4 ENVIRONMENTAL CONSEQUENCES

A condensed format was used for this Final Environmental Impact Statement (EIS), as clarified in the Executive Summary of this report.

The discussion on environmental consequences in this chapter summarizes the potential effects on the human, physical, and natural environments that may result from the construction and operation of the Preferred Alternative for the Richmond to Raleigh Project. All references to "Study Area" and "Project" below pertain to the Richmond to Raleigh Project, unless otherwise noted.

As discussed in Chapter 2, the Preferred Alternative was selected as the "best-fit" from the three alternative alignments presented in the Tier II DEIS within each of the 26 sections of the Project. The impacts presented in this chapter are therefore based on the proposed preliminary engineering designs for the Preferred Alternative, composed of the recommended rail alignment within each section and its associated roadway modifications.

As presented in Chapter 2, and further discussed in this chapter, several changes have been made to the railroad and roadway designs for the Preferred Alternative (from the alternative designs presented in the Tier II DEIS), to avoid or minimize impacts to human, physical or natural resources. To further mitigate impacts of the Preferred Alternative on affected resources, other mitigation measures are also identified, and are discussed within the resource sections, as applicable.

4.1 WATER RESOURCES

Potential Project impacts to streams, wetlands, and other jurisdictional waters are discussed in the following sections, followed by discussion of potential permits required. Clean Water Act - Waters of the US, Clean Water Act Permits, Construction Moratoria, Chesapeake Bay Preservation Act regulations, North Carolina River Basin Buffer Rules, and Rivers and Harbors Act Section 10 - Navigable Waters are addressed. Stormwater, floodplain, and Wild and Scenic Rivers Act impacts are also discussed. Avoidance and minimization of impacts to these resources, and mitigation for unavoidable impacts to wetlands and streams are addressed in Sections 4.1.5 and 4.1.6.

4.1.1 SURFACE WATERS

Impacts to the surface waters described in Section 3.1.1 are likely to result from activities associated with Project construction, such as clearing and grubbing on stream banks, riparian canopy removal, in-stream construction, extending or replacing existing pipes and culverts, bridge construction, fertilizer and pesticide application during re-vegetation, and railroad installation.

Erosion associated with construction activities can be 200 times greater than that from cropland and 2,000 times greater than that naturally occurring in woodlands. The majority of the Study Area is located in woodland areas. Erosion problems associated with construction activities include water pollution, flooding, stream channel damage, decreased groundwater storage, slope failures, damage to adjacent and/or downstream properties, and the time and costs associated with addressing these issues.

The following impacts to surface water resources could potentially result from Project construction activities:

- Changes in light incidence and water clarity due to forest clearing, necessary for the maintenance of the railroad corridor
- Changes in and destabilization of water temperature due to increased light incidence from vegetation removal

- Increased sedimentation as a result of vegetation removal primarily from access roads and skid trails
- Increased sedimentation from erosion in the Study Area associated with grading new alignments and repairing old slopes on the existing railroad corridor
- Alteration of water levels and flows due to interruptions and/or additions to surface and groundwater flow from construction
- Alteration of stream discharge due to silt loading and changes in surface and groundwater drainage patterns
- Channel alteration from stream crossings because culverts are often under or oversized causing destabilization of the stream channel morphology up and downstream
- Increased siltation downstream of the stream crossings as culverts are repaired or installed
- Increased nutrient loading during construction via runoff from exposed areas
- Increased potential for release of toxic compounds such as fuel and oil from construction equipment and other vehicles

VDRPT and NCDOT will minimize construction related impacts by implementing erosion and sediment control (ESC) measures on construction sites to prevent soil movement/loss in the first place, enhance Project aesthetics, reduce complaints, and most importantly, eliminate appreciable damage to off-site receiving channels, property and natural resources.

In order to minimize potential impacts to water resources in the Study Area, VDRPT and NCDOT will strictly enforce the most recent edition of VDCR's Erosion Sediment Control Handbook and NCDOT's Best Management Practices for the Protection of Surface Waters during the construction phase of the Project.

VDRPT and NCDOT will limit in-stream activities and re-vegetate streambanks immediately following the completion of grading in order to further reduce impacts. In addition, whenever possible, VDRPT and NCDOT will use bridges or bottomless culverts to maintain adequate fish passage and stream channel morphological integrity.

4.1.1.1 *STREAMS*

Jurisdictional streams in the Study Area have been designated as warm water streams for the purposes of stream mitigation. Potential Project impacts to 40,679 linear feet of jurisdictional intermittent and perennial channels, including 3,651 linear feet of Section 303(d) listed streams are anticipated. Stream impacts were calculated by determining the length of field-delineated jurisdictional channel within 25 feet of the Project slope-stake line. As noted in Section 3.1.1, more detailed identification of the nature of affected streams (e.g. perennial/intermittent classification) will take place during Section 401 Water Quality Certification (33 U.S.C. § 1341) and Section 404 permitting required by of the Clean Water Act (CWA) (33 U.S.C. § 1344). The Project is not anticipated to cause or contribute to significant degradation of 303(d) listed streams or other jurisdictional aquatic resources.

4.1.1.1.1 **VIRGINIA**

Potential Project impacts (in linear feet) to streams in the James, Chowan, and Roanoke River Basins in Virginia are summarized by section in Table 4-1. The portion of these impact totals that are Section 303(d)-listed streams are also tabulated.

Potential Project impacts to streams in the James River basin were the same for each of the three Virginia alternatives, so selection of Alternative VA1 as the Preferred Alternative for these sections offers no advantage for impact minimization.

In the Chowan River Basin, the Project alternative with the least potential impact to streams was selected for all sections except for Sections B and D. Alternative VA1/VA3 was selected for

Section B in part to minimize noise impacts, business relocations, and to maintain operating speed to meet purpose and need. In Section D, a new alternative (VA4) was developed to avoid effects to an historic property, avoid impacts to a Michaux's sumac population, and reduce wetland impacts compared with alternative VA2. Refer to Chapter 2 for additional discussion regarding selection of the Preferred Alternative in these sections.

In the Roanoke River Basin in Virginia, the Project alternative with the least potential impact to streams was selected as the Preferred Alternative for all sections.

Streams to be potentially impacted in Virginia include Goode Creek (S010, S010A); No Name Creek (unnamed tributary to the James River; S025A, S025B, S025C, & S029); Kingsland Creek (S035); Proctors Creek (S040); Oldtown Creek (S071); and Buckskin Creek (S178) on the 303(d) list due to *Escherichia coli*. Kingsland Creek and Timsbury Creek (S059A) are also listed due to pH. Proctors Creek and Oldtown Creek are listed due to Benthic Macroinvertebrate Bioassessments. Rowanty Creek and tributaries (S103, S103A, & S104) and Hatcher Run (S107) are listed due to Dissolved Oxygen and Hatcher Run is also listed due to Mercury in Fish Tissue.

Table 4-1
Potential Impacts to Stream Channels in Virginia (linear feet)

Section	River Basin	Streams	303(d) Listed Streams
AA	James	3,919	2,391
BB		2,078	28
CC		2,405	31
James Subtotal:		**8,402**	**2,450**
DD	Chowan	585	85
A		3,094	284
B		760	0
C		2,803	203
D		1,998	0
E		860	0
F		1,004	0
G		510	0
H		2,808	0
Chowan Subtotal:		**14,422**	**606**
I	Roanoke, VA	22	0
J		420	0
K		1,419	0
L		497	0
Roanoke, VA Subtotal:		**2,358**	**0**
VA Total:		**25,182**	**3,056**

4.1.1.1.2 NORTH CAROLINA

Potential Project impacts to streams in the Roanoke, Tar-Pamlico, and Neuse River Basins in North Carolina are summarized by section in Table 4-2.

Potential Project impacts to streams in North Carolina have been minimized through selection of the Project alternative affecting the least linear footage for all sections except for Sections L, O, T, and U. In Sections L and O in the Roanoke River Basin, the Preferred Alternatives are Section 4(f) avoidance alternatives, which necessitate additional stream impacts. In Sections T and U in the Tar-Pamlico River Basin, selection of Preferred Alternative was based on many factors including operating speed, operability and construction limitations. Refer to Chapter 2 for additional discussion regarding selection of the Preferred Alternative in these sections.

Streams potentially impacted in North Carolina include Perry Creek (S487) and Marsh Creek (S495) on the Section 303(d) list due to Ecological/Biological Integrity - Benthos. Fishing Creek (S370) is 303(d) listed due to Dissolved Oxygen.

Table 4-2
Potential Impacts to Stream Channels in North Carolina (linear feet)

Section	River Basin	Streams	303(d)
L	Roanoke, NC	2,005	0
M		442	0
N		42	0
O		53	0
P		777	0
Roanoke NC Subtotal:		**3,319**	**0**
N	Tar-Pamlico	344	0
O		3,049	565
P		755	0
Q		1,127	0
R		438	0
S		1,620	0
Tar-Pamlico Subtotal:		**7,333**	**565**
T	Neuse	415	0
U		3,394	0
V		1,036	95
Neuse Subtotal:		**4,845**	**95**
NC Total:		**15,497**	**660**

The James, Appomattox, Nottoway, Meherrin, and Roanoke Rivers in Virginia; and the Tar and Neuse Rivers in North Carolina are Navigable Waters under Section 10 of the Rivers and Harbors Act. As discussed in Chapter 4.14.3.1, the three proposed rail alternatives are on common alignment at the crossings of these rivers and major creeks (Cedar Creek and Crabtree Creek in North Carolina).

