

VRE System Plan Summary

January 2014

VRE SYSTEM PLAN SUMMARY

VRE –A Cost-Effective Contributor to Regional Mobility

During the last decade, VRE has demonstrated its ability to accommodate a rapid and substantial increase in ridership in two of the most heavily travelled commuter corridors in the region. VRE has done so with cost-effective investments, while continuing to be one of the most efficient operations in the region. As a result VRE today provides critical capacity – the equivalent of 150 lane miles of highway – in the I-95/395 and I-66 corridors, with less pollution, energy consumption, and accident cost from highway operation.

The Washington region’s population is forecast to grow by another 2 million persons from 2010 to 2040, with Virginia accounting for over half of the increase. In the same period, the economy is expected to add 1.6 million new jobs, about a third of them in the inner jurisdictions that are the prime employment centers today. Increasing congestion pressure on the region’s highway and transit systems is inevitable without additional investment.

The rail lines owned by CSX and Norfolk-Southern (NS), and used by VRE, provide an excellent option for significant expansion of transportation capacity in the corridors parallel to I-95 and I-66, while preserving the host railroads’ ability to meet their freight movement goals. Significant capacity increases can take place almost entirely within the existing right of way, at a cost and in a time frame competitive with highway and heavy rail construction projects in the region. Investment in these lines also contributes to capacity for the freight railroad owners, as well as for intercity rail passenger services that Virginia, North Carolina, Amtrak, and Federal transportation agencies are pursuing.

VRE is also one of the most cost-effective operators in the Washington D.C. region, with lower subsidy per passenger mile than any, and the highest percentage of costs covered by passenger fares after Metrorail. Among VRE’s peer commuter railroads, only Metro North in New York and Caltrain in the San Francisco Bay Area cover a greater proportion of their operating costs from fares paid by passengers.

The investments in the System Plan are grouped into three phases between now and 2040. In the first phase through 2020, relatively low-cost projects are recommended to maximize the capacity and service currently allowed VRE in its agreements with

VRE – Cost-Effective Capacity

The VRE System Plan investments provide more peak capacity than an equivalent amount invested in highways or heavy rail.

Major Washington Area Capital Initiatives

<i>Project</i>	<i>Total Capital Cost (\$M)</i>	<i>Route-Miles Constr.</i>	<i>Incremental Peak Hour Capacity*</i>	<i>Unit Cost/ Capacity Ratio**</i>	<i>Capital / Annual Pass-Mi ***</i>
<i>Express Lanes, I-495</i>	<i>\$1,400</i>	<i>14</i>	<i>3,700</i>	<i>\$26.5</i>	<i>\$10.00</i>
<i>Intercounty Connector, MD</i>	<i>\$2,600</i>	<i>18</i>	<i>9,700</i>	<i>\$14.9</i>	<i>\$7.10</i>
<i>Woodrow Wilson Bridge Replacement</i>	<i>\$2,500</i>	<i>6.5</i>	<i>9,700</i>	<i>\$39.7</i>	<i>\$6.80</i>
<i>Dulles Metrorail – Phase 1</i>	<i>\$2,900</i>	<i>11.7</i>	<i>19,200</i>	<i>\$12.9</i>	<i>\$6.10</i>
<i>VRE Railroad Capacity (System Plan Phase 2)</i>	<i>\$2,000</i>	<i>33.4</i>	<i>7,600</i>	<i>\$7.9</i>	<i>\$4.90</i>

**Capacity in passengers/hr in peak direction, at location of peak demand, over and above existing capacity. Highway capacities assume a portion of peak hour traffic allocated to buses. Metrorail capacity per WMATA standards, at 3 min. peak headways.*

***\$M/route-mi. per 1,000 p/hr of incremental capacity provided.*

****Assuming peak hour is 15% of daily traffic, annual=daily * 325, avg. trip lengths of 18 mi. for highway, 12 mi. for Metrorail and 25 mi. for rail, and system operates at capacity during peak hour.*

the CSX and NS railroads. These projects have already been incorporated into VRE’s FY2015-2020 Capital Improvement Program (CIP).

