

PHASE II

**BRISTOL, ROANOKE, AND RICHMOND
PASSENGER TRAIN STUDY**

Prepared for:

Norfolk Southern Corporation

**Virginia Department of Rail and
Public Transportation**

Prepared By:

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Bristol, Roanoke, and Richmond Passenger Train Study

I. Introduction

In February 2001, The Woodside Consulting Group, Inc. (“Woodside”) was retained by Norfolk Southern Corporation (“NS”) on behalf of the Virginia Department of Rail and Public Transportation (“VDRPT”) to conduct a Study of the proposed operation of a Bristol, VA-Washington, DC, Amtrak passenger train service (“proposed Bristol passenger train”), with connecting Amtrak passenger train service between Lynchburg, VA, and Richmond, VA (“proposed Richmond passenger train”).

NS’s stated objective for the Bristol, Roanoke, and Richmond Passenger Train Study is to seek to facilitate implementation of the proposed Bristol, Roanoke, and Richmond passenger trains, while minimizing interference with NS’s freight train operations. Our assignment is to determine the impacts of the proposed trains on the operations both of NS’s freight trains and of other passenger trains, to identify specific railroad track capacity needs required to mitigate those impacts, and to estimate the costs of construction of the required physical improvements. In addition, we were asked to recommend any changes in the proposed Bristol, Roanoke, and Richmond passenger train schedules that could reduce freight or passenger train interference and to estimate the extent and costs of the railroad capacity improvements that would be required to accommodate those adjusted schedules.

The routes of the proposed Bristol, Roanoke, and Richmond passenger trains over NS’s Piedmont and Virginia Divisions are shown on the map in Attachment A.

Between Washington, DC and Lynchburg, VA, the proposed Bristol and Roanoke passenger trains would operate over NS’s Piedmont Division, as shown in Attachment A.

NS's Piedmont Division extends generally in a southwesterly direction from Alexandria, VA to Norcross, GA, near Atlanta. It includes other lines to such important locations as Charleston, SC, Asheville, NC, and Raleigh-Durham, NC, as well as connections to other NS divisions and to other railroads.

Both the proposed Bristol and Roanoke passenger trains, on the portion of the route between Lynchburg, Roanoke, and Bristol, and the proposed Richmond passenger trains would operate over NS's Virginia Division, as shown in Attachment A. The Virginia Division extends generally in a southwesterly direction from Hagerstown, MD, to Bristol, VA, at the Tennessee border. Other Virginia Division lines link the coal fields in Bluefield, VA, with Norfolk, VA, serve important locations, such as Winston-Salem, NC, Hyco, NC, and Richmond, VA, and provide connections to other NS divisions and to other railroads.

Founded in 1980, The Woodside Consulting Group is a small, four-person railroad consulting firm. Three Woodside Consultants prepared this Study:

- John H. Williams, President and Project Manager;
- Alan D. DeMoss, Principal; and
- Judith H. Roberts, Vice President.

The brochure for The Woodside Consulting Group, which summarizes the range of consulting services that we provide, lists selected clients for whom we have performed work, and provides summary resumes for each of these three consultants, is included as Attachment S.

We began Phase I of our Study with a review of two prior reports regarding passenger train service to Bristol and Richmond. A feasibility analysis and initial planning for operation of the proposed Bristol and Richmond passenger trains were conducted by a consultant team headed by Frederic R. Harris, Inc. for VDRPT. The July 1998 Study entitled *“Bristol Rail Passenger Study Phase 2 – Final Report”* (“Harris Study”) proposed two pairs of trains daily between Washington, DC, and Bristol, VA, and two pairs of connecting trains between Lynchburg, VA, and Richmond, VA. Amtrak’s assessment of the Harris Study findings, produced at the request of VDRPT, is contained in Amtrak’s June 22, 2000 *“Rail Passenger Service Study: Richmond, VA/Washington, DC to Bristol, VA”* (“Amtrak Study”).

During the conduct of our Study, we performed the following:

- Field inspections, both by hy-rail vehicle and automobile, of NS’s Piedmont Division Line between Alexandria and Lynchburg and of NS’s Virginia Division Lines between Lynchburg and Bristol and between Lynchburg and Richmond;
- Interviews of NS’s Piedmont Division Operations personnel, located in Greenville, SC;
- Interviews of NS’s Virginia Division Operations personnel located in Roanoke, VA;
- Analyses of the proposed Bristol, Roanoke, and Richmond passenger train schedules and of other existing Amtrak and Virginia Railway

Express (“VRE”) passenger train schedules on the Piedmont Division; and

- Analyses of NS’s freight train schedules and actual freight train movements over both the Piedmont Division and the Virginia Division.

Throughout our Study, we received full cooperation from Norfolk Southern.

Our Study has been conducted in two phases. In Phase I, we examined the impacts on NS’s operations of a single pair of Bristol passenger trains and a single pair of Richmond passenger trains daily. Our Phase I Final Report was provided to VDRPT and NS in June 2001. It included our findings and recommendations, as well as extensive physical descriptions of the NS Lines to be used by the proposed Bristol and Richmond passenger trains that have not been duplicated in this Phase II Report.

As requested by VDRPT and NS, Phase II examines the impacts on NS’s operations of an expansion of the Bristol and Richmond passenger train daily operations to two pairs of trains on each route, although the second pair of “Bristol” trains is proposed to operate only between Washington, D.C., and Roanoke. This is our Final Report for Phase II of the Bristol, Roanoke, and Richmond Passenger Train Study.

II. Conclusions and Recommendations

During our Phase II Study, we concluded that, given NS’s proposed passenger train speeds over the Virginia Division Lines, the schedules for the Bristol, Roanoke, and Richmond passenger trains that Amtrak proposed in October 2001 were

largely achievable, except between Roanoke and Bristol. Passenger trains have not been operated over these Virginia Division Lines for more than twenty years, and at this time both superelevation and track condition have been established by NS at levels appropriate only to their freight trains. The schedules proposed by Amtrak in October 2001 largely addressed these limiting factors. However, in order to reflect NS's proposed passenger train track speeds, Woodside was required to lengthen those October 2001 schedules by one hour in each direction between Roanoke and Bristol only. We made no modification to those October 2001 schedules north of Roanoke, thereby preserving the connectivity contemplated by VDRPT and Amtrak. (For the remainder of this Report, the term "Amtrak Schedules" is used to refer to the schedules proposed by Amtrak in October 2001, as modified by one hour in each direction between Roanoke and Bristol.)

In this Phase II Report, we present the impacts on NS's operations of the proposed Bristol, Roanoke, and Richmond passenger trains operating according to the Amtrak Schedules. For the Piedmont Division Line between Alexandria and Lynchburg and for the Virginia Division Lines between Lynchburg and Bristol and between Lynchburg and Richmond, we identified the conflicts with other scheduled passenger and freight trains that would be created by the introduction of the proposed Bristol, Roanoke, and Richmond passenger trains. Additional conflicts with other non-scheduled NS freight trains were also identified. Then we identified specific railroad track capacity needs that would mitigate the impacts and estimated the costs of construction required to provide the additional track capacity. Our cost estimates are based on those normally used by Class I railroads for railroad construction projects and on our experience.

From our analyses, we recommend twenty-two construction projects, at an estimated cost of \$120.0 million, that would provide additional track capacity in order to minimize the train delays both to the proposed Bristol, Roanoke, and Richmond

passenger trains and to all other trains operating on the Lines. These recommended twenty-two construction projects are summarized for each Line in Attachment B.

As detailed in Attachment R, and as discussed in our Phase I Final Report, we identified 48 grade crossings on the Virginia Division that should be considered for further review if passenger trains are to be operated at those locations. We estimate that upgrading all of the identified crossings would cost \$10.3 million and that the cost of adjusting the track circuits or the grade crossing predictors for higher passenger train speeds would be an additional \$2.3 million. None of that \$12.6 million is included in the \$120.0 million construction projects cost estimate cited above.

Because our Study assumes use of the Amtrak Schedules, which are based on the higher passenger train speeds that are expected to be authorized by NS, the additional costs estimated at \$12.0 million by the Virginia Division required to increase superelevation and upgrade the Virginia Division Lines to permit them to attain the higher passenger train speeds must also be considered. None of that \$12.0 million is included in the \$120.0 million construction projects cost estimate cited above.

III. Schedules for the Proposed Bristol, Roanoke, and Richmond Passenger Trains

This section of our Report discusses the Amtrak Schedules that would govern the operations of the proposed Bristol, Roanoke, and Richmond passenger trains.

In October 2001, Amtrak proposed schedules for two pairs of trains daily between Washington, DC, and Bristol/Roanoke, VA; and two pairs of connecting trains between Lynchburg, VA, and Richmond, VA. These Amtrak Schedules were developed to

connect with Northeast Corridor trains between Washington, DC, and New York City, with the expectation that ridership would be increased because access to the large Northeast Corridor market would be improved. A comparison of the Phase II October 2001 schedules proposed by Amtrak for the Bristol, Roanoke, and Richmond passenger trains with the Phase I proposed Amtrak and Woodside Schedules is contained in Attachment C-1.

During our Phase I reviews with NS personnel of the proposed Bristol and Richmond train operations, we concluded that the Phase I schedules prepared by Amtrak could not be operated on the designated lines of the Virginia Division without upgrading those lines. Such upgrading must include, most importantly, adjusting the superelevation on the numerous curves on those lines to permit higher speeds for passenger trains and extending signal system and grade crossing warning system circuits to accommodate higher train speeds. Also, the lines between Pamplin, Burkeville, and Richmond require upgrading to permit higher passenger train speeds. All of this upgrading would be in addition to the requirements for additional track capacity that we have recommended in order to minimize the conflicts of the proposed Bristol and Richmond passenger trains with other trains.

Subsequent to the completion of our Phase I Report, NS's engineering and operations personnel responded to the request by Amtrak for increased passenger train speeds on the lines of the Virginia Division extending from Lynchburg to Bristol and from Lynchburg to Richmond. Data that reflected NS's recommendations for increasing the passenger train speeds above the maximum authorized freight train speeds on these NS Lines were provided by NS to Woodside. As shown by our calculation in Attachment C-2, the time savings by line segment are:

- Kinney Yard – Roanoke 4.98 Minutes
- Roanoke – Bristol 22.12 Minutes
- Kinney Yard – S. Richmond 41.70 Minutes

From our comparison of the Phase I Woodside Schedules - - that were based on maximum authorized track speeds for freight trains - - with the maximum authorized track speeds for passenger trains that have now been offered by NS, we concluded that the October 2001 passenger train schedules proposed by Amtrak for Phase II could be operated between Washington and Roanoke, as well as between Richmond and Lynchburg. Between Roanoke and Bristol, however, the maximum authorized passenger train speeds offered by NS required that we lengthen the October 2001 schedules proposed by Amtrak for Phase II by about one hour in each direction. Those modifications, delaying Train No. 81's scheduled arrival in Bristol to 9:02 p.m. from Amtrak's proposed arrival time of 8:05 p.m. and accelerating Train No. 82's departure from Bristol to 7:14 a.m. from Amtrak's proposed departure time of 8:15 a.m., have been incorporated into the proposed Amtrak Schedules, as indicated in Attachment C. Note, however, that the scheduled arrival and departure times north of Roanoke for both Bristol trains were not changed, so that Amtrak's planned connectivity to the Richmond and Northeast Corridor trains remained undisturbed.

As shown by Attachment C, the Amtrak Schedules provide for a 7:00 a.m. departure from Washington for a southbound Roanoke passenger train, with a stop at Lynchburg to connect with the train from Richmond, and arrival in Roanoke at 11:50 a.m. The Amtrak Schedules for the northbound train provide for a departure from Roanoke at 4:30 p.m., a stop at Lynchburg to connect with the Richmond train, and arrival in Washington, DC at 9:29 p.m. The two connecting round-trips between Richmond and Lynchburg are scheduled to depart Richmond at 7:15 a.m. and 11:10 a.m., arriving in

Lynchburg at 10:10 a.m. and 2:05 p.m., respectively, with connections to the Bristol/Roanoke-Washington trains. The return connecting train schedules are for departures from Lynchburg at 2:20 p.m. and 6:10 p.m., with arrivals back in Richmond at 5:15 p.m. and 9:05 p.m., respectively. None of these proposed Amtrak Schedules for either the Roanoke or the Richmond trains required modification by Woodside, as we judged that they could be operated according to their schedules over the Virginia Division Lines in accordance with the higher passenger train speeds expected to be authorized by NS.

IV. Amtrak Schedules: Projected Train Conflicts and Recommended Construction Projects

This portion of our Report discusses the train conflicts that we have projected would occur from the operation of the proposed Bristol, Roanoke, and Richmond passenger trains on the Amtrak Schedules. It also presents the construction projects that we recommend in order to mitigate delays to all trains on each of the lines to be used by the proposed Bristol, Roanoke, and Richmond passenger trains.

A. Piedmont Division: Alexandria-Lynchburg Line

NS's Piedmont Division includes the line that runs between Alexandria, VA, and Montview, VA, NS's freight yard in Lynchburg, as shown by the map in Attachment A. Attachment D is a portion of the *Piedmont Division Timetable No. 19*, in effect June 20, 1999, that shows the mileposts and names of the stations on this line, which is 166.4 miles in length. Attachment O is a photographic study of the Alexandria-Lynchburg Line, reprinted from our Phase I Final Report.

1. Projected Train Conflicts

Amtrak currently operates Train Nos. 19 and 20 (the “Crescent”) daily over NS’s line between Washington and Lynchburg. Amtrak also operates Trains Nos. 50 and 51 (the “Cardinal”) three days per week over NS’s line between Washington, DC, and Orange, VA, near Charlottesville.

A commuter rail service is operated by Virginia Railway Express over a portion of the same line, between Washington, DC, and Broad Run, VA, just south of Manassas. The VRE service operates nine trains in each direction, Monday through Friday.

NS operates fourteen scheduled freight trains daily over the Alexandria-Lynchburg Line. Four NS scheduled freight trains operate over the entire route between Alexandria and Lynchburg. The other ten operate on this Line only between Lynchburg and Manassas Jct., the junction with NS’s route toward Hagerstown, MD. NS also operates some 8 to 11 extra through freight trains per week and six local freights daily over some portion or all of the Alexandria-Lynchburg Line.

The additional operation on the Alexandria-Lynchburg Line of the two pairs of proposed Bristol and Roanoke passenger trains would potentially conflict with the operations of the four existing Amtrak trains, the eighteen VRE weekday commuter trains, and the fourteen scheduled NS freight trains, as well as with the unscheduled NS through freight and local freight trains. Because almost one-half of the Alexandria-Lynchburg Line consists of only single track, additional track capacity will be required to permit the four proposed Bristol and Roanoke passenger trains to meet or pass the other trains operating on the Line, without excessive delays.

Schedule data provided to us by Piedmont Division operations personnel were used to develop Attachment F-1, a “Stringline Chart of Proposed Bristol, Roanoke, and Richmond Passenger Trains and Scheduled Passenger and Freight Trains on the Alexandria-Lynchburg Line, MP 8.2-MP 174.6.” This stringline chart illustrates how the four proposed Bristol and Roanoke trains would interact with the other scheduled passenger and freight trains currently using the Alexandria-Lynchburg Line. Intersections on the stringline chart of the four proposed new Amtrak trains (the lines designated “881-SB,” “81-SB,” “882-NB,” and “82-NB”) with other trains indicate potential conflicts. At those locations, either passing sidings or multiple main tracks must be available in order to permit meets or passes with the proposed Bristol or Roanoke trains without causing delays to the existing Amtrak, VRE, and NS trains.

The precise locations of the expected meets and passes between the four proposed Bristol and Roanoke passenger trains and the existing Amtrak, VRE, and NS scheduled trains on the Alexandria-Lynchburg Line that are shown by the stringline chart in Attachment F-1 are summarized in Attachment F-2. As shown by Attachment F-2, between Alexandria and Lynchburg, the proposed southbound Roanoke Amtrak Train No. 881 would meet or pass seven trains, including Amtrak Train No. 20, four VRE trains, and two NS scheduled freight trains. The proposed southbound Bristol Amtrak Train No. 81 would meet or pass three NS scheduled freight trains, and it would meet the proposed northbound Bristol Amtrak Train No. 82. The proposed northbound Bristol Amtrak Train No. 82 would meet three NS scheduled freight trains and one VRE train, in addition to the proposed southbound Bristol Amtrak Train No. 81. The proposed northbound Roanoke Amtrak Train No. 882 would meet Amtrak Train No. 19, and it would meet or pass five NS scheduled freight trains.

Additional train conflicts with the proposed Bristol, Roanoke, or Richmond passenger trains are expected at Springfield, at Lynchburg Station, and on the Connecting Track between Montview and Kinney Yards at Lynchburg. Except at Springfield, however, we did not attempt to identify conflicts with NS's 8-11 per week extra through freight trains or with NS's six daily local freight trains, because of the imprecise timing of their movements. We have assumed that NS would be willing to accept some delays to these lower priority freight trains, in order to facilitate the operation of the proposed passenger trains.

2. Recommended Construction Projects

Having determined the conflicts of the proposed Bristol passenger trains operating on the Amtrak Schedules with other Amtrak trains, VRE's commuter trains, and NS's freight trains, we identified additional track capacity needs and estimated the cost of construction that would be required to mitigate those conflicts. At the locations where we identified specific train conflicts, we recommended seven construction projects, at an estimated cost of \$40.5 million, that would provide additional track capacity to minimize the delays resulting from conflicts between the proposed Bristol passenger trains and the other trains operating on the Alexandria-Lynchburg Line. A summary of the seven recommended construction projects is contained in Attachment G, and our recommendations for each of the seven locations are discussed, in ascending milepost order, in this portion of our Report. Where we have recommended construction of new or extended sidings, we have generally utilized the current NS design standard of 11,000 ft. length.

Attachment F-3 shows the projected meets and passes between the proposed Bristol and Roanoke passenger trains and scheduled passenger and freight trains on the

Alexandria-Lynchburg Line, assuming that the recommended construction projects have been built. As shown by Attachment F-3, all twenty-one Bristol and Roanoke passenger train conflicts would be mitigated, if the seven construction projects that we recommend were completed, as none of the eight meets or passes with other passenger trains and none of the thirteen meets or passes with NS freight trains would occur on single track.

Because we have tailored our construction project recommendations to fit only those precise locations where train conflicts are projected to occur, the construction projects we recommend are quite sensitive to the on-time performance of the proposed Bristol and Roanoke passenger trains. Clearly, unless the proposed passenger trains are operated precisely on time, then either Amtrak or NS will be required to absorb the impact of the resulting train delays. It is our opinion, therefore, that the train schedules to be operated must be realistic and attainable, in accordance with the judgments of both Amtrak and NS.

Our discussion of each of the seven construction projects that we recommend follows:

a. **Extend Springfield Runaround Track, MP 15.1**

At the Springfield Runaround Track, during the morning commute hours, the northbound VRE commuter train fleet would be operating on Main Track No. 1, requiring that the proposed southbound Roanoke Amtrak Train No. 881 operate on Main Track No. 2. At the time that Train No. 881 would pass Springfield, however, an NS local freight train usually occupies Main Track No. 2 with a portion of its cars, because the adjacent industry support track is inadequate in length.

In order to clear Main Track No. 2 for Train No. 881, we recommend lengthening the Springfield Runaround Track by about 40 car lengths, so that the NS local freight train will no longer need to occupy Main Track No. 2 for switching. As shown in Attachment G-1, we estimate the cost of this Project at \$0.5 million.

b. Add Second Crossover at Moore (MP 32.5)

As described above, during the morning commute hours, the northbound VRE commuter train fleet would be operating on Main Track No. 1, while the proposed southbound Roanoke Amtrak Train No. 881 would operate on Main Track No. 2.

As shown by Attachment F-2, Train No. 881 is projected to meet northbound train VRE 330 at Milepost 28.2 at 7:44 a.m. and NS Train No. 342 at Milepost 28.3 at 7:45 a.m. VRE Train No. 330 is scheduled to depart Manassas at 7:32 a.m., followed closely by NS Train No. 342, scheduled to depart Manassas Yard at 7:30 a.m.

In order to clear Main Track No. 2 for the proposed southbound Roanoke Amtrak Train No. 881, while not delaying northbound NS Train No. 342, we recommend adding a second crossover at Moore (MP 32.5) that would permit northbound trains to move from Main Track No. 2 to Main Track No. 1. With VRE Train No. 330 operating northbound on Main Track No. 1 and the proposed southbound Amtrak Train No. 881 operating on Main Track No. 2, the recommended second crossover at Moore would permit NS Train No. 342 to move from Manassas Junction via Manassas Yard on Main Track No. 2 to Moore, and then via the proposed new crossover to reach Main Track No. 1 and follow VRE Train No. 330. As shown in Attachment G-2, we estimate the cost of this Project at \$1.4 million.

c. **Construct Third Main Track Between Manassas Jct. (MP 33.6) and Broad Run Bridge (MP 36.2)**

Maintaining the continuous availability of the two main tracks at Manassas Junction is very important to NS's train operations because, at this location, ten scheduled freight trains daily diverge to or converge from the line to Hagerstown, MD. Additional intermodal and other scheduled freight trains are projected to be operated by NS in future years to and from Hagerstown, although our Study did not consider those future volumes. However, there are also scheduled NS freight trains that currently operate through Manassas Junction to and from NS's yard at Alexandria.

Both north and south main tracks through Manassas Junction are utilized by the four daily existing Amtrak passenger trains and also by the 18 weekday VRE commuter trains that operate to and from Washington, DC, and that originate or terminate south of Manassas Junction at Broad Run Station. Just south of the Broad Run Station, off Main Track No. 1, is a VRE storage yard for the "layover" commuter train sets.

During the morning commute hours, northbound VRE commuter trains occupy Main Track No. 1 between the VRE storage yard located south of Broad Run through Manassas Junction and north to Alexandria. Current operating practice is for NS freight trains to occupy Main Track No. 2, to avoid interference with the northbound VRE commuter trains.

As shown by Attachment F-2, our analysis projected that the proposed southbound Bristol Amtrak Train No. 81 would pass NS Train No. 127 at Manassas Junction (MP 33.6) at 11:58 a.m., and Train No. 81 would meet northbound NS Train No. 227 at MP 34.0, between Manassas Junction and S. Manassas, at 11:59 a.m. NS Train No. 127 would have arrived at Manassas Junction from the Manassas/Riverton Junction

Line at 11:45 a.m. and would depart at 12:01 p.m. NS Train No. 227 would arrive at Manassas Junction, most likely on Main Track No. 1, at 12:00 noon, and would depart toward Riverton Junction at 12:10 p.m. As a result, there would be no track capacity available for Train No. 81 to pass NS Train No. 127 and meet NS Train No. 227, except by delaying one of these three scheduled trains.

As also shown by Attachment F-2, our analysis projected a meet of the proposed southbound Roanoke Amtrak Train No. 881 with VRE Train No. 332 at S. Manassas at 7:50 a.m. At that time, no NS freight trains could be occupying Main Track No. 2 for any reason, including picking up or setting out cars at Manassas Yard. As a result, there would be no track capacity available for NS freight trains, including NS Train No. 342, if it were delayed, or if there were other unscheduled freight trains moving through Manassas Junction in either direction. Moreover, if Train No. 881 were delayed by as little as seven minutes, its projected meet with northbound Amtrak Train No. 20 would occur between S. Manassas and Manassas Jct. Proposed northbound Roanoke Amtrak Train No. 882 has a similar problem, as its meet with southbound Amtrak Train No. 19 is scheduled to occur at MP 39.3.

In order to provide track capacity to accommodate the four proposed Bristol and Roanoke passenger trains, we recommend that the important Hagerstown Lead be extended about 2.6 miles south to form a third main track from Manassas Junction to Broad Run Bridge. This third main track would usually permit Amtrak and VRE passenger trains to occupy Main Tracks Nos. 1 and 2 and NS freight trains to occupy the new third main track. As shown by Attachment G-2, the estimated cost of constructing the third main track is \$5.0 million. (See Attachment O, Pages 1 through 5, Photographs Nos. 1 through 9.)

d. **Extend Second Main Track from Bristow (MP 36.4) To Calverton (MP 46.0)**

As shown by Attachment F-2, we projected that two train meets would occur each day between Bristow and Calverton. The proposed southbound Roanoke Amtrak Train No. 881 is projected to meet northbound Amtrak Train No. 20 at 7:57 a.m. at MP 42.0, and the proposed northbound Roanoke Amtrak Train No. 882 is projected to meet southbound Amtrak Train No. 19 at MP 39.3 at 8:30 p.m.

In order to accommodate these passenger train meets without delaying any of the four Amtrak trains involved, we recommend that the existing double track be extending from Bristow, at MP 36.4, for a distance of 9.6 miles to Calverton, at MP 46.0, at an estimated cost of \$16.4 million, as shown by Attachment G-4.

e. **Extend Second Main Track From McIvor (MP 164.2) To Harris Creek Bridge (MP 169.3)**

As shown by Attachment F-2, we projected one meet between the proposed northbound Roanoke Amtrak Train No. 882 and southbound NS Train No. 127 at Milepost 167.0, between McIvor and Rivermont, at 6:10 p.m. NS Train No. 127 is a high priority, long distance train that operates from Conway, PA, to Lynwood, NC, via Hagerstown, MD, Manassas Junction, and Lynchburg.

In order to accommodate this meet without delaying either of the two trains involved, we recommend that the existing double track be extended from McIvor at MP 164.2, for a distance of 5.1 miles, to Harris Creek Bridge at MP 169.3, at an estimated cost of \$8.8 million, as shown by Attachment G-5.

This recommended construction project would also mitigate the delays that are projected to occur to northbound NS Train No. 212, because it passes Lynchburg Station at about 6:00 p.m., the same time that the proposed northbound Roanoke Amtrak Train No. 882 is scheduled to depart. NS Train No. 212 could utilize Main Track No. 2 at Lynchburg, while Train No. 882 would be able to depart Lynchburg on Main Track No. 1. North of Rivermont, NS Train No. 212 would follow Train No. 882 on the recommended new second main track; this would avoid either delaying NS Train No. 212 to meet NS Train No. 127 at Rivermont or delaying NS Train No. 127 to meet NS Train No. 212 at McIvor.

f. Construct Bypass Main Track At Lynchburg Station

All of the proposed new passenger trains between Washington and Bristol, between Washington and Roanoke, and between Lynchburg and Richmond will utilize the historic station building at Lynchburg that is currently in the process of being restored.

As shown by the Amtrak Schedules in Attachment C, the proposed southbound Roanoke Amtrak Train No. 881 is scheduled to arrive at Lynchburg at 10:29 a.m. and to depart at 10:34 a.m., five minutes later. Arriving at Lynchburg at 2:39 p.m. and departing Lynchburg at 2:45 p.m., the proposed southbound Bristol Amtrak Train No. 81 would occupy Lynchburg Station for six minutes. The first proposed connecting train from Richmond would arrive at Lynchburg at 10:10 a.m. and not depart until 2:20 p.m., an elapsed time of four hours and ten minutes. The second proposed connecting train from Richmond would arrive at 2:05 p.m. and depart at 6:10 p.m., an elapsed time of four hours and five minutes. Because both Richmond connecting trains would be at Lynchburg between 2:05 p.m. and 2:20 p.m., the second Richmond train would have to occupy Main Track No. 1 until the House Track was vacated by the first Richmond

connecting train, which would move from the House Track to Main Track No.1 to load its passengers.

In order to permit NS's freight trains to move past the Lynchburg Station during the time periods when main tracks are occupied by any of the proposed Bristol, Roanoke, or Richmond passenger trains, we recommend that a bypass main track be constructed, as shown by the figure that is included in Attachment G-6. We also recommend rehabilitation of the House Track on the station side of NS's main tracks, and installation of an electric-locked main track turnout, to accommodate the Richmond trains during their lengthy layovers at the Lynchburg Station. We estimate the cost of this construction at \$4.0 million, as shown by Attachment G-6. (See Attachment O, Page 10, Photographs Nos. 19 and 20.)

g. Construct Second Connecting Track Between Montview and Kinney Yards At Lynchburg

The figure included in Attachment G-7 shows how Montview and Kinney Yards, as well as the Piedmont and Virginia Divisions, are connected at Lynchburg. The existing Connecting Track between the two yards is currently congested and is occupied up to 75% of the time with one or more of the following railroad operating activities:

- Through trains moving between the main tracks of the two NS Divisions;
- Trains moving between either Montview or Kinney Yard and the main tracks located adjacent to the other yard;

- Switching moves to and from the two industrial spur tracks located on the Connecting Track;
- Yard-to-yard transfer movements between Montview Yard and Kinney Yard;
- Wye track movements to turn locomotive consists or loaded cars for proper unloading on one or both of the wye tracks at either end of the Connecting Track, with the Connecting Track being one leg of each wye track; and
- Use of a portion of each end of the Connecting Track as a “tail track” for switching moves involving train make-up in both Montview and Kinney Yards.

All of the proposed Bristol and Roanoke passenger trains must use the Connecting Track between Montview and Kinney Yards to move between the Alexandria-Lynchburg Line and the Lynchburg-Roanoke-Bristol Line. The proposed Richmond passenger trains must also use the Connecting Track, because the line between Kinney Yard and Richmond crosses over the top of the Lynchburg-Roanoke-Bristol Line on a high viaduct located between the Lynchburg Station and Montview Yard. Therefore, when departing Lynchburg, the proposed eastbound Richmond passenger trains must go past Montview Yard, use the Connecting Track to Kinney Yard, and then, using the Lynchburg-Richmond Line, cross over the Alexandria-Lynchburg Line on the high viaduct, having made almost a 360-degree turn.

In order to facilitate the movement of both pairs of proposed passenger trains through this congested area and to reduce train and yard delays, we recommend the construction of a Second Connecting Track, at a cost of \$4.4 million, as detailed in Attachment G-7. (See Attachment O, Pages 11-14, Photographs Nos. 21-27.)

B. Virginia Division: Lynchburg-Bristol Lines

NS's Virginia Division includes the line segments from Lynchburg (Kinney Yard) to Roanoke and on to Bristol that are shown in Attachment A. Attachment E shows excerpts from portions of the *Virginia Division Timetable No. 5*, in effect April 26, 1998. Attachment P is a photographic study of the Virginia Division line segments to be used by the proposed Bristol, Roanoke and Richmond passenger trains.

This section of our Report addresses the Lynchburg-Bristol Lines in three parts: the Lynchburg-Roanoke Line; the Roanoke-Walton Line; and the Walton-Bristol Line.

1. Lynchburg-Roanoke Line

The Lynchburg to Roanoke Line encompasses a portion of the Blue Ridge District and extends a distance of 48.7 miles from Kinney Yard at Lynchburg to Randolph Street at Roanoke. The entire Line has ABS and TC with remotely controlled powered switches. About 55%, or 26.7 miles, of the Lynchburg-Roanoke Line is single track, and the remaining 45%, or 22.0 miles, is double track.

a. **Projected Train Conflicts**

NS operates ten scheduled freight trains daily over the Lynchburg-Roanoke Line. In addition, NS operates between nine and seventeen extra through freight trains and one local freight train daily over some portion or all of the Lynchburg-Roanoke Line.

The operation of the four proposed Bristol and Roanoke passenger trains on the Lynchburg-Roanoke Line would potentially conflict with the operation of some of NS's freight trains. Because more than one-half of the Lynchburg-Roanoke Line consists of only single track, additional track capacity on the Line would be required to permit the proposed Bristol and Roanoke passenger trains to meet or pass NS freight trains without excessive delays.