4.1.1.2 *RIPARIAN AREAS AND OTHER JURISDICTIONAL WATERS*

Within Tidewater Virginia, the Chesapeake Bay Preservation Act (Va. Code Ann. § 10.1-2100) (CBPA) regulates Chesapeake Bay Preservation Areas that include land areas adjacent to water bodies. Within the Study Area, the cities of Richmond, VA, Colonial Heights, VA, and Petersburg, VA, as well as Chesterfield County, VA, are subject to the CBPA. Chapter 20

Section 9VAC 10-20-150 of the CBPA, "Nonconformities, exemptions, and exceptions," excludes public utilities, railroads, public roads, and facilities from the requirements of the CBPA. The Project is subject to this exemption, provided that the Project and related construction activities follow local, state, and Federal water quality regulations. The Project is committed to complying with all applicable water quality regulations and permit requirements, as well as to minimizing all impacts to water quality as designs are finalized. This includes complying with the Virginia Erosion and Sediment Control Law (§62.1-44.15:51 *et seq*.) and the Virginia Stormwater Management Act.(§62.1-44.15:24 *et seq*).

Streamside riparian zones within the Study Area in North Carolina are protected under provisions of the Tar-Pamlico and the Neuse River Basin Riparian Buffer Rules (15A NCAC 02B .0259 and 15A NCAC 02B .0233, respectively) administered by NCDWR. The rules protect two riparian zones: Zone 1 extends 30 feet from stream bank and Zone 2 extends from 30 to 50 feet from the stream bank. Table 4-3 summarizes the potential impacts (in square feet) to each riparian buffer zone for each section of the Project in the Tar-Pamlico and Neuse River Basins.

Table 4-3
Potential Impacts to Tar-Pamlico and Neuse Riparian Buffers (square feet)

Section	Zone 1	Zone 2	Total
N	21,964	16,097	38,061
O	145,656	115,503	261,159
P	48,940	33,741	82,681
Q	77,743	61,031	138,774
R	23,935	13,337	37,272
S	104,397	73,537	177,934
Tar-Pamlico:	**422,635**	**313,246**	**735,881**
T	25,937	17,638	43,575
U	219,901	148,808	368,709
V	71,017	55,067	126,084
Neuse:	**316,855**	**221,513**	**538,368**
Total:	**739,490**	**534,759**	**1,274,249**

The Tar-Pamlico and Neuse River Basin Riparian Buffer Rules provide that:

- Railroad crossings that impact equal to or less than 40 linear feet of riparian buffer are exempt.
- Railroad crossings that impact greater than 40 linear feet but equal to or less than 150 linear feet or one-third of an acre (14,520 square feet) of riparian buffer are allowable provided that there are no practicable alternatives.
- Railroad crossings that impact greater than 150 linear feet or one-third of an acre of riparian buffer will require mitigation.

Based on the buffer impacts listed in Table 4-3, as well as the linear footages of the corresponding stream impacts (from Table 4-2), mitigation will be required for impacts to riparian buffers at each stream crossing in North Carolina. Mitigation for impacted riparian buffers, where required, will be coordinated directly with NCDWR.

As described in Chapter 2, recommendations for the preferred alternative in Sections O, T, and U were based on avoidance of resources other than streams, and subsequently do not result in the least impacts to riparian buffers.

Other Jurisdictional Surface Waters - The Project will potentially affect other jurisdictional waters (such as lakes, ponds, and reservoirs). Potential Project impacts (in acres) to other waters in the Chowan and Roanoke River Basins in Virginia are summarized by section in Table 4-4. The alternatives selected for each of the Virginia sections with potential impacts to lakes, ponds, and reservoirs were not necessarily the ones involving lowest impact to other waters. Other water resources (streams, wetlands, riparian buffers) were assigned more value in determining the least environmentally damaging practicable alternative, consistent with the relative environmental value of man-made lakes, ponds, and reservoirs versus natural streams, rivers, riparian areas, and wetlands.

Table 4-4
Potential Impacts to Other Jurisdictional Surface Waters in Virginia

Section	River Basin	Impact (acres)
AA	James	0.7
BB		0.4
CC		0.03
	James Subtotal:	**1.13**
DD	Chowan	**1.7**
A		**0.4**
D		**0.2**
E		**0.01**
H		**0.06**
	Chowan Subtotal:	**2.37**
K	Roanoke, VA	0.1
L		0.3
	Roanoke, VA Subtotal:	**0.4**
	VA Total:	**3.9**

Potential Project impacts (in acres) to other waters in the Roanoke, Tar-Pamlico, and Neuse Rivers Basins in North Carolina are summarized by section in Table 4.5. Selection of the alternative having the least impacts to other waters was recommended for all North Carolina sections with the exception of Sections L and U. As described in Section 4.1.1.1, other factors more heavily influenced the recommendation of the Preferred Alternative for these sections. Refer to Chapter 2 for additional discussion regarding selection of the Preferred Alternative in these sections.

Table 4-5 Potential Impacts to Other Jurisdictional Surface Waters in NC		
Section	**River Basin**	**Impact (acres)**
L	Roanoke, NC	1.25
O		0.16
P		0.03
	Roanoke, NC Subtotal:	**1.44**
P		0.001
R		0.002
S		0.01
	Tar-Pamlico Subtotal:	**0.013**
U		0.24
	Neuse Subtotal:	**0.24**
	NC Total:	**1.693**

Water Supply Reservoirs - No direct impacts to water supply reservoirs are contemplated by the Project in VA or NC.

4.1.1.3 *STORMWATER/DRAINAGE*

Increased stormwater runoff from Project development can impact stream channel networks and land surfaces through two means: longer-term impacts caused by runoff from increased impervious surface and short-term impacts caused by land disturbance during construction. These separate impacts are discussed in this section, followed by a discussion regarding strategies for mitigation.

The Project will increase the amount of impervious surface in the watersheds, which can cause increased stormwater runoff. Stormwater runoff from roadways carries substantial quantities of silt, heavy metals, petroleum products, nitrogen, and phosphorus. These materials can potentially degrade water quality and aquatic habitat integrity. The effects on water quality depend on the size of the waterways crossed and the number of such crossings. In general, additional road runoff as a result of the Project will be minimal because the increases in impervious surface are small. Streams with low flow are more severely affected since they have less volume to dilute the runoff.

Stormwater runoff from railroads is less pronounced than that from roadways because much of the railroad corridor is permeable to rainfall (i.e., ballast and side slopes). However, some runoff will collect in ditches adjacent to the railroad corridor. This runoff may carry similar pollutants to and have similar impacts to surface waters as runoff from roadways with shoulders.

Short-term impacts on water quality within the Study Area may result from soil erosion and sedimentation due to land-disturbing activities during construction. Land-disturbing activities include construction of the tracks, bridges, communication facilities, and other related structures and facilities of the railroad, including road crossings and alterations, as well as clearing of ROW, staging areas, access roads, and borrow/spoil areas. Construction-related impacts are likely to be similar for road and rail. Uncontrolled erosion and sedimentation can potentially destroy aquatic algae, eliminate benthic macroinvertebrate habitat, eradicate fish spawning habitat, and remove food resources for many stream species.

The Project will be designed and constructed to meet all current Federal, state, and local requirements for water quality and stormwater management. These requirements include permits,

plans, and temporary best management practices (BMPs) to manage stormwater runoff during construction, as well as design criteria for permanent rail and road runoff control and treatment measures. Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control practices and use of BMPs. The regulations and their requirements are discussed below for both Virginia and North Carolina.

Long-term impacts on water quality are also possible due to particulates, heavy metals, organic matter, pesticides, herbicides, nutrients, and bacteria that are often found in highway and railway runoff.

The Project Team will incorporate the following mitigation measures to eliminate or reduce short-term and long-term water quality impacts wherever practicable:

- Development of roadway and railway alignments that avoid streams and ponds to the extent possible
- Use of design measures to protect water quality, including avoiding stormwater discharge into public water supplies, minimizing stream crossings, and minimizing segments of roadway or railway that closely parallels streams
- Use of grass shoulders, grass lined ditches, and vegetative buffers to intercept highway/railway runoff
- Implementation of construction practices that protect stream bottom habitat from siltation by sedimentation control, retention of riparian vegetation buffers, and restoration of stream bottom habitat taken by construction
- Countersink culverts to allow unimpeded passage by fish and other aquatic organisms
- Avoid installation of bridge bents in creeks
- Avoid placing sediment and erosion control measures in wetlands or streams
- Restricting the use of scuppers (bridge deck drains) in bridges that span water bodies.

4.1.1.4 *PUBLIC WATER SUPPLIES*

Impacts to water supplies are not anticipated. Best Management Practices will be employed along the Project corridor, including erosion and sediment controls and Spill Prevention Controls and Countermeasures.

4.1.1.5 *GROUNDWATER WELLS*

The Preferred Alternative avoids direct impacts to all identified public groundwater wells with the exception of one on Ligon Mill Road in Wake Forest, NC, in Section U. It is anticipated that the impact to this well can be mitigated with a connection to a public water supply or the well will be relocated, if necessary. This issue will be addressed during the final design stage of the Project, at which time the Project Team will coordinate with the owner of the well.

The Preferred Alternative will impact a private well serving Hillcrest Mobile Home Park, located north of La Crosse, VA in Section I. The Mecklenburg County, VA, Health Department has indicated that there is sufficient land available within the Hillcrest property to accommodate relocation of the drinking water well. During final design, a suitable new water source will be identified to ensure a continuous, safe, and sanitary water source for the residents.