The second phase from 2021-2030 includes major investment in relieving the key capacity bottlenecks on the VRE system, including the Long Bridge crossing of the Potomac River. Without these significant capacity investments, the VRE growth potential from other improvements such as the Gainesville-Haymarket extension and the number of additional peak hour trains would be limited and long-term system capacity still constrained. However, with increased Long Bridge corridor capacity, the full ridership potential of those improvements can be fully realized at relatively low incremental cost.

The final phase of the System Plan, from 2031 through 2040, returns to a level of investment comparable to Phase 1 and contains capital projects to enable continued growth in traffic, including completing the triple tracking of the CSX main line between Alexandria and Spotsylvania, which will position VRE to achieve its full potential.

Phase 1 (2015-2020) – Maximizing VRE Service within Existing Railroad Agreements

Carrying roughly 19,000 trips a day, VRE is currently at or near capacity with numerous full peak trains, limited available parking at several stations, and train storage yards full. VRE can cost-effectively meet the forecast growth in commuters from the outer jurisdictions to the region’s center while remaining within the existing CSX, NS and Amtrak railroad agreements. With the recommended Phase 1 investments, VRE will be able to:

- Lengthen existing peak trains to add seats
- Add an additional round trip on each of the Manassas and Fredericksburg lines
- Increase station parking
- Improve station facilities to accommodate longer trains.

This near-term program, summarized in **Table 1**, will enable VRE to carry approximately 6,000 more trips a day, providing sufficient capacity to meet the expected growth in demand until the mid- 2020s.

Table 1 - 2015-2020 Recommended Capacity Investments
(millions of dollars)

Items	Phase 1 2015-2020
14 additional bi-level coaches	\$ 35
Lengthen /add platforms, existing stations	\$ 46
Core station investments	\$ 22
4,150 parking spaces, existing stations	\$ 91
CSX RF&P Line – additional 3rd track	\$ 50
Train yard storage, DC & VA	\$ 41
Total 2015 - 2020	\$ 285
<i>Source: VRE 2015-2020 Capital Improvement Plan</i>	

The passenger revenue from the increased ridership that can be handled by the increased capacity is expected to be more than the incremental operating cost, slightly increasing the proportion of operating cost covered by passenger revenues, which VRE is required to maintain above 50%, and which currently stands around 52%.

Phases 2 and 3 (2021 to 2040) – Maximizing VRE Contribution to Regional Mobility

VRE can cost-effectively provide much more regional mobility by increasing the number of daily trains beyond the levels allowed in existing agreements, expanding the system to Gainesville-Haymarket and providing additional types of service such as reverse peak and off-peak services. With the recommended investments and additional service, VRE could carry 18,000 new weekday trips by 2040, in addition to the 25,000 made possible by the investments through 2020. In addition, the capacity investments recommended may be sufficient for the host railroads to agree to the introduction of weekend VRE service. If so, an estimated average of 6,000 trips a day could be made on VRE on a typical weekend day.

Close coordination, and cost-sharing, will be needed with the other public agencies that would benefit from the investments to increase passenger capacity. New agreements will be needed with the CSX and NS freight railroads, and attention will have to be paid to provide sufficient freight operational capacity and flexibility to meet future goals.

In going beyond the Phase 1 (2015-2020) investments, VRE can add to the core peak direction markets, and tap into four new market segments, each representing a potential significant addition to ridership.