Attachments H-1 and H-2 contain stringline charts of the proposed Bristol and Roanoke passenger trains and NS freight trains operating over the Lynchburg-Roanoke Line. Operating data for the freight trains were provided by NS's Virginia Division Operations personnel, who recommended that we consider the use of seven days of actual NS through freight train movements in order to identify train conflicts. The time period selected by them for our review, Thursday, March 12, 1998, through Wednesday, March 18, 1998, contained traffic volumes that are higher than are currently moving on these NS lines, largely because current export coal movements are believed to be unusually depressed. Based on our experience in Phase I, we selected Sunday, March 15, 1998 as the high day within the week of actual train movements, and used that date in our Phase II analysis. Separately, we also modeled NS's scheduled through freight train movements, as derived from the NS Virginia Division freight schedule dated March 8, 2001. Attachment H-1 contains the stringline chart of the proposed Bristol and Roanoke passenger trains and scheduled NS through freight trains. Attachment H-2 is the

stringline chart of the proposed Bristol and Roanoke passenger trains and actual NS freight trains for March 15, 1998.

The locations of the meets and passes that we projected on the Lynchburg-Roanoke Line for scheduled and actual NS freight trains are shown in Attachments H-3 and H-4, respectively. Having identified the locations of the projected conflicts between the proposed Bristol and Roanoke passenger trains and NS's scheduled and actual through freight trains, we developed the following two recommendations for construction projects between Kinney Yard at Lynchburg and the Roanoke Terminal that would largely mitigate the delays caused by the operation of the proposed Bristol and Roanoke passenger trains:

- Connect sidings between Kinney (MP PH 16.6/N 208.7) and Liberty (MP PH 19.9/N 212.0); and
- Extend second main track from Montvale (MP N 239.1) easterly to near Big Otter (MP N 226.0).

We estimated that the total cost of these two projects would be \$24.7 million.

As shown by Attachment K, thirteen meets and passes between the proposed Bristol and Roanoke passenger trains and either NS's scheduled or actual freight trains were projected to occur between Lynchburg and Roanoke. Attachment K also shows that, if the two recommended construction projects had been implemented, then all of the train conflicts created by the operation of the four proposed Bristol and Roanoke passenger trains would have been eliminated, because all of the meets and passes would have occurred on double track.

However, as demonstrated above for the Alexandria-Lynchburg Line, we would observe that the value of the additional track capacity availability at the specific locations of these recommended construction projects is quite sensitive to the on-time performance of the proposed Bristol and Roanoke passenger trains.

Also, we did not identify conflicts with NS's daily local freight train between Lynchburg and Roanoke, because of the imprecise timing of its movements. For this lower priority freight train, our assumption is that NS would be willing to accept some delays to it in order to facilitate the operation of the proposed Bristol and Roanoke passenger trains.

b. Recommended Construction Projects

Detailed cost estimates of the two recommended construction projects are contained in Attachment L, and our recommendations for both of the locations are discussed, in ascending milepost order, below:

(1) Connect Sidings Between Kinney (MP PH 16.6/N 208.7) and Liberty (MP PH 19.9/N 212.0)

As shown by Attachments H-3 and H-4, daily meets were projected at two locations between Kinney and Forest. In order to accommodate these meets, provide for the freight trains to clear, and allow for a modest tolerance in the projected meet times and locations, without delaying any of the proposed Bristol or Roanoke passenger trains or NS's freight trains, we recommend connecting the sidings between Kinney, at MP PH 16.6/N 208.7, and Liberty, at MP PH 19.9/N 212.0, thus forming a single 5.57-mile long

siding. As shown by Attachment L-1, we estimate the cost of the proposed 17,500 ft. siding extension at \$8.5 million.

(2) **Extend Second Main Track From Montvale (MP N 239.1)
Easterly to Near Big Otter (MP N 226.0)**

As shown by Attachments H-3 and H-4, five meets and passes were projected between MP N 226.0 and MP N 235.7. There is an 8.4-mile long stretch of single track between the west switch at Bedford, MP N 230.7, a station stop for all four Bristol and Roanoke passenger trains, and the east switch at Montvale, MP N 239.1, the beginning of double track to Roanoke. There is also a 2.5-mile long siding between Big Otter, at MP 228.2, and Bedford, at MP 230.7.

In order to reduce delays to the proposed Bristol and Roanoke passenger trains and to the NS freight trains, we recommend extending the second main track from Montvale (MP N 239.1) easterly for a distance of 13.1 miles to MP N 226.0, a location 2.2 miles east of Big Otter. Such an extension would incorporate the Big Otter-Bedford Siding into the double track. As shown by Attachment L-2, we estimate the cost of extending the existing double track at \$16.2 million. (See Attachment P, Page 1, Photograph No. 2, and Page 2, Photographs Nos. 3 and 4.)

2. **Roanoke-Walton Line**

The Roanoke-Walton Line encompasses a portion of the Christiansburg District and extends a distance of 40.1 miles from Randolph Street in Roanoke to Walton. Except for the single main track from Randolph Street in Roanoke to WB, near West Roanoke, a distance of 5.5 miles, the remaining 34.6 miles of the Roanoke-Walton Line

are double track. The only two locations where potential conflicts would occur between the two proposed Bristol passenger trains and NS's through freight trains are unchanged from those identified in our Phase I Final Report.

a. **Projected Train Conflicts**

NS operates sixteen scheduled freight trains daily over the Roanoke-Walton Line. In addition, NS operates an average of nineteen non-scheduled through freight trains daily, ranging from a low of fifteen to a high of twenty-four trains daily. NS also operates three local trains daily over some portion of the Roanoke-Walton Line.

From our field inspection, we determined that significant conflicts would exist within the Roanoke Terminal between the proposed Bristol passenger trains and NS's through freight trains, local freight trains, and yard assignments. These conflicts would occur on the single track between Randolph Street and West Roanoke, when the single main track was required to remain clear for the operation of the proposed Bristol passenger trains.

Attachment I-1 contains the stringline chart of the proposed Bristol passenger trains and scheduled NS through freight trains, according to the NS freight schedule dated March 8, 2001. Attachment I-2 contains a stringline chart of the proposed Bristol passenger trains and the actual NS freight trains operating over the Roanoke-Walton Line for Sunday, March 15, 1998. These stringline charts identified potential conflicts between Christiansburg (MP N 289.7), a station stop for the proposed Bristol passenger trains, and the east end of the tunnels at Montgomery (MP N 284.6). The locations of all of the meets and passes that we projected on the Roanoke-Walton Line for scheduled and actual NS freight trains are shown in Attachments I-3 and I-4, respectively.

b. Recommended Construction Projects

As shown in Attachment L, the estimated total cost of our recommended construction projects at Roanoke and Montgomery on the Roanoke-Walton Line is \$6.2 million. The detailed cost estimates of the two construction projects are contained in Attachments L-3 and L-4, and our recommendations for both locations are discussed below.

(1) Create Second Main Track Through Roanoke Terminal and Upgrade Passenger Station Trackage

Roanoke Terminal is located at the crossroads of NS's north-south and east-west service routes between NS's westerly markets and the railroad gateways of Chicago, St. Louis, Memphis and New Orleans; NS's easterly markets north through Hagerstown to Philadelphia, Newark, New York and Boston; and NS's markets easterly and south to Washington, DC, Norfolk, Atlanta and Jacksonville. Roanoke Terminal not only originates and terminates trains, but also handles numerous through trains, such as intermodal and coal trains, that require mechanical inspections and crew changes. Because of its location, Roanoke Terminal is a key to NS's System freight train operations.

Roanoke Terminal is approximately seven miles long, and consists of a 57-track classification yard, a 13-track forwarding yard, a 20-track receiving yard, a 10-track "Empty Side" yard, a 7-track Park Street yard, and various other running tracks and storage yards. In addition, there are extensive rail car and locomotive maintenance facilities and a track material salvage yard. Only a single main track extends through Roanoke Terminal, from Randolph Street, at MP N 257.4, to WB Interlocking, at MP N 262.9.

In order to ensure that NS's freight trains and yard operations are not delayed when the proposed Bristol passenger trains occupy the single main track through the Roanoke Terminal, we recommend that a second main track be created through the Roanoke Terminal from Randolph Street in Roanoke to WB Interlocking (near West Roanoke) by upgrading an adjacent track to main track standards and converting certain hand-throw switches to remotely controlled, power operated switches. This recommendation is more fully described in Attachment L-3, which includes a schematic drawing. The availability of a second main track would expedite the movement of NS's freight trains entering and leaving Roanoke Terminal ahead of the proposed Bristol passenger trains, particularly if train speeds were also increased on both the existing single main track and the recommended second main track. Moreover, as more fully described in Attachment L-3, we recommend upgrading the trackage at Roanoke Station that would be used by the proposed Bristol passenger trains, both to enhance safety and to minimize delays to both passenger and freight trains. As shown by Attachment L-3, we estimate the cost of creating a second main track through the Roanoke Terminal and upgrading the passenger station trackage at \$4.9 million. (See Attachment P, Pages 3 through 5, Photographs Nos. 5 through 10.)

As shown by Attachment I-3, the proposed eastbound Bristol Amtrak Train No. 82 is projected to meet scheduled westbound NS Train No. 227 within the Roanoke Terminal at MP 262.0, between 24th Street and West Roanoke. Unless the second main track that we recommend be constructed were available, NS Train No. 227 would have to be delayed in a non-signaled yard track, while waiting for Train No. 82 to move east of the meet location. As shown by Attachment I-4, a similar delay would have to occur to westbound NS Train No. Q59V414, which would have to wait in a non-signaled yard track for Train No. 82 to move east of the meet location.

(2) Construct Second Crossover At Montgomery (MP N 284.6)

The 663-ft. long tunnels at Montgomery are single track tunnels for each of the two main tracks. The tunnel for Main Track No. 2 was enlarged several years ago to accommodate double-stack container trains, various other high/wide loads, and certain multilevel automobile cars. However, the tunnel over Main Track No. 1 was not enlarged and, therefore, trains with double-stack containers and other excess height cars cannot pass through it. (See Attachment P, Page 6, Photograph No. 11.)

Christiansburg (MP N 289.7) would be a station stop for the proposed Bristol passenger trains. (See Attachment P, Page 6, Photograph No. 12.) The proposed westbound Bristol Amtrak Train No. 81 would normally approach Montgomery on Main Track No. 2, because traffic is usually separated directionally in this territory. However, the lack of a crossover at Montgomery (MP N 284.6) would preclude Train No. 81 from crossing from Main Track No. 2 to Main Track No. 1 to reach the station platform at Christiansburg Station, which is located on Main Track No. 1. Thus, without the recommended crossover, either the proposed Bristol passenger train or NS's freight train would be delayed.

The fact that the railroad at Montgomery is on a 1.32% grade ascending westward, extending six miles easterly and four miles westerly, further creates conditions where the proposed Bristol passenger trains will be delayed by slower NS freight trains moving on the grade, in the absence of the recommended crossover.

As shown by the stringline chart that is Attachment I-1, westbound NS Train No. 112 is scheduled to depart 24th Street in Roanoke at 4:00 p.m. and arrive at Christiansburg at 5:03 p.m. The proposed westbound Bristol Amtrak Train No. 81 is

scheduled to depart 24th Street only 5 minutes later, at 4:05 p.m., and to gradually overtake and pass NS Train No. 112 by the time it reaches Christiansburg at 5:02 p.m. Within the Roanoke Terminal, Train No. 81 would occupy the single main track that becomes Main Track No. 2 in double track territory, thereby necessitating that NS Train No. 112 depart Roanoke on Main Track No. 1. At some location between Roanoke and Christiansburg, these two trains would need to reverse their positions to permit the proposed westbound Bristol Amtrak Train No. 81 to reach the station platform at Christiansburg Station on Main Track No. 1 and to permit NS Train No. 112 to operate through the enlarged tunnel at Montgomery on Main Track No. 2, if it carried double-stack containers or other excess height cars.

As shown by the stringline chart in Attachment I-2, a similar situation could occur with proposed westbound Bristol Amtrak Train No. 81 and westbound NS Trains Nos. 763V415 and 821V414, all of which depart Roanoke within a short time period. As shown by Attachment I-4, Train No. 81 is projected to pass NS Train No. 763V415 at VN, Milepost 267.3, after which NS Train No. 763V415 would cross over from Main Track No. 1 to Main Track No. 2. Train No. 81 would then follow NS Train No. 821V414 on Main Track No. 2 until crossing over to Main Track No. 1 at Montgomery to reach the station platform at Christiansburg Station.

As shown by Attachment L-4, we recommend construction of a No. 20 crossover adjacent to the existing crossover near the east end of the Montgomery Tunnels, thus forming a universal crossover, at an estimated cost of \$1.3 million.

3. Walton-Bristol Line

The Walton-Bristol Line encompasses the Pulaski District and extends a distance of 109.7 miles from Walton to Bristol. Except for 3.2 miles of double track between Plum Creek and JC, near Walton, the remaining 106.5 miles of the Walton-Bristol Line are single track. Although there are seven sidings between JC and Bristol, only the fairly new Crockett Siding, between MP NB 345.9 and NB 347.8, exceeds 10,000 ft. in length and can accommodate NS's long freight trains. Thus, operation of the proposed Bristol passenger trains will require the construction of sidings and other trackage in order to minimize delays to both the proposed Bristol passenger trains and NS's through freight trains.

a. Projected Train Conflicts

NS operates fourteen scheduled freight trains daily over the Walton-Bristol Line. The increase from the eight scheduled freight trains operated over the Line during the 1998 portion of our study period probably reflects NS's operation of its portion of Conrail since mid-1999. In addition to its fourteen scheduled freight trains, NS also operates six local freight trains daily over some portion of the Walton-Bristol Line.

Attachment J-1 contains the stringline chart of the proposed Bristol passenger trains and the scheduled NS through freight trains, according to the Virginia Division freight schedule dated March 8, 2001. Attachment J-2 contains the stringline chart of the proposed Bristol passenger trains and the actual NS freight trains operating over the Walton-Bristol Line on Sunday, March 15, 1998. The locations of the eight meets and passes that we projected on the Walton-Bristol Line for scheduled and actual NS freight trains are shown in Attachments J-3 and J-4, respectively.

Because almost all of the Walton-Bristol Line consists of only single track with short sidings, additional track capacity would be required to permit the two proposed Bristol passenger trains to meet or pass NS freight trains operating on the Line without excessive delays. Having identified the locations of the projected conflicts between the proposed Bristol passenger trains and NS's scheduled through freight trains, we developed the following six recommended construction projects between Walton and Bristol in order to mitigate the delays caused by the operation of the proposed Bristol passenger trains:

- Extend second main track from Walton (MP NB 297.6) to Plum Creek (MP NB 298.9);
- Construct crossover at Radford (MP NB 300.0);
- Extend Wysor Siding westerly to MP NB 311.4;
- Construct siding between MP NB 326.0 (near Gunton Park) and MP NB 328.0 (Near Max Meadows);
- Construct siding between MP NB 368.8 (near McMullin) and MP NB 371.4 (near Seven Mile Ford); and
- Construct siding between MP NB 395.4 and MP NB 397.5, west of Abingdon.

We also recommend the construction and rehabilitation of certain trackage in Bristol in

order to safely accommodate the proposed Bristol passenger trains. The estimated total cost of these seven projects is \$26.5 million.

In developing these recommendations, we have adopted the two suggestions of NS's Virginia Division Operations personnel that Wysor Siding be extended and that a new siding be constructed as close to Bristol as possible. For the latter, we determined the best available location to be between MP NB 395.4 and MP NB 397.5, west of Abingdon. Our analyses show a conflict between the proposed eastbound Bristol Amtrak Train No. 82 and NS Train No. 22A at MP 322.1, Clark Siding. Although our preference to mitigate this conflict would be an extension of Clark Siding, we determined that would not be practical in either direction. Accordingly, we recommend the construction of a 2.0-mile long siding between MP NB 326.0 and MP NB 328.0, near Max Meadows. In addition, we recommend construction of a new siding approximately midway in the nearly fifty miles between MP NB 347.8 at Duncan, the westerly end of Crockett Siding, and the east switch of the proposed new siding at MP NB 395.4, near Abingdon. The best available physical location appears to be between MP NB 368.8, near McMullin, and MP NB 371.4, near Seven Mile Ford.

Attachment K shows that, even if the six construction projects recommended to add track capacity had been implemented, only four of the eight train conflicts resulting from the operation of the proposed Bristol passenger trains would appear to have been eliminated. As shown by Attachment K, expected meets and passes between the proposed Bristol passenger trains and NS's through freight trains were projected to occur at eight locations between MP NB 297.6 and MP NB 407.3. Of those eight meets and passes, two were projected to occur on the recommended extended double track between Walton, at MP NB 297.6, and JC, at MP NB 302.1, the westerly end of the existing double track. Of the six remaining expected meets and passes, only

two occurred at the precise locations where sidings exist or where we are recommending extension of an existing siding or construction of new sidings. Even with the recommended projects, only five long sidings would be available to accommodate the six meets and passes over the 105 miles between JC and Bristol. Thus, unless additional sidings are constructed, NS's freight trains will experience some delays because of the train conflicts created by the operation of the proposed Bristol passenger trains.

Although the availability of these five long sidings in conjunction with the extended double track between Walton and Plum Creek will not perfectly mitigate the train conflicts caused by the operation of the proposed Bristol passenger trains, it is our opinion that, in combination, they produce a reasonable mitigation result, while providing operational flexibility to accommodate changes in train schedules and delays en route. As shown by Attachment K, two of NS's scheduled freight trains would meet or pass the proposed Bristol passenger trains on the extended double track between Walton and JC. The projected meet of NS Train No. 22A with the proposed eastbound Bristol Amtrak Train No. 82 at MP NB 322.1 would most likely occur at the new siding that would be located between MP NB 326.0 and MP NB 328.0. The projected meet of NS Train No. 189 with the proposed eastbound Bristol Amtrak Train No. 82 at MP NB 368.4 would occur at the proposed new siding that would be located between MP NB 368.8, near McMullin, and MP NB 371.4, near Seven Mile Ford.

In conducting our analysis and comparing the scheduled through freight trains operated by NS during 1998 with the Virginia Division's March 2001 through freight train schedules, we observed that there have been some substantial changes. We believe that, when planning additions to track capacity, the greater weight should be given to NS's more recent scheduled freight trains. However, because of cyclical

variations in traffic patterns, we feel that the 1998 train movements should also be given consideration.

Considering the four actual 1998 train movements shown in Attachment K, we believe that two of the meets and passes projected to occur on single track at MP NB 337.4 and MP NB 346.5 would occur at Crockett Siding. However, the two meets projected to occur at MP NB 356.0 and at MP NB 369.0 would occur at the proposed new siding to be located between MP NB 368.8, near McMullin, and MP NB 371.4, near Seven Mile Ford.

We have not identified conflicts with NS's local freight trains between Walton and Bristol, because of the imprecise timing of those train movements. Our assumption is that NS will be willing to accept some delays to these lower priority freight trains in order to facilitate the operation of the proposed Bristol passenger trains.

b. Recommended Construction Projects

As shown in Attachment L, the estimated total cost of the seven recommended construction projects between Walton and Bristol is \$26.5 million. The detailed cost estimates of each of the seven construction projects we recommend are contained in Attachments L-5 through L-11, and our recommendations for each of the seven locations are discussed, in ascending milepost order, in this portion of our Report.

(1) **Extend Second Main Track From Walton (MP NB 297.6) to Plum Creek (MP NB 298.9)**

As shown by Attachment K, two meets and passes are projected to occur between MP NB 297.6 and MP NB 302.1. Although one of the meets would occur on existing double track, we recommend extending the second main track between Walton and Plum Creek, a distance of 1.3 miles, in order to permit the proposed westbound Bristol Amtrak Train No. 81 to pass NS Train No. 112 without delays to either train. As shown by Attachment L-5, we estimate the cost of extending the existing double track at \$1.8 million. (See Attachment P, Page 7, Photographs Nos. 13 and 14.)

(2) **Construct Crossover at Radford (MP NB 300.0)**

This crossover is necessary in order to route the proposed Bristol passenger trains to and from the station platform at Radford while, at the same time, avoiding interruptions of Radford Yard switching movements. As shown by Attachment L-6, we estimate the cost of constructing this crossover at \$2.2 million. (See Attachment P, Page 8, Photograph No. 15.)

(3) **Extend Wysor Siding Westerly to MP NB 311.4**

We recommend extension of Wysor Siding to a total length of 11,000 ft., the current NS standard length for siding construction, as requested by the Virginia Division. In order to avoid public grade crossings east of Wysor Siding, we recommend extending Wysor Siding in a westerly direction for a distance of 4,900 ft., at an estimated cost of \$2.9 million, as shown by Attachment L-7. (See Attachment P, Page 8, Photograph No. 16.)

(4) **Construct Siding Between MP NB 326.0 (near Gunton Park) and MP NB 328.0 (near Max Meadows)**

We determined it would not be practicable to extend Clark Siding in either direction to accommodate the projected meet at Clark between proposed eastbound Bristol Amtrak Train No. 82 and westbound Train No. 22A, because of existing bridges, heavy curvature and rock cuts to the east and a public at-grade crossing to the west. Accordingly, we recommend the construction of a 2.0-mile long siding between MP NB 326.0, near Gunton Park, and MP NB 328.0, near Max Meadows, at an estimated cost of \$4.9 million, as shown by Attachment L-8.

(5) **Construct Siding Between MP NB 368.8 (near McMullin) and MP NB 371.4 (near Seven Mile Ford)**

Construction of the proposed new siding at this location would likely eliminate three of the projected train conflicts resulting from operation of the proposed Bristol passenger trains. Although the physical location is difficult, because of the extensive curvature and the location on a ruling grade for eastward trains of 1.32%, there are no public or private at-grade crossings at this location. As shown by Attachment L-9, we estimate the cost of constructing the proposed new 13,700 ft. siding at \$8.3 million.

(6) **Construct Siding Between MP NB 395.4 and MP NB 397.5, West of Abingdon**

We believe that the availability of this new siding, as discussed above, would increase NS's operational flexibility to resolve train conflicts resulting from the

introduction of the Bristol passenger trains. As shown by Attachment L-10, we estimate the cost of constructing the proposed new 11,000 ft. siding at \$5.6 million.

(7) **Construct and Rehabilitate Bristol Trackage**

In order to accommodate the proposed Bristol passenger trains in Bristol, construction of a new layover train storage and servicing track will be necessary. Another requirement at Bristol will be rehabilitation of the NS wye track that will be needed for turning the proposed Bristol passenger trains for their northward operation. As shown by Attachment L-11, we estimate the cost of constructing the new trackage and rehabilitating the existing wye track at Bristol at \$0.8 million. (See Attachment P, Pages 10 through 13, Photographs Nos. 20 through 26.)

C. **Virginia Division: Lynchburg-Richmond Lines**

Between Lynchburg and Richmond, the proposed Richmond connecting passenger trains will operate on the Virginia Division. For our review, we have divided NS's Virginia Division between Kinney Yard in Lynchburg and South Richmond Yard, a total of about 125 miles, into two line segments. The first line segment extends from Lynchburg (Kinney Yard) via Pamplin and Farmville to Burkeville, approximately 73 miles. The second line segment extends from Burkeville Yard to Belle Isle Yard at South Richmond, about 52 miles.

The two line segments, which are part of the Blue Ridge District and of the Richmond District, are shown on the map in Attachment A and in Attachments E-1 and E-4, which are portions of the *Virginia Division Timetable No. 5*, in effect April 26, 1998. Attachment P, pages 14 through 15, is a photographic study of the Virginia Division line

segments to be used by the proposed Richmond passenger trains. Attachment Q is a photographic study of the South Richmond Terminal of the Virginia Division.

1. Lynchburg-Burkeville Line

The Lynchburg (Kinney Yard) to Burkeville Line encompasses a portion of the Blue Ridge District over its 73-mile length. The entire line is single track. There are five controlled sidings between Kinney Yard and Pamplin. However, between Shields and Burkeville, a distance of 35 miles on what NS terms the "Old Line," there are no controlled sidings at all. As a result, the Old Line between Pamplin and Burkeville is used primarily for the movement of westbound empty coal trains. NS operates most of its other trains in both directions over its parallel and faster "Farmville Belt Line."

a. Projected Train Conflicts

NS operates fourteen scheduled freight trains daily between Lynchburg and Pamplin. NS also operates an average of six non-scheduled through freight trains daily, with the actual number ranging between three and eight. Between Pamplin and Burkeville, NS operates an average of ten non-scheduled through freights daily, with the actual number ranging between six and fourteen. NS also operates two local trains daily over some portion or all of the Lynchburg-Burkeville Line.

Attachment M-1 contains the stringline chart of the proposed Richmond passenger trains and the scheduled NS through freight trains, according to the NS freight schedule dated March 8, 2001. Attachment M-2 contains the stringline chart of the proposed Richmond passenger trains and the actual NS through freight trains operating over the Lynchburg-Burkeville Line on Sunday, March 15, 1998. The locations of the

meets and passes that we projected on the Lynchburg-Burkeville Line for our study period are shown in Attachments M-3 and M-4 for scheduled and actual NS trains, respectively.

Because almost all of the Lynchburg-Burkeville Line consists of single track and a limited number of sidings, additional track capacity on the Line would be required to permit the proposed Richmond passenger trains to meet or pass NS freight trains without excessive delays. Having identified the locations of the projected conflicts between the proposed Richmond passenger trains and NS's scheduled through freight trains, we developed the following two recommended construction projects between Lynchburg and Burkeville that would only partially mitigate the delays caused by the operation of the proposed Richmond passenger trains:

- Construct Siding between MP PH 8.4/N 198.3 and MP PH 6.4/N 196.3, east of Campbell; and
- Construct Siding between MP N 148.6 and MP N 146.5, east of Farmville.

These two recommendations are unchanged from our Phase I Final Report.

Attachment M-5 shows that, even if the two recommended construction projects had been implemented, then a majority of train conflicts created by the operation of the proposed Richmond passenger trains would appear not to have been eliminated. As shown by Attachment M-5, fourteen expected meets and passes (twelve between Lynchburg and Burkeville) between the proposed Richmond passenger trains and NS's through freight trains were projected to occur during our study period. Of those, seven

were projected to occur either at existing sidings or at the locations where we recommend construction of new sidings. The availability of only one long siding to accommodate the four meets and passes over the 35 miles between Shields and Burkeville is a limiting factor in mitigating train conflicts. Thus, unless additional sidings are constructed, NS's freight trains will experience some delays because of the train conflicts created by the operation of the proposed Richmond passenger trains.

Although the two sidings recommended for construction, in conjunction with the existing sidings, will not perfectly mitigate the train conflicts caused by the operation of the proposed Richmond passenger trains, it is our opinion that, in combination, they produce a reasonable result. As shown by Attachment M-5, three of NS's scheduled freight trains are projected to meet or pass the proposed Richmond passenger trains between Lynchburg and Burkeville. One of the four scheduled freight trains, eastbound NS Train No. 228, is projected to meet the proposed Richmond passenger Train No. R2-WB at the existing siding at Appomattox, as also shown in Attachment M-3. The remaining two NS Trains Nos. 29G and 159 would be passed or met, respectively, by the proposed Richmond passenger Train No. R1-EB at the recommended new siding between MP PH 6.4 and MP PH 8.4.

A total of four meets or passes of actual NS freight trains are projected on the almost twenty-mile line segment between Shields, at MP N 168.1, and the recommended new siding at MP N 148.6. Two of these would be within about four miles of the siding at Shields, and one would be about seven miles from the siding at Shields. The remaining meets would occur about one mile from the recommended new siding between MP N 148.6 and MP N 146.5, east of Farmville. Due to cost considerations, we are not recommending construction of any additional sidings between Shields and Burkeville that would further mitigate these train conflicts.

We have not identified conflicts with NS local freight trains on the Lynchburg-Burkeville Line, because of the imprecise timing of those movements. We have assumed that NS would be willing to accept some delays to these lower priority freight trains in order to facilitate the operation of the proposed Bristol passenger trains.

b. Recommended Construction Projects

As shown in Attachment N, our estimate of the total costs of these two construction projects for the Lynchburg-Burkeville Line is \$9.9 million. The detailed cost estimates of the recommended construction projects are contained in Attachments N-1 and N-2, and our recommendations for both of the locations are discussed in this portion of our Report.

(1) Construct Siding Between MP PH 8.4/N 198.3 and MP PH 6.4/N 196.3, East of Campbell

As can be inferred from Attachment M-5, we project that two meets and passes would occur at the proposed new siding at this location. As shown by Attachment N-1, we estimate the cost of constructing this siding at \$3.5 million. (See Attachment P, Page 14, Photograph No. 27.)

(2) Construct Siding Between MP N 148.6 and MP N 146.5, East of Farmville

There are no sidings in the thirty-five miles between Shields and Burkeville. At least one siding would be required in order to permit the proposed eastbound Richmond passenger trains to meet the flow of NS freight trains, which is primarily in the

westbound direction. Further, at least one siding would be required in order to permit the proposed westbound Richmond passenger trains to overtake and pass slower moving westbound freight trains. We project that three meets and passes would occur at the recommended new siding east of Farmville, involving three of the four proposed Richmond passenger trains, Trains Nos. R1-EB, R2-WB, and R2-EB, with NS Trains Nos. 813V215, 159V215, and 555V215, as indicated in Attachment M-4. Although the physical location that we have selected involves difficult construction, there are no public or private at-grade crossings at this location. As shown by Attachment N-2, we estimate the cost of constructing the proposed new 11,000 ft. siding at \$6.4 million. (See Attachment P, Page 15, Photograph No. 30.)

2. **Burkeville-Richmond Line**

The Burkeville-Richmond Line encompasses a portion of the Richmond District between Burkeville Yard and South Richmond, a distance of about 50 miles. The entire line is single track with no usable sidings.

NS operates only a single local freight train on this Line that originates at South Richmond, operates to Crewe, near Burkeville, and returns to South Richmond. Tuesday through Saturday, this local is on duty at 9:00 p.m. and off duty by 8:00 or 9:00 a.m.

a. **Construct Siding Between MP F 127.2 and MP F 129.4, near Robius**

Because the Amtrak Schedules provide for a 7:15 a.m. departure for passenger Train No. R1-WB from Richmond, it would be necessary for that proposed

westbound Richmond passenger train to meet the eastbound Richmond local at some point west of South Richmond. To permit those trains to meet, we recommend construction of a siding as close to South Richmond as possible. Our preferred location for the siding would be between Robius, at MP F 129.9, and Bon Air, at MP F 132.0, but if the Robius-Bon Air siding location is not physically or politically acceptable, the next best location would be between MP F 127.2, near Midlothian, and MP F 129.4, at Robius. For conservatism, we have included the latter alternative in the construction projects that we recommend. As shown by Attachment N-3, we estimate the cost of constructing the siding between Robius and Bon Air at \$2.9 million and the cost of constructing the siding between Midlothian and Robius at \$3.5 million.

b. **Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal**

Our June 2001 Phase I Final Report described the facility improvements required to move one scheduled passenger train in each direction per day through NS's South Richmond Terminal, including the Belle Isle Yard. However, the Phase II passenger train plan to operate two scheduled passenger trains in each direction per day will require additional improvements, including signaling and installing Train Control (TC) from the west end of the South Richmond Terminal to the proposed track connections to the CSX main track east of NS's South Richmond Terminal.

Neither the line from Burkeville to the north nor any of the lines within the South Richmond Terminal is signaled. There is no full-time yardmaster assigned at South Richmond who would be available to authorize the movements of the four daily proposed Richmond passenger trains. Moreover, the entire NS South Richmond and North Richmond Terminals are within a single yard limit.