4.1.2 WETLANDS

Wetlands are categorized as “Waters of the United States” as defined in 33 CFR 328.3 and in accordance with provisions of Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344). These waters are regulated by the US Army Corps of Engineers (USACE). Any action that proposes to dredge or place fill material into wetlands is subject to these provisions.

Potential Project impacts (in acres) to jurisdictional wetlands in the James, Chowan, and Roanoke River Basins in Virginia are summarized by section in Table 4-6. The alternative with least impact to wetlands has been selected for each Virginia section with the exception of Sections DD, B, and D in the Chowan River basin; and Section J in the Roanoke River basin.

Table 4-6
Potential Impacts to Jurisdictional Wetlands in Virginia

Section	River Basin	Impact (acres)
AA	James	2.3
BB		5.2
CC		1.2
James Subtotal:		**8.7**
CC	Chowan	1.4
DD*		2.4
A		2.8
B		0.6
C		2.2
D		2.0
E		1.2
F		0.6
G		0.3
H		0.4
I		0.001
Chowan Subtotal:		**13.9**
I	Roanoke, VA	0.0
J		0.2
K		0.9
L		0.0002
Roanoke, VA Subtotal:		**1.1**
VA Total:		**23.7**

In Section DD, the Preferred Alternative was selected to minimize the effect to the Weldon Railroad/Globe Tavern Battlefield, which is eligible for the National Register of Historic Places (NRHP). In Section B the Preferred Alternative was selected to minimize noise impacts, business relocations and to maintain operating speed directed by the purpose and need. In Section D, the Preferred Alternative (VA4) was developed to avoid effects to an historic property, avoid impacts to a Michaux's sumac population, and reduce wetland impacts compared with Alternative VA2. In Section J, the Preferred Alternative was selected in part to avoid stream impacts. Refer to Chapter 2 for more information regarding selection of the Preferred Alternative in these sections.

Potential Project impacts to wetlands (in acres) in the Roanoke, Tar-Pamlico, and Neuse River Basins in North Carolina are summarized by section in Table 4-7. The alternative with least impact to wetlands has been selected for each North Carolina section with the exception of Sections L, N, S, T, and U. In these sections, avoidance of significant resources other than wetlands led to Preferred

Alternatives that do not have the least impact to wetlands. In Sections N and S, additional wetland impacts are recommended in order to minimize impacts to significant stream and other natural resources. Refer to Chapter 2 for additional information regarding selection of the Preferred Alternative in these sections.

Table 4-7
Potential Impacts to Jurisdictional Wetlands in North Carolina

Section	River Basin	Impact (acres)
L	Roanoke, NC	0.72
P		0.49
	Roanoke Subtotal:	**1.21**
N	Tar-Pamlico	1.25
O		0.3
P		0.42
Q		0.03
S		0.48
	Tar-Pamlico Subtotal:	**2.48**
T	Neuse	0.07
U		0.38
V		0.05
	Neuse Subtotal:	**0.5**
	NC Total:	**4.19**

4.1.3 FLOODPLAINS AND FLOODWAYS

This section discusses the potential for floodplain impacts within the Study Area. Floodplain areas were defined in Section 3.1.1 and shown in Figures 3-2 and 3-3. Data from Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) were analyzed and the FEMA zone designations were determined for the 100-year FEMA floodplains crossed by the Study Area. The alignment of the Preferred Alternative was reviewed to determine the area it will encroach on a FEMA floodplain within each section of the Project. Specific designs (i.e., including elevations) were considered. Also, the analysis considered whether the floodplain crossing was at grade or over a structure that would minimally contact the floodplain (e.g., a wide span bridge).

Table 4-8 lists the area of FEMA floodplain that will be encroached upon by section.

Reviewing the impacts at each crossing allows for determination of specific acreages of potential impact. The slope stakes (i.e., construction limits) in the current design files do not extend under the existing or proposed bridges, so no floodplain impacts are counted in these areas. Some of the structures may have piers on the floodplain. Placement of the structure piers will not be decided until final design so it is not possible to assess the floodplain impact of piers at this stage. NCDOT and VDRPT will re-examine these floodplain crossings once the final designs have been completed.

Mitigation includes designing the proposed floodplain crossing to minimize or eliminate an increase in the base flood elevation. Mitigation measures include right angle crossings and typical section reductions.

FEMA Executive Order 11988, (May, 1977) (Floodplain Management) requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy

and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities" for the following actions:

- Acquiring, managing, and disposing of Federal lands and facilities;
- Providing Federally-undertaken, financed, or assisted construction and improvements;
- Conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

Summary of Requirements

The guidelines for Executive Order 11988 address an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain. The eight steps, which are summarized below, reflect the decision-making process required in Section 2(a) of the Order.

- Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year).
- Conduct early public review, including public notice.
- Identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain.
- Identify impacts of the proposed action.
- If impacts cannot be avoided, develop measures to minimize the impacts and restore and preserve the floodplain, as appropriate.
- Reevaluate alternatives.
- Present the findings and a public explanation.
- Implement the action.

Among a number of things, the Interagency Task Force on Floodplain Management clarified the Executive Order with respect to development in floodplains, emphasizing the requirement for agencies to select alternative sites for projects outside the floodplains, if practicable, and to develop measures to mitigate unavoidable impacts.

The Project Team will coordinate with FEMA and local authorities during final design to ensure compliance with applicable floodplain management/development ordinances. Also, the NCDOT Hydraulics Unit and Virginia DRPT will coordinate with FEMA to determine if a Conditional Letter of Map Revision (CLOMR) and a subsequent final Letter of Map Revision (LOMR) are required for the Project. Floodplain development permits will be obtained from the local jurisdictions and include a no-rise/impact certification for each regulated floodplain/floodway and/or non-encroachment area crossing or a submittal for a CLOMR per 44 CFR Section 65.12.

Table 4-8
FEMA Mapped 100-Year Floodplain Impacts

Section	Preferred Alternative Floodplain Impact (acres)
AA	25.72
BB	11.4
CC	6.16
DD	4.63
A	4.67

Table 4-8 FEMA Mapped 100-Year Floodplain Impacts	
Section	**Preferred Alternative Floodplain Impact (acres)**
B	0.85
C	6.38
D	1.31
E	0.85
F	3.2
G	0.32
H	0.06
I	0
J	0
K	0.19
L (VA)	0.04
L (NC)	0
M	0
N	0
O	0
P	0
Q	0
R	0.04
S	0.42
T	0
U	0
V	1.38
Total	**67.62**

4.1.4 WILD AND SCENIC RIVERS

As stated in Section 3.1.4, there are four rivers in the Study Area designated as Virginia Scenic Rivers: the James River, Nottoway River, Appomattox River, and Meherrin River. The Nottaway River and Meherrin Rivers are listed in the Nationwide Rivers Inventory (NRI) (see Table 3-5). In North Carolina, the Tar River is listed on the NRI through the Study Area. For all of the proposed crossings, the Project alternatives cross the listed rivers on common alignments, and the river will be spanned by a bridge.

In Virginia, the Project will cross the James River on a new bridge adjacent to the existing single-track bridge. At the Appomattox River, a new parallel bridge is proposed for high speed passenger trains, located to the east of the existing single-track bridge. The Project will utilize the existing bridge piers and substructure of the bridges at the Nottaway and Meherrin Rivers (pending results of a detailed bridge investigation that would occur prior to final design). The superstructure (girders, decking and track) will be replaced at the Nottoway River, while the existing girders and decking will be retained at the Meherrin River. There is no conflict with the Wild and Scenic Rivers Act of 1968; however, coordination with the Virginia Scenic Rivers Board will be required to comply with the Virginia Scenic Rivers Act of 1970 for the new structures on the James and Appomattox Rivers.

In North Carolina, the Tar River will be crossed on the existing single-track bridge. The substructure will be utilized, as well as the superstructure (girders and decking).

4.1.5 PERMITS

A discussion of permitting requirements for impacts to wetlands and surface waters is provided below, and is followed by a discussion of permitting requirements for waters over which the US Coast Guard has jurisdiction. As discussed in Section 4.1.1, the Project is exempt from the CBPA, provided that the Project complies with all applicable local, state, and Federal water quality regulations and permit requirements. Permit applications will be filed after the ROD is signed, prior to construction.

4.1.5.1 *SECTION 404/401 PERMITS*

Wetlands and surface waters fall under the broad category of "Waters of the United States" as defined in 33 CFR 328.3 and in accordance with provisions of Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344). Any action that proposes to dredge or place fill material into surface waters or wetlands is subject to these provisions. Some excavation/dredging in waters of the U.S. may not be considered a jurisdictional activity, depending on how the activity is conducted.

The USACE issues either general or individual permits. An individual permit (IP) is generally reserved for projects with potential for substantial environmental impacts. An IP requires a full public interest review, including public notices and coordination with involved agencies, interested parties, and the general public. A general permit, either through the Nationwide Permit and the Regional General Permit programs, is reserved for only the most minor impacts to streams, wetlands, and other waters. An IP is required for impacts greater than 1/2-acre of wetlands and/or 300 linear feet streams. Impacts to jurisdictional wetlands and perennial streambed or important intermittent streambed that result from activities authorized under an IP require compensatory mitigation.