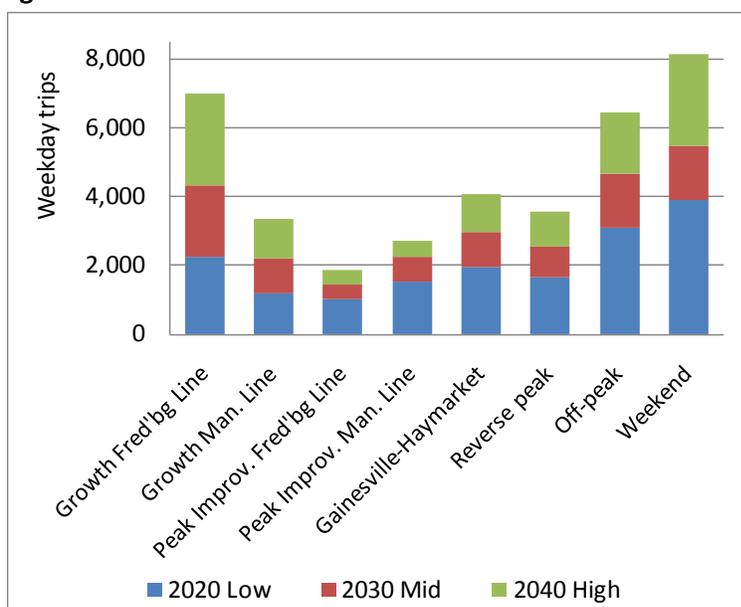
Figure 1 shows the size of these markets, which are:

- Growth in peak commuter demand from population increases & economic growth as well as from peak service improvements – up to four trains per hour and express service
- Gainesville-Haymarket extension – up to two trains per hour
- Reverse peak service from Washington DC to activity centers such as Quantico, Fort Belvoir, Fairfax/George Mason University, Innovation/George Mason University – up to two trains per hour
- Off-peak service hourly in midday and evening hours
- Weekend service at hourly or two-hourly intervals

A by-product of the increased peak frequencies and bi-directional service is the ability to attract additional riders for short cross-Potomac trips in each direction that could supplement Metrorail core capacity across the river or other modes in the Washington to Alexandria travel market.

In addition to market growth, the track capacity investment would make possible additional future

Figure 1 Size of Potential VRE Markets



service improvements beyond those that are included explicitly in the VRE System Plan:

- Future coordination and run-through of MARC and VRE trains,
- Additional state-supported regional intercity trains, and
- Higher-speed trains extending the Northeast Corridor through Washington, DC into Virginia.

These services and their sponsoring entities would derive significant benefits from the investments in Long Bridge capacity expansion, and the

CSX third track south of Alexandria. Consequently, the System Plan assumes that VRE will not bear the entire costs itself, but will pay a share of them proportional to the total benefits derived.

The regional benefits from the VRE capacity expansion would be significant, with a potential doubling of train riders who otherwise mostly would be traveling on area highways. In an expansion of its current benefits, VRE alone would provide the equivalent of another 100 lane miles at the peak rush hour on both I-95/395 and I-66, as well as day-long and week-long service that increases the viability of transit-oriented communities.

The fare revenue from new trips on VRE is projected to rise roughly proportionally with the increases in operating costs associated with expanded service, maintaining VRE's coverage of at least 50% of its operating costs from fare revenue. Operationally, the introduction of reverse peak and off-peak service will be especially helpful, since this will reduce VRE's need for costly additional train storage at Washington Union Terminal and improve VRE's cycling of trains and crews.

Capital Improvements Required and Timing 2021-2040

The level of capital investment in railroad infrastructure will need to increase substantially in the 2020s to relieve the significant capacity bottlenecks that constrain VRE and passenger rail growth. Two major capital initiatives are needed to provide sufficient capacity to enable VRE service expansion above 2020 levels:

- Long Bridge Corridor Program, expanding the existing 2-track Long Bridge across the Potomac River and expanding the rail corridor to 4 tracks between Alexandria and Washington, DC,
- CSX triple tracking Program, completing the plan to provide a 3-track railroad from Alexandria to Spotsylvania County.