Attachment N-4 describes, by project, the improvements needed to move the four Richmond Phase II passenger trains over the 2.5-mile passenger train route through the South Richmond Terminal at 25 mph. Attachment Q is a photographic study of the South Richmond Terminal.

We define the improvements that we recommend to construct, signal, and rehabilitate NS's trackage in the South Richmond Terminal as five of the six projects described in Attachment N-4. Projects Nos. 1 through 4 are:

- Project No. 1: Construct and Signal a Bypass Main Track from about MP F 137.3 to MP F 138.6;
- Project No. 2: Rehabilitate and Signal Existing Main Track Through Belle Isle Yard;
- Project No. 3: Construct and Signal Bypass Main Track and Reconstruct Yard Track; and
- Project No. 4: Rehabilitate and Signal NS Industrial Lead Track Connecting to CSX Main Track.

These four projects are described in Attachment N-4, and their total estimated cost is \$8.2 million.

Our Phase I Final Report addressed the two alternatives by which NS's trackage could be connected to CSX's Main Track. These two alternatives are described in Attachment N-4 as follows:

- Project No. 5: Rehabilitate NS Trackage and Construct a Bridge Connection to CSX Trackage Near South Richmond; and
- Project No. 6: Connect Existing NS Industrial Lead to CSX Main Track with a Crossover to Permit Push/Pull Passenger Train to Reverse Direction.

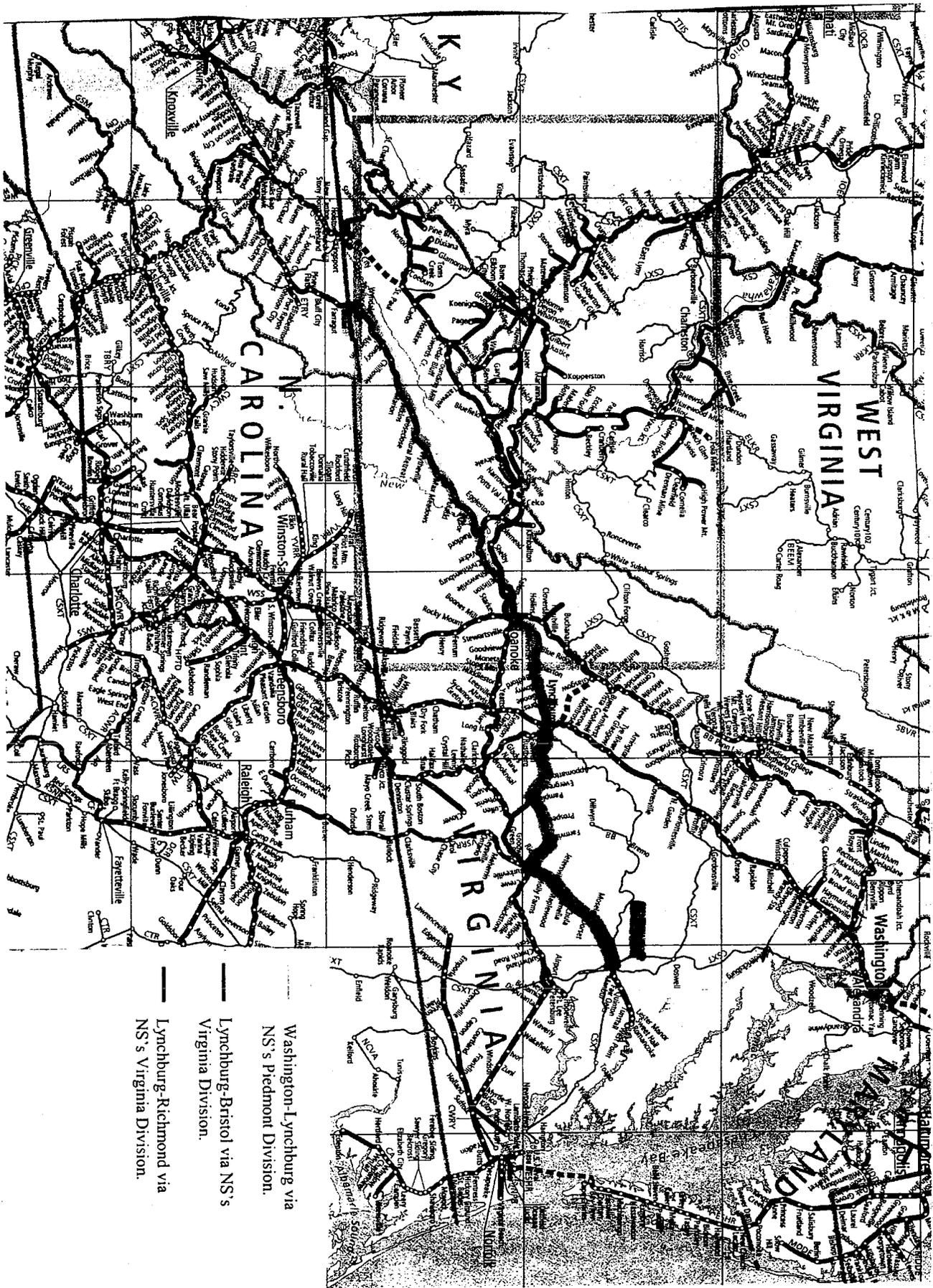
NS's yard facilities in South Richmond, on the southerly side of the James River, are not centrally located for a passenger station, and they are in an industrial area where public transportation is not available. The Harris Study concluded that the best route for terminating the proposed Richmond passenger train in downtown Richmond was to connect the easterly end of the South Richmond Terminal tracks to the CSX main track that runs between Richmond and Hopewell, near CSX's James River Bridge.

As was discussed more fully in our Phase I Final Report, we concluded that the Harris Study plan proposal for a turnout for passenger trains would be located on a CSX open deck bridge, thereby necessitating the installation of a power switch and a signal interlocking plant to expedite passenger train movements and keep train crews off the open deck structure. The proposed connection requires a curve of about 300 ft. radius, or 19 degrees, which would be located for the most part on a proposed new 350 ft. open deck bridge across wetlands and Walker's Canal. As detailed in Attachment N-4, we estimate that the proposed connection between the NS yard tracks and the CSX main track, which we have identified as Project No. 5, would cost \$4.8 million.

According to the Harris Report, the proposed passenger train operation between Richmond and Lynchburg will be a "push-pull" operation and, therefore, will require no turning at the end of its run, as it can be operated from either the locomotive end or the cab car end of the train. The proposed connection between NS and CSX involving the bridge and signals would likely be delayed while obtaining the necessary regulatory approvals and because of the high cost of that Project No. 5. Therefore, we recommend instead that a crossover be constructed between an existing NS industrial track and the CSX main track. Thus, a Lynchburg bound passenger train in a push-pull mode could proceed south on the CSX main track to the vicinity of Maury Street; the engineer would then change ends, make an air brake test and, upon receiving permission, cross over into the NS South Richmond Terminal. This Project No. 6 is shown by the figure in Attachment N-4B. As described in Attachment N-4, we estimate the cost of Project No. 6 at \$0.5 million.

Attachment A

Routes of the Proposed Bristol, Roanoke, and Richmond Passenger Trains



- Washington-Lynchburg via NS's Piedmont Division.
- Lynchburg-Bristol via NS's Virginia Division.
- Lynchburg-Richmond via NS's Virginia Division.
- Lynchburg-Richmond via NS's Virginia Division.

Attachment B

Attachment B**Summary of Recommended Construction Projects
For Piedmont Division and Virginia Division**

<u>Required Construction Projects:</u>	<u>Estimated Cost \$ (Millions)</u>
1. Piedmont Division, Alexandria-Lynchburg Line (See Attachment G)	\$40.5
2. Virginia Division, Lynchburg-Bristol Line (See Attachment L)	57.4
3. Virginia Division, Lynchburg-Richmond Line (See Attachment N)	<u>22.1</u>
Total Costs	\$120.0

Attachment C



Attachment C

Proposed Amtrak Bristol, Roanoke and Richmond Passenger Train Schedules

Southbound				Northbound			
<u>Station</u>		<u>Train No. 881</u>	<u>Train No. 81</u>	<u>Station</u>		<u>Train No. 82</u>	<u>Train No. 882</u>
Washington, D.C.	Dp	7:00 AM	11:10 AM	Bristol	Dp	7:14 AM	
Alexandria	Dp	7:15 AM	11:25 AM	Abingdon	Dp	7:40 AM	
Manassas	Dp	7:48 AM	11:58 AM	Marion	Dp	8:34 AM	
Culpeper	Dp	8:24 AM	12:34 PM	Wytheville	Dp	9:27 AM	
Charlottesville	Dp	9:16 AM	1:26 PM	Pulaski	Dp	10:13 AM	
Lynchburg	Ar	10:29 AM	2:39 PM	Radford	Dp	10:47 AM	
				Christiansburg	Dp	11:12 AM	
Richmond	Dp	11:10 AM	7:15 AM	Roanoke	DP	12:15 PM	4:30 PM
Farmville	Dp	12:45 PM	8:05 AM	Bedford	Dp	12:50 PM	5:05 PM
Appomattox	Dp	1:19 PM	9:24 AM	Lynchburg	Ar	1:35 PM	5:50 PM
Lynchburg	Ar	2:05 PM	10:10 AM				
				Lynchburg	Dp	2:20 PM	6:10 PM
Lynchburg	Dp	10:34 AM	2:45 PM	Appomattox	Dp	3:06 PM	6:56 PM
Bedford	Dp	11:14 AM	3:25 PM	Farmville	Dp	3:39 PM	7:29 PM
Roanoke	Dp	11:50 AM	4:01 PM	Richmond	Ar	5:15 PM	9:05 PM
Christiansburg	Dp		5:04 PM				
Radford	Dp		5:29 PM	Lynchburg	Dp	1:40 PM	6:00 PM
Pulaski	Dp		6:03 PM	Charlottesville	Dp	2:47 PM	7:07 PM
Wytheville	Dp		6:49 PM	Culpeper	Dp	3:39 PM	7:59 PM
Marion	Dp		7:42 PM	Manassas	Dp	4:14 PM	8:34 PM
Abingdon	Dp		8:36 PM	Alexandria	Dp	4:46 PM	9:06 PM
Bristol	Ar		9:02 PM	Washington, D.C.	Ar	5:09 PM	9:29 PM

Source: Amtrak NEC Transportation Planning Department, *Option A; Trains Nos. 181 and 196 Extended, Washington-Roanoke Train Added*, October 2001, as modified by The Woodside Consulting Group.

Attachment C-1

Comparison of Proposed Phase I and Phase II Bristol and Richmond Passenger Train Schedules

<u>Station</u>		<u>Phase I Proposed Amtrak Schedules</u>	<u>Phase I Proposed Woodside Schedules</u>	<u>Phase II October 2001 Proposed Amtrak Schedules</u>	
<u>Southbound Bristol Trains</u>					
Washington, DC	Dp	6:30 AM	8:30 AM	7:00 AM	11:10 AM
Lynchburg	Ar	9:59 AM	11:59 AM	10:29 AM	2:39 PM
Lynchburg	Dp	10:20 AM	12:20 PM	10:34 AM	2:45 PM
Roanoke	Dp	11:22 AM	1:44 PM	11:50 AM	4:01 PM
Bristol	Ar	3:07 PM	7:07 PM	---	8:05 PM
<u>Elapsed Times:</u>					
Washington-Lynchburg		3'29"	3'29"	3'29"	3'29"
Lynchburg		21"	21"	5"	6"
Lynchburg-Roanoke		1'02"	1'24"	1'16"	1'16"
Roanoke-Bristol		3'45"	5'23"	---	4'04"
Total Trip		8'37"	10'37"	4'50"	8'55"
<u>Northbound Bristol Trains</u>					
Bristol	Dp	6:00 AM	6:00 AM	---	8:15 AM
Roanoke	Dp	9:35 AM	11:28 AM	4:30 PM	12:15 PM
Lynchburg	Ar	10:49 AM	12:49 PM	5:50 PM	1:35 PM
Lynchburg	Dp	11:10 AM	1:10 PM	6:00 PM	1:40 PM
Washington, DC	Ar	2:39 PM	4:39 PM	9:29 PM	5:09 PM
<u>Elapsed Times:</u>					
Bristol-Roanoke		3'35"	5'28"	---	4'00"
Roanoke-Lynchburg		1'14"	1'21"	1'20"	1'20"
Lynchburg		21"	21"	10"	5"
Lynchburg-Washington		3'29"	3'29"	3'29"	3'29"
Total Trip		8'39"	10'39"	4'59"	8'54"

Attachment C-1

**Comparison of Proposed Phase I and Phase II
Bristol and Richmond Passenger Train Schedules**

<u>Station</u>		<u>Phase I Proposed Amtrak Schedules</u>	<u>Phase I Proposed Woodside Schedules</u>	<u>Phase II October 2001 Proposed Amtrak Schedules</u>	
		Connecting Richmond Trains			
Richmond	Dp	7:15 AM	8:15 AM	7:15 AM	11:10 AM
Lynchburg	Ar	9:56 AM	11:56 AM	10:10 AM	2:05 PM
Lynchburg	Dp	11:05 AM	1:05 PM	2:20 PM	6:10 PM
Richmond	Ar	1:41 PM	4:41 PM	5:15 PM	9:05 PM
<u>Elapsed Times:</u>					
Richmond-Lynchburg		2'41"	3'41"	2'55"	2'55"
Lynchburg-Richmond		2'36"	3'36"	2'55"	2'55"

Attachment C-2

Proposed NS Track Speed Changes For Passenger Train on the Virginia Division

Location	Milepost		Distance (Miles)	Passenger Speeds		Time Savings (Minutes)
	Prefix	No.		Existing	Proposed	
Kinney Yd. - Roanoke						
Kinney Yd.	PH	16.18	1.12	50	55	0.12
	PH	17.30	2.16	60	65	0.17
	PH	19.46	0.46	60	70	0.07
	PH	19.92	1.18	50	70	0.40
	PH	21.10	0.73	50	60	0.15
	PH	21.83	0.53	50	55	0.06
Forest	PH	22.36	0.00	50	55	0.00
Forest	N	214.50	0.48	50	55	0.05
	N	214.98	3.31	60	65	0.25
	N	218.29	1.08	50	55	0.12
	N	219.37	1.68	45	45	0.00
	N	221.05	1.28	60	60	0.00
	N	222.33	1.15	50	50	0.00
	N	223.48	1.13	60	60	0.00
	N	224.61	1.81	50	55	0.20
	N	226.42	1.05	45	50	0.14
	N	227.47	1.35	60	60	0.00
	N	228.82	0.61	50	50	0.00
	N	229.43	1.32	50	70	0.45
Bedford	N	230.75	0.81	60	70	0.12
	N	231.56	0.55	60	65	0.04
	N	232.11	1.95	60	70	0.28
	N	234.06	0.95	60	60	0.00
	N	235.01	0.55	50	55	0.06
	N	235.56	1.96	60	65	0.15
	N	237.52	0.60	60	60	0.00
	N	238.12	0.79	55	60	0.07
	N	238.91	0.09	60	70	0.01
	N	239.00	1.21	50	70	0.41
	N	240.21	1.61	50	55	0.18
	N	241.82	0.83	40	40	0.00
	N	242.65	0.59	50	60	0.12
	N	243.24	1.14	50	65	0.32
	N	244.38	1.81	50	55	0.20
	N	246.19	0.19	40	50	0.06
	N	246.38	0.54	40	45	0.09
	N	246.92	0.94	50	50	0.00
	N	247.86	0.42	50	55	0.05
	N	248.28	0.56	60	60	0.00
	N	248.84	0.56	55	60	0.05
	N	249.40	0.85	60	60	0.00
	N	250.25	0.76	40	45	0.13
	N	251.01	0.87	60	60	0.00
	N	251.88	0.40	55	60	0.04
	N	252.28	0.65	60	60	0.00
	N	252.93	2.21	60	65	0.17

Attachment C-2

**Proposed NS Track Speed Changes
For Passenger Train on the Virginia Division**

Location	Milepost		Distance (Miles)	Passenger Speeds		Time Savings (Minutes)
	Prefix	No.		Existing	Proposed	
	N	255.14	0.45	50	55	0.05
	N	255.59	0.30	40	55	0.12
	N	255.89	0.62	40	45	0.10
	N	256.51	0.70	40	40	0.00
	N	257.21	0.19	25	25	0.00
Roanoke	N	257.40	0.00	25	25	0.00
Kinney Yd. - Roanoke, Total			49.08			4.98
Roanoke-Bristol						
Roanoke	N	257.40	0.20	25	25	0.00
	N	257.60	0.18	25	30	0.07
	N	257.78	1.89	25	35	1.30
	N	259.67	0.11	30	40	0.05
	N	259.78	2.72	40	40	0.00
	N	262.50	0.39	40	40	0.00
W. Roanoke	N	262.89	5.05	45	60	1.68
	N	267.94	1.28	50	60	0.26
	N	269.22	1.07	50	55	0.12
	N	270.29	0.38	45	50	0.05
	N	270.67	0.53	50	50	0.00
	N	271.20	0.48	35	35	0.00
	N	271.68	0.87	50	55	0.09
	N	272.55	0.92	35	40	0.20
	N	273.47	0.41	40	45	0.07
	N	273.88	2.27	50	55	0.25
	N	276.15	0.34	40	40	0.00
	N	276.49	1.58	50	55	0.17
	N	278.07	0.21	50	50	0.00
	N	278.28	0.70	35	40	0.15
	N	278.98	10.47	30	35	2.99
	N	289.45	3.31	35	35	0.00
	N	292.76	1.09	30	35	0.31
	N	293.85	1.95	35	35	0.00
	N	295.80	0.31	30	35	0.09
	N	296.11	1.52	35	35	0.00
Walton	N	297.63	1.31	35	35	0.00
Walton	NB	297.63	0.00	35	35	0.00
	NB	298.94	0.63	25	35	0.43
	NB	299.57	2.60	35	35	0.00
	NB	302.17	2.24	30	30	0.00
	NB	304.41	0.41	30	35	0.12
	NB	304.82	2.45	40	40	0.00
	NB	307.27	2.37	45	45	0.00
	NB	309.64	0.36	40	40	0.00
	NB	310.00	0.42	35	35	0.00
	NB	310.42	2.98	40	40	0.00

Attachment C-2

**Proposed NS Track Speed Changes
For Passenger Train on the Virginia Division**

Location	Milepost		Distance (Miles)	Passenger Speeds		Time Savings (Minutes)
	Prefix	No.		Existing	Proposed	
	NB	313.40	0.12	30	35	0.03
	NB	313.52	0.28	30	30	0.00
	NB	313.80	2.71	40	45	0.45
	NB	316.51	1.14	35	35	0.00
	NB	317.65	3.49	30	35	1.00
	NB	321.14	0.71	30	30	0.00
	NB	321.85	0.23	30	35	0.07
	NB	322.08	1.52	35	35	0.00
	NB	323.60	0.60	30	35	0.17
	NB	324.20	1.70	35	40	0.36
	NB	325.90	1.20	40	45	0.20
	NB	327.10	0.60	40	40	0.00
	NB	327.70	0.66	35	35	0.00
	NB	328.36	2.34	40	40	0.00
	NB	330.70	0.17	35	35	0.00
	NB	330.87	2.52	40	45	0.42
	NB	333.39	1.72	40	40	0.00
	NB	335.11	0.62	35	35	0.00
	NB	335.73	1.67	35	40	0.36
Wytheville	NB	337.40	2.29	40	40	0.00
	NB	339.69	0.41	35	35	0.00
	NB	340.10	3.81	40	40	0.00
	NB	343.91	0.19	40	45	0.03
	NB	344.10	4.82	45	50	0.64
	NB	348.92	2.37	45	45	0.00
	NB	351.29	2.01	45	55	0.49
	NB	353.30	0.40	45	50	0.05
	NB	353.70	1.21	40	45	0.20
	NB	354.91	0.96	35	35	0.00
	NB	355.87	0.64	45	45	0.00
	NB	356.51	1.70	45	55	0.41
	NB	358.21	3.03	45	70	1.44
	NB	361.24	0.14	45	45	0.00
	NB	361.38	0.14	35	35	0.00
	NB	361.52	0.30	35	40	0.06
	NB	361.82	1.54	35	45	0.59
	NB	363.36	0.44	30	35	0.13
	NB	363.80	0.59	25	35	0.40
	NB	364.39	2.41	30	35	0.69
	NB	366.80	2.83	40	40	0.00
	NB	369.63	0.19	30	30	0.00
	NB	369.82	1.27	35	35	0.00
	NB	371.09	0.61	45	50	0.08
	NB	371.70	3.04	45	55	0.74
	NB	374.74	0.40	45	50	0.05
	NB	375.14	1.88	40	45	0.31
	NB	377.02	0.18	40	40	0.00

Attachment C-2

**Proposed NS Track Speed Changes
For Passenger Train on the Virginia Division**

Location	Milepost		Distance (Miles)	Passenger Speeds		Time Savings (Minutes)
	Prefix	No.		Existing	Proposed	
	NB	377.20	1.29	35	35	0.00
	NB	378.49	1.02	40	40	0.00
	NB	379.51	1.91	45	50	0.25
	NB	381.42	1.53	55	55	0.00
	NB	382.95	0.87	55	70	0.20
	NB	383.82	0.68	55	55	0.00
	NB	384.50	0.25	55	60	0.02
	NB	384.75	2.42	55	65	0.41
	NB	387.17	0.30	55	60	0.03
	NB	387.47	0.27	45	50	0.04
	NB	387.74	1.19	50	50	0.00
	NB	388.93	0.99	50	55	0.11
	NB	389.92	4.46	60	70	0.64
	NB	394.38	0.37	60	60	0.00
	NB	394.75	2.19	55	55	0.00
	NB	396.94	4.72	60	79	1.14
	NB	401.66	1.11	60	60	0.00
	NB	402.77	0.75	45	50	0.10
	NB	403.52	0.99	45	45	0.00
	NB	404.51	2.16	40	45	0.36
	NB	406.67	0.29	30	35	0.08
	NB	406.96	0.21	25	30	0.08
	NB	407.17	0.87	20	30	0.87
Bristol	NB	408.04	0.00	20	30	0.00
Roanoke - Bristol, Total			150.64			22.12
Kinney Yd. - S. Richmond						
Kinney Yd.	PH	16.18	0.00	50	55	0.00
	PH	14.91	1.27	45	55	0.31
	PH	14.60	0.31	40	45	0.05
	PH	12.70	1.90	45	55	0.46
	PH	8.33	4.37	45	50	0.58
	PH	3.70	4.63	45	45	0.00
	PH	3.27	0.43	45	55	0.10
	PH	1.80	1.47	50	79	0.65
	PH	0.13	1.67	50	60	0.33
Concord	PH	0.00	0.13	50	60	0.03
Concord	N	189.87	0.00	50	60	0.00
	N	189.52	0.35	50	60	0.07
	N	189.01	0.51	50	55	0.06
	N	187.60	1.41	50	50	0.00
	N	186.80	0.80	45	50	0.11
	N	186.10	0.70	50	55	0.08
	N	185.56	0.54	60	70	0.08

Attachment C-2

Proposed NS Track Speed Changes For Passenger Train on the Virginia Division

Location	Milepost		Distance (Miles)	Passenger Speeds		Time Savings (Minutes)
	Prefix	No.		Existing	Proposed	
	N	184.15	1.41	60	79	0.34
	N	184.00	0.15	50	75	0.06
	N	181.60	2.40	50	55	0.26
Appomattox	N	180.63	0.97	50	75	0.39
	N	179.39	1.24	60	65	0.10
	N	177.90	1.49	50	55	0.16
	N	175.78	2.12	60	70	0.30
	N	173.06	2.72	60	75	0.54
	N	169.80	3.26	60	60	0.00
Pamplin	N	168.21	1.59	40	45	0.27
	N	167.41	0.80	40	70	0.51
	N	166.40	1.01	40	75	0.71
	N	164.62	1.78	40	79	1.32
	N	162.78	1.84	40	55	0.75
	N	160.97	1.81	40	50	0.54
	N	160.40	0.57	40	60	0.28
	N	154.78	5.62	40	50	1.69
	N	154.58	0.20	40	55	0.08
	N	153.61	0.97	40	79	0.72
	N	151.49	2.12	40	75	1.48
	N	150.01	1.48	40	50	0.44
Nr. Farmville	N	149.68	0.33	40	40	0.00
	N	148.11	1.57	40	50	0.47
	N	147.60	0.51	40	55	0.21
	N	145.68	1.92	40	70	1.23
	N	144.57	1.11	40	55	0.45
	N	141.67	2.90	40	45	0.48
	N	139.42	2.25	40	70	1.45
	N	138.20	1.22	40	45	0.20
	N	136.46	1.74	40	55	0.71
	N	134.05	2.41	40	75	1.69
Burkeville	N	133.68	0.37	40	40	0.00
Kinney Yd. - Burkeville, Subtotal			72.37			20.75
Burkeville	F	86.50	0.17	15	20	0.17
	F	86.67	3.09	20	59	6.13
	F	89.76	5.78	45	59	1.83
	F	95.54	1.46	45	55	0.35
	F	97.00	1.64	45	59	0.52
	F	98.64	0.58	45	50	0.08
	F	99.22	3.46	45	55	0.84
	F	102.68	0.74	45	50	0.10
	F	103.42	3.64	45	55	0.88
	F	107.06	5.07	45	59	1.60
	F	112.13	1.22	45	55	0.30

Attachment C-2

**Proposed NS Track Speed Changes
For Passenger Train on the Virginia Division**

Location	Milepost		Distance	Passenger Speeds		Time Savings
	Prefix	No.	(Miles)	Existing	Proposed	(Minutes)
	F	113.35	3.61	45	59	1.14
	F	116.96	0.93	45	55	0.23
Dorset	F	117.89	2.34	45	59	0.74
	F	120.23	1.47	45	55	0.36
	F	121.70	4.66	45	59	1.47
	F	126.36	0.64	35	55	0.40
	F	127.00	0.75	35	45	0.29
	F	127.75	0.27	35	35	0.00
	F	128.02	0.70	35	50	0.36
	F	128.72	1.10	35	55	0.69
	F	129.82	1.48	35	59	1.03
	F	131.30	0.20	35	50	0.10
	F	131.50	0.30	35	45	0.11
	F	131.80	0.15	30	35	0.04
	F	131.95	0.33	30	30	0.00
	F	132.28	1.73	30	35	0.49
	F	134.01	0.42	30	59	0.41
	F	134.43	0.28	30	40	0.14
	F	134.71	0.18	30	35	0.05
	F	134.89	1.88	35	35	0.00
	F	136.77	0.23	35	45	0.09
S. Richmond	F	137.00	0.00	35	45	0.00
Burkeville - S. Richmond, Subtotal			50.50			20.94
Kinney Yd. - S. Richmond, Total			122.87			41.70

Attachment D

Attachment D

Piedmont Division Timetable For The Alexandria-Lynchburg/Montview Line

SOUTH WARD ↓	ALEXANDRIA/MONTVIEW		↑ NORTH WARD
MILE POST	STATIONS		SIDINGS IN FEET
8.2		Alexandria.....	.....
9.1		A. F. Tower.....	.....
10.7		C. R. Tower.....	.....
12.9		Edsall.....	.....
15.1		Springfield.....	.....
17.8		Raven.....	.....
20.0		Burke.....	.....
22.3		Crestwood.....	.....
24.7		Fairfax.....	.....
26.8		Clifton.....	.....
30.2		Bull Run.....	.....
32.4		Moore.....	.....
32.6		Manassas.....	.....
33.8		Powell.....	.....
35.7		S. Manassas.....	.....
36.4		Bristow.....	.....
46.0		Calverton.....	.....
56.0	□	Remington.....	.....
65.9		Mountain Run.....	.....
67.4	□	Culpeper.....	.....
70.8		Winston.....	.....
80.0		Rapidan.....	.....
84.7	□	Orange.....	.....
92.1	□	Weyburn.....	.....
102.0		Gilbert.....	.....
109.9		Rio.....	.....
112.2	□	Charlottesville.....	.....
114.8		Teel.....	.....
120.4		Red Hill.....	.....
126.6	□	Applegate.....	.....
132.0		Hamner.....	.....
143.4		Oak Ridge.....	.....
148.0	□	Kingswood.....	.....
150.1		Tye River.....	.....
160.8	□	Angelo.....	.....
164.2		McIvor.....	.....
170.8		Rivermont.....	.....
172.5		Lynchburg.....	.....
173.3		Durmid.....	.....
174.6		Montview.....	.....

Source: NS *Piedmont Division Timetable No. 19*, in effect June 20, 1999.

Attachment E

Attachment E-1

Virginia Division Timetable For The Lynchburg To Roanoke Line
and The Lynchburg To Burkeville Line

WEST- WARD ↓		BLUE RIDGE DISTRICT		↑ EAST- WARD	
MILE POST		STATIONS		SIDINGS IN FEET	
N 131.6		West End Crewe.	YL	-----	
N 133.4		Burkeville.....	J	-----	
N 133.9		Atwood.....	J	-----	
N 149.1		Farmville.....		-----	
N 156.3		Tuggle.....		-----	
N 168.1		Shields.....		-----	
N 169.1		Pamplin.....	J SS.	11000	
N 170.6		Bowler.....		-----	
N 180.6		Appomattox.....	SS	16700	
N 184.1		Lee.....		-----	
PH 0.0		Concord.....		-----	
PH 2.3		Phoebe.....	SS	10292	
PH 10.5		Campbell.....		-----	
PH 12.6		Posm.....	SS	10028	
PH 14.9		Rutherford.....		-----	
PH 15.9		Dover.....		-----	
PH 16.6		Kinney.....	J J SS	7483	
PH 19.9		Liberty.....		-----	
PH 22.4		Forest.....	SS	11890	
N 228.2		Big Otter.....		-----	
N 230.7		Bedford.....	SS	12800	
N 239.1		Montvale.....		-----	
N 243.8		Villamont.....		-----	
N 248.6		Webster.....		-----	
N 252.5		Bonsack.....		-----	
N 255.0		Vinton.....		-----	
N 255.7		Midway.....		-----	
N 256.1		Tinker Creek.....	J	-----	
N 257.4	Randolph St.....	y	-----		

Note: Kinney Yard at MP PH 16.6 is located at Lynchburg and Randolph Street at MP N 257.4 located in Roanoke.

Source: NS Virginia Division Timetable No. 5, In Effect April 26, 1998.

Attachment E-2

Virginia Division Timetable For Roanoke To Walton Line

WEST- WARD ↓		CHRISTIANSBURG DISTRICT		↑ EAST- WARD	
MILE POST		STATIONS		SIDINGS IN FEET	
N257.4		Randolph Street..			
N258.0		Park Street.....			.....
N259.1		16th Street.....			.....
N259.8		24th Street.....	B SC		.....
N261.9					.....
N262.2		West Roanoke....	YL		.....
N262.4					.....
N262.9		WB.....			.....
N267.3		VN.....	J		.....
N267.7		Glenvar.....			.....
N273.3		Singer.....			.....
N282.2		Arthur.....			.....
N284.6		Montgomery.....			.....
N289.7		Christiansburg...	J		.....
N290.5		Pelton.....			.....
N297.5		Walton.....	J		.....

Note: Randolph Street, MP N 257.4 is at Roanoke.

Source: NS Virginia Division, Timetable No. 5, In Effect April 26, 1998.