Due to the placement of fill associated with crossing over and filling in of jurisdictional waters (i.e., wetlands and surface waters), it will be necessary for the Project Team to obtain permits for the Project from the USACE, Virginia Department of Environmental Quality (VDEQ), and NCDWR. Section 401 of the CWA requires each state to certify that state water quality standards will not be violated for activities that either involve issuance of a Federal permit or license, or require discharges to waters of the United States. The USACE cannot issue a Section 404 permit until a Section 401 certification is issued. Therefore, the Project Team must apply to VDEQ and NCDWR for Section 401 Water Quality Certification as part of the permit process. Based on the assessments summarized in Sections 4.1.1 and 4.1.2, it is likely that a Section 404 IP requiring mitigation will be required for the Project. Temporary activities such as stream dewatering, work bridges, or temporary causeways that are often used during bridge construction or rehabilitation should also be included in the permit application. The USACE will determine what permit(s) will be required to authorize Project construction.

In Virginia, the Project Team will complete a Joint Permit Application to apply for a Section 404 permit, Section 401 certification (Virginia Water Protection Permit), and a subaqueous permit from the Virginia Marine Resources Commission (VMRC). The Virginia Water Protection Permit (VWPP) is a state permit which governs wetlands, surface water, and surface water withdrawals/impoundments. It also serves as § 401 certification of the Federal Clean Water Act § 404 permits for dredge and fill activities in waters of the U.S. The subaqueous permit is needed to encroach upon or over bottomlands under VMRC jurisdiction, which include submerged lands (beds of lakes, rivers, and streams) including non-tidal, perennial tributaries draining five square miles or greater. To issue the permit, the VMRC must determine that the Project is necessary, that there are no reasonable alternatives requiring less environmental disruption, and that adverse effects

do not unreasonably interfere with other private and public rights to the use of waterways and bottomlands.

The Virginia Coastal Zone Management Program was established in 1986 to protect and manage Virginia's coastal areas. This program is part of national coastal preservation effort authorized under the Coastal Zone Management Act of 1972 (16 USC 1451-1464, Chapter 33). Virginia's Coastal Zone Management area consists mostly of Tidewater Virginia as defined by the Code of Virginia §28.2-100. In particular, several localities within the Study Area are within Virginia's coastal zone, including; City of Richmond, VA, Chesterfield County, VA, City of Colonial Heights, VA, and City of Petersburg, VA. As a result, final design plans for the Project will be subject to a Federal Consistency Review, which outlines any affects to the land, water, or natural resources within Virginia's coastal zone. Regulations pertaining to the Chesapeake Bay Preservation Act are discussed in Section 4.1.1.2.

4.1.5.2 *STORMWATER PERMITS*

Since the Project would disturb more than 10,000 square feet, it must obtain a Virginia Stormwater Management Program (VSMP) general National Pollutant Discharge Elimination System (NPDES) permit (CWA Section 402) through the VDCR. A site-specific Stormwater Pollution Prevention Plan (SWPPP) will be prepared and implemented. The SWPPP outlines the steps and techniques the operator will take to comply with the terms and conditions of the permit, including water quality and quantity requirements that are consistent with the VSMP permit regulations, to reduce pollutants in the stormwater runoff from the construction site. The SWPPP also includes a description of post development stormwater management measures to be installed, including design calculations. Prior to construction, an erosion and sediment control (ESC) plan and a stormwater management (SWM) plan to ensure compliance with state law and regulations will be prepared and implemented.

In North Carolina, the Project Team may also need to obtain an NPDES permit from the NC Division of Energy, Mineral, and Land Resources (NCDEMLR). Although NCDOT has a statewide NPDES permit for roads, the railroad portion of the Project is potentially subject to NPDES permitting within urban areas. NCDEMLR will determine if such a permit is required. The requirements for this permit include public education, illicit discharge identification, and post-construction stormwater management.

In North Carolina, a sediment and erosion control permit also must be obtained from the NCDEMLR. The Project Team will implement the appropriate sediment and erosion control measures as detailed in the most recent version of the North Carolina Erosion and Sediment Control Planning and Design Manual. During final design of the Preferred Alternative, the Project Team will investigate and implement appropriate stormwater treatment measures as detailed in the most recent version of NCDEMLR Stormwater Best Management Practices Manual, which may include grassed swale treatment, preformed scour holes, other energy dissipater devices, stormwater detention basins, pipe-end treatments, and level spreaders to the extent practicable. In addition, the Project Team will develop a stormwater management plan and obtain a State Stormwater Permit prior to construction.

NCDOT and VDRPT will require the contractor(s) constructing the Project to follow contract specifications pertaining to erosion control measures (as outlined in 23 CFR Part 650, Subpart B and Article 107-13) entitled Control of Erosion, Siltation, and Pollution. These measures include the following:

- Use of dikes, berms, silt basins, and other containment measures to control runoff during construction. Regular maintenance and inspection of these structures is recommended to insure effectiveness.

- Elimination of construction staging areas in floodplains or adjacent to streams and tributaries to help reduce the potential for petroleum contamination or discharges of other hazardous materials into receiving waters.
- Rapid re-seeding of disturbed sites to help alleviate sediment loading and reduce runoff. Increased runoff from new highway surfaces can be partially mitigated by providing for grassed road shoulders and limited use of ditching.
- Careful management and use of herbicides, pesticides, de-icing compounds, or other chemical constituents to minimize potential negative impacts on water quality. Roadside maintenance crews should be well versed in the use of these chemicals.
- Avoidance of direct discharges into streams whenever feasible. Runoff effluent should be allowed to filter through roadside vegetation in order to remove contaminants and to minimize runoff velocities.

In general, sediment and erosion control measures will not be placed in wetlands or streams, outfalls will be designed to prevent adverse impacts to the receiving stream or wetland, and impacts to riparian buffers and stream bottom habitat will be minimized to the extent practicable. All relevant directives with regards to invasive species will be complied with during construction.

4.1.5.3 *US COAST GUARD PERMITS*

The USCG has jurisdiction over navigable waters (see Section 3.1.5 for discussion regarding navigable waters as defined by 33 CFR 2.05-25). A USCG permit will be required for the Project crossing of the James River near I-95 in Richmond, VA, which is subject to tidal influence. Permits are not required for the crossings of the Appomattox River, Nottoway River, Meherrin River, Neuse River, or Tar River because these waterways are not subject to tidal influence nor are they used for interstate commerce (see Section 3.1.5). In addition, a permit is not required for the crossing of Lake Gaston because the Project will use the existing bridge piers; work will involve upgrading the deck of the bridge to the Project design standards.

At the James River crossing (where all alternatives are on common alignment), the Preferred Alternative will construct a new rail bridge immediately adjacent to the existing rail bridge located between the South 14th Street and I-95 roadway bridges in Richmond, VA. The new bridge will provide an additional track that is necessary to accommodate the high speed trains associated with the Project. The bridge will provide approximately the same vertical and horizontal clearance for boats that the existing bridge provides (within one to two feet, depending on the deck material). The existing bridge is at an elevation of 26.3 feet above the average water surface.

The bridge permit will be prepared as the bridge design is developed. Coordination with the USCG has been initiated and will continue throughout the development of the Project.

4.1.6 AVOIDANCE, MINIMIZATION, AND MITIGATION EVALUATION

Mitigation is defined in NEPA regulations (40 CFR Section 1508.20 and 40 CFR Part 230) as efforts that a) avoid, b) minimize, c) rectify, d) reduce or eliminate, or e) compensate for adverse impacts to the environment. Mitigation of wetland impacts is recommended in accordance with CWA Section 404(b)(1) Guidelines (40 CFR Part 230), mitigation policy mandates articulated in the USACE/USEPA Memorandum of Agreement (MOA); Page and Wilcher 1990), Executive Order 11990 (42 FR 26961 [1977]), US Fish and Wildlife Service (USFWS) mitigation policy directives (46 FR 7644-7663 [1981]), and the USACE/USEPA New Mitigation Rule (Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (33 CFR Parts 325 and 332 and 40 CFR Part 230, effective on June 6, 2008).

Section 404(b)(1) Guidelines, the USACE/USEPA MOA, and Executive Order 11990 stress avoidance and minimization as primary considerations for protection of Waters of the US. These

efforts, and other measures that may be implemented later in the design process in consultation with the USACE, are described below.

4.1.6.1 *AVOIDANCE AND MINIMIZATION*

The Project designs attempt to maximize use of the existing rail ROW in order to avoid new impacts to aquatic resources. However, due to the need to straighten curves (to meet design speed dictated by purpose and need) or to avoid impacts to other resources (such as historic properties), there are occasions when it is necessary for Project impacts to extend outside the existing ROW. During the development of the preliminary engineering designs for each Project alternative, efforts were made to avoid and minimize impacts to wetlands and streams wherever practicable. Where stream crossings were unavoidable, they were located, within design constraints, as perpendicular as practicable, in order to minimize the length of stream impacted. Bridges are generally preferred over culverts for road crossings, to minimize impacts to streams.

4.1.6.2 *OTHER AVOIDANCE AND MINIMIZATION MEASURES*

Jurisdictional impacts have been minimized by reducing, where applicable, fill slopes at stream and wetland crossings. Conservative use of culverts and sensitive placement of drainage structures has been applied to minimize degradation of water quality and reduce adverse impacts on aquatic habitat viability in streams and tributaries. Sediment and erosion control measures will not be placed in wetlands or streams and outfalls will be designed to prevent adverse impacts to the receiving stream or wetland. Elimination of construction staging areas in floodplains or adjacent to streams, wetlands, and tributaries will help reduce the potential for petroleum contamination or discharges of other hazardous materials into receiving waters. Impacts to riparian buffers and stream bottom habitat will be minimized to the extent practicable. All relevant directives with regards to invasive species will be complied with during construction. More detailed information concerning potential impacts to "other waters" and mitigation may be developed during the final design and permitting phases of the Project.