Both the Long Bridge Corridor and CSX triple tracking programs will benefit and provide capacity for freight, VRE, regional intercity and Southeast high-speed trains. These programs also open up possibilities for extending MARC commuter service and selected Amtrak Northeast Corridor services through Washington, DC into northern Virginia. The distribution of the benefits and costs for each increment of investment will only be fixed after more detailed studies and as circumstances and negotiations evolve among all beneficiaries. Until then, the System Plan assumes that the VRE capital program would cover only a 30% share of the total capital costs of these major programs, with other non-VRE entities responsible for the rest.

The ongoing increases in seats (rolling stock), stations (platforms and parking) and storage (yards) – will also need to continue beyond 2020 and can be staged incrementally as demand grows. Their costs average about \$25 million a year for twenty years, well within the range of currently planned capital funding. Additionally, the VRE Gainesville-Haymarket Extension, which extends VRE service for 11 miles along an existing NS branch line from Manassas to Haymarket, would add VRE service to a relatively untapped commuter transit market and expand track capacity for both VRE and NS.

Over \$1.7 billion (in 2013 dollars) will be needed during Phase 2 (2021-0230) in all facets of the railroad and passenger support infrastructure, including the Long Bridge and Gainesville-Haymarket projects. In Phase 3 (2031-2040) capital needs total \$690 million with an emphasis on the completion of the CSX triple tracking south of Alexandria to Fredericksburg and Spotsylvania County. The investments by category are summarized in **Table 2**.

Table 2 - 2021-2040 Recommended Capacity Investments

(millions of 2013 dollars)

Items	Phase 2 2021-2030	Phase 3 2031-2040	Total Phases 2 & 3
Gainesville – Haymarket Extension	\$ 295	\$ --	\$ 295
Added third track, CSX	\$ 100	\$ 440	\$ 540
Long Bridge and related projects	\$ 1,100	\$ --	\$ 1,100
Additional cars and locomotives	\$ 125	\$ 125	\$ 250
Lengthen/add platforms, existing stations	\$ 80	\$ 35	\$ 115
Train yard storage, DC & VA	\$ 10	\$ 60	\$ 70
2,400 parking spaces, existing stations	\$ 20	\$ 30	\$ 50
Core station improvements	\$ 20	\$ --	\$ 20
Total Cost	\$ 1,750	\$ 690	\$ 2,440

The System Plan envisages that VRE funding from its traditional federal formula and regional sources and its sponsoring jurisdictions will be amply matched in the Phases 2 & 3 investments by the other entities (e.g., federal, state, Amtrak, freight railroads) which have a stake in the investments. **Table 3** provides a range of possible participation, based on VRE’s historical funding sources, and the resulting funding that might be required from VRE sources.

Table 3 – Estimated VRE, Local and Regional Share of 2021-2040 Capacity Investments

(millions of 2013 dollars)

Items	VRE/Local/ Regional Share*	Phases 2+3 Low Range	Phases 2+3 High Range
Gainesville – Haymarket Extension	15% - 50%	\$ 44	\$ 146
Added third track, CSX RF&P	15% - 50%	\$ 41	\$ 136
Long Bridge and related projects	15% - 50%	\$ 33	\$ 111
Additional cars and locomotives	32% - 100%	\$ 81	\$ 252
Lengthen/add platforms, existing stations	30% - 100%	\$ 34	\$ 114
Train yard storage DC & VA	66% - 100%	\$ 48	\$ 72
2,400 parking spaces, existing stations	66% - 100%	\$ 31	\$ 48
Core station improvements	30% - 100%	\$ 6	\$ 20
Total VRE/Local/Regional Cost	25% - 70%	\$ 318	\$ 900
Average Annual VRE/Local/Regional Cost		\$ 16	\$ 45

