions.

The VPA will be the driver of decisions over the coming months and if the project continues to advance, upon buildout, the VPA will operate the facility. Elements of the facility impacting rail mainline operations and rail service will be done in concert with, and ultimately in consensus with the rail carrier, NS. Those exchanges have begun.

B. Target Capacity

i. Definition of Capacity

Throughput of an inland port is defined as the total cargo that arrives and departs via rail over a given period of time. For containerized cargo, this throughput is typically expressed as either the number of containers or the number of twenty-foot equivalent units (TEU).

Containers that are twenty feet long are considered to be one TEU. Containers forty feet or more in length are considered to be two TEUs, regardless of their actual length. Few international containers fall between these two ranges and they do not impact long-term throughput for planning purposes. High-cube containers (which are slightly taller) are considered to be equivalent to standard sized containers.

The conversion between containers and TEUs is unique to the cargo mix moving through a given facility. For planning purposes, a ratio of approximately 1.7 TEUs per container is being used based on a limited survey of the prospective customer's cargo makeup. A ratio of 1.7 reflects that the preponderance of traffic will be in forty-foot units (two TEUs in maritime terms). Throughput volume may be expressed in containers (also referred to as lifts) or TEU depending on context of the discussion. TEU is a helpful unit for space-related calculations (e.g. storage, train capacity, etc.), whereas containers are more suited for operational-related issues (e.g. number of cranes needed to move cargo within a specific duration, number of lanes needed for the entrance gate facilities, etc.).

Terminal throughput capacity is a measure of cargo throughput that a particular terminal is capable of handling over a period of one year under a specific set of conditions. These conditions include, but are not limited to:

- Physical conditions such as storage capacity, number of working tracks, and size and type of the container handling fleet.
- Policies and resultant industry responses that affect characteristics such as container dwell times, empty container volumes, and demand patterns (i.e. peak traffic).
- External transit/transportation conditions such as train schedules and highway congestion.
- Financial objectives of the VPA in that a level of service may need to be balanced with financial sustainability. While a terminal may be physically able to handle a higher volume of containers by extending operating hours, the rate structures established in the customer contracts may not provide the revenue needed to offset premium labor rates, particularly during sustained periods of higher volumes.

Stated capacities are a function of the metrics defined by the business case. These conditions are subject to change, as is the resultant calculated capacity.

ii. Capacity Targets

As is a typical practice with port facilities, the concept development seeks to identify the infrastructure needed to support both an initial and future phase of operations, to provide opportunities to control the level of capital investment needed to begin generating revenue.

Using the range of container demand projections developed by the VPA's commercial team, the design team identified a preliminary interim demand target that serves as a natural breakpoint in the infrastructure needed to support throughput.

Based on the intermediate demand projection, initial capacity for the facility will be based on a 2037 planning horizon (~33,000 loaded containers per year), with a full buildout of the facility based on a 2056 planning horizon (~48,000 loaded containers per year). As a disclaimer, these are preliminary targets that may change as demand characteristics are clarified and site constraints are better understood, which may identify a different initial planning horizon.

While higher or lower growth rate scenarios affect when demand might begin to exceed facility capacity, the imbalance of export cargo over import cargo expected to be present at the facility's inception is a complicating factor. The import of empty containers significantly adds to the level of activity needed to support a given throughput of loaded containers. Targeted economic development efforts to attract import-reliant industries is one strategy being discussed with the Virginia Economic Development Partnership (VEDP) to help maximize the throughput capacity of the facility and the efficiency of the

associated supply chains. If the import and export demand become more balanced, the same infrastructure supporting the above milestones may approach 60,000 lifts/year and 86,000 lifts/year of loaded containers, respectively.

C. Terminal Operations

The VPA controls operations within the terminal. These operations will consist of positioning the rail segments onto working tracks arranged for the efficient unloading and loading of containers, transport of the containers between the working tracks and onsite storage tracks, and the transfer of containers between the facility and over-the-road trucks. Administrative transfer of container custody (also referred to as interchange) also drives infrastructure requirements such as truck scales, interactive driver kiosks, and imaging technologies.

i. Working and Storage Tracks

Working tracks are under consideration for a minimum of two trains daily (one eastbound and one westbound). Arrangement of these tracks is sensitive to the container handling equipment that will be deployed to transfer the containers between the rail cars and horizontal transport equipment. Since the containers can be double stacked on the train, additional requirements are applicable to allow personnel to operate the container-to-container locking hardware that secures the top level of containers to the bottom level (referred to as coning/de-coning operations).