Attachment E-3

Virginia Division Timetable For The Walton To Bristol Line

WEST- WARD ↓		PULASKI DISTRICT		↑ EAST- WARD	
MILE POST		STATIONS		SIDINGS IN FEET	
NB297.6	┌───┐	Walton.....			-----
NB297.9	┌───┐	Tyler.....	J Y		-----
NB298.9	┌───┐	Plum Creek.....	J YL		-----
NB300.7	┌───┐	Radford.....	B SC		-----
NB302.1	┌───┐	JC.....	J YL		-----
NB309.2	┌───┐	Wysor.....	SS		6244
NB310.5	┌───┐	Newbern.....			-----
NB322.1	┌───┐	Clark.....	SS		6189
NB323.3	┌───┐	Gunton Park.....			-----
NB336.3	┌───┐	Stones Mill.....			-----
NB337.4	┌───┐	Wytheville.....	SS		5518
NB349.6	┌───┐	Rural Retreat.....			-----
NB362.9	┌───┐	Schuleen.....			-----
NB364.1	┌───┐	Marion.....	SS		5740
NB380.4	┌───┐	Glade Spring.....	SS		5796
NB381.7	┌───┐	Washington.....			-----
NB393.2	┌───┐	Litchfield.....			-----
NB393.9	┌───┐	Abingdon.....	SS		3743
NB399.6	┌───┐	Wyndale.....			-----
NB407.3	┌───┐	Bristol.....	B SC YL		-----

Source: NS Virginia Division Timetable No. 5, In Effect April 26, 1998.

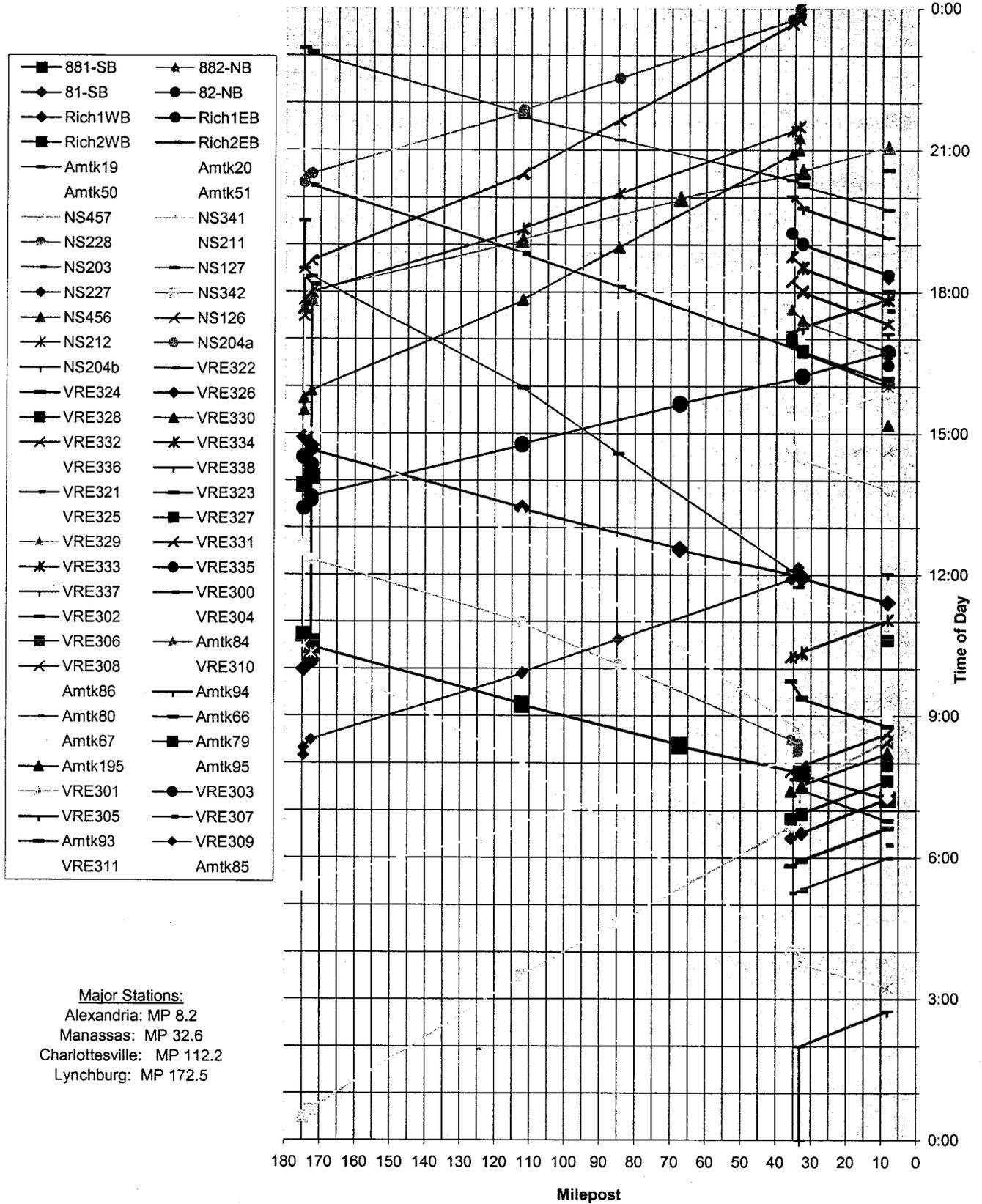
Attachment E-4

Virginia Division Timetable For The Burkeville To South Richmond Line

NORTH WARD ↓		RICHMOND DISTRICT		↑ SOUTH WARD	
MILE POST		STATIONS		SIDINGS IN FEET	
F 86.5	|	South End of Yard...	YL	.....
F 89.0		Burkeville.....	J, YL	6772	
F 94.0		Holly Farms.....		.....
F 97.0		Jetersville.....		.....
F 100.0		Maplewood.....		.....
F 104.0		Amelia.....		1215	
F 110.0		Chula.....		.....
F 117.5		Dorset.....		2240	
F 122.0		Hallsboro.....		.....
F 130.0		Robious.....		.....
F 137.0		South Richmond	SC B X YL	.....

Source: NS Virginia Division Timetable No. 5, In Effect April 26, 1998.

Attachment F-1
Stringline Chart of Proposed Bristol, Roanoke, and Richmond Passenger Trains
and Scheduled Passenger and Freight Trains
on the Alexandria-Lynchburg Line, MP 8.2 - MP 174.6



Attachment F-2

**Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Freight Trains on the Alexandria-Lynchburg Line**

<u>Proposed Train</u>	<u>Meet/Pass Train ID</u>	<u>Meet Train Direction</u>	<u>Approx. Time</u>	<u>Milepost</u>	<u>Location</u>	<u>Single/Double Track</u>
ATK 881 (SB)	VRE 326	NB	07:15	8.2	At Alexandria	Double
	VRE 328	NB	07:25	16.0	Between Springfield and Raven	Double
	VRE 330	NB	07:44	28.2	Between Clifton and Bull Run	Double
	NS 342	NB	07:45	28.3	Between Clifton and Bull Run	Double
ATK 81 (SB)	VRE 332	NB	07:50	35.7	At S. Manassas	Double
	ATK 20	NB	07:57	42.0	Between Bristow and Calverton	Single
	NS 227	NB	09:35	127.0	Between Applegate and Hammer	Double
ATK 82	NS 127	SB	11:58	33.6	At Manassas Jct.	Double
	NS 227	NB	11:59	34.0	Between Manassas Jct. and S. Manassas	Double
	ATK 82	NB	14:10	146.8	Between Oak Ridge and Kingswood	Double
	NS 457	SB	14:15	149.0	Between Kingswood and Tye River	Double

Attachment F-2 (Cont'd)

**Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Freight Trains on the Alexandria-Lynchburg Line**

<u>Proposed Train</u>	<u>Meet/Pass Train ID</u>	<u>Meet Train Direction</u>	<u>Approx. Time</u>	<u>Milepost</u>	<u>Location</u>	<u>Single/Double Track</u>
ATK 82 (NB)	NS 457	SB	14:07	147.5	Between Oak Ridge and Kingswood	Double
	NS 127	SB	15:10	95.0	Between Weyburn and Gilbert	Double
	NS 203	SB	16:29	22.5	Between Crestwood and Fairfax	Double
	VRE 327	SB	16:30	22.2	Between Burke and Crestwood	Double
ATK 882 (NB)	NS 212	NB	18:00	172.5	At Lynchburg	Double
	NS 127	SB	18:10	167.0	Between McIvor and Rivermont	Single
	NS 203	SB	19:00	118.5	Between Teel and Red Hill	Double
	NS 211	SB	19:00	118.5	Between Teel and Red Hill	Double
	NS 456	NB	20:15	53.5	Between Calverton and Remington	Double
	ATK 19	SB	20:30	39.3	Between Bristow and Calverton	Single

Attachment F-3

Projected Meets and Passes Between The Proposed Bristol and Roanoke Passenger Trains and Scheduled Passenger and Freight Trains on the Alexandria-Lynchburg Line, Assuming That Recommended Construction Projects Have Been Built

<u>Mileposts</u>	<u>Location</u>	<u>Tracks</u>	<u>Bristol and Roanoke Passenger Train Conflicts</u>			
			<u>Passenger Trains</u>	<u>Scheduled Freight Trains</u>	<u>Actual Freight Trains</u>	<u>Meets and Passes</u>
8.2 – 33.6	Alexandria- Manassas Jct.	Double	8.2 16.0 22.2 28.2	22.5 28.3		6
33.6 – 36.2	Manassas Jct.- Broad Run Bridge	Triple	35.7	33.6 34.0		3
36.2 – 56.0	Broad Run Bridge- Remington	Double	39.3 42.0	53.5		3
56.0- 65.9	Remington – Mountain Run	Single				
65.9 – 70.8	Mountain Run – Winston	Double				
70.8 – 80.0	Winston – Rapidan	Single				
80.0 – 84.7	Rapidan – Orange	Double				
84.7 – 92.1	Orange – Weyburn	Single				
92.1 – 102.0	Weyburn – Gilbert	Double		95.0		1
102.0 – 109.9	Gilbert – Rio	Single				

Attachment F-3 (Cont'd)

Projected Meets and Passes Between The Proposed Bristol and Roanoke Passenger Trains and Scheduled Passenger and Freight Trains on the Alexandria-Lynchburg Line, Assuming That Recommended Construction Projects Have Been Built

<u>Mileposts</u>	<u>Location</u>	<u>Tracks</u>	<u>Bristol and Roanoke Passenger Train Conflicts</u>			
			<u>Passenger Trains</u>	<u>Scheduled Freight Trains</u>	<u>Actual Freight Trains</u>	<u>Meets and Passes</u>
109.9 – 120.4	Rio – Red Hill	Double		118.5 118.5		2
120.4 – 126.6	Red Hill - Applegate	Single				
126.6 – 132.0	Applegate - Hamner	Double		127.0		1
132.0 – 143.4	Hamner – Oak Ridge	Single				
143.4 – 150.1	Oak Ridge – Tye River	Double	146.8	147.5 149.0		3
150.1 – 160.8	Tye River – Angelo	Single				
160.8 – 169.3	Angelo – Harris Crk. Bridge	Double		167.0		1
169.3 – 170.8	Harris Crk. Bridge – Rivermont	Single				
170.8 – 174.6	Rivermont – Montview	Double		172.5		1
Totals			8	13	N/A	21

Attachment G

Summary of Recommended Construction Projects for Piedmont Division, Alexandria-Lynchburg Line

<u>Projects</u>	<u>Estimated Cost (Millions)</u>
1. Extend Springfield Runaround Track, MP 15.1.	\$0.5
2. Add Second Crossover at Moore (MP 32.5).	1.4
3. Construct Third Main Track Between Manassas Jct. (MP 33.6) and Broad Run Bridge (MP 36.2).	5.0
4. Extend Second Main Track from Bristow (MP 36.4) to Calverton (MP 46.0).	16.4
5. Extend Second Main Track from McIvor (MP 164.2) to Harris Creek Bridge (MP 169.3).	8.8
6. Construct Bypass Main Track at Lynchburg Station.	4.0
7. Construct Second Connecting Track Between Montview and Kinney Yards at Lynchburg.	<u>4.4</u>
Total	\$40.5

Attachment G-1

Extend Springfield Runaround Track, MP 15.1

The Springfield Runaround Track at MP 15.1 is an industrial support track and has a capacity of about 53 cars. However, Newton Asphalt and Vulcan Materials receive a total of about 90 cars per day near this location, thus, requiring that cars must be set out on Main Track No. 2. In order to clear Main Track No. 2 for the proposed southbound Bristol passenger train, it will be necessary to lengthen the Springfield Runaround Track by about 40 car lengths or about 2,000 ft.

The following is an order of magnitude estimate for the proposed track extension:

• Construct 2,000 TF of Side Track @ \$90 TF (FIT).	\$180,000
• Relocate No.10 Turnout.	50,000
• Signal Work.	80,000
• Grading, retaining wall and drainage.	<u>100,000</u>
Subtotal	\$410,000
Engineering	25,000
Contingency	<u>70,000</u>
Total	\$505,000

Note: Assumes any utilities including fiberoptics will be relocated at no expense by the owner and no additional right-of-way will be purchased.

Attachment G-2

Add Second Crossover at Moore (MP 32.5)

There is a power operated remotely controlled No. 20 crossover from the Main Track No. 2 to Main Track No. 1 for southbound trains at Moore, MP 32.4, which is about 0.4 miles north of Manassas Yard, and is located off Main Track No. 2. This Project would construct a second crossover at Moore to permit northbound freight trains departing Manassas Yard toward Alexandria to access Main Track No. 1 quickly in lieu of running north to the universal crossovers at Clifton, a distance of about 5.5 miles.

The following is an order of magnitude estimate for constructing the proposed No. 20, power operated, remotely controlled crossover.

	<u>\$ Millions</u>
• <u>Trackwork</u>	
- Construct two No. 20 turnouts with 39 ft. switch points and crossover closure rails @ \$130,000 each	\$0.26
• <u>Signal Work</u>	
- Install two interlocks @ \$450,000 each	<u>0.90</u>
	Subtotal 1.16
	Engineering 0.06
	Contingencies <u>0.17</u>
	Total \$1.39

Note: Assumes all utilities, including fiberoptics if any will be relocated at no expense by the owner.

Attachment G-3

Construct Third Main Track Between Manassas Jct. (MP 33.6) and Broad Run Bridge (MP 36.2)

This Project would construct a third main track between Manassas Jct. (MP 33.6) and Broad Run Bridge (MP 36.2). The proposed third main track will cross two public at-grade crossings and one private crossing, and will require the extension of a 28 ft. concrete arch culvert. Generally, the fill required for a third track roadbed is less on the easterly side than on the westerly side of the present main tracks. Some "0" degree, 30 minute reverse curves in the existing main tracks may be required to minimize the grading.

The following is an order of magnitude estimate for the proposed third main track:

	<u>\$ (Millions)</u>
• Construct 2.6 TM using new 136 lb CWR @ \$140/TF including 3 grade crossings.	\$1.922
• Construct one new 136 lb. No. 20 turnout.	0.130
• <u>Signal Work:</u>	
- One interlock, coded track circuits, revise grade crossing warning system (2 each), relocate cables, boxes, houses, signals.	0.550
• <u>Grading:</u>	
- Includes compaction and sub-ballast, 96,800 CY @ \$15/CY.	1.452
• <u>Bridge Work:</u>	
- Extend one 28 ft. concrete arch culvert.	<u>0.050</u>
Subtotal	\$4.104
Engineering	0.250
Contingency	<u>0.600</u>
Total	\$4.954

Note: Assumes that no purchase of right-of-way will be required and all utilities including fiberoptics will be relocated at no expense by the owner.

Attachment G-4

Extend Second Main Track from Bristow (MP 36.4) to Calverton (MP 46.0)

This Project consists of constructing a second main track, parallel to and at 15 ft. track centers from the existing single main track between Bristow (MP 36.4) and Calverton (MP 46.0). The second main track will be laid on an existing, abandoned railroad roadbed. One highway overpass at MP 38.45 will accommodate the additional track as well as the 51 ft. concrete arch culvert at MP 38.0. Two steel deck girder bridges will require bridge ties. There are four (4) public at-grade crossings with flashing lights and gates and six (6) private crossings all of which require improvements, relocations and/or modifications for the new, second main track.

The following is an order of magnitude estimate for this proposed Project:

	<u>\$ Millions</u>
• <u>Trackwork</u>	
- Construct 9.6 TM using new 136 lb CWR @ \$140/TF including transition to existing main tracks at Calverton	\$7.10
- Construct universal No. 20 power crossovers at Bristow and No. 20 universal power crossovers at Calverton (8 turnouts @ \$130,000 each)	1.04
- Relocate one spur track	0.13
• <u>Signal Work</u>	
- Construct 8 interlocks, coded track circuits, communications, relocate 2 telephones, install additional combination hot box and drag detector and additional AEI Scanner, increase central dispatching capacity	4.39
- Relocate and improve existing automatic Grade Crossing Warning Systems including flashing lights and gates at 4 single track public crossings	0.40
• <u>Grading</u>	
- Grub, clean and level existing abandoned roadbed, provide drainage and place subballast @ \$8/TF	0.40

Attachment G-4

**Extend Second Main Track from Bristow (MP 36.4) to Calverton (MP
(Cont'd)**

	<u>\$ Millions</u>
• <u>Grade Crossings</u>	
- Construct timber flangeway guards and asphalt roadway crossings for 4 public crossings and 6 private crossings totaling 200 LF @ \$400/LF	0.08
• <u>Bridge Work</u>	
- Inspect, improve ballast cribs as required for 51 ft. concrete arch culvert MP 38.0.	0.01
- Inspect, make minor bridge repairs and install treated bridge ties on:	
• 33 ft. open deck, deck girder, MP 43.0 (25 Bridge Ties)	0.01
• 161 ft. open deck, deck girder, MP 44.6 (126 Bridge Ties)	0.03

	Subtotal \$13.59
	Engineering 0.81
	Contingency <u>2.03</u>
	Total \$16.43

Note: Assumes that no purchase of right-of-way will be required and all utilities including fiberoptics will be relocated at no expense by the owner.

Attachment G-5

**Extend Second Main Track from McIvor (MP 164.2) to
Harris Creek Bridge (MP 169.3)**

The Project consists of constructing a second main track parallel to and at 15 ft. track centers from the existing main track from McIvor (MP 164.2) to the north end of the Harris Creek Bridge (MP 169.3). The track will be constructed on the existing abandoned railroad roadbed. There are four (4) highway overpasses in this territory, all of which can accommodate a second main track. There are no bridges, and there is one culvert, a 33 ft. concrete arch, which can also accommodate a second track. There are no public at-grade crossings in this territory.

The following is an order of magnitude estimate for this proposed Project:

	<u>\$ Million</u>
• <u>Trackwork</u>	
- Construct 5.1 TM using new 136 lb CWR @ \$140/TF	\$3.77
- Construct a No. 20 power universal crossover at McIvor and a No. 20 power turnout at Harris Creek Bridge MP 169.3 (5 turnouts @ \$130,000 each)	0.65
• <u>Signal Work</u>	
- Construct 5 interlocks, coded track circuits, communications increase central dispatching capacity	2.65
• <u>Grading</u>	
- Grub, clean, level existing roadbed, provide drainage and place subballast @ \$8/TF	0.21
	—
	Subtotal \$7.28
	Engineering 0.43
	Contingency <u>1.09</u>
	Total \$8.80

Note: Assumes that no purchase of right-of-way will be required and all utilities including fiberoptics will be relocated at no expense by the owner.

Attachment G-6

Construct Bypass Main Track at Lynchburg Station

The figure that is part of this Attachment G-6 illustrates Woodside's plan for Lynchburg passenger service trackage, as well as the Harris Report plan at Lynchburg Station.

The following is an order of magnitude estimate of cost for the Woodside plan for trackage at Lynchburg Station:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 1,000 TF of new main track using 136 lb CWR @ \$140/TF .	\$0.140
- Construct two No. 15 Crossovers (2 x \$220,000).	0.440
- Construct two No.15 turnouts (2 x \$110,000).	0.220
- Construct one No.10 turnout.	0.100
- Rehabilitate 700 TF of house track spur with new crossties and FIT CWR @ \$95/TF. Also, retire, remove 200 TF.	0.067
• <u>Signal Work</u>	
- Construct interlocking plants, power 6 Turnouts, electric lock 1 turnout, coded track circuits for new trackage, signal cases, communications (Assumes no additional dispatching capacity required).	2.100

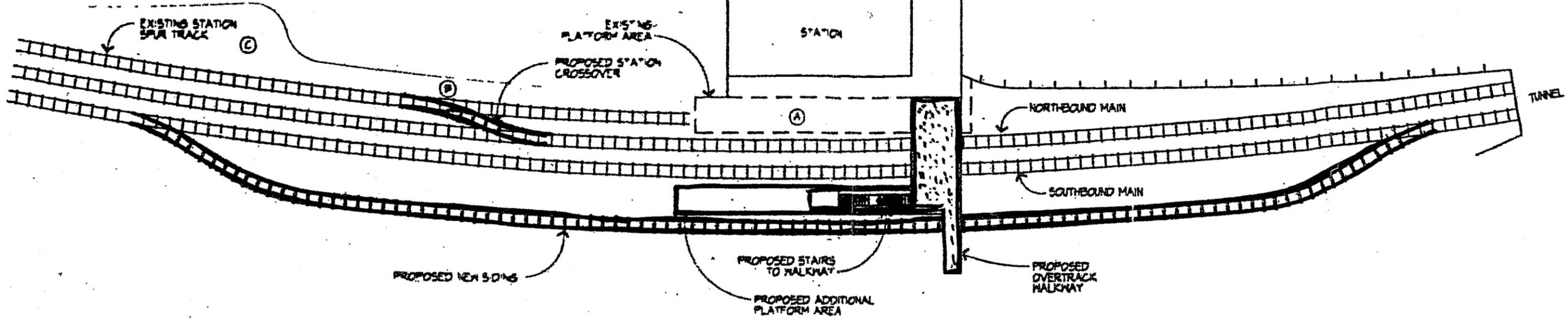
Attachment G-6Construct Bypass Main Track at Lynchburg Station (Cont'd)

	<u>\$ (Millions)</u>
• <u>Grading</u>	
- (Assume new track at 15 ft. track centers with Main Track No. 2) 1200 LF of side cut, waste, cut material, level the subgrade, construct 5 ft. retaining wall, drainage pipes. Assumes no purchase of right-of-way, but includes subbase for track structure.	0.200

Subtotal	\$3.267
Engineering	0.200
Contingency	<u>0.500</u>
Total	\$3.967

Note: Assumes no purchase of right-of-way required, no increase in central dispatching capacity, and all utilities including fiberoptics will be relocated at no expense by the owner.

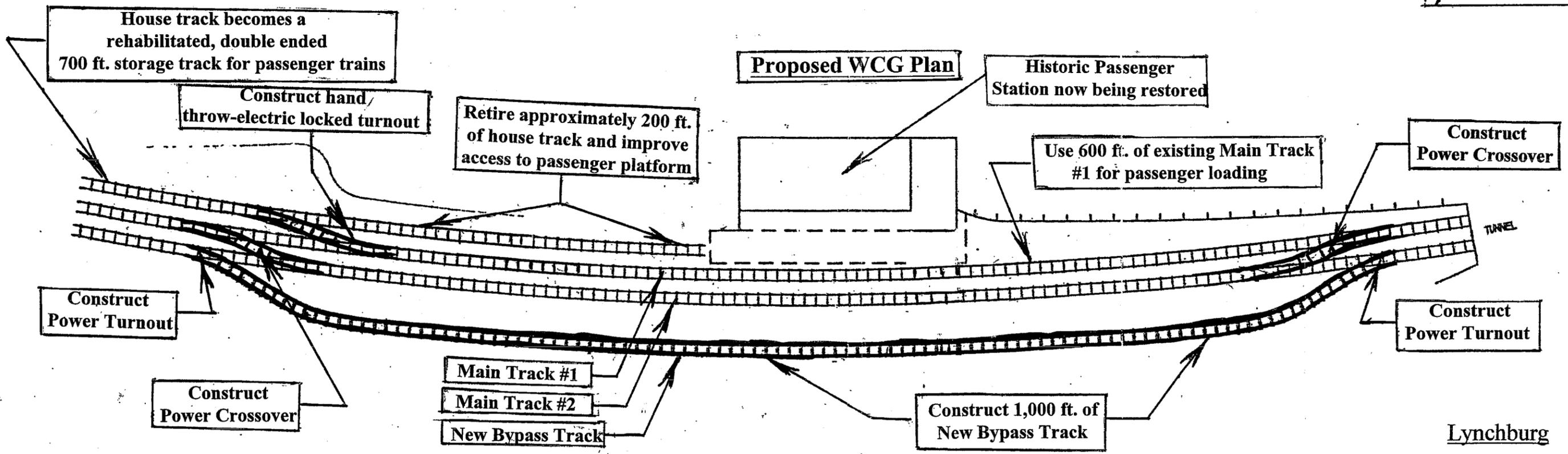
Proposed Harris Plan



To Washington DC

To Richmond and Bristol

Proposed WCG Plan



Lynchburg

Passenger Station Plans
No Scale

Red - Proposed Work
Yellow - Retire and Remove

Attachment G-7

Construct Second Connecting Track Between Montview and Kinney Yards At Lynchburg

In order to prevent further congestion on the existing Connecting Track between Montview and Kinney Yards at Lynchburg, we recommend constructing a Second Connecting Track parallel to the existing Connecting Track, rearranging the south lead (east leg of wye) to Kinney Yard, and constructing a crossover, as shown in the figure that is part of this Attachment G-7.

This plan will permit Montview Yard to continue switching at the north end and utilize the Montview Wye Track without interference by passenger trains. Freight trains and passenger trains can make running meets on the Connecting Tracks which are located between the single main track to Roanoke and Richmond, and the double main tracks to the Lynchburg Passenger Station and to Montview Yard.

The following is an order of magnitude estimate for constructing the recommended Second Connecting Track, and for the bridge and signal work shown in the figure contained in this Attachment G-7:

	<u>\$ (Millions)</u>
• <u>Trackwork:</u>	
- <u>Connecting Track</u>	
• Construct 7,800 TF with FIT, CWR @ \$90/TF	\$0.702
• Construct two new 136 lb, No.15 turnouts @ \$120,000 ea and two new No. 10 turnouts (Crossover) @ \$110,000 ea.	0.460
• Relocate one No.10 industrial turnout.	0.030
• Relocate one No.10 turnout, one derail and and realign east leg of wye at Kinney Yard.	0.075

Attachment G-7

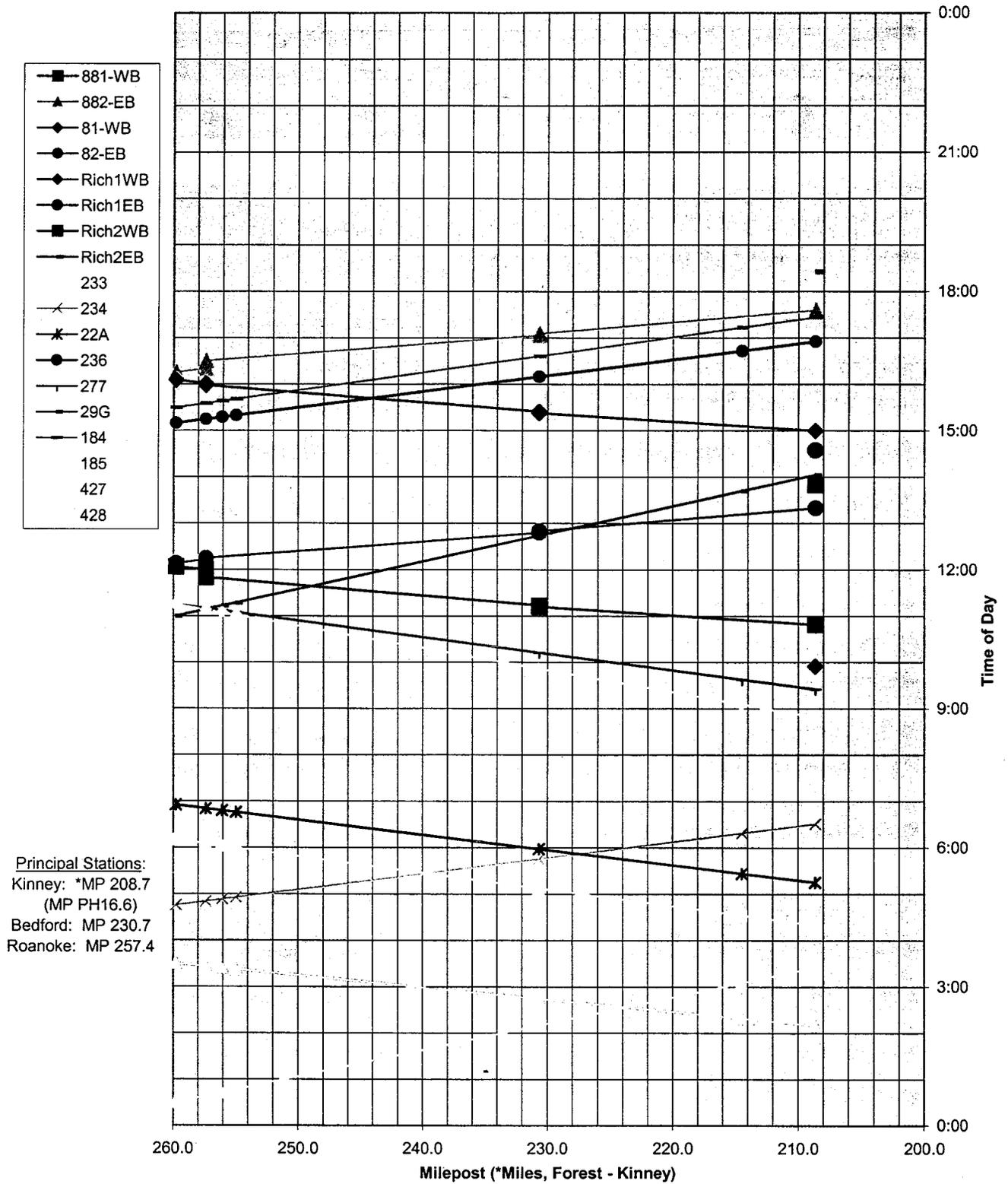
**Construct Second Connecting Track Between Montview
and Kinney Yards At Lynchburg (Cont'd)**

• <u>Signal Work:</u>		
- Power and Interlock 5 turnouts and one derail. Increase central dispatching capacity and construct communications, signals, cases, buildings and coded track circuits.		1.200
• <u>Bridge Work:</u>		
- Construct one 75 ft. steel open deck, through Plate Girder, Cooper's E80 rating bridge over highway U.S. 29 @ \$13,000/LF.		1.000
- Extend 10 Ft., masonry arch culvert 20 LF, MP 174.7, Montview.		0.020
• <u>Grading:</u>		
- Grub, clean, level, and place subballast for 7,800 TF @ \$8/TF.		0.065
- Fill between MP 174.4 and MP 174.85, 6000 CY @ \$18/CY.		0.108
		<hr/>
	Subtotal	\$3.660
	Engineering	0.200
	Contingency	<u>0.550</u>
	Total	\$4.410

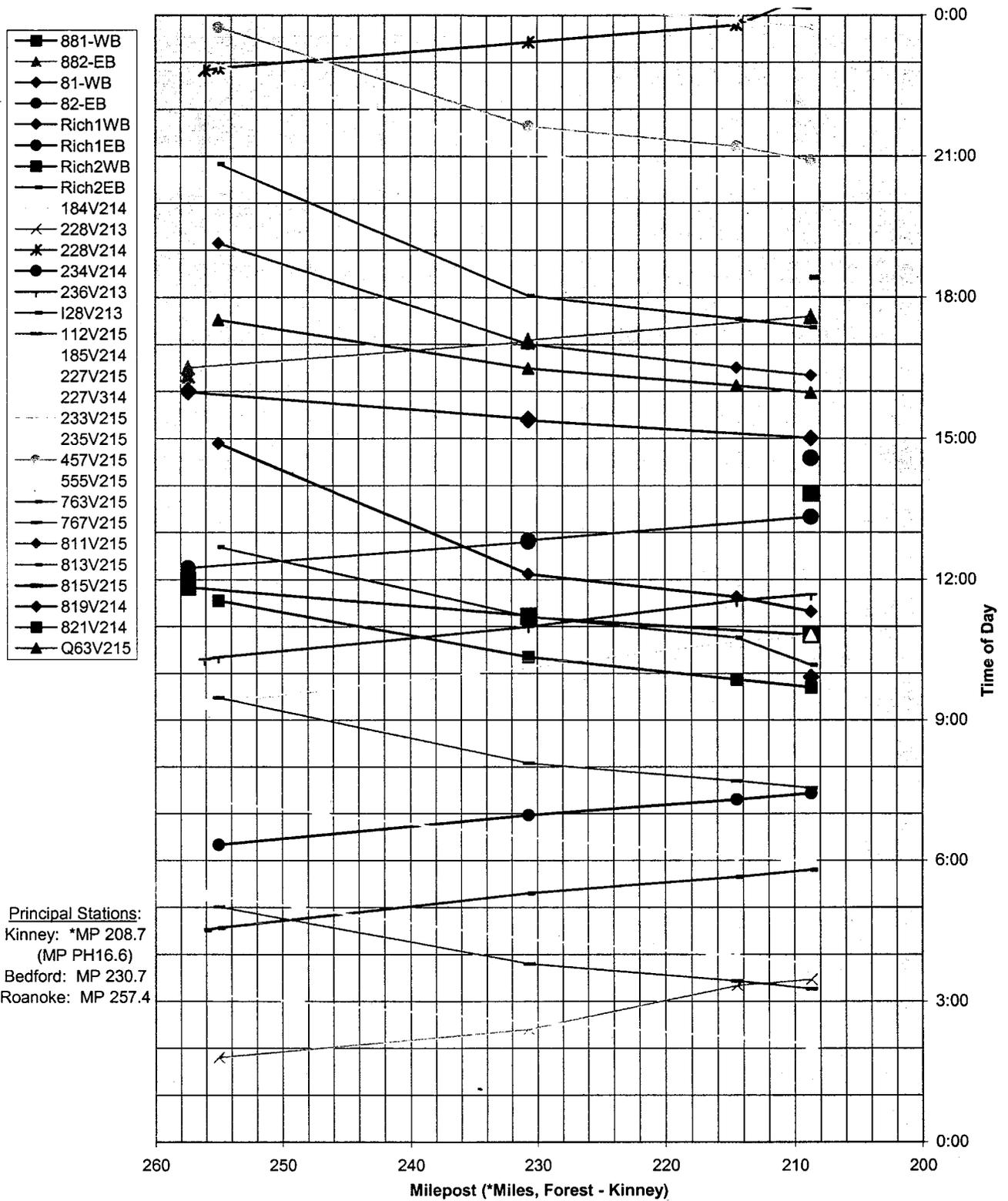
Note: Assumes relocation of all utilities including fiberoptics will be performed by the owner at no cost to the railroad and no additional right-of-way will be required. Also, assumes no additional dispatching capacity will be required at central dispatching.