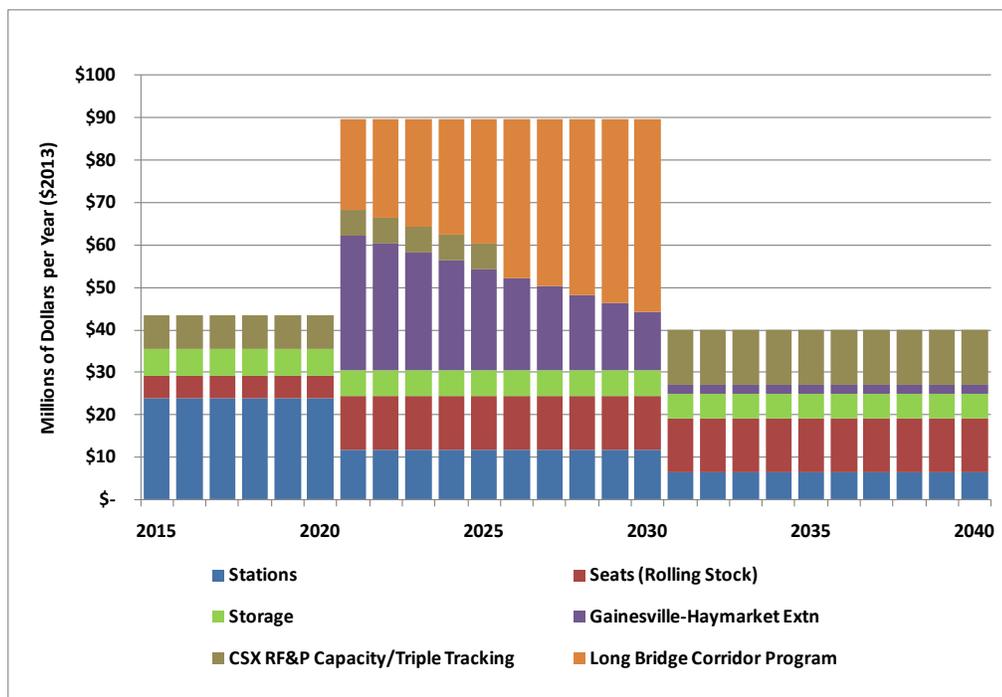
*Includes Federal formula funds as “VRE” funds and CMAQ and NVTA/HB2313 sources as “regional” funds.

System Plan Capital Implications

Figure 2 shows the average annual capital expenditure by year. The Phase 1 (2015 – 2020) capital program spends an average of just over \$40 million annually, with the emphasis on expanding existing station, fleet, and yard capacity. In Phase 2 (2021-2030), the focus moves to implementing the Long Bridge project, the essential precondition of fully serving any of the new markets, and the Gainesville - Haymarket extension. Expenditure continues on basic capacity, at a somewhat reduced level, and the total annual expenditure grows to \$90 million a year for the ten year period. For the final decade of this System Plan, 2031 – 2040, overall spending returns to the \$40 million a year, level, with the emphasis on

building the CSX third track, with continued investment in capacity to handle passenger growth, primarily in equipment and storage.

Figure 2 - Annual VRE Capital Improvement by year
 (\$\$ in millions)



Recommended System Plan Actions

- Implement the Phase I System Plan Program
- Continue the planning, environmental clearance and design process for the Gainesville-Haymarket Extension to enable a construction start in the 2021-2025 time frame
- Continue to participate in the development of an implementation plan for Long Bridge Corridor program, aiming for implementation by the mid-2020s, and broad funding participation by federal, state and other non-VRE stakeholders
- Work in partnership with DRPT and CSX to develop a strategy, to be codified in future access and capital agreements, for the capacity expansion in the Washington-Richmond corridor, including development of a phasing and funding plan for triple-tracking to support long-term expansion of VRE service
- Develop strategy, in partnership with DRPT and NS, for determining appropriate future investment in NS railroad capacity to support future increases in train service, to be codified in future access and capital agreements
- Participate in regional transportation studies to identify and evaluate long-range concepts for regional and intercity passenger rail service, including options for Virginia to Maryland “run-through” service