Various types of equipment are being considered to perform the physical lifting of container on and off the rail cars, with each having their own needs for space adjacent to the working track and their interface with the equipment that transports the containers to/from the storage area. The early preference is leaning toward use of rubber-tired gantry cranes (RTGs) that span all the working tracks, which can support a space-efficient facility, but there is opportunity to deploy specialized lift equipment (varieties include reach stackers and top picks) as an early operation.

Additional storage tracks are typically provided to store rail segments as a buffer to minimize the impacts of unexpected operational conditions such as a cancelled train or higher than expected cargo demand. The VPA and NS will consider the correct ratio for working versus storage tracks. A decision has been made on the need to provide a zero percent grade for working and storage tracks. This is an important consideration given the context of the already-noted southwest Virginia topography.

ii. Horizontal Transport

The early VPA preference for transporting containers between the working tracks and onsite container storage areas will be with yard tractors hauling bombcarts (Photo 2). Yard tractors are specialized trucks with features that allow the operator to quickly connect to or drop off special chassis referred to as bombcarts. Containers securely rest within the bombcarts without the need to operate mechanical locks to keep the containers in place, which in turn supports more efficient lifting operations.

Photo 2 – Yard tractor w/ bombcart at Norfolk International Terminals

iii. Container Storage

The facility will have a container storage area for temporarily storing customer containers while they are awaiting pickup by train or truck. The first decision is whether containers will be stored on the ground (referred to as grounded storage), or pre-staged on over-the-road chassis (referred to as wheeled storage).

Grounded storage typically allows containers to be stored in container stacks up to 5 containers high and 6 or 7 containers deep, with an RTG or top pick deployed to transfer containers between the stack and chassis (both for customers and the horizontal transport; see Photo 3). Storage in this configuration is very space-efficient but can impact how quickly a specific container can be retrieved. Modern terminal operating systems can minimize this impact through sophisticated container management algorithms and/or use of a driver appointment system.

Photo 3 – RTG operation

Wheeled storage is often attractive to customers because it avoids the need for interaction with container handling equipment and reduces their time on the terminal. However, this operation requires considerably more storage area. Wheeled storage accommodates about 80 TEUs per acre compared to around 400 TEUs per acre in a grounded operation supported by RTGs. Wheeled storage also needs a supply of over-the-road chassis.

Figure 1 below illustrates an early concept sketch that was used to discuss potential operations and initial vs. full buildouts of the facility using a mix of top picks and RTGs.