Attachment H

Attachment H-1
Stringline Chart of Proposed Bristol, Roanoke, and Richmond Passenger Trains
and Scheduled NS Freight Trains Between Lynchburg and Roanoke, MP 208.7* - MP 257.4
NS Freight Schedule Dated March 8, 2001



Attachment H-2
Stringline Chart of Proposed Bristol, Roanoke, and Richmond Passenger Trains
and Actual NS Freight Trains Between Lynchburg and Roanoke, MP 208.7* - MP 257.4
Sunday, March 15, 1998



Attachment H-3

**Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Freight Trains on the Lynchburg-Roanoke Line**

Proposed Train	Meet/Pass Train ID	Meet Train Direction	Approx. Time	Milepost	Location	Single/Double Track
881 (WB)	29G	EB	11:40	249.0	Between Webster and Bonsack	Double
81 (WB)	159	WB	15:00	208.7 (PH 16.6)	At Kinney	Double
	236	EB	15:40	244.2	Between Villamont and Webster	Double
	184	EB	15:50	250.5	Between Webster and Bonsack	Double
882 (EB)	None					
82 (EB)	29G	EB	12:55	228.2	At Big Otter	Double

Attachment H-4

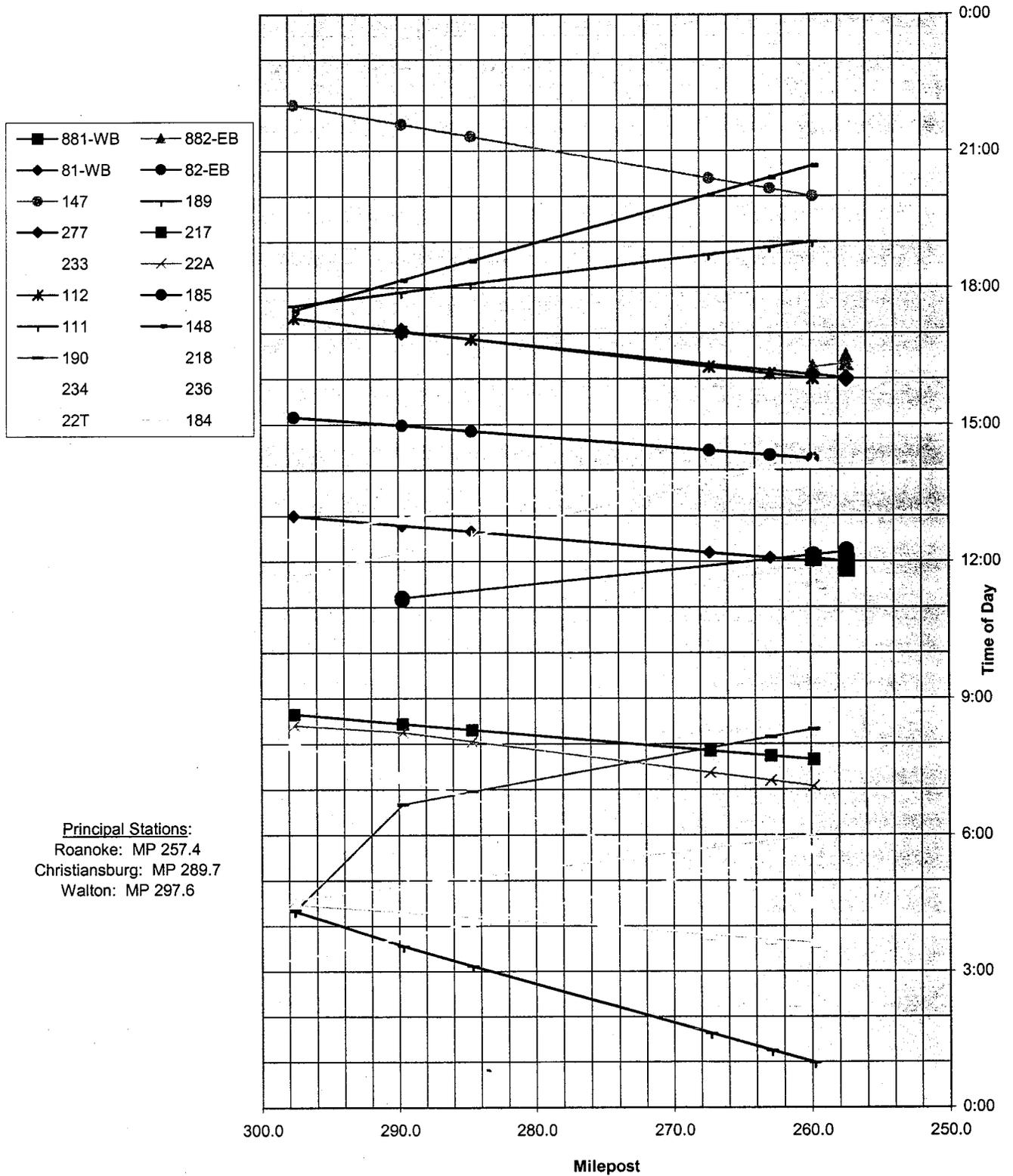
**Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Actual Freight Trains on the Lynchburg-Roanoke Line**

Proposed Train	Meet/Pass Train ID	Meet Train Direction	Approx. Time	Milepost	Location	Single/Double Track
881 (WB)	184V214	EB	10:49	208.7 (PH 16.6)	At Kinney	Double
	236V213	EB	11:08	227.0	Between Forest and Big Otter	Single
	763V215	WB	11:10	229.8	Between Big Otter and Bedford	Double
81 (WB)	None					
882 (EB)	813V215	WB	17:30	212.8	Between Liberty and Forest	Double
	811V215	WB	17:01	231.2	Between Bedford and Montvale	Single
	Q63V215	WB	16:50	239.7	Between Montvale and Villamont	Double
82 (EB)	819V214	WB	12:45	235.7	Between Bedford and Montvale	Single
	763V215	WB	12:25	250.2	Between Webster and Bonsack	Double

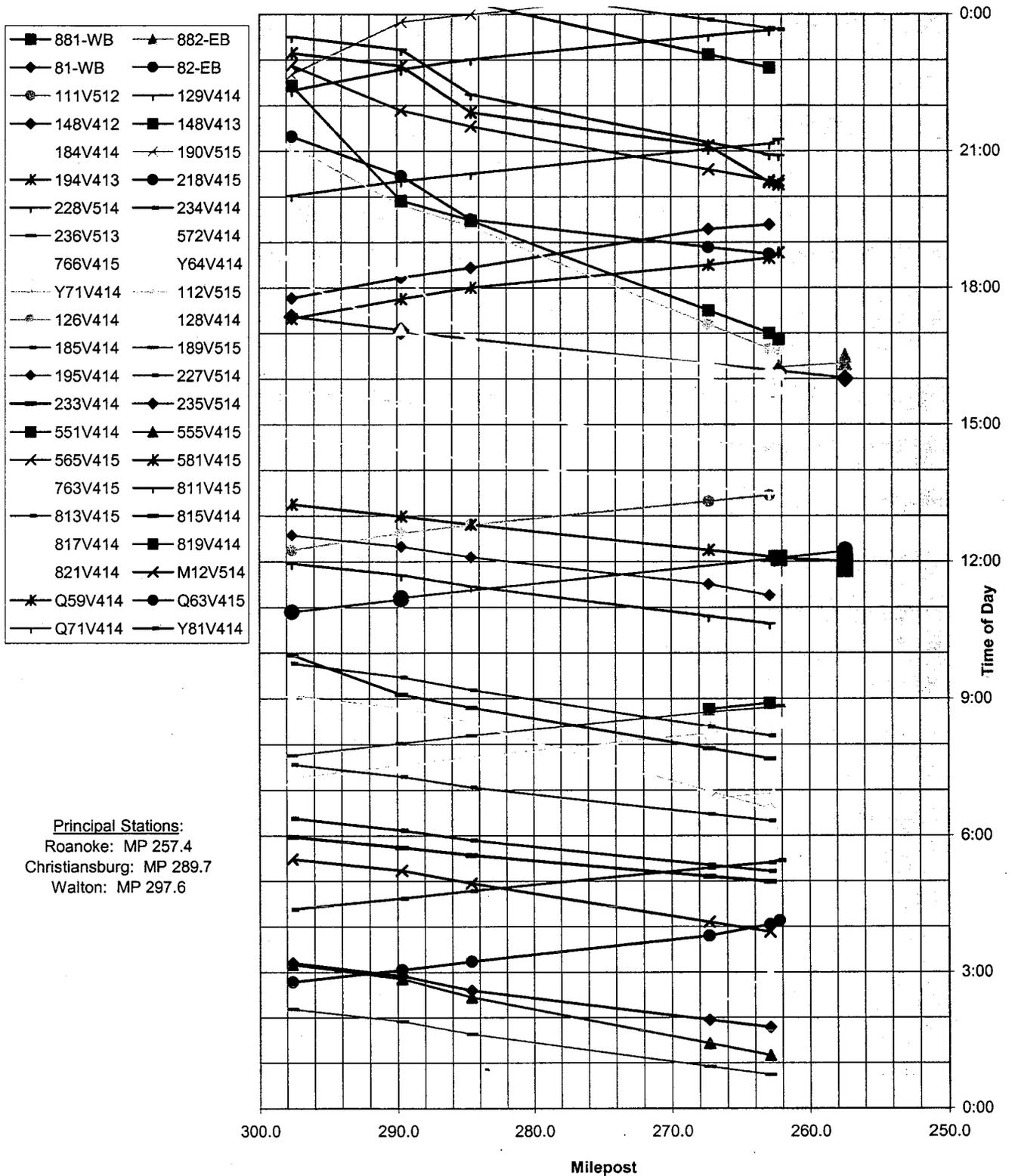


Attachment I

Attachment I-1
Stringline Chart of Proposed Bristol and Roanoke Passenger Trains
and Scheduled NS Freight Trains Between Roanoke and Walton, MP 257.4 - MP 297.6
NS Freight Schedule Dated March 8, 2001



Attachment I-2
Stringline Chart of Proposed Bristol and Roanoke Passenger Trains
and Actual NS Freight Trains Between Roanoke and Walton, MP 257.4 - MP 297.6
Sunday, March 15, 1998



Attachment I-3

**Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Freight Trains on the Roanoke-Walton Line**

Proposed Train	Meet/Pass Train ID	Meet Train Direction	Approx. Time	Milepost	Location	Single/Double Track
881 (WB)	None					
81 (WB)	112	WB	16:50	284.6	At Montgomery	Double
882 (EB)	None					
82 (EB)	227	WB	12:05	262.0	Between 24 th St. and West Roanoke	Single

Attachment I-4

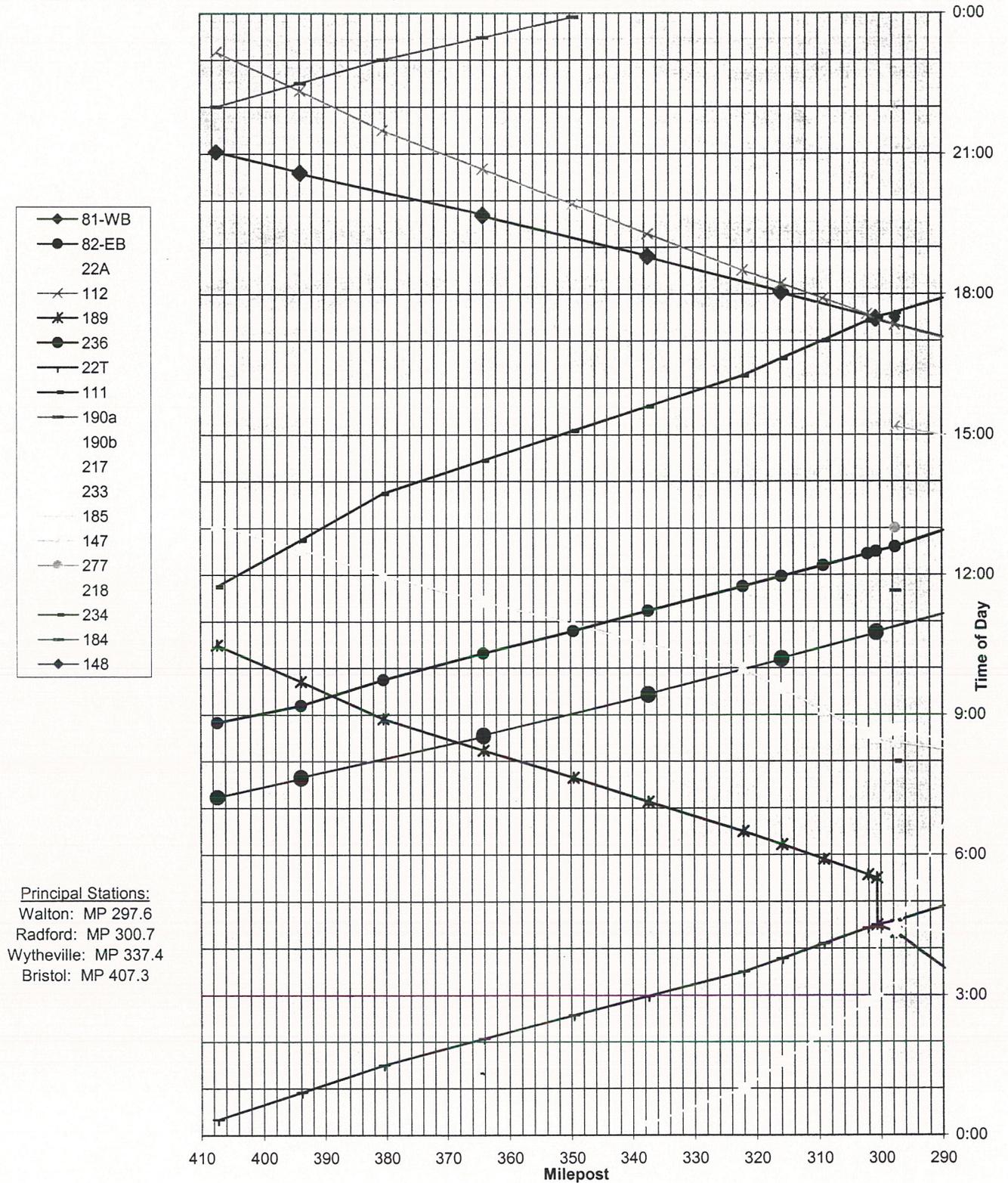
Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Actual Freight Trains on the Roanoke-Walton Line

<u>Proposed Train</u>	<u>Meet/Pass Train ID</u>	<u>Meet Train Direction</u>	<u>Approx. Time</u>	<u>Milepost</u>	<u>Location</u>	<u>Single/Double Track</u>
881 (WB)	None					
81 (WB)	763V415	WB	16:19	267.3	At VN	Double
	821V414	WB	17:00	288.5	Between Montgomery and Christiansburg	Double
	194V413	EB	17:20	297.5	Near Walton	Double
882 (EB)	None					
82 (EB)	Q59V414	WB	12:02	262.0	Between 24 th St. and West Roanoke	Single
	195V414	WB	11:45	273.7	Between Singer and Arthur	Double
	Q71V414	WB	11:25	283.5	Between Arthur and Montgomery	Double

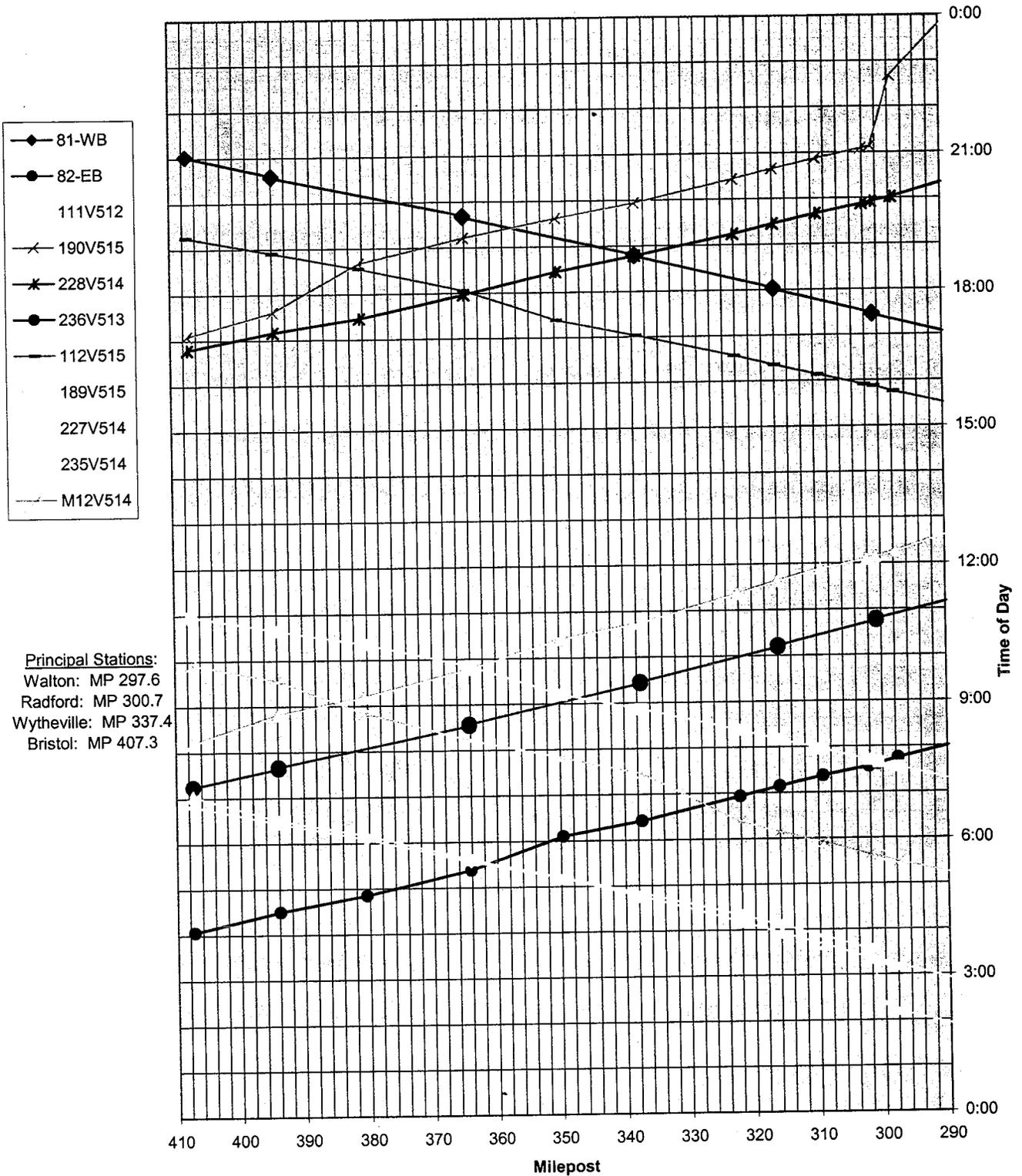
Attachment J



Attachment J-1
Stringline Chart of Proposed Bristol Passenger Trains
and Scheduled NS Freight Trains Between Walton and Bristol, MP 297.6 - MP 407.3
NS Freight Schedule Dated March 8, 2001



Attachment J-2
Stringline Chart of Proposed Bristol Passenger Trains
and Actual Freight Trains Between Walton and Bristol, MP 297.6 - MP 407.3
Sunday, March 15, 1998



Attachment J-3

**Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Freight Trains on the Walton-Bristol Line**

<u>Proposed Train</u>	<u>Meet/Pass Train ID</u>	<u>Meet Train Direction</u>	<u>Approx. Time</u>	<u>Milepost</u>	<u>Location</u>	<u>Single/Double Track</u>
81 (WB)	111	EB	17:29	301.0	Between Radford and JC	Double
	112	WB	17:21	298.0	Between Walton and Plum Creek	Single
82 (EB)	22 A	WB	10:00	322.1	At Clark	Double
	189	WB	08:25	368.4	Between Marion and Glade Spring	Single

Attachment J-4

**Expected Meets and Passes Between the Proposed Bristol and Roanoke Passenger Trains
and Scheduled Passenger and Actual Freight Trains on the Walton-Bristol Line**

Proposed Train	Meet/Pass Train ID	Meet Train Direction	Approx. Time	Milepost	Location	Single/Double Track
81 (WB)	228V514	EB	18:47	337.4	At Wytheville	Double
	190V515	EB	19:20	356.0	Between Rural Retreat and Schuleen	Single
82 (EB)	227V514	WB	09:10	346.5	Between Wytheville and Rural Retreat	Single
	M12V514	WB	08:25	369.0	Between Marion and Glade Spring	Single



Attachment K

Projected Meets and Passes Between The Proposed Bristol and Roanoke Passenger Trains and Other Passenger And Freight Trains on the Lynchburg-Bristol Line, Assuming That Recommended Construction Projects Have Been Built

			<u>Bristol and Roanoke Passenger Train Conflicts</u>			
<u>Mileposts</u>	<u>Location</u>	<u>Tracks</u>	<u>Passenger Trains</u>	<u>Scheduled Freight Trains</u>	<u>Actual Freight Trains</u>	<u>Total</u>
PH 16.6/208.7 – PH 22.4/214.5	Kinney – Forest	Extended Siding		208.7	208.7 212.8	3
N 214.5- N 226.0	Forest – Near Big Otter	Single Track				
N 226.0 – N 257.4	Near Big Otter – Roanoke	Extended Double Track		228.2 244.2 249.0 250.5	227.0 229.8 231.2 235.7 239.7 250.2	10
N 257.4 – N 262.2	Roanoke – W. Roanoke	New Double Track		262.0	262.0	2
N 262.2 – N 297.6	W. Roanoke – Walton	Double Track		284.6	267.3 273.7 283.5 288.5 297.5	6
NB 297.6 – NB 302.1	Walton – JC	Extended Double Track		298.0 301.0		2
NB 302.1 – NB 309.2	JC – Wysor	Single Track				
NB 309.2 – NB 311.4	Wysor – Near Newbern	Extended Siding				
NB 311.4 – NB 326.0	Near Newbern – Near Gunton Park	Single Track		322.1		1
NB 326.0 – NB 328.0	Near Gunton Park – Near Max Meadows	New Siding				
NB 328.0 – NB 345.9	Near Max Meadows - Crockett	Single Track			337.4	1

Attachment K (Cont'd)

**Projected Meets and Passes Between The Proposed Bristol and Roanoke Passenger Trains
and Other Passenger And Freight Trains on the Lynchburg-Bristol Line,
Assuming That Recommended Construction Projects Have Been Built**

<u>Mileposts</u>	<u>Location</u>	<u>Tracks</u>	<u>Bristol and Roanoke Passenger Train Conflicts</u>			
			<u>Passenger Trains</u>	<u>Scheduled Freight Trains</u>	<u>Actual Freight Trains</u>	<u>Total</u>
NB 345.9 – NB 347.8	Crockett – Duncan	Siding			346.5	1
NB 347.8 – NB 368.8	Duncan – Near McMullin	Single Track		368.4	356.0	2
NB 368.8 – NB 371.4	Near McMullin – Near 7 Mile Ford	New Siding			369.0	1
NB 371.4 – NB 395.4	Near 7 Mile Ford – N/A	Single Track				
NB 395.4 – NB 397.5	N/A – N/A	New Siding				
NB 397.5 – NB 407.3	N/A – Bristol	Single Track				
Total			<u>0</u>	<u>11</u>	<u>18</u>	<u>29</u>

Attachment L

Attachment L

Summary of Recommended Construction Projects For Virginia Division, Lynchburg-Bristol Line

<u>Projects</u>	<u>Estimated Cost (Millions)</u>
1. Connect Sidings between Kinney (MP PH 16.6/N 208.7) and Liberty (MP PH 19.9/N 212.0).	\$8.5
2. Extend Second Main Track from Montvale (MP N 239.1) Easterly to near Big Otter (MP N 226.0).	16.2
3. Create Second Main Track through Roanoke Terminal and Upgrade Passenger Station Trackage.	4.9
4. Construct Second Crossover at Montgomery (MP N 284.6).	1.3
5. Extend Second Main Track from Walton (MP NB 297.6) to Plum Creek (MP NB 298.9).	1.8
6. Construct Crossover at Radford (MP NB 300.0).	2.2
7. Extend Wysor Siding Westerly to MP NB 311.4.	2.9
8. Construct Siding between MP NB 326.0 (near Gunton Park) and MP NB 328.0 (near Max Meadows).	4.9
9. Construct Siding between MP NB 368.8 (near McMullin) and MP NB 371.4 (near Seven Mile Ford).	8.3
10. Construct Siding between MP NB 395.4 and MP NB 397.5, West of Abingdon.	5.6
11. Construct and Rehabilitate Bristol Trackage.	<u>0.8</u>
Total, Lynchburg-Bristol Line	\$57.4

Attachment L-1

**Connect Sidings Between Kinney (MP PH 16.6/N 208.7)
and Liberty (MP PH 19.9/N 212.0)**

This Project would construct 17,500 ft. of siding in order to connect the existing sidings that are located at Kinney (MP PH 16.6/N 208.7) and at Liberty (MP PH 19.9/N 212.0), thus forming a single continuous siding 5.57 miles in length.

There are no public at-grade crossings between Kinney and Liberty and the only large drainage structures are three concrete arch culverts which are 20 ft. to 24 ft. wide. There are four highway overpasses and two highway underpasses, all of which appear to have adequate clearance for a second track having 15 ft. center-to-center distance from the existing main track, except for the US 501 highway underpass at MP PH 18.39 that we have projected would require another span.

Some portions of the existing roadbed will require minimal grading to accommodate the siding extension, but there are deep cuts near MP PH 17 that will require a substantial amount of grading, and perhaps the purchase of additional right-of-way.

The following is an order of magnitude estimate for the proposed 17,500 ft. siding extension:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 17,500 TF of siding using FIT CWR @ \$95/TF.	\$1.70
- Relocate turnout at Liberty and construct universal crossovers at Kinney, 4 turnouts @ \$125,000 ea.	0.50
• <u>Signal Work</u>	
- Construct universal crossovers, coded track circuits, relocate signals, cases, etc.	2.10
• <u>Grading</u>	
- Construct 17,500 TF of subgrade @ 8 CY/TF @ \$16/CY and provide subballast at \$8/TF.	2.20

Attachment L-1

**Connect Sidings Between Kinney (MP PH 16.6/N 208.7)
and Liberty (MP PH 19.9/N 212.0)**

(Cont'd)

	<u>\$ (Millions)</u>
• <u>Bridge Work</u>	
- Construct one 50 ft. steel open deck, deck plate bridge at MP PH 18.39 @ \$12,000 per LF.	0.60
- Extend 3 Concrete Arch culverts approximately 20 ft. with headwall.	0.03

Subtotal	\$7.13
Engineering	0.40
Contingency	<u>1.00</u>
Total	\$8.53

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner, no additional right-of-way will be required, and that no additional central dispatching capacity will be needed.

Attachment L-2

Extend Second Main Track From Montvale (MP N 239.1) Easterly to near Big Otter (MP N 226.0)

Our Phase I Final Report dated June 2001 recommended the extension of Big Otter Siding eastward for a distance of 2.1 miles at a cost of \$3.2 million and the extension of the double track at Montvale eastward a distance of 2.1 miles at a cost of \$4.3 million. The additional passenger trains proposed to be operated in Phase II require that the end of double track be extended from Montvale (MP 239.1) to Bedford Siding (MP 230.7), upgrading of the 2.5 mile long Bedford-Big Otter Siding to Main Track standards, and extending the upgraded Bedford-Big Otter Siding eastward a distance of 2.1 miles as a second main track, thus creating a total of 13 miles of a Second Main Track.