4.1.6.3 *COMPENSATORY MITIGATION*

The purpose of compensatory mitigation is to replace the lost functions and values from the impact of a project to Waters of the US. Mitigation activities include restoration, creation, enhancement, or preservation of wetlands and streams. The amount of mitigation required is determined on a case-by-case basis. Typical mitigation ratios (amount of mitigation required compared to amount impacted) for wetland mitigation are 2:1 for restoration (meaning 2 acres must be restored for every 1 acre impacted), 3:1 for creation, from 3:1 to 9:1 for enhancement, and from 10:1 to 20:1 for preservation, depending on the type and quality of the wetland being preserved and the extent of uplands included in the preserved area. Typical ratios for stream mitigation are 2:1 (2 feet of mitigation for every 1 foot impacted) for restoration, 4:1 for enhancement, and 10:1 for preservation. In Virginia, the Unified Stream Methodology (USM), developed jointly by the Norfolk District and the Virginia Department of Environmental Quality, provides a guide for determining appropriate stream compensation requirements. Appropriate specific mitigation ratios for the Norfolk and Wilmington District USACE will be applied during the Section 404 permitting process.

DRPT and NCDOT are responsible for developing compensatory mitigation separately for the their respective portions of the Project according to 33 CFR Parts 325 and 332. This rule creates a flexible preference for the use of mitigation bank credits to satisfy requirements for mitigation, since banks can help reduce many of the risks and uncertainties associated with compensatory mitigation. The watershed approach to mitigation also provides for application of in-lieu fee programs and permittee-responsible mitigation.

In Virginia, mitigation will be provided through the use of mitigation banks and/or the Virginia Aquatic Resources Trust Fund (VARTF). The VARTF pursues stream and wetland mitigation projects throughout Virginia as an in-lieu fee program. It is administered in partnership with the USACE Norfolk District and The Nature Conservancy in Virginia. The use of the VARTF as a mitigation option is at the discretion of the appropriate regulatory agencies. There are currently 12 USACE-pending and 22 USACE-approved mitigation banks listed for the seven Norfolk District hydrologic units (HU) intersected by the Project (Regional Internet Banking Information System or "RIBITS"). However, there are no credits listed as "available" for the Roanoke River Basin or the Meherrin (03010204) HU of the Chowan River basin. Bank credit availability may not currently be adequate for potential Project wetland impacts in the Nottoway (03010201) HU or stream impacts in the Blackwater (03010202) HU of the Chowan River basin.

In North Carolina, mitigation will be provided through coordination with the North Carolina Ecosystem Enhancement Program (NCEEP) within the same HU as the potential impacts to jurisdictional waters occur. The USACE, NCDOT, and NC Department of Environment and Natural Resources entered into a MOA in July 2003 that established procedures for providing compensatory mitigation through NCEEP to offset impacts to streams and wetlands from NCDOT projects. The three parties agreed that mitigation for transportation projects should occur before impacts and using a watershed approach. Appropriate compensatory mitigation requirements for wetland and stream impacts from the Preferred Alternative will be determined in consultation with the appropriate Federal and state environmental resource and regulatory agencies.

4.2 TOPOGRAPHY, GEOLOGY, AND SOILS

4.2.1 TOPOGRAPHY

The Study Area lies in the Northern Outer Piedmont and Rolling Coastal Plain ecoregions of Virginia and the Northern Outer Piedmont Ecoregion of North Carolina. Topography of the Study Area ranges from 9 feet above sea level in Richmond, VA, to approximately 445 feet above sea level in Youngsville, NC. The various sections chosen as the Preferred Alternative are not anticipated to have an effect on area topography.

4.2.2 GEOLOGY

There is little difference in the geology along the Project alternatives through the Study Area. All alternatives pass through coastal plain sediments in Richmond, VA, and Piedmont igneous and metamorphic complexes from Petersburg, VA, through Raleigh, NC, with some isolated areas of sedimentary rock. The various sections chosen as the Preferred Alternative are not anticipated to have an effect on area geology.

Within a specific section of the Project, soil and subsurface geology may influence the levels of ground-borne vibration, especially the stiffness and internal damping of the soil and the depth to bedrock (Federal Transit Administration, 2006). See Section 4.7 for more information on specific vibration impacts.

4.2.3 SOILS

There is little difference in soil types between the Project alternatives. The soils in the Study Area will affect the constructability of the various Project sections, however they are not anticipated to be a major concern for the various sections chosen as the Preferred Alternative. Soil drainage characteristics, shrink-swell potential, and erodibility vary depending on soil types. Generally, well drained soils with low shrink swell potential and low erodibility are best suited for rail transport.

4.3 PRIME AND OTHER IMPORTANT FARMLANDS

As stated in Section 3.3 and shown in Table 3.7, substantial Prime and Important Farmlands, as well as farmlands of statewide and local importance, are located in the Study Area. As required by the Farmland Protection Policy Act (FPPA) of 1981 (7 U.S.C. 4202(a)) and North Carolina Executive Order Number 96, coordination with the Natural Resources Conservation Service (NRCS) for the Project was initiated by submittal of Form AD-1006, requesting the Farmland Conversion Impact Rating for each county in the Study Area. This coordination effort served as the basis for determining the farmland impacts of the Project alternatives. The NRCS responded by completing their portions of this form and providing a relative value of farmland that may be affected (converted) by the proposed Project. Land that was owned by CSX railroad prior to 1981 is exempt from consideration as prime or important farmland, as defined by the regulation.

The NRCS assigns ratings to potential farmland impacts in order to determine the level of significance of these impacts. The ratings are comprised of two parts. The Land Evaluation Criterion Value represents the relative value of the farmland to be converted and is determined by the NRCS on a scale from 0 to 100 points. The Corridor Assessment, which is rated on a sale of 0 to 160 points, evaluates farmland soil based on its use in relation to the other land uses and resources in the immediate area. The two ratings are combined for a possible total rating of up to 260 points. Sites receiving a total score of less than 160 should be given a minimal level of protection, and sites receiving a total score of 160 or more are given increasingly higher levels of consideration for protection (7 CFR Section 658.4).

Completed AD-1006 Farmland Conversion Rating Forms for the Study Area were provided in the Tier II DEIS Appendix E. Farmland ratings are not required for areas designated as urban. Based on 2000 Census data, two urban areas are in the SESHR Study Area: Richmond, VA (which includes Richmond, VA, Colonial Heights, VA, and Petersburg, VA) and Raleigh, NC (which includes Raleigh, NC, Wake Forest, NC, and Youngsville, NC). There is also one urban cluster (Henderson, NC).

The Tier II DEIS noted that the NRCS did not provide Land Evaluation Criterion Values for Sections AA through C in Virginia. However, values for the remainder of the Project were provided and were used in the evaluation for the Tier II DEIS. The Tier II DEIS indicated that no special protections for farmland were needed in these sections (D through V).

Subsequent to the Tier II DEIS, in September 2013, NRCS provided Land Evaluation Criterion Values for Sections AA through C for the Preferred Alternative (Appendix D). Based on the 2013 completed forms for Sections AA through C, the Preferred Alternative does not result in an average site assessment score greater than 160 points. Therefore, special protections for farmland are not required for this part of the Project Study Area.

Table 4-9 summarizes the acreage of prime farmland, and farmland of statewide or local importance impacted by the preferred alternative for each section. Sections O and D have the most impacted acreage (all types, combined) with 124.4 and 99.9 acres, respectively. Sections AA through CC have the smallest area of farmland impacts with acreages ranging from 0 to 16.4 acres.

Project Sections D in Virginia through V in North Carolina were reviewed to determine if the minor design changes developed since the publication of the Tier II DEIS were sufficient to require re-submittal of AD-1006 forms to NRCS. There was a net gain of 28.3 acres of Prime and Important farmland in Virginia as compared with the Tier II DEIS. The change in North Carolina was a net decrease of 38 acres as compared with the Tier II DEIS. Because of the increases in farmland totals in Sections D and G in Virginia, Virginia NRCS requested an update of AD-1006 forms for those sections. Based on the completed forms, no special protections for farmland were needed. North Carolina NRCS was contacted about the design changes and updated AD-1006 forms were submitted for all sections. None of the sites exceeded the 160 point threshold, therefore no special protections for farmland are required.

Table 4-9 Prime and Other Important Farmland Acres Impacts for the Preferred Alternative by Section (where values had changed since DEIS)		
Section	**Selected Alternative**	**Prime / Statewide Acreage**
(Virginia)		
AA	VA1	0 / 0
BB	VA1	13.3 / 0
CC	VA1	16.4 / 0
DD	VA3	31.6 / 4.1
A	VA2	49.3 / 2.5
B	VA1	44.4 / 20.4
C	VA1	79.3 / 7
D	VA4	84.8 / 15.1
E	VA1	51.7 / 8.1
F	VA1	22.5 / 2.5
G	VA3	30.2 / 2.9
H	VA1	47.3 / 34.7
I	VA1	36.9 / 20.7
J	VA2	45.2 / 26.9
K	VA1	12.1 / 25.5
L (VA)	VA1	14.8 / 17.4
(North Carolina)		
L (NC)	NC1	68.9 / 8.9
M	NC1	86.0 / 1.4
N	NC1	64.0 / 0.7
O	NC3	82.1 / 42.3
P	NC1	83.2 / 3.8
Q	NC1	82.6 / 14.1
R	NC1	25.1 / 0
S	NC1	63.3 / 29.3
T	NC1	32.3 / 9.6
U	NC1	40.5 / 55.0*
V	NC5	28.9 / 26.6*

* Includes farmland of local importance

4.4 MINERAL RESOURCES

As stated in Section 3.4, the main non-fuel resources in Virginia and North Carolina are crushed stone, sand and gravel, and lime. The alternatives pass over areas that contain bedrock, as well as sand and gravel resources; however, only eight mine sites are located in the Study Area. In late 2013 Dinwiddie County, VA, contacted the Project Team to obtain information about Project designs near Burgess, VA (Section A) in relation to a request for a Conditional Use Permit for a proposed stone quarry that the County was reviewing but had not yet approved.