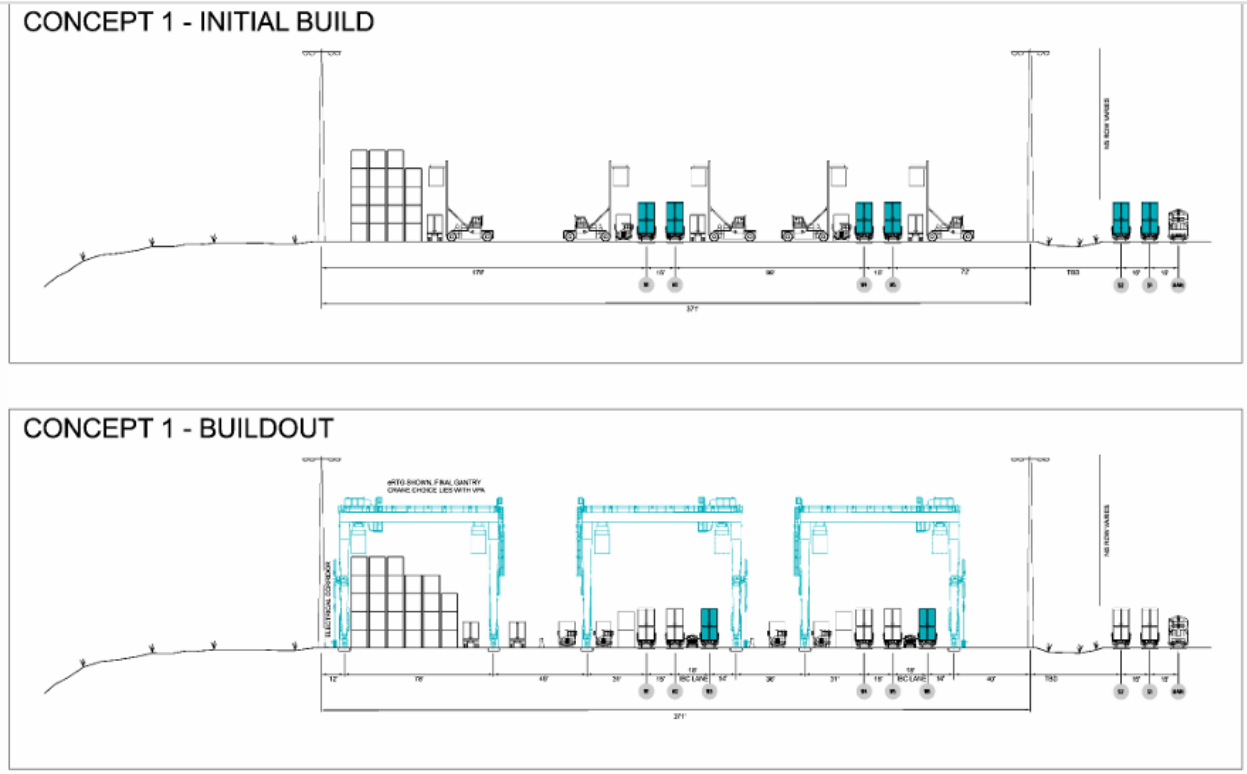

Figure 1: Terminal operations concept

D. Arrival and Departure Operations

The interface between NS and the facility has been another major topic of discussion and concept development. A requirement of the facility will be to provide a means for NS to efficiently deliver and pick up rail segments processed by the terminal that is compatible with their mainline operations. The extent of infrastructure needed will be very sensitive to NS's existing operations on the mainline and they are currently having internal discussions to better clarify what they may need. In the meantime, discussions with VPA operations have begun to step through different train management strategies to help identify VPA preferences, as the VPA will also have a role in receiving and staging rail segments ahead of the NS train arriving. Figure 2 is one illustration of the types of train movements being evaluated.

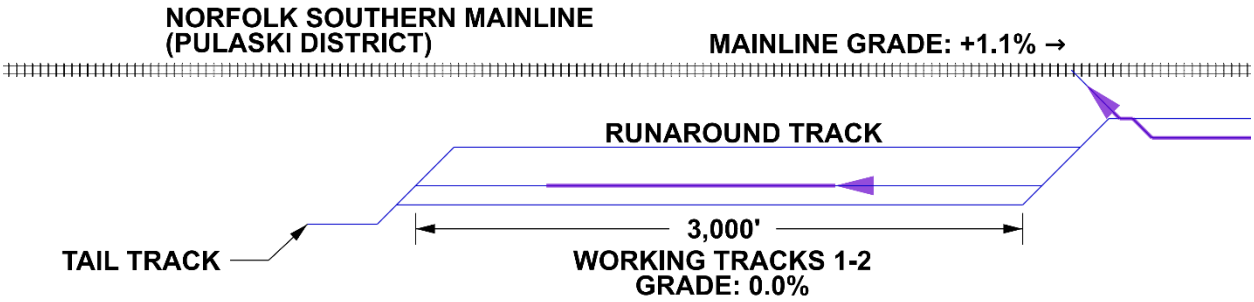

Figure 2: Rail operations concept diagram

As indicated previously, concept development efforts to date have been focused on supporting operational discussions. As preferences and requirements become clarified by the VPA and NS, the design team will seek to integrate the preferred concept(s) into the existing site and begin better understanding how the site conditions and its constraints affect the design.

IV. DEVELOPMENT LOOKAHEAD

Initial field investigations, consisting primarily of site surveys and geotechnical investigations will be commencing this spring and will be used to develop a basic risk matrix that will be revised in future updates. More comprehensive concepts that fully encompass the objectives and requirements identified in the Basis of Concept will be generated and integrated into the site.

For the remainder of the calendar year, the VPA anticipates following milestone updates to the designated legislative and executive oversight entities:

- Calendar Q2 (June 2024) update will identify a preferred concept alternative based on early survey, geotechnical, and topographic studies. Additional engineering of that preferred concept will help to identify earthwork, property, right-of-way, utility, and permitting needs. The risk matrix will be updated.

- Calendar Q3 (September 2024) update will present a 30% preliminary design and an opinion of probable cost. Port, rail, economic development, and community stakeholder involvement will be initiated and addressed. The risk matrix will be updated.

- Calendar Q4 (December 2024) update will update the preliminary design based on stakeholder involvement. Earthwork, property, right-of-way, utility, and permitting needs will be identified and confirmed in a separate update. An independent value engineering study will be conducted to ensure a cost-effective design and acceptable cost estimate. Potential shipper commitments should be in process with VPA and NS. A business recruitment strategy will be coordinated with VEDP.