The following is an order of magnitude estimate for creating 13 miles of a Second Main Track on an existing abandoned roadbed:

	<u>\$ Millions</u>
• <u>Trackwork</u>	
- Construct new second main track between Bedford and Montvale (8.4 miles), 44,352 TF @ \$140/TF	\$6.21
- Rehabilitate Bedford-Otter Siding to Main Track standards, relay 2.5 TM with new 136 lb CWR, ties and surfacing	1.02
- Construct new second Main Track between Big Otter and MP 226.1 (2.1 TM) 11,088 TF @ \$140/TF	1.55
- Construct 1 No. 20 power turnout at MP 226.1, and construct, No. 20 power universal crossovers at Irving (MP 237.0), 5 No. 20 turnouts @ \$130,000 each	0.65
• <u>Signal Work</u>	
- Construct 5 interlocks, coded track circuits, communications modify 2 sets of flashing lights and gates, expand 1 AEI scanner, increase dispatching capacity	3.28
• <u>Grading</u>	
- Grub, clean, level existing abandoned roadbed and add subballast, 10.5 TM @ \$42,200/TM	0.44

Attachment L-2

**Extend Second Main Track From Montvale (MP N 239.1)
Easterly to near Big Otter (MP N 226.0)**

	<u>\$ Millions</u>
• <u>Bridgework</u>	
- Construct bridge for second Main Track for SR 684 highway underpass, MP 234.03. Bridge seats are in place	0.25

	Subtotal \$13.40
	Engineering 0.80
	Contingency <u>2.01</u>
	Total \$16.21

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner, no additional right-of-way will be required, and that no additional central dispatching capacity will be needed.

Attachment L-3

Create Second Main Track Through Roanoke Terminal Station And Upgrade Passenger Station Trackage

The figure that is a part of this Attachment L-3 is a schematic drawing of Roanoke Yard which shows the proposed route of the Washington, DC-Bristol passenger train through the terminal. The schematic drawing shows that there are two main tracks entering and leaving Roanoke Yard from the "railroad east" (Washington, DC) and the "railroad west" (Bristol) directions, but there is only a single main track of about 5.5 miles in length that is signaled, has power-operated switches, and can be used by through freight trains bypassing the yard. The inset of a portion of Virginia Division's Timetable No.19 on the schematic drawing shows the extent of the single main track and also shows the slower train speeds on that track.

This Construction Project would create a second main track through the Roanoke Terminal by upgrading the track now adjacent to the main track to main track standards and converting certain hand-throw switches to remotely-controlled, power-operated switches. This new second main track would expedite the movement of freight trains entering and leaving the yard ahead of the proposed Bristol passenger trains, particularly if train speeds are also increased on both the existing single main track and proposed second main track.

In order to accomplish these two objectives, the following improvements must be made:

- 1) Convert two hand throw switches which serve the west end of Empty Side Yard Tracks Nos. 1, 2 and 3 to remotely-controlled, power-operated switches as shown in the figure in Attachment L-3.
- 2) Upgrade and signal the track adjacent to the existing single main track between the "Empty Side" yard and Park Street Yard. This work will involve upgrading 19,500 Track Feet (TF) of this track as shown in red in the figure in Attachment N-5, and installing coded track circuits and signals. In addition, all trackage in this plan must be continuous welded and all non-controlled cooled rail must be replaced with qualified FIT rail.
- 3) Convert two hand throw switches which lead to Park St. No. 1 Track, and Park St. Nos. 2 and 3 Tracks, also known as running tracks, to remotely controlled power operated switches.

Attachment L-3

**Create Second Main Track Through
Roanoke Terminal Station And Upgrade Passenger Station Trackage**
(Cont'd)

- 4) Upgrade the No. 4 Station Track, the No. 6 Pocket Track, and a portion of the Coach Track Lead, all of which when combined provide access by passenger trains to the Roanoke Station Platform to and from the main tracks to the east. This work must assure that all of that trackage is CWR with control cooled rail and a remotely-controlled power switch is installed where the No. 6 Pocket Track connects to the Coach Yard Lead. It should be noted that the station platform itself may not be of the proper height for modern passenger trains when not using a "stepbox" and ADA regulations require tactiles and other physical improvements.
- 5) Present train speeds for all trains and engines are shown in a portion of Timetable No.19, which is included in Attachment E. The Timetable, Track Chart and figure of Roanoke Terminal are used as a source for the following:

<u>Milepost/ Locations</u>	<u>Miles</u>	<u>Operation</u>	<u>Authorized Train Speed (mph)</u>	<u>Comments</u>
A. N 255.6-257.0	1.4	Double Track, ABS, TC	40	MP 255.6 is east yard limit. MP 257 is 8 ½ Street.
B. N 257.0-258.0	1.0	Double Track, ABS, TC	25	Speed reduction caused by curvature and #10 turnouts.
C. N 258.0-259.8	1.8	Single Track, ABS, TC	30	Study must be made to determine what can be done to increase train speed.
D. N 259.8-262.8	3.0	Single Track, ABS, TC.	40	MP 262.8 is the west yard limit. Begin two Main Tracks.

Attachment L-3

**Create Second Main Track Through
Roanoke Terminal Station And Upgrade Passenger Station Trackage**
(Cont'd)

Note: Train speed beyond the West Yard limit of Roanoke Yard is 45 mph and beyond the East Yard limit is 50 mph.

In Item B above, between MP N 257.0 and MP N 258.0, our Study reviewed the possibility of increasing train speeds to 30 or 35 mph. However, there are 6, 7 and 8 degree curves between these two mileposts and the No. 10 crossover turnouts fit tightly between the curves, thus preventing the installation of No.15 or No. 20 turnouts. Perhaps No.12 turnouts could be installed, but further evaluation is needed.

In Item C above, between MP N 258.0 and MP N 259.8, where the train speed is 30 mph for 1.8 miles and the maximum curvature is 4.6 degrees, perhaps a study of signal spacing and superelevation on curves relating to passenger equipment may make it possible to increase passenger train speeds to 40 mph.

In Item D above, between MP N 259.8 and MP N 262.8, train speed is 40 mph where the maximum curvature is 6.7 degrees. Again further study is needed, but it may be possible to increase passenger train speeds to 45 mph or more in order to match similar speeds west of the west yard limit.

The following is an order of magnitude estimate for constructing the proposed improvements to the Roanoke Terminal as outlined above:

	<u>\$ (Millions)</u>
• <u>Trackwork:</u>	
- Upgrade 19,500 TF of Empty Side, and Park Street Yard tracks including crossties Line, surface and rail as required.	\$0.925
- Upgrade 2,600 TF of No. 4 Station Track, 4 Pocket Track and Coach Yard Lead.	0.250
- Upgrade 7 turnouts.	0.700

Attachment L-3

**Create Second Main Track Through
Roanoke Terminal Station And Upgrade Passenger Station Trackage**
(Cont'd)

	<u>\$ (Millions)</u>
• <u>Signal Work:</u>	
- Signal 22,100 TF of yard track, power 5 hand throw switches, 5 interlocks, coded track circuits, communications, signals, cases, houses, central dispatching expansion.	2.200
Subtotal	\$4.075
Engineering	0.250
Contingency	<u>0.600</u>
Total	\$4.925

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment L-4**Construct Second Crossover at Montgomery (MP N 284.6)**

This Construction Project would add a No.20 crossover adjacent to the existing crossover near the east end of the Montgomery Tunnels, thus forming a "Universal Crossover." The following is an order of magnitude estimate for the construction of the second crossover:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct one No. 20 Crossover (2 each @ \$130,000).	\$0.260
- Grading connecting track subballast.	0.050
• <u>Signal Work</u>	
- Interlock two turnouts, communications, central dispatching.	0.750

Subtotal	\$1.060
Engineering	0.064
Contingency	<u>0.160</u>
Total	\$1.284

Note: Assumes required utility relocation, will be paid for by owner including fiberoptics and no additional central dispatching installations will be required.

Attachment L-5

**Extend Second Main Track From Walton (MP NB 297.6)
To Plum Creek (MP NB 298.9)**

This Construction Project would extend the existing second main track from Walton to Plum Creek. This 1.3 mile stretch of railroad was once a double track and the existing subgrade is in good condition.

A turnout can be constructed off Main Track No. 2, and by shifting Main Track No. 1, a "seamless" double track can be constructed leading into the Pulaski District. The existing No.20 turnout at the east end of the double track at Plum Creek can be relocated to MP NB 300.0, between main track switches to Radford Yard, to form part of a crossover as is explained in Attachment L-6.

The following is an order of magnitude estimate to extend the second main track from Walton to Plum Creek, a distance of 1.3 miles:

	<u>\$ (Millions)</u>
• <u>Track Work</u>	
- Construct one new No. 20 turnout at Walton.	\$0.13
- Construct 1.3 TM of new track with 136 lb. CWR @ \$140/TF and remove one No. 20 turnout.	0.96
- Re-establish subgrade, grub, clean and add subballast for 6,800 TF @ \$8/TF.	0.05
• <u>Signal Work</u>	
- Relocate one interlocking plant.	0.20
- Communications, coded track circuits, relocate signals cases, houses.	0.15
Subtotal	\$1.49
Engineering	0.09
Contingency	<u>0.23</u>
Total	\$1.81

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner, and that no additional central dispatching equipment will be needed.

Attachment L-6**Construct Crossover at Radford (MP NB 300.0)**

The east end of Radford Yard on Main Track No. 2, MP NB 299.5, is a hand throw switch and there is no switching activity at that location. However, the west end of Radford Yard including Main Track No. 2 beginning at MP 301.15 is used extensively for switching and tail track respectively. Since the Radford Station platform is on Main Track No. 1, it is necessary to construct a crossover between Main Track No. 2 and Main Track No. 1 at MP NB 300.0 to divert the passenger train to the station platform at the same time and to avoid the interruption of Radford Yard switching movements.

The following is an order of magnitude estimate for the construction of the crossover:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct one No. 20 Crossover using one turnout salvaged from MP 298.9, Plum Creek.	\$0.21
- Miscellaneous grading, subballast, switch tie renewals, etc.	0.60
• <u>Signal Work</u>	
- Construct two interlocks, communications, coded track circuits, cables, cabinets, relocate signals, etc.	1.00

Subtotal	\$1.81
Engineering	0.11
Contingencies	<u>0.27</u>
Total	\$2.19

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment L-7**Extend Wysor Siding Westerly to MP NB 311.4**

This Construction Project is for an extension of Wysor Siding at MP NB 309.2, which is currently 6,244 ft. long. This Project would extend Wysor Siding an additional 4,900 ft. to the west, which avoids public grade crossings, to a new siding length of 11,000 ft., which is the NS standard for new sidings.

There are no public grade crossings, spur tracks or drainage structures of significant size in the proposed extension. There is adequate space available under highway overpass MP NB 310.85 (SR643). The White Motor Corp. spur switch has been removed. The grading consists of some cut widening as well as substantial embankment fill to a depth of about 20 to 30 feet. The cut and fill yardage will not balance, and, thus, fill material must be imported. The existing right-of-way is only about 70 ft. wide, so a retaining wall or purchase of right-of-way will be required.

The following is an order of magnitude estimate to extend Wysor Siding a distance of 4,900 ft.:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 4,900 TF using FIT CWR @ \$95/TF.	0.47
- Relocate one No. 10 turnout and upgrade points, stockrails, frog, switch ties as required.	0.06
• <u>Signal Work</u>	
- Relocate one interlock, coded track circuits, communications, cases, houses, relocate signals switch heaters, etc.	0.35
• <u>Grading</u>	
- Excavate and fill @ average 12 CY/TF for 4,900 TF @ \$25/CY.	1.50
- Subballast @ \$4/TF	0.02
• <u>Purchase Right-of-Way</u>	
- Estimate that 4 acres is required @ \$2500/AC.	0.01

Attachment L-7

Extend Wysor Siding Westerly to MP NB 311.4 (Cont'd)

	<u>\$ (Millions)</u>
• <u>Bridge Work</u>	
- Extend 60 inch concrete culvert by 20 ft. plus headwall.	0.01
	—
Subtotal	\$2.42
Engineering	0.15
Contingency	<u>0.36</u>
Total	\$2.93

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment L-8

**Construct Siding Between MP NB 326.0 (near Gunton Park) and
MP NB 328.0 (near Max Meadows)**

This Project would construct a 2.0 mile long new siding between MP NB 326.0, near Gunton Park, and MP NB 328.0, near Max Meadows. Our Study showed that the proposed Bristol passenger trains would meet several NS freight trains at or near Clark Siding. However, Clark Siding is only 6,189 ft. long and will not accommodate most of the longer NS freight trains. It would not be practical to extend Clark Siding east or west because of two steel bridges, heavy curvature and rock cuts to the east and a public at-grade crossing to the west. Moreover, since Clark Siding is at the summit of two ascending grades of about 1.3% each, dispatching flexibility would be decreased because of slower freight train speeds. Therefore, we recommend the construction of a new 2.0 mile long (10,560 TF) siding between MP NB 326.0 and MP NB 328.0 near Max Meadows.

The following is an order of magnitude estimate for the proposed new siding:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct a 10,560 TF long siding using FIT CWR @ \$95.	1.00
- Construct two No. 20 turnouts @ \$130,000 ea.	0.26
• <u>Signal Work</u>	
- Construct two interlocks, coded track circuits, relocate signals, cases and increase central dispatching capacity.	1.20
• <u>Grading</u>	
- Construct 10,560 TF of subgrade @ 4 CY/TF @ \$25/CY and place 10,560 TF of subballast @ \$5/TF.	1.10

Attachment L-8

**Construct Siding Between MP NB 326.0 (near Gunton Park) and
MP NB 328.0 (near Max Meadows)**

(Cont'd)

	<u>\$ (Millions)</u>
• <u>Bridge Work</u>	
- Construct one 62 LF long steel open deck girder bridge @ \$8,000 LF.	0.50
- Extend one 24 ft. wide masonry arch culvert a distance of 20 ft. and place headwall.	0.02

	Subtotal \$4.08
	Engineering 0.25
	Contingency <u>0.60</u>
	Total \$4.93

Attachment L-9

**Construct Siding Between MP NB 368.8 (near McMullin)
and MP NB 371.4 (near Seven Mile Ford)**

This Project would construct a new 13,700 ft. long siding between Marion and Glade Springs, between MP NB 368.8 (near McMullin) and MP NB 371.4 (near Seven Mile Ford). The proposed siding is located on a ruling grade for eastward trains of 1.32% and where curvature varies from about 1° to 7°. However, this proposed “Seven Mile Ford” siding would be located where there are no public or private at-grade crossings, and there are no bridges or large culverts. It is assumed that there is adequate space available over the Holston Road underpass at MP 370.8 for a second track at 15 ft. center-to-center with the main track.

The following is an order of magnitude estimate for the proposed 13,700 ft. siding:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 13,700 TF of new siding using FIT CWR @ \$95/TF.	\$1.30
- Construct two No. 20 turnouts.	0.26
• <u>Signal Work</u>	
- Construct 2 interlocks, coded track circuits, increase central dispatching and communications capacity.	1.20
• <u>Grading</u>	
- Construct 13,700 TF of side hill cut and fill @ 15 CY/TF @\$20/CY.	4.10
- Construct 13,700 TF of subballast @ \$4/TF	<u>0.05</u>
	Subtotal
	\$6.91
	Engineering
	0.40
	Contingency
	<u>1.00</u>
	Total
	\$8.31

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment L-10

Construct Siding Between MP NB 395.4 And MP NB 397.5, West of Abingdon

Our Study shows that there is a high probability that NS freight trains and the proposed Bristol passenger trains will meet at or near Abingdon. However, Abingdon siding is only 3,743 ft. long, and there are four (4) public at-grade crossings and a 49 ft. long steel deck girder bridge that prevent the extension of Abingdon siding in either direction.

Therefore, we propose to construct a new siding about two miles west of Abingdon where there is only one private at-grade crossing, and there are no bridges or large culverts. It is assumed that the private crossing at MP NB 396.8 which has passive warning system can be closed, and, that, if necessary, a private roadway can be constructed along the right-of-way to Providence Road underpass about 0.3 miles to the west. It is also assumed that the Providence Road underpass has sufficient width on top for a second track at 15 ft. center-to-center with the main track.

The following is an order of magnitude estimate for constructing the proposed new 11,000 ft. siding:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct an 11,000 TF siding using FIT CWR @ \$95/TF.	\$1.05
- Construct 2 No. 20 turnouts.	0.26
• <u>Signal Work</u>	
- Construct two interlocks, coded track circuits signals, cases, houses and expand capacity of communication and central dispatcher.	1.10
• <u>Grading</u>	
- Construct 11,000 TF of fill @ 10 CY/TF @ \$20/CY.	2.20
- Construct 11,000 TF of subballast @ \$4/TF.	<u>0.05</u>
Subtotal	\$4.66
Engineering	0.25
Contingency	<u>0.70</u>
Total	\$5.61

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment L-11

Construct and Rehabilitate Bristol Trackage

Rehabilitation of the station facilities and construction of a new layover train storage and servicing track is necessary at Bristol. It would be possible to construct a combination passenger train storage track and station platform track where a former station track existed, and this track would require a turnout and about 600 ft. of track.

Another consideration at Bristol is the need for turning the proposed Bristol passenger trains on the Wye Track. The Wye Track is located several city blocks from the passenger station and the curvature and condition of the connecting track located in the street leading to the Wye need further review. The total trackage of the Wye Track, including the tail track required for use by a 450 ft. long passenger train, is estimated at 4,000 TF. The Wye Track must be rehabilitated and upgraded for passenger train service, including replacement of existing rail, renewal of cross-ties, surfacing, lining and rehabilitation of three turnouts.

The following is an order of magnitude estimate for this work:

A. Construct Passenger Station Platform and Layover Track

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 600 TF using FIT CWR @ \$95/TF.	\$0.060
- Construct one new hand-throw No.10 turnout.	0.100
• <u>Grading</u>	
- Excavate, level, place subballast and drain pipes.	<u>0.015</u>
Subtotal	\$0.175
Engineering	0.015
Contingency	<u>0.026</u>
Total	\$0.216

Attachment L-11

Construct and Rehabilitate Bristol Trackage (Cont'd)**B. Rehabilitate the Wye Track****\$ (Millions)**• Trackwork

- Relay 4,000 TF of rail with FIT CWR @ \$50/TF.	\$0.200
- Install 800 crossties @ \$100 ea.	0.080
- Install 3 ea. No.10 FIT turnouts @ \$60,000 ea.	0.180
- Ballast, surface, line 4,000 TF.	0.020
- Rehabilitate 60 TF of Grade Crossing @ \$450/TF.	0.030

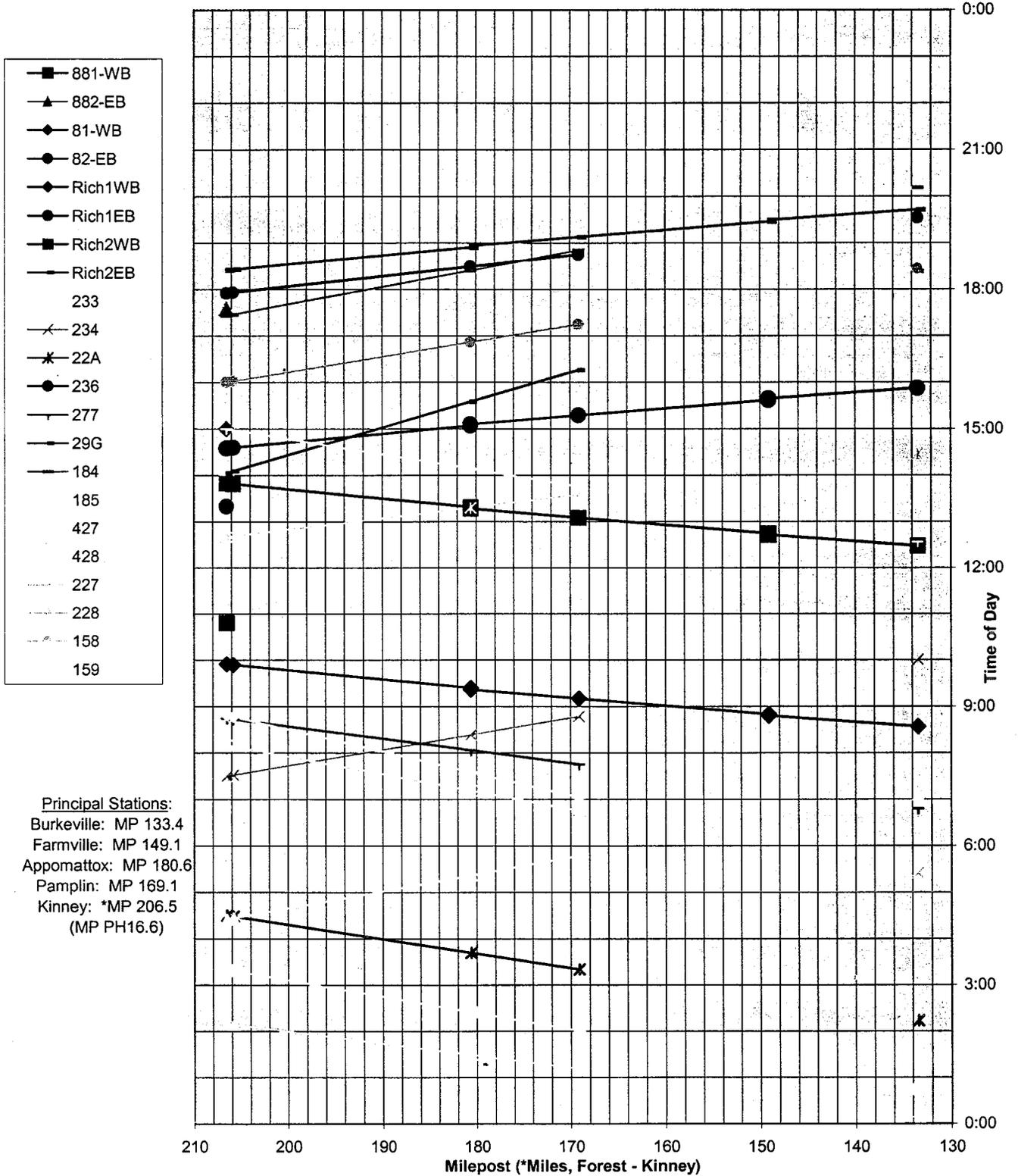
Subtotal	\$0.510
Engineering	0.030
Contingency	<u>0.080</u>
Total	\$0.620

Attachment M

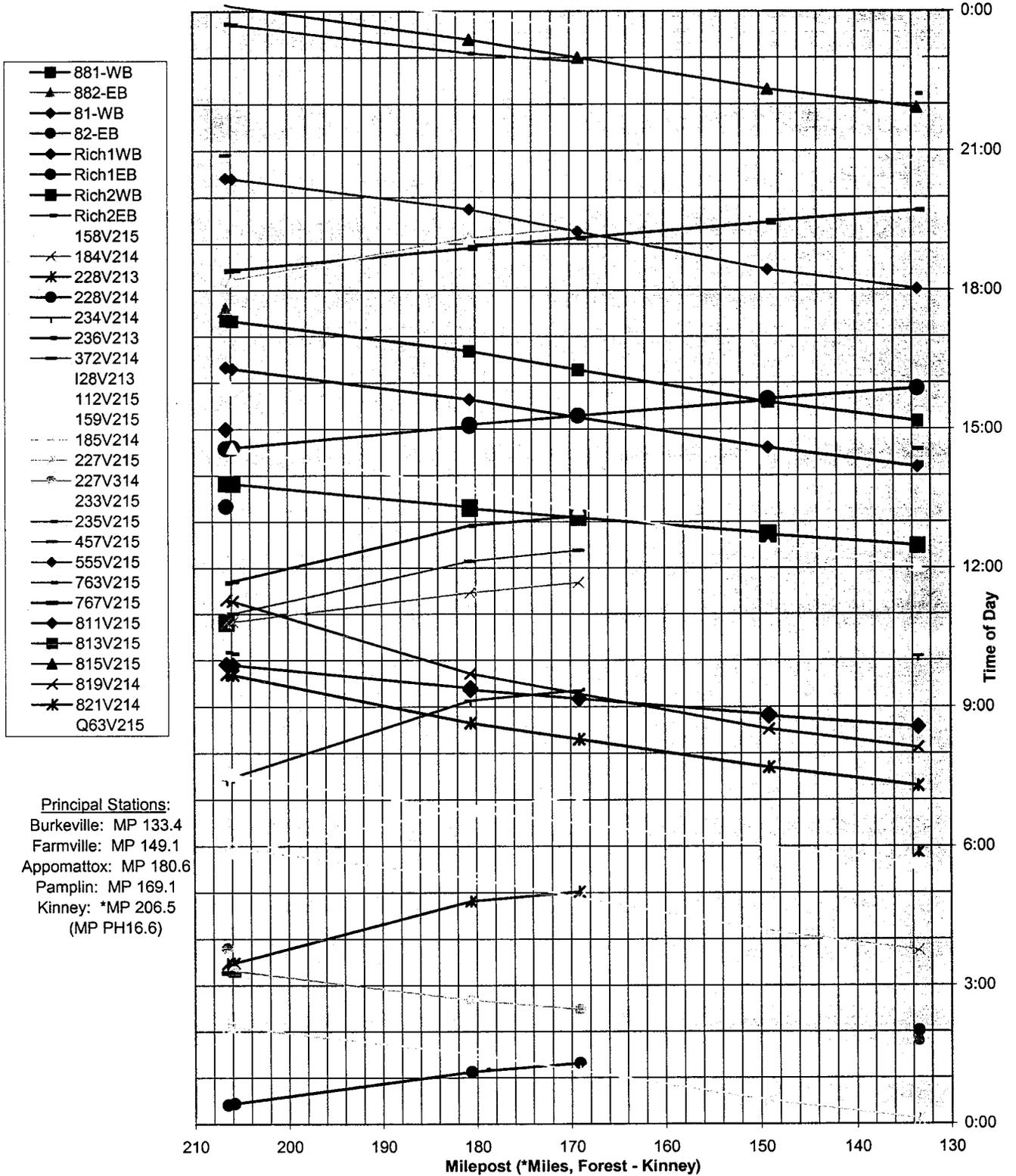
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Attachment M-1
Stringline Chart of Proposed Bristol, Roanoke, and Richmond Passenger Trains
and Scheduled NS Freight Trains Between Lynchburg and Burkeville, MP 206.5* - MP 133.4
NS Freight Schedule Dated March 8, 2001



Attachment M-2
Stringline Chart of Proposed Bristol, Roanoke, and Richmond Passenger Trains
and Actual NS Freight Trains Between Lynchburg and Burkeville, MP 206.5* - MP 133.4
Sunday, March 15, 1998



Attachment M-3

**Expected Meets and Passes Between the Proposed Richmond Passenger Trains
and Scheduled Passenger and Freight Trains on the Lynchburg-Burkeville Line**

<u>Proposed Train</u>	<u>Meet/Pass Train ID</u>	<u>Meet Train Direction</u>	<u>Approx. Time</u>	<u>Milepost</u>	<u>Location</u>	<u>Single/Double Track</u>
R1-WB	None					
R1-EB	29G	EB	14:50	193.4 (PH 3.5)	Between Phoebe and Campbell	Single
	159	WB	14:45	198.5 (PH 8.6)	Between Phoebe and Campbell	Single
R2-WB	228	EB	13:17	180.6	At Appomattox	Double
R2-EB	None					

Attachment M-4

**Expected Meets and Passes Between the Proposed Richmond Passenger Trains
and Scheduled Passenger and Actual Freight Trains on the Lynchburg-Burkeville Line**

Proposed Train	Meet/Pass Train ID	Meet Train Direction	Approx. Time	Milepost	Location	Single/Double Track
R1-WB	819V214	WB	09:10	164.0	Between Tuggle and Shields	Single
	234V214	EB	09:15	174.0	Between Bowler and Appomattox	Single
R1-EB	813V215	WB	15:36	149.8	Between Farmville and Tuggle	Single
	811V215	WB	15:16	169.5	Between Pamplin and Bowler	Double
	159V215	WB	14:36	205.5 (PH 15.6)	Between Dover and Kinney	Double
R2-WB	159V215	WB	12:55	161.5	Between Tuggle and Shields	Single
	236V213	EB	13:06	170.0	Between Pamplin and Bowler	Double
R2-EB	555V215	WB	19:10	167.5	Between Tuggle and Shields	Single
	158V215	EB	18:40	192.5 (PH 2.0)	Between Concord and Phoebe	Double

Attachment M-5

Projected Meets and Passes Between The Proposed Richmond Passenger Trains and Other Passenger Trains and Freight Trains on the Lynchburg-Richmond Line, Assuming That Recommended Construction Projects Have Been Built

<u>Mileposts</u>	<u>Location</u>	<u>Tracks</u>	<u>Richmond Passenger Train Conflicts</u>			
			<u>Passenger Trains</u>	<u>Scheduled Freight Trains</u>	<u>Actual Freight Trains</u>	<u>Total</u>
PH 16.6 – PH 14.9*	Kinney – Rutherford	Siding			15.6	1
PH 14.9 – PH 12.6	Rutherford- Posm	Single Track				
PH 12.6 – PH 10.5	Posm – Campbell	Siding				
PH 10.5 – PH 8.4	Campbell – N/A	Single Track		8.6		1
PH 8.4 – PH 6.4	N/A - N/A	New Siding				
PH 6.4 – PH 2.3	N/A – Phoebe	Single Track		3.5		1
PH 2.3 – PH 0.0	Phoebe – Concord	Siding			2.0	1
N 189.9 – N 184.1	Concord – Lee	Single Track				
N 184.1 – N 180.6	Lee – Appomatox	Siding		180.6		1
N 180.6 – N 170.6	Appomatox- Bowler	Single Track			174.0	1
N 170.6 – N 168.1	Bowler – Shields	Siding			169.5 170.0	2
N 168.1 – N 148.6	Shields – N/A	Single Track			149.8 161.5 164.0 167.5	4
N 148.6 – N 146.5	N/A – N/A	New Siding				
N 146.5 – N 133.3	N/A – Burkeville	Single Track				
F 86.5 – F 87.9	Burkeville- Burkeville	Siding				

Attachment M-5

**Projected Meets and Passes Between The Proposed Richmond Passenger Trains
and Other Passenger Trains and Freight Trains on the Lynchburg-Richmond Line,
Assuming That Recommended Construction Projects Have Been Built (Cont'd)**

			Richmond Passenger Train Conflicts			
<u>Mileposts</u>	<u>Location</u>	<u>Tracks</u>	<u>Passenger Trains</u>	<u>Scheduled Freight Trains</u>	<u>Actual Freight Trains</u>	<u>Total</u>
F 87.9 – F 127.2	Burkeville – Midlothian	Single Track				
F 127.2 – F 132.0	Midlothian- Bon Air	New Siding		132.0	132.0	2
F 132.0 – F 137.0	Bon Air – S. Richmond	Single Track				
Total				4	10	14

* Equivalent to MP 208.7-214.5.