The eight existing mine sites located in the Study Area are:

- Carter Sand and Gravel Company, Richmond, VA (listed as past producer)

- McGowan Quarry, Richmond, VA (listed as past producer)
- Rawlings Quarry, Brunswick County, VA (listed as past producer)
- Vulcan-Greystone Quarry, Vance County, NC
- Carolina Sun Rock, L.L.C., Vance County, NC
- Franklin Quarry, Franklin County, NC
- Raleigh Quarry, Wake County, NC
- Rowland Mine, Wake County, NC (listed as past producer) (USGS, 2008)

Of these sites, five are in areas where rail alternatives remain within existing railroad ROW, and where there would be no direct impacts from proposed rail or roadway designs:

- Carter Sand and Gravel Company, Richmond, VA
- McGowan Quarry, Richmond, VA
- Franklin Quarry, Franklin County, NC
- Raleigh Quarry, Wake County, NC
- Rowland Mine, Wake County, NC

For the Preferred Alternative, no impacts are anticipated to Rawlings Quarry, as there is no active mine pit. At the Vulcan-Greystone Quarry, the Preferred Alternative would require the acquisition of mine ROW due to necessary road realignments. However, the realigned road would be relocated further away from the current pit, so impacts to mine operations are not anticipated.

Based on preliminary designs, there will be minor ROW impacts to Carolina Sun Rock, L.L.C. However, impacts would be limited to areas adjacent to existing railroad ROW and it is anticipated that mining operations would remain unaffected.

4.5 HAZARDOUS MATERIAL

As stated in Section 3.5 and listed in Appendix Q, a number of hazardous waste sites are within the Study Area, particularly in the urban areas of Virginia and North Carolina. These sites were plotted based on data in publicly available databases that have varying degrees of data quality. Sites found within the Study Area were classified as underground storage tanks (USTs), dry cleaners, hazardous waste disposal sites, and similar hazardous areas. The vast majority of these sites are USTs.

Hazardous waste sites fall under various state and Federal regulations. State regulations include:

- Virginia Waste Management Act (Code of Virginia Section 10.1-1400 et seq.)
- Virginia Hazardous Waste Management Regulations (VHWMR) (9 VAG 20-60)
- Virginia Solid Waste Management Regulations (VSWMR) (9 VAG 20-80)
- Virginia Regulations for the Transportation of Hazardous Materials (9 VAG 20-110)
- North Carolina Hazardous Waste Management Regulation (15A NCAC 13A.0101)
- North Carolina Solid Waste Management Law (15A NCAC 13A290 to 310.22)
- North Carolina Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (40 CFR 266 as adopted in 15A NCAC 13A.0111)
- North Carolina Standards Applicable to Transporters of Hazardous Waste (40 CFR 263 as adopted in 15A NAC 13A.0108).

Federal regulations include:

- Resource Conservation and Recovery Act (RCRA) (42 U.S.C. Section 6901 et seq.)
- Title 40 of the Code of Federal Regulations
- U.S. Department of Transportation Rules for Transportation of Hazardous materials (49 CFR Part 107).

During the impact assessment, if a construction alternative crossed any part of a parcel listed in the hazardous waste summary, it was counted as a potentially impacted site. This allowed for a conservative, defensible assessment of potential impacts. Potential impacts to hazardous waste sites are included in Table 4-10. As stated in Section 3.5, one additional site (Covidien, previously called Malinckrodt) was added to the site list based on comments received for the Tier II DEIS. This site is located in Section U of the Project, just north of the intersection of Durant Road and Capital Boulevard.

The Project will not impact Superfund sites in Virginia or North Carolina. Two Resource Conservation and Recovery Act (RCRA) Corrective Action Facility sites, one in Virginia and the other in North Carolina, are located within the Study Area. The Virginia site, the First Energy Corporation (FEC) Bioremediation Facility, is in Section AA and is impacted by the Preferred Alternatives. The North Carolina Site, the Covidien/Mallinckrodt SCC Raleigh Site, is located in Section U and is impacted by the Preferred Alternative. One polychlorinated biphenyl (PCB) site, owned by the Town of Wake Forest, NC, is located in Section U and is impacted by the Preferred Alternative.

If any potential hazardous waste sites cannot be avoided during final design, further assessments of the properties will be conducted. Based on current knowledge, it is not expected that any of these sites would preclude the construction of the Preferred Alternative.

Table 4-10 Hazardous Waste Sites by Section, Preferred Alternative	
Section	**VA**
AA	59
BB	10
CC	20
DD	1
A	1
B	3
C	3
D	1
E	0
F	0
G	0
H	0
I	2
J	1
K	0
L (VA)	0
Section	**NC**
L (NC)	1
M	0
N	1
O	1
P	31
Q	4
R	0
S	7
T	4
U	20
V	79

4.6 AIR QUALITY

Please refer to Section 3.6.1 for regulatory information on air quality. This section analyzes criteria pollutant air emissions associated with the proposed railroad engine operations and affected (i.e., diverted) motor vehicles. While mobile source air toxics (MSATs) are not a criteria pollutant nor subject to conformity requirements, they are considered in this section in accordance with US Environmental Protection Agency (USEPA) guidance. Potential air quality impacts of the proposed Project include:

- Changes in rail-related emissions due to an increase in train operations each day and a change in equipment
- Changes in the overall regional emissions

- Changes in local (microscale) emissions, including changes at various crossings that could handle additional traffic due to nearby highway-railroad crossing closures, and changes in vehicular delay due to increased traffic resulting from increased ridership.

Federal Railroad Administration (FRA), Federal Highway Administration (FHWA), NCDOT, Virginia Department of Transportation (VDOT), and USEPA guidance manuals were used to analyze the potential air quality impacts. Data sources for the project-level analysis in Virginia included VDOT and Project traffic data. Data sources for the project-level analysis in North Carolina included NCDOT, NCDENR (Division of Air Quality) Capital Area Metropolitan Planning Area (CAMPO), Triangle Air Quality Partnership (air quality conformity documents), and Project traffic data.

4.6.1 LOCOMOTIVE OPERATIONS - CO, NOX, HC, AND PM

Locomotive operations are subject to Federal air quality conformity regulations (40 CFR 51.853). In 2008, USEPA proposed a comprehensive program to dramatically reduce emissions from locomotives, including line-haul, switch, and passenger engines (see 73 FR 25097 (May 6, 2008) and 40 CFR, Part 92). The program establishes emission standards with applicability dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) applies to most locomotives originally manufactured before 2001. The most stringent set of standards (Tier 4) applies to locomotives originally manufactured in 2015 and later.

Locomotives contribute to air pollution by generating notable emissions of fine particulate matter ($PM_{2.5}$) and nitrogen oxides (NO_X). USEPA estimates that by using the new standards to control the exhaust emission standards and idle reduction requirements of diesel locomotives of all types (line-haul, switch, and passenger), that PM reductions of 90 percent and NO_X reductions of 80 percent would be possible by the year 2030, as compared to the engine emissions that would be encountered under the previous guidance.

To advance this goal, Motive Power (located in Boise, ID) designed and developed the MP40 locomotive, which is anticipated to be used for SEHSR Corridor service and, therefore, was used for the Project air quality analysis. With improved fuel efficiency, a diesel oxidation catalyst, and a diesel particulate filter, this locomotive provides the advanced emissions reduction technology currently required to be Tier 2 compliant and the company estimates that their engines will be Tier 3 compliant by either 2014 or 2015.

Tier 2 emission rates for this locomotive are assumed to be the following (in grams/brake horsepower-hour) as referenced in the Federal Register listed above.

- CO - 1.5*
- PM - 0.2
- NO_X - 5.5
- HC - 0.3

*USEPA did not propose new standards for CO. Emissions of CO are relatively low in diesel engines compared to non-diesel pollution sources. Locomotives are already subject to relatively stringent CO standards in Tier 2 compared to the former heavy-duty highway diesel engine CO standard of 15.5. Additionally, even though USEPA did not set more stringent standards for CO (for Tier 4), note that after-treatment devices using precious metal catalysts projected to be employed to meet Tier 4 PM, NOX and HC standards will provide meaningful reductions in CO emissions as well.

Based on the above calculations, the emission rates are expressed as grams emitted per gallon of fuel consumed by multiplying the Tier 2 emission rates by a conversion factor. USEPA has estimated the appropriate conversion factor to be 20.8 bhp-hr/gal (USEPA Technical Highlights: Emission Factors for Locomotives USEPA420-F-97-051, December, 1997). These converted emission factors (in grams/gallon) are shown here:

- CO - 31.20
- PM - 4.16
- NO_X - 114.40
- HC - 6.24

The next step in developing air quality impacts is to estimate the amount of fuel that the diesel engines will consume. At a conservative Notch 6 throttle setting, the fuel consumption rate is approximately 146.5 gallons/hr. This is based on Motive Power fuel consumption measured at their Federal Test Procedures (FTP) emissions test facility in Boise, ID. Therefore, for an approximate 2-hour trip for the Project, the total fuel consumed during a one-way trip is 293 gallons and 586 gallons for a round trip. The Project estimates four round trips a day between Richmond, VA, and Raleigh, NC.

Table 4-11 presents calculated emissions for CO, NO_X, PM, and HC for SEHSR locomotive emissions in the Project corridor based on the collected data.

Table 4-11
Predicted Locomotive Emissions

County/Area	Annual Emissions (tons/year)			
	CO	NO_X	PM	HC
Richmond-Chesterfield * (Virginia)	3.55	13.02	0.47	0.71
Colonial Heights-Petersburg-Dinwiddie (Virginia)	5.98	21.94	0.80	1.20
Brunswick (Virginia)	4.11	15.09	0.55	0.82
Mecklenburg (Virginia)	3.37	12.34	0.45	0.67
Warren (North Carolina)	2.62	9.60	0.35	0.52
Vance (North Carolina)	3.93	14.40	0.52	0.79
Franklin-Wake ** (North Carolina)	5.80	21.25	0.77	1.16
De minimis (allowable) levels in the various counties/areas according to 40 CFR 51.853, as applicable	100.00	100.00	100.00	100.00

* Within the Richmond Regional Planning District
** Within the North Carolina Capital Area Metropolitan Planning Organization

Note that the above emissions are conservative because of the Notch 6 setting and that actual pollutant emission rates are lower than the Tier 2 standards (according to Motive Power, Inc.). However, these rates have not been certified; therefore, the conservative rates were used in the analysis.

Nonetheless, the predicted annual emissions are well below the *de minimis* levels established in 40 CFR 51.853 for the respective areas and no further action or mitigation is necessary. Additionally, note that the above emissions are for the proposed SEHSR operations only. Between Richmond, VA, and Petersburg, VA, there is currently a mixture of freight trains and Amtrak passenger trains. There are currently no trains operating in the Project corridor between Petersburg, VA, and Norlina, NC. Between Norlina, NC, and Raleigh, NC, there is some limited existing freight service. It is estimated that with the Project, there will be eight additional intermodal trains between Petersburg, VA, and Raleigh, NC, with improvements made to the rail infrastructure, along with two to four additional freight trains. (Two freight trains per day are assumed between Petersburg, VA, and Youngsville, NC, and four freight trains per day are assumed between Youngsville, NC and Raleigh, NC. Between Richmond, VA, and Petersburg, VA, growth in freight and Amtrak is projected, but is not anticipated as a result of the Project.)

From an air quality perspective, the additional intermodal and freight trains will likely result in a regional efficiency improvement as a result of freight providers switching from long haul trucking to

intermodal and freight rail. Quantification of the reductions and re-routing of truck hauling was determined to be outside the scope of the Project. The intermodal and freight trains are not considered to be induced by the Project, but rather represent an improved and more efficient transfer from other fuel-consumption sources. Regardless, even if they were hypothetically 100% induced by the Project, the intermodal and freight emissions could be triple the HSR locomotive operation emissions (conservatively) and still not exceed the *de minimis* levels.

4.6.2 LOCOMOTIVE OPERATIONS - MSATS

Currently there is no Federally approved model to perform a quantitative MSAT hot spot analysis. A hot spot analysis is known as a "microscale" analysis because it focuses on a relatively small geographic area. In the absence of a microscale model, regional MSAT impacts from locomotives are discussed qualitatively.

Effective April 27, 2007, USEPA adopted controls on locomotive MSATs. At that time, USEPA proposed more stringent standards for large diesel engines used in locomotives.

In May 2008, USEPA published the final rule adopting a comprehensive program to dramatically reduce pollution from locomotives, applying to all types of locomotives. This final rule strengthened the locomotive and marine diesel programs proposed in April 2007. When fully implemented, the programs will reduce harmful diesel engine emissions to a small fraction of their previous levels.

On a nationwide annual basis, these overall reductions from all MSAT sources are projected to reduce annual MSAT emissions by 83% from 1999 to 2050. Specific to locomotives, the reduction from existing standards in PM Tiers 0 through 4 locomotives will be approximately 60, 50, 50, 50, and 90 percent, respectively. The reduction in NO_X for range year Tiers 0 through 4 will be approximately 20, 20, 20, 20, and 80 percent, respectively. All Tier idle emissions are predicted to be reduced by 50 percent for both PM and NO_X.

4.6.3 HIGHWAY VEHICLE OPERATIONS - CO

CO emissions are associated with large volumes of slow-moving traffic, such as highly congested intersections. Areas experiencing high levels of CO are referred to as CO "hot spots." The purpose of a CO hot spot analysis is to determine if CO emissions generated by a proposed project would cause or contribute to an exceedance of the air quality standard for CO as promulgated by USEPA.

The state and Federal ambient air quality standards for CO are 35 ppm (1-hour) and 9 ppm (8-hour). An analysis was made to determine the CO impacts at the worst-case intersections along the Study Area in North Carolina and Virginia.

The consolidation of rail crossings throughout the Study Area will necessitate that some automobiles travel an additional distance to reach a grade-separated crossing. The additional distance vehicles will need to travel to the nearest bridge or underpass is typically less than one mile. The anticipated CO emissions associated with the additional distance are likely to be offset by the removal of the vehicle idling that currently occurs while trains pass at-grade crossings. As an example, a vehicle idling for one minute as a train crosses an at-grade crossing will produce approximately 70 grams of CO. Were the same car to travel two miles out of its way to use a grade-separated crossing (one mile in each direction), it will generate approximately 16 grams of CO. Although many factors can effect vehicle emissions, the benefit of removing vehicle idling should more than offset the additional vehicle miles traveled.

4.6.3.1 *VIRGINIA*

According to VDOT's Consultant Guide for Air Quality Project-Level Analysis, the level of CO analysis is determined by a memorandum of understanding (MOU) between VDOT and FHWA that outlines when a quantitative or qualitative CO hot spot analysis is required.

The intersections in Virginia are exempt from a quantitative analysis based on the following criteria from Section II-Level of Analysis, subsection B, "Projects meeting one of the following criteria require only a qualitative analysis":

"Any project affecting capacity for roadways with intersections and/or freeway interchanges for which the build scenario design year intersection/freeway interchange LOS is E or better (or reasonable proxy thereof) and the corresponding ADT does not exceed the following levels for the roadway being improved as part of the project or any intersecting roadway within the Study Area:

> (i) 59,000, for intersections and freeway interchanges for which the minimum skew angle (defined here as the smallest angle modeled between intersecting roadways in a reasonable representation of the intersection or interchange selected for air quality analysis following applicable state and Federal guidance) is 60 degrees or more"

Since the ADTs at all potentially affected Virginia intersections are predicted to be less than 59,000, have a skew angle of 60 degrees or more and an LOS E or better condition for the build scenario design year, the qualitative analysis applies. As a result, the following language from the VDOT Consultant's Guide applies:

"The project does not include or directly affect any roadway whose design year average daily traffic volume, skew angle or level of service would exceed the threshold criteria specified in the Agreement between the Federal Highway Administration and the Virginia Department of Transportation for streamlining the project-level air quality analysis process for carbon monoxide. Modeling using "worst-case" parameters has been conducted for these thresholds and it has been determined that projects, such as this one, for which the thresholds would not be exceeded would not significantly impact air quality and would not cause or contribute to a new violation, increase the frequency or severity of an existing violation, or delay timely attainment of the National Ambient Air Quality Standards for carbon monoxide."

4.6.3.2 *NORTH CAROLINA*

An analysis was performed for the worst-case intersection based on traffic modeling (see Section 4.14.2), and Level of Service (LOS). The worst-case intersection in North Carolina is predicted to be Oxford Road and Dabney Drive in Henderson, NC.

For the North Carolina analysis, the concentrations were evaluated at locations (receptors) just outside the mixing zone. The mixing zone is considered to be the area of uniform emissions and turbulence. These receptors were placed where the general public has access and at 25 and/or 50 foot intervals along the intersection roadway approach and departure links.

The CO hot spot analysis compared the 2011 Existing (Base), 2015 Interim Build and No-Build, and 2030 Design Year Build and No-Build scenarios.

On December 20, 2010, USEPA (as coordinated with FHWA and FTA) issued guidance for using the Motor Vehicle Emission Simulator (MOVES) in project-level CO analysis. For CO hot spot analyses (outside California) that are started during the 2 year MOVES grace period ending December 20, 2012, either the MOBILE 6.2 emission modeling software or MOVES2010 can be used. The air quality analysis for the Project was started prior to December, 20, 2012. Therefore, MOBILE 6.2 emissions factors are applicable and were used in the analysis. The CAL3QHC dispersion model was used to estimate CO concentrations in accordance with Section 5.2.3 of

Appendix W to 40 CFR Part 51. (CAL3Q interface software with NC input parameters.) The land use near the intersection is composed of residential, some small retail stores and a school. Model input parameters included MOBILE 6.2 emissions factors, CO background levels (from NCDENR), persistence factors (from NCDENR), peak-hour volumes, free-flow speeds and traffic signal operations data (Hatch Mott MacDonald, 2014).

The results of the analyses indicated that the 1-hour and 8-hour concentrations for both intersections in any scenario were well below the NAAQS. Based on these results, no mitigation is required and additional analysis is not recommended. The results are presented in Table 4-12.