Attachment N

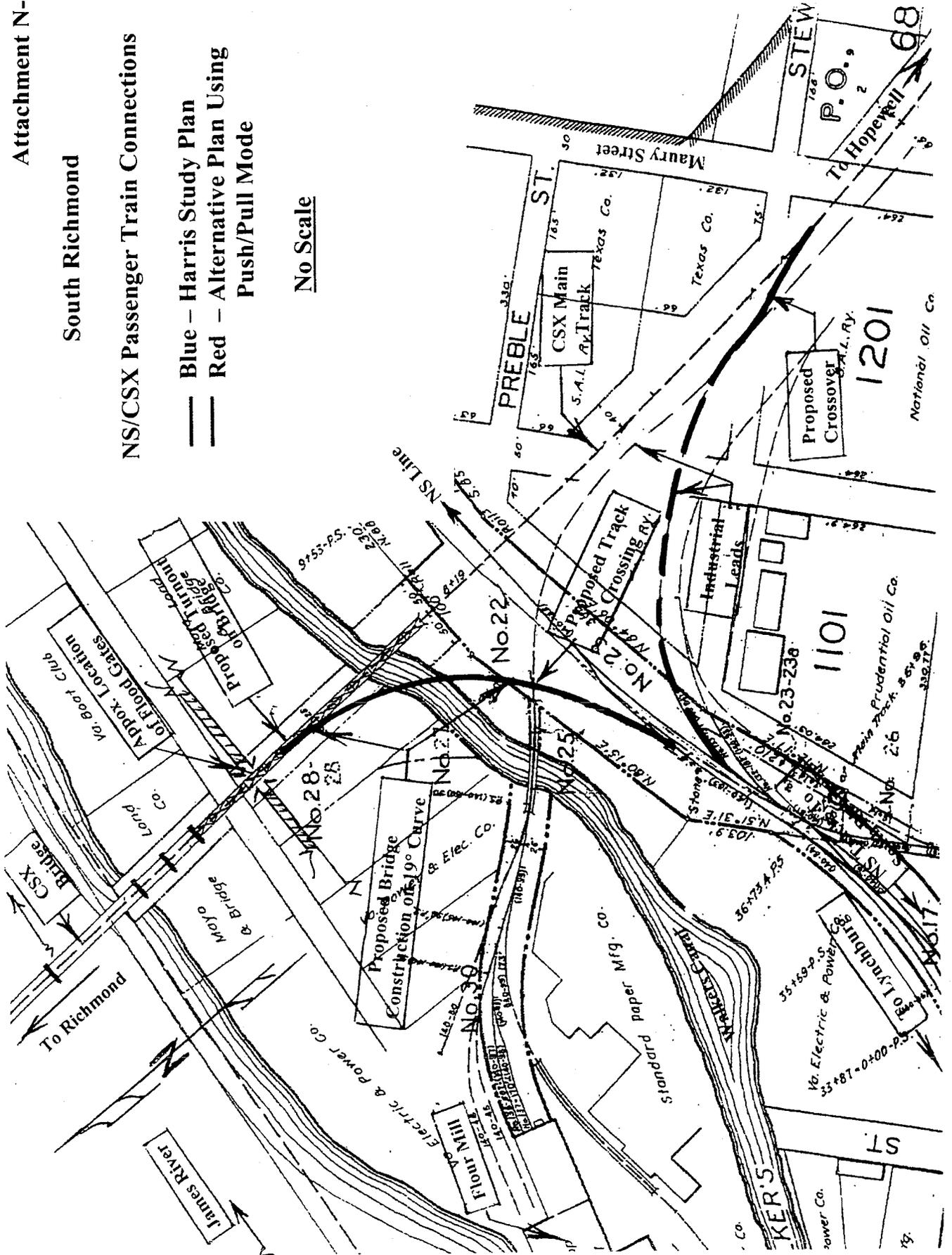
Attachment N-4B

South Richmond

NS/CSX Passenger Train Connections

- Blue — Harris Study Plan
- Red — Alternative Plan Using Push/Pull Mode

No Scale



Attachment N

Summary of Recommended Construction Projects For Virginia Division, Lynchburg-Richmond Line

<u>Projects</u>	<u>Estimated Cost (Millions)</u>
1. Construct Siding between MP PH 8.4/N 198.3 and MP PH 6.4/N 196.3, east of Campbell.	\$3.5
2. Construct Siding between MP N 148.6 and MP N 146.5, east of Farmville.	6.4
3. Construct Siding between MP F 127.2 and MP F 129.4, near Robious.	3.5
4. Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal.	8.7
Total, Lynchburg-Richmond Line	\$22.1

Attachment N-1

**Construct Siding Between MP PH 8.4/N 198.3
and MP PH 6.4/N 196.3, East of Campbell**

This Project would construct a new 10,560 TF long siding between the public at-grade crossing of SR757 at MP PH 6.4 and the Beaver Creek Bridge at MP PH 8.39. At this location, there are no public at-grade crossings, only one small drainage structure, and adequate space is available under the highway overpass at PH 7.09 (SR 660) for a second track.

The following is an order of magnitude estimate to construct a 10,560 ft. long siding between Phoebe and Campbell:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 10,560 TF using FIT CWR @ \$95/TF.	\$1.00
- Construct 2, No. 20 turnouts @ \$130,000 each.	0.26
• <u>Signal Work</u>	
- Install two interlocks, coded track circuits, relocate signals, cases, communications, houses and expand central dispatching capacity.	1.20
• <u>Grading</u>	
- Construct subgrade and place subballast for 10,560 TF @ \$8/TF for subballast and \$15/CY @ 10,560 TF @ 2 CY/TF including drainage.	0.40
• <u>Bridge Work</u>	
- Extend 20 ft. wide concrete arch culvert (MP PH 6.65) a distance of 25 ft. and place headwall.	0.03

	Subtotal \$2.89
	Engineering 0.17
	Contingency <u>0.43</u>
	Total \$3.49

Note: Assumes all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment N-2

Construct Siding Between MP N 148.6 and MP N 146.5, East of Farmville

This Project would construct an 11,000 ft. long siding between MP N 146.5 and MP N 148.6, east of Farmville. There are no public at-grade crossings and no private crossings at this location. There is only one drainage structure which is a 12 ft. wide masonry arch culvert. The widened roadbed will require relatively high fills and widened rock cuts which may balance the required yardage.

The following is an order of magnitude estimate for constructing the proposed siding:

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 11,000 TF of siding using FIT CWR @ \$95/TF.	\$1.05
- Construct two No. 20 turnouts.	0.26
• <u>Signal Work</u>	
- Construct two interlocks communications, coded track circuits, relocate signals, houses, cases and increase central dispatching capacity.	1.20
• <u>Grading</u>	
- Construct 11,000 TF of roadbed for side track @ \$25/CY @ 10 CY/TF (some blasting required).	2.75
• <u>Purchase Right-of-Way</u>	
- 5.0 acres @ \$1500/AC.	<u>0.01</u>
	Subtotal \$5.27
	Engineering 0.30
	Contingency <u>0.80</u>
	Total \$6.37

Note: Assumes all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment N-3

Construct Siding Between MP F 127.2 and MP F 129.4, Near Robious

There are no viable sidings in the 50 miles of non-block signal territory between Burkeville's South End Yard and South Richmond Yard. The local freight train out of South Richmond also operates as a "turn" to Crewe and back, and may have up to 180 cars. On its return trip from Crewe, this train will incur substantial delays unless there is a long siding west of South Richmond Yard where it will be able to meet the proposed westbound Richmond train.

There are housing subdivisions and a substantial amount of community activity on both sides of the NS line segment west of Richmond. An effort must be made to locate the proposed siding as close to Richmond as possible without raising objections from the local community. Our Study indicates that it may be possible to locate an 11,000 ft. long siding between MP F 129.9 and F 132.0 (Alternative No. 1) near Robius and Bon Air. If this proposal is not physically or politically acceptable, the next best location is west of Robius between MP F 127.2 and MP F 129.4, near Midlothian (Alternative No. 2).

The following are order of magnitude estimates to construct these alternative sidings:

A. Alternative No. 1 – Robius-Bon Air (MP F 129.9 to MP F 132.0)

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Construct 11,000 TF of FIT CWR @ \$95/TF.	\$1.05
- Construct two hand throw No. 10 turnouts @ \$100,000 each.	0.20
• <u>Signal Work</u>	
- None	---
• <u>Grading</u>	
- Construct 11,000 TF of roadbed @ \$30/CY @ 3.5 CY/TF including subballast.	1.16

Attachment N-3

Construct Siding Between MP F 127.2 and MP F 129.4, Near Robious

(Cont'd)

	<u>\$ (Millions)</u>
• <u>Bridge Work</u>	
- None	---
Subtotal	\$2.41
Engineering	0.15
Contingency	<u>0.36</u>
Total	\$2.92

Note: Assumes all utilities including fiberoptics will be relocated and paid for by the owner.

B. Alternative No. 2 Midlothian-Robious (MP F 127.2 to MP F 129.4)

	<u>\$ (Millions)</u>
• <u>Track Work</u>	
- Construct 11,000 TF of FIT CWR @ \$95/TF.	\$1.05
- Construct two hand throw No.10 Turnouts @ \$100,000 each.	0.20
• <u>Signal Work</u>	
- None	---
• <u>Grading</u>	
- Construct 11,000 TF of subgrade and subballast @ 3.5 CY/TF @ \$30/CY.	1.16

Attachment N-3

Construct Siding Between MP F 127.2 and MP F 129.4, Near Robious

(Cont'd)

	<u>\$ (Millions)</u>
• <u>Bridge Work</u>	
- Construct 3 spans of 30 ft. long prestressed concrete bridge @ \$4,800/LF at MP F 128.6.	0.43
- Construct 20 ft. extension on a 12 ft. wide brick arch culvert at MP F 127.8.	0.03

Subtotal	\$2.87
Engineering	0.20
Contingency	<u>0.45</u>
Total	\$3.52

Note: Assumes all utilities including fiberoptics will be relocated and paid for by the owner.

Attachment N-4

Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal

Our Phase I Final Report dated June 2001 described the facility improvements required to move one scheduled passenger train in each direction per day through NS's South Richmond Terminal, including the Belle Isle Yard. However, the Phase II passenger train plan to operate two scheduled passenger trains in each direction per day will require additional improvements, including signaling and installing Train Control (TC), from the west end of the South Richmond Terminal to the proposed track connections to the CSX main track east of NS's South Richmond Terminal.

Neither the line from Burkeville to South Richmond nor any of the lines within the South Richmond Terminal are signaled. There is no full-time yardmaster assigned at South Richmond who would be available to authorize the movements of the four daily proposed Richmond passenger trains. Moreover, the entire NS South Richmond and North Richmond Terminals are within a single yard limit.

The attached drawing that is labeled N-4A illustrates, by Project Nos. 1 through 6, the improvements needed to move the four Phase II passenger trains over the 2.5 mile passenger train route through South Richmond Yard at 25 mph.

The following is an estimate for the proposed improvements using the project identifications shown on the drawing that is Attachment N-4A as a reference for the six projects:

Project No. 1: Construct and Signal a Bypass Main Track from about MP F 137.3 to MP F 138.6

As shown by the drawing that is Attachment N-4A, this is Project No. 1. There is a substantial amount of industrial switching and train make-up performed in Belle Isle Yard. The only available track space for setting out cuts of cars and train make-up is the main track and parallel main yard lead between MP F 137.3 and MP F 138.6, between which there are three crossovers which create set-out pockets. This Project would construct a 1.3 mile long bypass track around this yard arrangement so that the proposed Richmond passenger trains can move through the south end of Belle Isle Yard without delay, and that switching on the adjacent tracks would not be interrupted.

Attachment N-4**Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal**

(Cont'd)

The order of magnitude estimate for Project No. 1 is shown below:

	<u>\$ Millions</u>
• <u>Trackwork</u>	
- Construct 7,000 TF with FIT Rail @ \$95/TF	\$0.67
- Construct two No. 15 turnouts @ \$110,000 each	0.22
• <u>Grading</u>	
- Clean, level, place subballast @ \$8/TF	0.06
• <u>Signal Work</u>	
- Interlock 2 turnouts, coded track circuits, approach circuits, communications and signals to the west, increase central dispatching capacity for TCS MP 137.3 to MP 139.9 on the industrial lead used for the passenger route	1.30

Project No. 1 Subtotal	\$2.25

Project No. 2: Rehabilitate and Signal Existing Main Track Through Belle Isle Yard

Project No. 2 would rehabilitate and signal the existing main track through Belle Isle Yard, as shown on the drawing that is Attachment N-4A. Because there is insufficient room between the existing main track and the James River, it would not be possible to construct a bypass track at this location.

The order of magnitude estimate for Project No. 2 is shown below:

	<u>\$ Millions</u>
• Tie and Surface (150 crossties)	\$0.02
• Coded Track Circuit	<u>0.01</u>
Project No. 2 Subtotal	\$0.03

Attachment N-4

Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal
(Cont'd)

Project No. 3: Construct and Signal Bypass Main Track and Reconstruct Yard Track

As shown by the drawing that is Attachment N-4A, this Project No. 3 would construct a new bypass track at the north end of Belle Isle Yard so that switching on the tail track would be possible even when passenger trains were operating on the adjacent bypass main track.

The order of magnitude estimate for Project No. 3 is shown below:

	<u>\$ Millions</u>
• <u>Trackwork</u>	
- Construct 800 TF of track with FIT Rail @ \$95/TF	\$0.08
- Reconstruct 500 TF of yard track @ \$95/TF	0.05
- Construct 4, No.15 Turnouts @ \$110,000 each	0.44
• <u>Signal Work</u>	
- Power and interlock 4 turnouts, signals, communications, coded track circuits	1.80
• <u>Grading</u>	
- None	
- Construct subballast for 1,300 TF @ \$8/TF	<u>0.01</u>
Project No. 3 Subtotal	\$2.38

Attachment N-4

Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal
(Cont'd)

Project No. 4: Rehabilitate and Signal NS Industrial Lead Track Connecting To CSX Main Track

As shown by the drawing that is part of Attachment N-4, this Project No. 4 would rehabilitate and signal the NS industrial lead track that must be used to reach the CSX Main Track to Richmond.

The order of magnitude estimate for Project No. 4 is shown below:

	<u>\$ Millions</u>
• <u>Trackwork</u>	
- Rehabilitate 3,500 TF using FIT with crossties and surfacing @ \$80/TF	\$0.28
- Construct 2 new No.15 turnouts @110,000	0.22
- Construct 7, No.10 Turnouts @ \$80,000 each	0.56
• <u>Signal Work</u>	
- Power and interlock 2 No.15 Turnouts	0.90
- Install 7 electric locks on No.10 turnouts, signals, coded track circuits, communications	0.16
• <u>Street Crossings</u>	
- Reconstruct 60 LF of roadway with timber flange way guards and asphalt @ \$400/LF	0.02

Project No. 4 Subtotal	\$2.14

Attachment N-4**Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal**
(Cont'd)**Project No. 5: Rehabilitate NS Trackage and Construct a Bridge Connection To CSX Trackage Near South Richmond**

Our Phase I Final Report provided a detailed analysis of the Harris Report's plan for a connection to CSX trackage near NS's South Richmond Terminal. The Harris Report's plan proposed a turnout for passenger trains that would be located on a CSX open deck bridge, which we determined would require the installation of a power switch and a signal interlocking plant to expedite passenger train movements and keep train crews off the open deck structure. The proposed connection would require a curve of about 300 ft. radius or 19 degrees which would be located for the most part on a new 350 ft. open deck bridge which crosses wetlands and Walker's Canal. The proposed connection would be located on the southerly edge of the James River flood plain, as shown by the drawing that is Attachment N-4B. A track crossing would also be required where the proposed connection crosses an active NS industrial lead track serving a flour mill. In view of the proposed passenger service, either some type of signalized derails or a complete interlocking plant may be required at the track crossing.

The proposed track connection will require approvals of NS and CSX, and, perhaps, a variety of regulatory agencies such as the EPA, FRA, U.S. Army Engineers, Fish and Game and others that could become involved in the decision making process. Also, a NS right-of-way map suggests that not all of the land along the route of the proposed connection is located on CSX or NS right-of-way.

The proposed connection between NS trackage and the CSX main track is estimated to cost \$4.8 million, as shown below in our order of magnitude estimate:

Attachment N-4

Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal
(Cont'd)

	<u>\$ Millions</u>
• <u>Trackwork</u>	
- Track on grade or fill 300 TF using new CWR @ \$140/TF.	\$0.042
- Track on Open Deck Bridge, Deck and Walkway, 350 LF @ \$1,100 LF.	0.385
- Rail and OTM, 350 TF @ \$75/TF (new CWR)	0.026
- New Track Crossing at Flour Mill Spur.	0.080
- Install two new No.15 turnouts @ \$120,000 ea.	0.240
• <u>Signal Work</u>	
- Construct interlock and power Turnout on CSX main track.	0.450
- Construct first come/first serve interlock with derails at Flour Mill track crossing.	0.250
• <u>Grading</u>	
- Grub, level, fill subgrade including approach to new bridge, 300 TF @ \$120/TF and construct subballast @ \$8/TF.	0.040
• <u>Bridge Work</u>	
- Construct 350 LF of steel, open deck DPG bridge @ \$7,000/LF.	2.450
	<hr/>
	Subtotal \$3.963
	Engineering 0.240
	Contingencies <u>0.590</u>
	Project No. 5 Subtotal \$4.793

Attachment N-4**Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal**
(Cont'd)

Note: Assumes that all utilities including fiberoptics will be relocated and paid for by the owner, and the additional signal interlocking installations will not require increased central dispatching capacity for CSX. Also, no estimate is included for the cost of obtaining any required regulatory permits or purchase of right-of-way.

Project No. 6: Connect Existing NS Industrial Lead to CSX Main Track with a Crossover to Permit Push/Pull Passenger Train To Reverse Direction

The proposed Richmond passenger train will be a “push-pull” operation and, therefore, requires no “turning” at the end of its run as it can be operated from either the locomotive end or the cab car end.

Because constructing the proposed connection between NS and CSX involving the bridge and signals would likely be delayed while obtaining the necessary regulatory approvals and because of the high cost of that Project No. 5, we recommend instead that a crossover be constructed between an existing track and the CSX main track, as shown in the drawing that is Attachment N-4B. Thus, a Lynchburg bound passenger train in a “push-pull” mode could proceed south on the CSX main track to the vicinity of Maury Street, the engineer would then “change ends,” make an air brake test, and cross over into the NS South Richmond Terminal.

The order of magnitude estimate for Project No. 6 is shown below:

Attachment N-4

Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal
(Cont'd)

	<u>\$ (Millions)</u>
• <u>Trackwork</u>	
- Rehabilitate 600 TF of industrial lead @ \$65/TF.	\$0.04
- Construct No.10 Crossover with 20 ft. track centers @ \$110,000 per turnout.	0.23
• <u>Signal Work</u>	
- Install Electric Lock or other protective signal equipment as required by CSX.	0.15

	Subtotal \$0.42
	Engineering 0.03
	Contingency <u>0.06</u>
	Project No. 6 Subtotal \$0.51

Recommended Projects in the South Richmond Terminal:

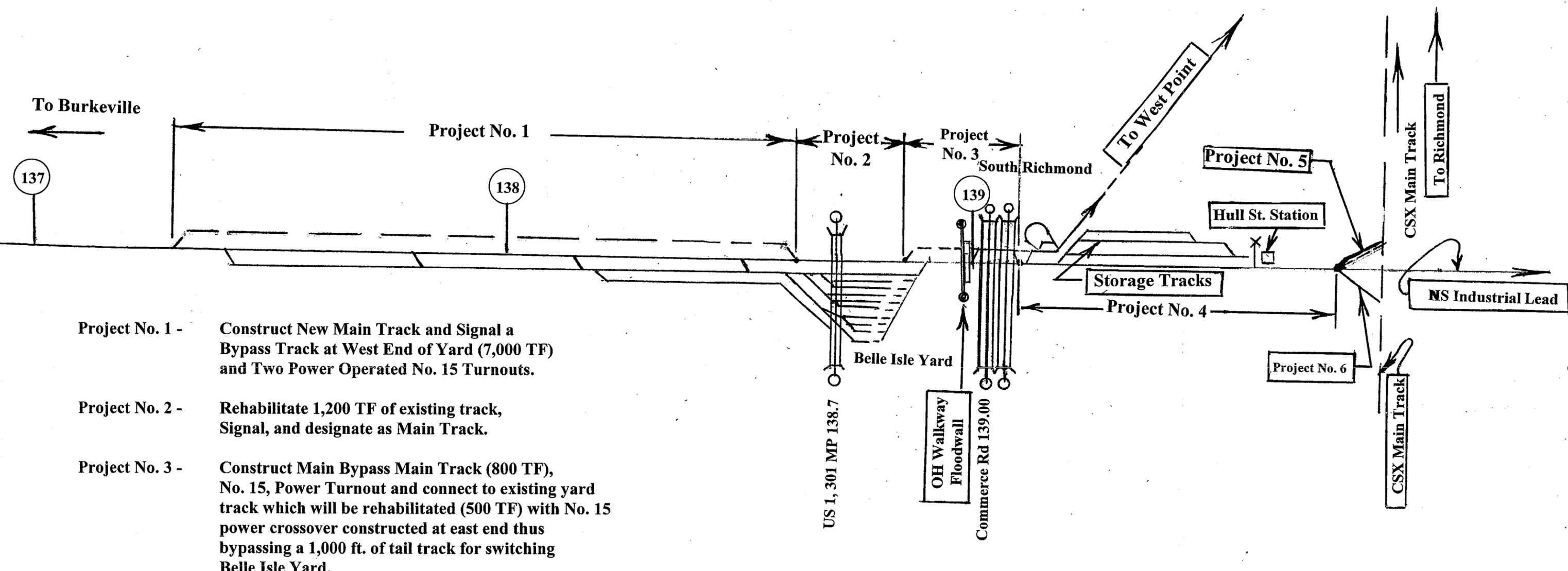
It is our recommendation that Project Nos. 1 through 4 and Project No. 6 be implemented in the South Richmond Terminal. The following is a summary of our order of magnitude estimates for these five Projects:

<u>Project</u>	<u>\$ Millions</u>
No. 1	\$2.25
No. 2	0.03
No. 3	2.38
No. 4	<u>2.14</u>
	Subtotal \$6.80
	Engineering 0.40
	Contingency <u>1.02</u>
	Total \$8.22
No. 6	<u>0.51</u>
	Grand Total \$8.73

Attachment N-4

Construct, Signal, and Rehabilitate Trackage in the South Richmond Terminal
(Cont'd)

Note: None of the order of magnitude estimates include the costs of relocating utilities including fiber-optic lines, regulatory permits and environmental remediation expenses, if any.



- Project No. 1 - Construct New Main Track and Signal a Bypass Track at West End of Yard (7,000 TF) and Two Power Operated No. 15 Turnouts.
- Project No. 2 - Rehabilitate 1,200 TF of existing track, Signal, and designate as Main Track.
- Project No. 3 - Construct Main Bypass Main Track (800 TF), No. 15, Power Turnout and connect to existing yard track which will be rehabilitated (500 TF) with No. 15 power crossover constructed at east end thus bypassing a 1,000 ft. of tail track for switching Belle Isle Yard.
- Project No. 4 - Rehabilitate Industrial Lead Track (3,500 TF) and signalize.
- Project No. 5 - Harris Report proposed Connection to CSX via Bridge over Walker's Canal.
- Project No. 6 - Woodside Consulting Group suggested Alternative to the Harris Plan for CSX Connection.

Red - New Trackage
 Blue - Rehabilitated Trackage
 Green - Harris Report Connection

Richmond VA
 Proposed Track and Signal
 Improvements to Accommodate
 Passenger Trains

No Scale

Attachment O

Photographic Study

of the

Piedmont Division, Alexandria-Lynchburg Line

Photos Taken: March 6, 2001 and March 17, 2001

Reprinted From Phase I Final Report



(1) Downtown Manassas (MP 32.6), facing northerly, showing Main Street in foreground and power crossover between main tracks at Moore (MP 32.4) in the distance.



(2) Manassas, facing southerly across Battle Ave., MP 32.6, showing passenger station on the left of Main Track No. 1, which serves the VRE, and Amtrak passenger station on the right of Main Track No. 2 in the far distance across West Street.



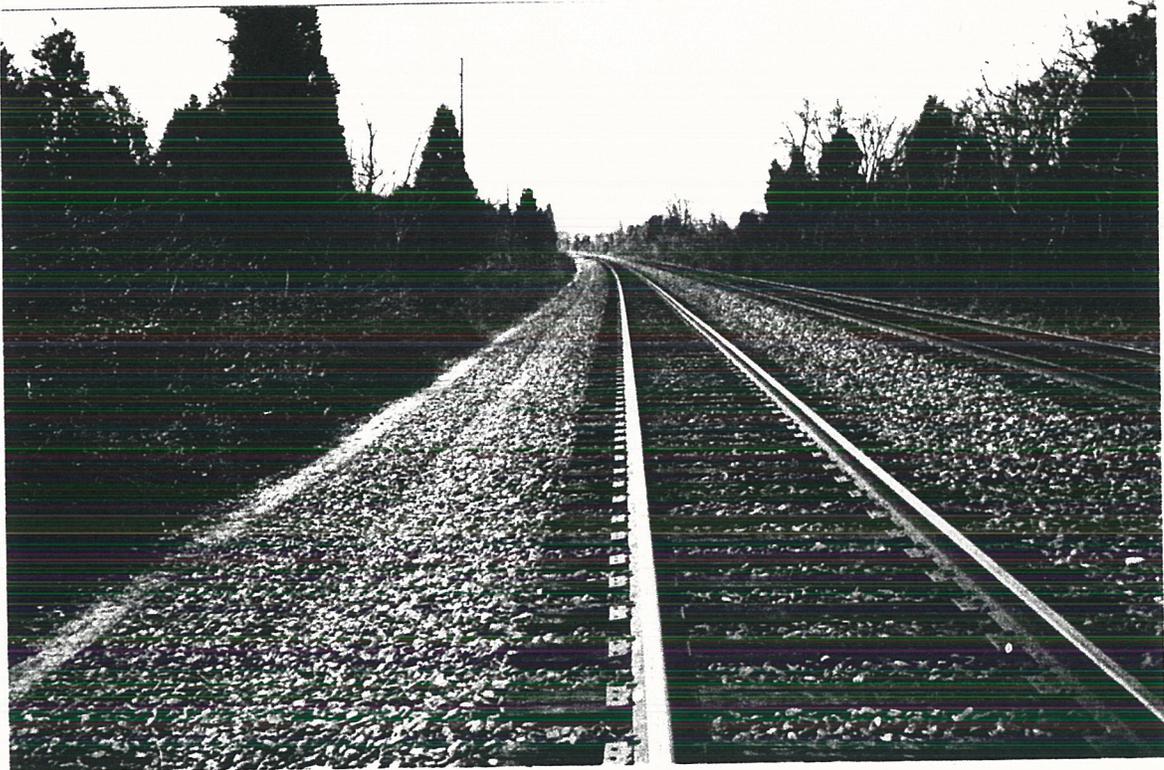
(3) At south end of Manassas Yard, MP 33.6, facing northerly, showing Main Tracks Nos. 1 and 2 to the right.



(4) At south end of Manassas Yard, facing northwesterly, showing the yard office on the far left and the main track lead curving to the left toward Riverton Jct. and Hagerstown.



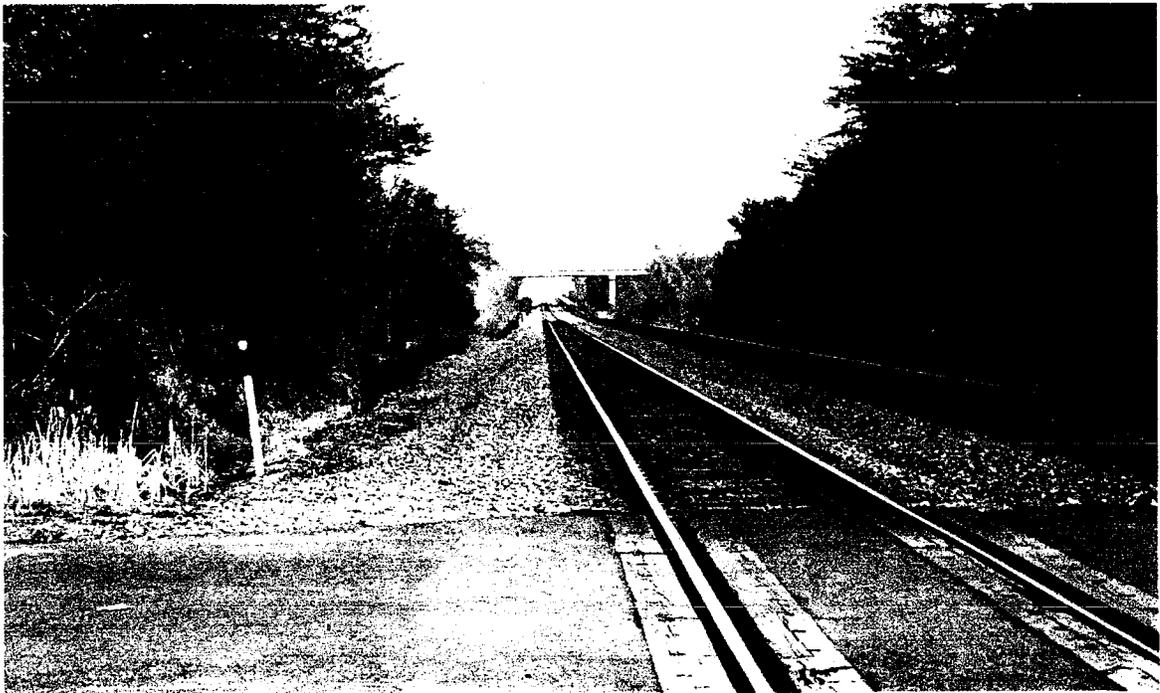
(5) Facing south at south end of Manassas Yard, showing at-grade crossing of Wellington Road, MP 33.5, which will be replaced with a highway overpass in year 2002. The lead track to Hagerstown is on the far right.



(6) Facing south at MP 34.0, showing available roadbed with minimal grading for a third main track.



- (7) Facing south at power switch to VRE's train storage yard, MP 35.8. Proposed third Main Track would be located on the far right. VRE's airport passenger station is on the left in far distance.



- (8) Facing north at Wakeman Ave. (Airport Access), MP 35.35, showing a new highway overpass in the distance. Also shown are space available for a third track under the overpass and minimal grading.



- (9) Facing north at MP 36.3 toward Manassas Yard, 2.6 miles away, showing the two-track, 229 ft., open deck steel deck plate girder bridges over Broad Run. Proposed third main track with a #20 turnout would begin on far side of Broad Run.



- (10) At MP 56.65, between Remington and Elkwood, facing north, showing the old second main track subgrade on the right.



- (11) At MP 56.65, facing south, showing abandoned second main track subgrade on the left and the abandoned 503 ft. open deck steel through truss bridge over the Rappahannock River. The bridge can be returned to service by repairs and replacement of about 380 new treated bridge ties.



- (12) At about MP 103.5, not far from Proffit, showing typical subgrade available from the abandoned second main track for a proposed siding near Proffit.



(13) MP 123.1, between Redhill and Applegate, showing available subgrade. However, there is substantial bridge work required in this territory in order to reconstruct a second main track.



(14) MP 136.5, between Hamner and Elma, showing grading required for a second track. Also, in addition to bridge work required, there is some unstable subgrade.



- (15) MP 142.1, between Elma and Oak Ridge, showing that the available subgrade from the abandoned second main track is in good condition in this territory. No bridge work is required.



- (16) MP 152.4, facing south between Tye and Buffalo River, showing available subgrade and available space at highway overpass, SR-610, MP 152.59, for a second track.



(17) At MP 152.4, facing north, showing available subgrade for a new second track between Tye River and Buffalo River.



(18) MP 169.6, facing south, showing the 1,860 ft. long bridge over the James River, the longest bridge on the Alexandria-Lynchburg Line . There is no proposed siding or second main track at this location, but space on the bridge is available.

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GROUP



(19) At MP 172.5, facing south and showing the historic Lynchburg passenger station on the left. The passenger platform with ADA tactiles used by Amtrak's Crescent is in the foreground.



(20) At MP 172.5, facing north, showing the older Lynchburg passenger platform. Also, the spur track on right, used as the House Track, is the suggested storage track for layover of the proposed Richmond passenger train.



(21) Montview (MP 174.6), facing north toward the Lynchburg passenger station, showing on the far left and opposite the locomotive in the distance the location of the beginning of a proposed bypass track that would run between Montview and Kinney Yards.



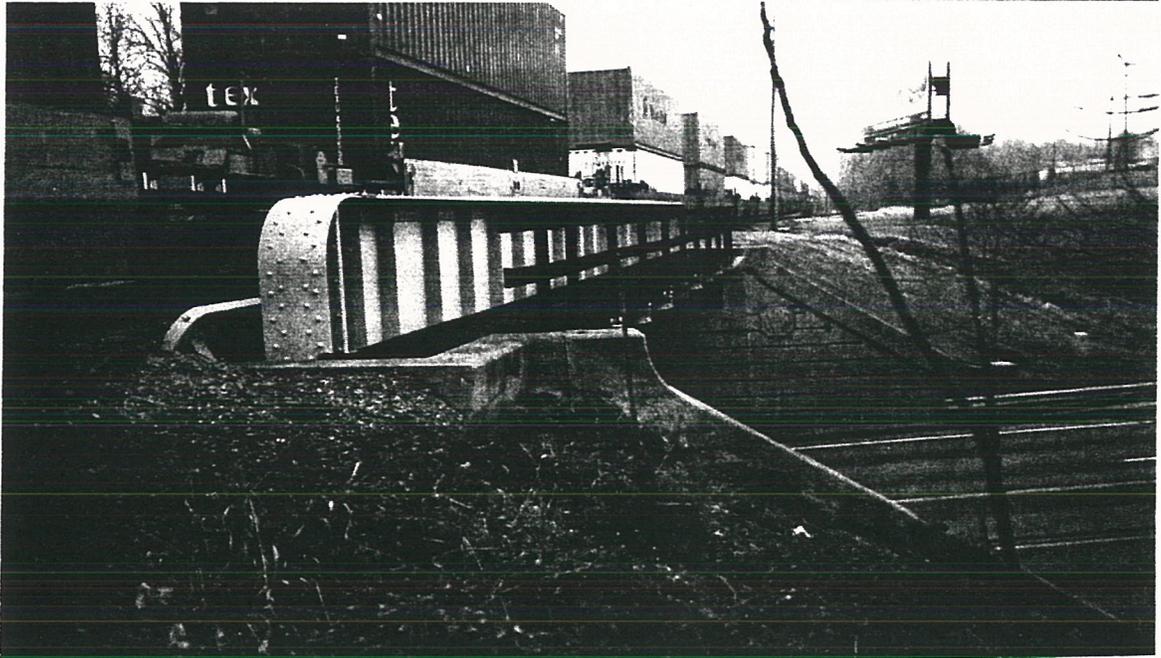
(22) Montview (MP 174.6), facing south toward Montview Yard, with the proposed location of a bypass track to the right of Main Track No. 2 on the far right.



- (23) At MP 174.9, facing south, with Montview Yard in the far distance, the tail track for switching Montview Yard in center foreground, and the Connecting Track between Montview and Kinney Yards to the right. This Connecting Track is also the north leg of the Montview wye track.



- (24) Facing easterly, east of highway U.S. 29 underpass on the Connecting Track, showing a double stack intermodal train in the distance moving away and toward the Alexandria-Lynchburg Line. Also shown are two industrial spur tracks in the foreground.



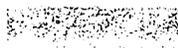
- (25) Facing easterly across U.S. Highway 29, showing a double stack intermodal train moving toward the Alexandria-Lynchburg Line over a 75 ft. long steel through plate girder span that must be duplicated for the proposed second Connecting Track.



- (26) Facing easterly and standing west of the U.S. Highway 29 underpass, showing the intermodal train leaving the Richmond Line and Kinney Yard on the left. The Connecting Track on the right and running to the Roanoke Line, behind the camera, is also the west leg of the Kinney wye track.



- (27) Facing westerly toward Kinney Yard and standing westerly from the U.S. Highway 29 underpass, showing the main lead to Kinney Yard, which is also the east leg of the Kinney Yard wye track. This lead is part of the track used by through freight trains from Norfolk and Richmond destined for the Alexandria-Lynchburg Line and would be used by the proposed Richmond passenger train.



Attachment P

Photographic Study of the Virginia Division Lines

<u>Location</u>	<u>Pages</u>
• Lynchburg to Roanoke	1 Through 2
• Roanoke Terminal	3 Through 5
• Roanoke to Bristol	6 Through 13
• Lynchburg to Richmond	14 Through 15

Photos Taken Between

March 1 and March 17, 2001

Reprinted From Phase I Final Report



(1) MP N 222.1, facing west between Goode and Big Otter, showing abandoned subgrade for a second main track in good condition under the vegetation to the right.



(2) MP N 231.5, facing east about one mile west of Bedford, showing the good condition of the subgrade of abandoned second main track to the left.



(3) MP N 235.2, facing east between Bedford and Montvale, showing the good condition of the subgrade of abandoned second main track to the left.



(4) MP N 235.2, facing west between Bedford and Montvale, showing subgrade of abandoned second main track to the right.



- (5) At about MP N 257.35, facing east at the east end of the Roanoke passenger platform. Station Track No. 3 to the left is one of two main tracks to Hagerstown that curves to the left in the distance. The power switch on the right diverts Station Track No. 4 to the Hagerstown second main track curving to the left and also to the No. 4 Pocket Track to the right that would be used by the proposed passenger trains to return to the main track.



- (6) At about MP N 257.4, facing west and standing on the Roanoke passenger platform, showing the pedestrian overpass. The Washington, DC to Bristol passenger train would utilize Station Track No. 4 to the left, since Track No. 3 on the right curves toward Hagerstown behind the camera.



- (7) At about MP N 257.4, facing west under pedestrian bridge, showing Roanoke passenger station platform on the far right and two power operated No. 10 crossovers. Station Tracks Nos. 3 and 4 straddle the passenger platform on the right, and the single main track is immediately to the right of the camera.



- (8) At about MP N 258.1, facing west at the east end of Park Street Yard and standing on a power crossover between the single main track at right and Park Street Track No. 1 on the left. We propose that the two hand throw switches to the three tracks in the center in the far distance be powered.



- (9) West end of Roanoke's "Empty Side" Yard, facing east, showing the single main track on the left and the power crossover between the main track and the ladder track in the far distance beyond the signal.



- (10) At the east end of the power crossover shown in photo above, facing east, showing main track on left and two hand throw switches to "Empty Side" Yard Tracks Nos. 1, 2 and 3. We propose that these two hand throw switches be powered.



(11) At MP N 284.5, facing west toward the 663 ft. long Montgomery Tunnel on Main Track No. 2 straight ahead. The tunnel on Main Track No. 1 is partially obscured to the left. A No. 20 power crossover between the main tracks is in the foreground.



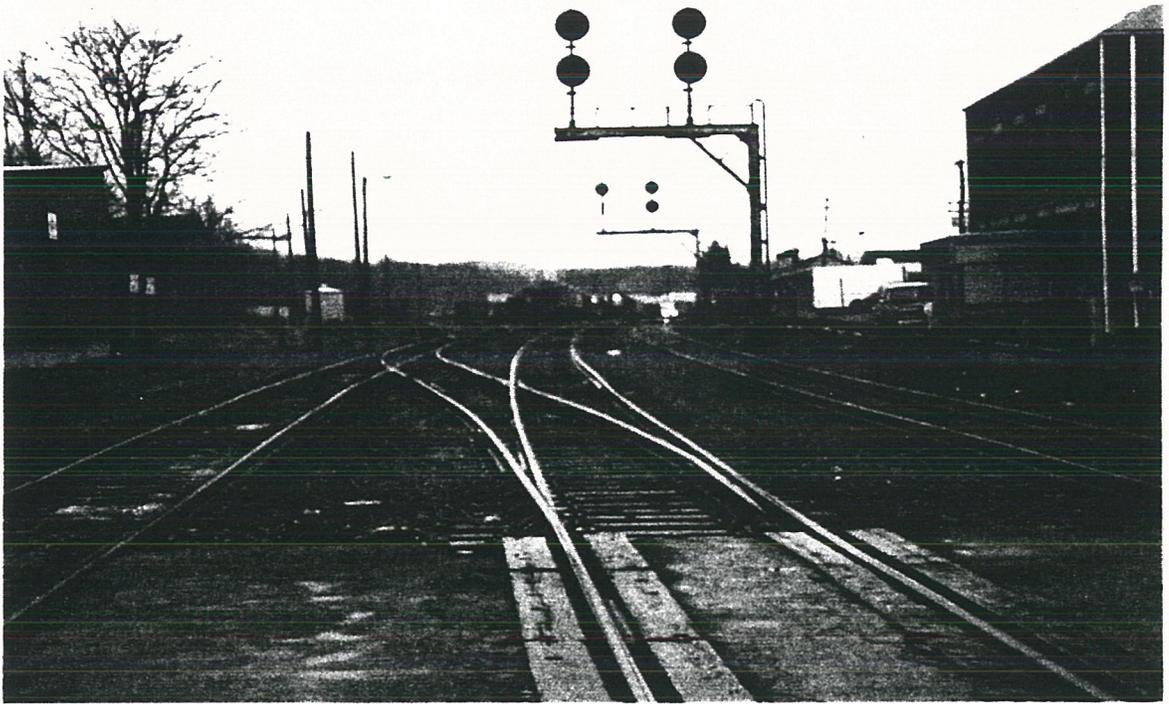
(12) At MP N 289.7, standing on Main Track No. 1, facing west, showing Christiansburg station building. Proposed passenger train would occupy Main Track No. 1 at the station.



(13) At MP N 297.5, facing east at Walton, showing the line to Bluefield diverging to the left and beginning of the single track railroad to Bristol on the right.



(14) At MP NB 297.8, facing west, where the line to Bristol diverges to the left and the subgrade of an abandoned second main track is shown on the left.



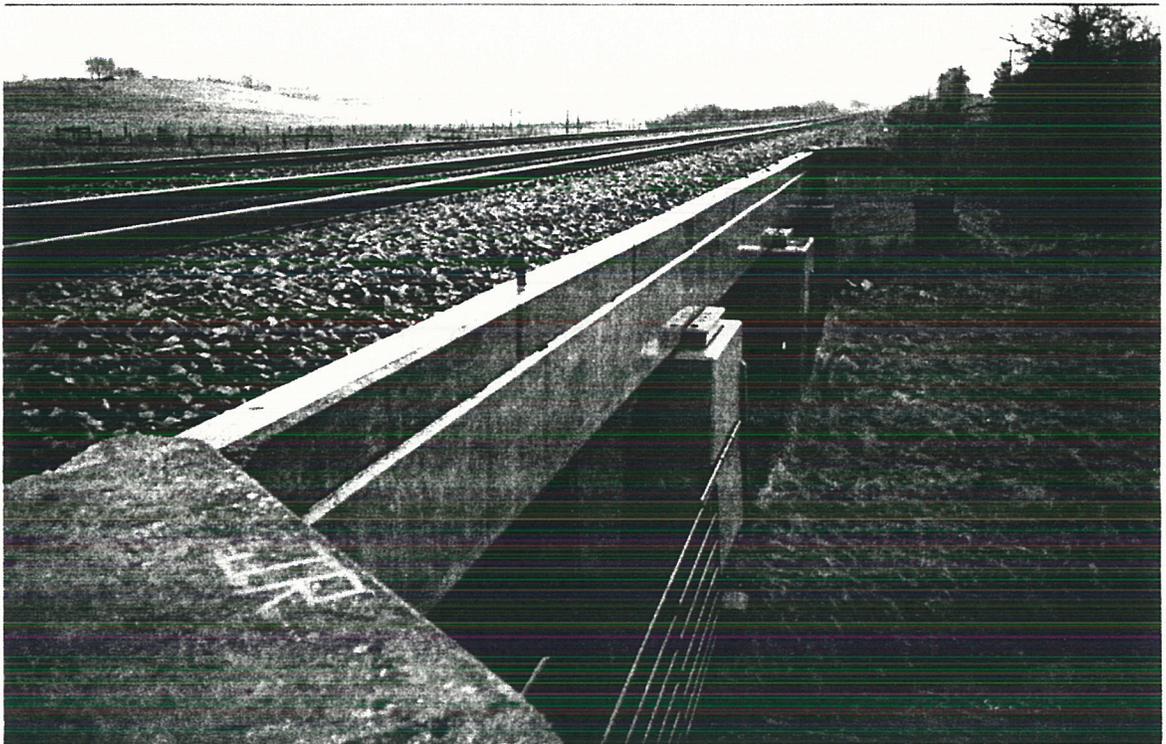
(15) MP NB 300.8, facing east at Harrison Street in Radford at the west end of Radford Yard. The passenger station is to the right of Main Track No. 1 on the far right and beyond the signals.



(16) MP NB 310.5, New Bern, facing west, showing the west switch at Wysor Siding and terrain in the far distance where a siding extension is proposed. Clearance is available on the right side of main track at the highway overpass, MP NB 312.59, in the distance.



(17) MP NB 323.3, facing west at west end of Clark Siding (Gunton Park), showing at-grade crossing, MP NB 323.5, in the far distance. Roadbed grading would be necessary to extend Clark Siding westward.



(18) At MP NB 347.12, facing west, showing a new 72 ft. long, ballast deck, concrete slab bridge over South Fork. This is near the center of a new 11,000 ft. long controlled siding at Crockett, between Wytheville and Rural Retreat.



(19) MP NB 352.5, facing west between Rural Retreat and Marion, showing a typical cut section required for constructing a roadbed and limited reversing tangent between $1^{\circ}50'$ curve and 3° curve in the far distance.



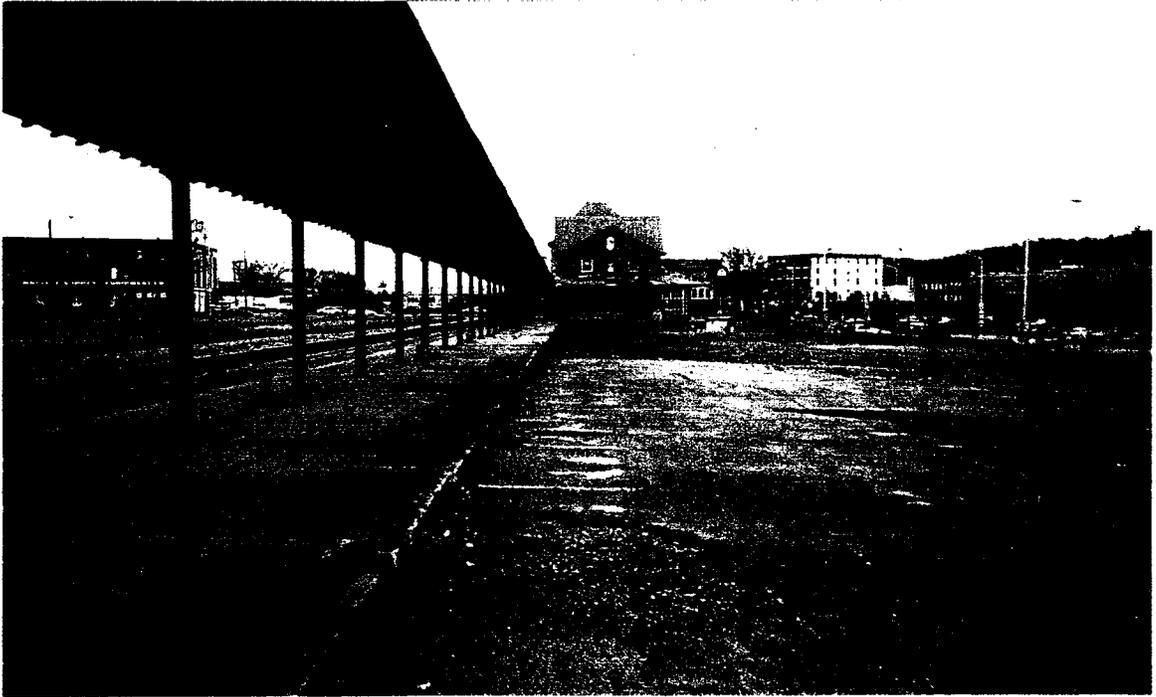
(20) At MP NB 406.3, Bristol, facing west, showing main track to left, lead to wye track at far right, and passenger station left of center in far distance.



- (21) Facing east at the east end of the old Bristol passenger station platform, showing where a spur track can be constructed from the main track to serve the passenger station.



- (22) Facing west from east of the old Bristol passenger station, showing where a passenger train spur track could be constructed to serve passengers off of the main track and provide a servicing and layover track.



(23) Facing west at the east end of the canopy at the old Bristol passenger station, showing where a passenger spur track could be constructed.



(24) Several blocks north of Bristol passenger station, showing where the wye track lead shown in Photo No. 20 connects with the wye track at Commonwealth Street. The wye track is necessary for turning the passenger train.



- (25) The west leg of the Bristol wye track is shown above. The jointed rail should be replaced and cross-ties renewed, if this track is to be used for passenger train service.



- (26) The east leg of the Bristol wye track is shown above. Track rehabilitation is required to assure that non-control cooled rails and defective cross-ties are removed.



(27) MP PH 6.5, facing west between Phoebe and Campbell, showing subgrade available for a siding.



(28) MP N 186.8, facing west at the SR647 overpass between Concord and Appomattox, showing space available for a second track.



(29) MP N 175.8 at Evergreen, between Pamplin and Appomattox, facing west, showing available subgrade for a second track.



(30) MP N 149.1, facing east at Farmville, showing that a new siding will require cut excavation and fill where there is irregular terrain.

Attachment Q

**Photographic Study
of the
South Richmond Terminal**

Photos Taken Between

March 1 and 17 and

on June 1, 2001



- (1) MP F 137.5, facing easterly (railroad north) near the westerly end of Belle Isle Yard, South Richmond. The main track at right and yard lead beyond are usually occupied with switching operations. Passenger trains will require a bypass track, which can be constructed to the left, as described as Project No. 1 in Attachment N-4.



- (2) Facing easterly at the west end of Belle Isle Yard. The proposed bypass track described as Project No. 1 would end at this point, and the passenger trains would utilize the rehabilitated main track, as described as Project No. 2 in Attachment N-4.



- (3) Adjacent to Belle Isle Yard. There is insufficient space between the existing main track and the James River to construct a bypass track at this location.



- (4) No. 3 in Attachment N-4 would begin in the vicinity of the telephone/power line pole and continue easterly toward the South Richmond Yard Office.



(5) Facing easterly, from the same location as Photograph No. 4. The bypass track described as Project No. 3 in Attachment N-4 would be at the left of this photograph.



(6) Facing easterly near MP F 139.0 at the Commerce Road overpass. The bypass track described as Project No. 3 in Attachment N-4 would connect to the yard track (to be rehabilitated) at the left of the photograph.



- (9) Facing easterly and continuing on the route that would be taken by passenger trains between Belle Isle Yard and the proposed CSX connection. The track on this route must be rehabilitated with CWR and cross-tie renewals, as part of Project No. 4.



- (10) Facing westerly along the route of the passenger trains, showing storage tracks full of cars in the far distance, a rail museum located on Hull Street on the right, and the route to the CSX connection in the center of the photograph that would be rehabilitated as a part of Project No. 4.



- (11) Standing on CSX main track facing toward Richmond, showing NS/CSX track crossing in foreground, CSX bridge over Walker's Canal in the distance, and a flood wall and flood gate. The Harris Study Plan connects NS with CSX tracks in the northwest quadrant of the crossing, and is described as Project No. 5 in Attachment N-4.

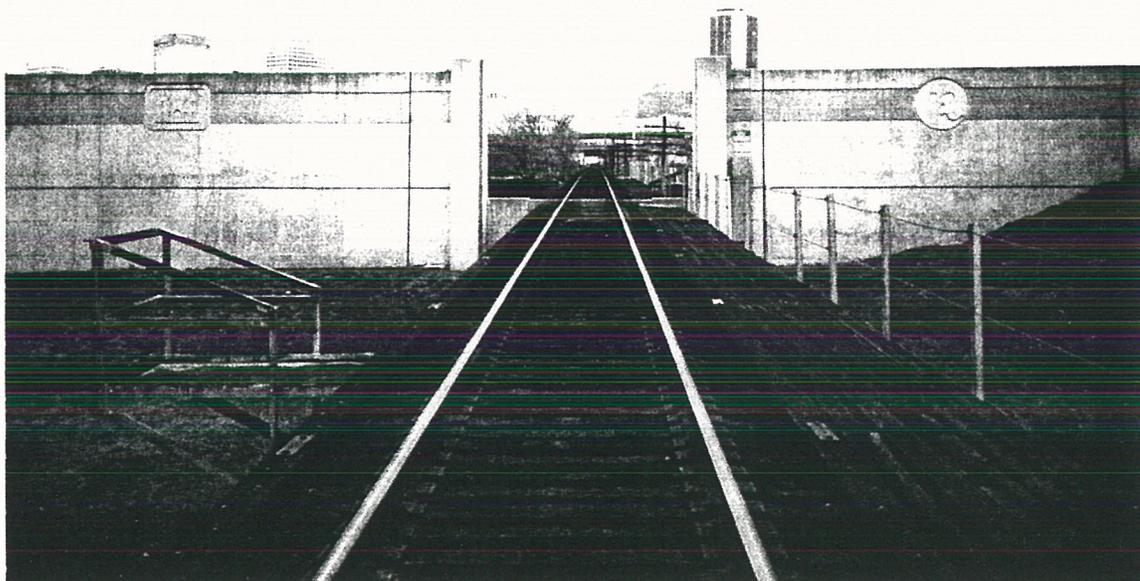


- (12) Standing at the edge of Walker's Canal; facing toward Richmond, showing where the Harris Study Plan connecting track bridge alignment would connect to the CSX bridge in the distance, as a part of Project No. 5.



(13) Facing southerly on CSX bridge over Walker's Canal about where the Harris Study Plan connecting bridge would intersect the CSX bridge from the right, as a part of Project No. 5.

(14) Facing northerly toward downtown Richmond, standing about where the Harris Study Plan turnout to the new connection would be located (see Project No. 5). In the foreground are the flood gate and wall, and the CSX bridge over the James River in the far distance.





- (15) Standing on CSX main track south of NS/CSX track crossing and facing northwest, showing the lead to the flour mill, which crosses Walker's Canal on a trestle beyond the red stop sign to the right. The Harris Study Plan track must cross this industrial lead.



- (16) Facing north at the switch to the flour mill lead running straight ahead. The track that diverges to the left is an NS lead that parallels the CSX main track behind the camera. The Woodside Plan would place a crossover between them to permit push/pull passenger train rerouting, as described as Project No. 6 in Attachment N-4.

Attachment Q

Attachment R

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review

Based on field observations and the assumption that passenger trains may have higher authorized train speeds than present freight and intermodal train speeds, we suggest that, in addition to adjusting the track circuits or Grade Crossing Predictors (GCP) that control automatic grade crossing warning systems for the higher speeds, the 48 grade crossings listed in this Attachment U be considered for upgrading and/or further review for other action.

The following is a summary of the order of magnitude estimates to upgrade grade crossing warning systems on all 48 of the grade crossings listed in this Attachment U:

<u>Line</u>	<u>\$ (Millions)</u>
Lynchburg to Roanoke	\$0.71
Roanoke to Walton	0.47
Walton to Bristol	<u>3.75</u>
Subtotal	\$4.93
Lynchburg to Burkeville	\$1.33
Burkeville to S. Richmond	<u>4.03</u>
Subtotal	\$5.36
Total	\$10.29

Our cost estimates for upgrading grade crossing warning systems are based on the following:

1. Construct a new automatic at-grade crossing warning system with flashing lights and gates, but not including cantilever flashing lights:

	<u>\$ (Millions)</u>
• Flashing lights, gates and grade crossing predictors	\$0.195
• Engineering	0.010
• Contingencies	<u>0.030</u>
Total	\$0.235

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review (Cont'd)

Note: Assumes installation is made in ABS territory with electrical power available. Add \$25,000 if electrical service is required.

\$ (Millions)

2. Add gates to existing flashing lights:

• Add gates to flashing lights and install grade crossing predictors.	\$0.125
• Engineering	0.010
• Contingencies	<u>0.020</u>
Total	\$0.155

These estimates do not include the costs of adjusting existing automatic grade crossing warning systems for FRA prescribed warning times for higher speed passenger trains which the Virginia Division has estimated at a cost of \$2.3 million.

1. Lynchburg-Roanoke Line

Listed below are three (3) at-grade crossings which may require upgrading if proposed passenger trains operate at speeds higher than existing freight train speeds. Currently, each of these crossings has a passive warning system. The order of magnitude cost estimate is \$235,000 each or a total cost of \$705,000.

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
N 230.3	Abrasive Ave.	Passive Sign	The sight distance are restricted. Close this crossing and reroute traffic to nearby underpass.
N 243.75	Unnamed	Passive Sign	Sight distance very restricted. This road serves at least 2 houses. Recommend flashing lights and gates.
N 255.2	Private	Passive Sign	Road Serves Mini Storage Area used by Public. Limited Sight Distance. Recommend flashing lights and gates.

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review

(Cont'd)

2. Roanoke-Walton Line

Listed below are two (2) at-grade crossings which may require upgrading if proposed passenger trains operate at speeds higher than existing freight train speeds. Currently, each of these crossings has a passive warning system. The order of magnitude cost estimate to install flashing lights and gates is \$235,000 each, or a total cost of \$470,000 for these two crossings.

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
N 281.6	Basham Hollow (CR 637)	None	View conditions and sight distances are very limited.
N 284.1	Crown Road	None	View conditions and sight distances are limited.

3. Walton-Bristol Line

Listed below are nineteen (19) at-grade crossings which may require upgrading if proposed passenger trains operate at speeds higher than existing freight train speeds. Nine (9) of these crossings have only flashing lights and the addition of gates is recommended. The remaining ten (10) at-grade crossings have either no warning systems or passive warning systems.

The following is an order of magnitude cost estimate to upgrade these warning systems.

	<u>\$ (Millions)</u>
• Add gates to existing flashing lights (9 x \$155,000 ea.)	\$1.40
• Construct flashing lights and gates (10 x \$235,000 ea.)	<u>2.35</u>
Total Cost	\$3.75

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review
(Cont'd)

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
NB 307.6	SR617	Flashing Lights	Recommend that gates be added.
NB 308.1	Cemetary Road	Flashing Lights	Recommend that gates be added. View conditions are poor.
NB 335.0	Nye Springs Road	Flashing Lights	Recommend that gates be added.
NB 349.8	Miller Street	Crossbuck	Either add flashing lights and gates or close the crossing.
NB 350.3	Cherry Street	Crossbuck	This street serves many houses. Recommend that flashing lights and gates be added.
NB 350.5	SR 676	Crossbuck	Some houses are accessed. Recommend flashing lights and gates.
NB 353.7	SR679	Flashing Lights	Recommend that gates be added.
NB 356.3	Private	None	Access to 4 houses and a mill. View conditions are poor. Recommend that flashing lights and gates be added
NB 358.6	VA Highlands Ave.	Flashing Lights	There are many residences served by this road. Recommend that gates be added.
NB 361.5	SR714	Flashing Lights	Recommend that gates be added.
NB 364.2	Prater Lane	Crossbuck	Recommend either close the crossing or add flashing lights and gates.

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review
(Cont'd)

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
NB 364.5	Chilhowie Street	Flashing Lights	This street has a substantial amount of traffic. Recommend installing flashing lights and gates.
NB 368.8	Convict Road	Crossbuck	Review in the field for possible improvement.
NB 373.2	Tattle Bridge Road	Flashing Lights	This is the main road to Chilhowie. Recommend that gates be added.
NB 380.4	Boxwood Street	Crossbuck	Recommend that flashing lights and gates be added.
NB 384.5	Bittersweet Drive, SR738	Crossbuck	Recommend flashing lights and gates.
NB 395.3	Repass Street, SR883	Flashing Lights	Serves many residences and has poor view condition. Recommend that gates be added.
NB 396.8	Milton Drive	Crossbuck	Recommend that crossing be closed to accommodate our proposed siding.
NB 402.9	Private Crossing	None	Crossing serves junk yard and house. Consider a warning system.

4. Lynchburg-Burkeville Line

Listed below are seven (7) at-grade crossings which may require upgrading if proposed passenger trains operate at speeds higher than existing freight train speeds. Four (4) of these crossings have only flashing lights and the other three (3) have no passive signs.

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review

(Cont'd)

The following is an order of magnitude estimate to upgrade these crossings, by adding gates and flashing lights or constructing a new automatic grade crossing warning system with flashing lights and gates:

	<u>\$ (Millions)</u>
• Add gates to existing flashing lights (4 x \$155,000 ea.)	\$0.62
• Construct new flashing lights and gates (3 x \$235,000 ea.)	<u>0.71</u>
Total Cost	\$1.33

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
PH 0.10	Private	Crossbuck	Frequently used roadway. Sight distances and view condition are limited. Consider use of flashing lights and gates.
N 162.3	SR 751	Flashing Lights only.	Recommend adding gates.
N 158.6	SR 649	Flashing Lights only.	Recommend adding gates.
N 156.5	SR 648	Flashing Lights Only	Recommend adding gates.
N 142.9	SR 601	Flashing Lights only.	Sight distances and view conditions are limited. Recommend adding gates.
N 141.7	SR 600		Sight distances are poor. Recommend adding gates.
N 138.0	SR 610		Recommend adding gates.

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review

(Cont'd)

5. Burkeville-Richmond Line

Listed below are seventeen (17) at-grade crossings which may require upgrading if proposed passenger trains operate at speeds higher than existing freight train speeds. Five (5) of these crossings have only flashing lights and twelve (12) have either no warning system or passive signs.

The following is an order of magnitude cost estimate to upgrade the warning systems for these crossings:

	<u>\$ (Millions)</u>
• Add gates and flashing lights to five crossings (5 x \$155,000 ea.)	\$0.78
• Construct flashing lights and gates (12 x \$235,000 ea.)	<u>2.82</u>
Subtotal	\$3.60
• Add \$25,000 for each crossing for power supply in non-block signal territory (17x \$25,000 ea.)	0.43
Total Cost	<u>\$4.03</u>

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
F 88.9	SR 661	Passive	Road has been resurfaced and widened and there is heavy traffic. Recommend flashing lights and gates.
F 89.9	Private but called Melody Lane	None	Heavily traveled and many trucks.
F 90.4	SR 647	Flashing Lights only	Recommend adding gates.
F 91.7	SR 670	Passive	Recommend flashing lights and gates.

Attachment R

Grade Crossings On The Virginia Division Suggested For Further Review

(Cont'd)

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
F 95.4	SR 679	Flashing Lights only	Limited sight distance recommend that gates be added.
F 96.5	SR 640	Flashing Lights only.	Recommend adding gates.
F 96.8	SR 1101	Passive	Recommend flashing lights and gates.
F 97.9	SR 665	Flashing Lights only	Sight distance limited by a curve, many trucks, recommend that gates be added.
F 99.7	Private	Passive	Many logging trucks. Recommend flashing lights and gates.
F 100.5	Private	Passive	Roadway serves residences and curve limits sight distances.
F 104.3	SR 1015	Passive	Crossing has heavy traffic. Recommend flashing lights and gates.
F 104.9	Private	None	Road serves 3 houses. Recommend further review.
F 106.6	SR 630	Flashing Lights only	Recommend that gates be added.
F 107.3	Private	None	At least 6 residences utilize the road crossing. Recommend further review.
F 112.9	SR 635	Passive	Roadway serves many residences and cut obscures view condition. Recommend for further study.
F 116.9	Private	Passive	Roadway serves at least 3 houses, sight distances are limited.

Attachment R**Grade Crossings On The Virginia Division Suggested For Further Review**
(Cont'd)

<u>Milepost</u>	<u>Crossing Name</u>	<u>Current Warning System</u>	<u>Comments</u>
F 134.8	Private	Passive	Roadway serves a swim and tennis club. Recommend further review.

Attachment S

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