Table 4-12
Predicted CO Concentration (in pp,m) Screening Analysis (Including background)

Worst-Case Intersection	Analysis Scenario									
	2010-Base Year		2020-No Build		2020-Build		2030-No Build		2030-Build	
	1-hr	8-hr	1-hr	8-hr	1-hr	8-hr	1-hr	8-hr	1-hr	8-hr
NC: Oxford/Dabney (Henderson)	4.2	3.3	4.0	3.2	4.4	3.5	4.0	3.2	4.2	3.3
VA: Centralia/Chester (Chester)	Exempt from quantitative analysis per VDOT guidance (because the ADT is below the analysis threshold)									

NAAQS: 35 ppm (1-hour) and 9 ppm (8-hour)

4.6.4 HIGHWAY VEHICLE OPERATIONS - $PM_{2.5}$

The Project is located in areas that are currently designated as being in attainment of the $PM_{2.5}$ standards. These standards were also not exceeded at any of the Study Area monitoring stations during 2012. For projects within $PM_{2.5}$ attainment areas, quantitative and/or qualitative analyses are not required. Therefore, no mitigation is proposed and further analysis is not recommended.

4.6.5 HIGHWAY VEHICLE OPERATIONS - MSAT

Currently, there is no Federally approved model to perform a quantitative MSAT hot spot analysis. On September 30, 2009, FHWA issued an update to its guidance concerning MSATs, which included a three-tiered approach to determine the level of analysis. Subsequent interim guidance was published on December 6, 2012. The update reflects recent changes in methodology for conducting emissions analysis and updates of research in the MSAT arena. All analysis beginning on or after December 20, 2012, should use the MOVES model. Any analysis initiated prior to that date may continue to operate under the previous guidance and utilize MOBILE 6.2.

The FHWA developed a tiered approach with three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

The Project falls under the Qualitative analysis category for projects with low potential MSAT effects.

The types of projects included in this category are those that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects.

Most highway projects that need an MSAT assessment fall into this category. Any projects not meeting the criteria in category (1) or category (3) below should be included in this category. Examples of these types of projects are minor widening projects; new interchanges, replacing a signalized intersection on a surface street; or projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT).

For these projects, a qualitative assessment of emissions projections should be conducted. This qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, including no-build, based on VMT, vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by USEPA. Because the emission effects of these projects typically are low, we expect there would be no appreciable difference in overall MSAT emissions among the various alternatives.

Please note that sensitive receptors within the Study Area were not identified for the Tier II FEIS as this task is no longer recommended by FHWA for qualitative analyses. Performing the highly intensive task of identifying sensitive sites from Richmond, VA, to Raleigh, NC, and looking at anticipated traffic volume change for each of these sites would not produce meaningful information, especially given the low volumes of the roads along the Study Area and the fact that MSATs are anticipated to decrease throughout the United States based on improvements in vehicle operation standards.

In addition to the qualitative assessment, a NEPA document for this category of projects must include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)). This discussion should explain how current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that could result from a transportation project in a way that would be useful to decision-makers. Also in compliance with 40 CFR 1502.22(b), it should contain information regarding the health impacts of MSAT.

The qualitative analysis for highway vehicle MSATs for the Project is included in Appendix M.

4.6.6 CONSTRUCTION IMPACTS

Construction activities will result in temporary increases in air pollution. The greatest increases are likely to occur in the areas where new bridges are proposed for construction. At this time, it is not known over what time frame the bridges will be constructed. However, it is not expected that increased pollutants from trucks and site equipment will cause violations of the NAAQS.

Generally, air quality along detour routes may be affected by an increase in vehicle idling or miles traveled during crossing closures. These will be temporary and where possible, the proposed road improvements will be constructed prior to the diversion of traffic.

VDOT and NCDOT require that BMPs are in place to control particulate emissions (e.g., fugitive dust) during construction activities. Operators of fugitive dust sources are expected to take reasonable precautions to prevent airborne dust such as requiring the appropriate emission-control devices on all construction equipment powered by gasoline or diesel fuel to reduce exhaust emissions.

In conclusion, the predicted project-level and regional level values are below either the *de minimis* levels established in 40 CFR 51.853, the NAAQS, and or do not require a formal detailed analysis for

the respective area conditions. As a result, no mitigation is required and no further action is necessary.

4.6.7 SUMMARY

In the Study Area, USEPA has designated the Richmond-Petersburg, VA, and Raleigh-Durham-Chapel Hill, NC, regions as being maintenance areas of the 8-hour ozone standard. For CO, the Study Area is in attainment within Virginia and designated as being in maintenance for Wake and Franklin counties, NC. Additionally, the Study Area is in attainment for NO_X and particulate matter (PM10, PM2.5).

A CO hot spot analysis was performed for the Project. There were no predicted CO impacts as the 1-hour and 8-hour concentrations were well below the NAAQS. Based on these results, no mitigation is required and additional analysis is not recommended.

For particulate matter, the Study Area is in attainment of the NAAQS. As a result, no analysis or mitigation is required.

Because the estimated VMT for the Preferred Alternative is less than the No-Build condition, it is expected there will be a positive impact in overall MSAT emissions. Also, emissions will likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Therefore, the Project was found to result in low potential MSAT effects and no further action is required.

For ozone, the Project is currently funded only at the planning level and does not yet have a dedicated funding source for construction. As a result, it falls under the exempt status for transportation conformity. Once funding is secured for ROW purchase and construction, NCDOT and VDRPT will perform conformity analyses in accordance with 40 CFR Part 93.

For general conformity, the predicted locomotive operations are well below the *de minimis* levels established in 40 CFR 51.853 and no further action or mitigation is necessary.

4.7 NOISE AND VIBRATION

The following section describes the potential noise and vibration impacts from the Project, and includes highway noise analysis that was conducted for the Preferred Alternative.

4.7.1 OPERATION IMPACT ASSESSMENT

Noise and vibration impacts from operation and construction activities related to the Project are presented in this section. Noise and vibration mitigation will be addressed during final design using FRA's High-Speed Ground Transportation Noise and Impact Assessment (FRA, 2012b) procedures.

4.7.1.1 *RAIL OPERATION NOISE*

Noise emissions were regulated under the Noise Control Act of 1972. Locomotive operations are subject to Federal noise emission standards (see 40 CFR, Part 201). Train noise impacts were evaluated based on projected noise level increases relative to existing conditions at noise-sensitive receptors. Depending upon the land use, this increase was measured in terms of either one-hour equivalent sound level (Leq(h)) or the day-night sound level L_{dn}.

The Project noise exposure was calculated based on the operating characteristics listed in Table 4-13. These characteristics were developed during preparation of the Tier II DEIS, at which time the initial noise analysis was completed. The most current ridership and revenue analysis (see Section 1.5), which was completed after the Tier II DEIS was published, anticipates potential increases in the number of passenger trains using the Project corridor over what was assumed in the Tier II

DEIS noise analysis. Notably, the updated ridership and revenue analysis estimated that one existing round trip Amtrak long distance train will divert to the Project corridor between Petersburg, VA, and Raleigh, NC, and one additional round trip train will travel the Project corridor between Richmond, VA and Petersburg, VA, to/from Norfolk, VA, to serve the Richmond, VA, to Hampton Roads, VA, SEHSR Corridor. In addition, three existing round trip Amtrak trains would continue to use the Project corridor between Richmond, VA, and Petersburg, VA. These changes are not anticipated to substantially affect the results of the original rail operation noise analysis because the noise impact resulting from a small number of additional passenger trains is negligible compared to the overall impact of relatively heavier and longer freight and intermodal trains. If any impacts occur as a result of these changes, they will be addressed by the Project Team during the final design phase of the Project.

The Tier II DEIS noise analysis also did not account for the existing freight traffic in the Project corridor between Richmond, VA, and Petersburg, VA, in which more than 20 trains currently operate. It is assumed that this large number of freight trains would render the impacts of any passenger trains negligible. In addition, existing and future freight operations in this section of the Project corridor are not dependent on the Project, and can be changed at the discretion of the operating railroad. Therefore, the model applied no freight trains in order to identify impacts resulting directly from the Project.

It is important to note that the alternatives evaluated in the Project corridor between Richmond, VA, and Petersburg, VA, (Sections AA through DD) were on common alignment, with the exception of slight differences in a small area just below the city limits of Petersburg, VA, at the south end of the Collier rail yard. Therefore, potential noise impacts did not have any bearing on the selection of the Preferred Alternative in these sections of the Project.

In addition to the operating assumptions listed above, it was also assumed that the track would consist of continuously welded rail and would generally be in very good condition. Based on these assumptions, distance-to-impact contours were developed for the different land use categories and existing noise levels. These distances were then used to tabulate the rail noise impacts that would occur as a result of the Project. A summary of projected noise impacts for the Project is provided in Table 4-14. The results in Table 4-14 represent a fairly conservative estimate in terms of the number of projected impacts. This is mainly due to the fact that maximum authorized speed was assumed throughout the corridor

Table 4-13
Noise Modeling Projected Train Operating Characteristics

Operating Characteristic	HSR Passenger Trains	Intermodal Trains	Freight Trains
Richmond, VA, to Petersburg, VA (1)			
Total Number of Daily Trains	14	--	--
Number of Trains - Day	14	--	--
Number of Trains – Night (2)	0	--	--
Number of Peak Hour Trains	2	--	--
Maximum Operating Speed (mph)	79-90 (3)	--	--
Petersburg to Raleigh			
Total Number of Daily Trains	8	8	2-4 (4)
Number of Trains - Day	8	5	2-4
Number of Trains – Night (2)	0	3	0
Number of Peak Hour Trains	1	2	0
Maximum Operating Speed (mph)	110	60	50

Notes:
(1) Since there is existing freight train traffic between Richmond, VA, and Petersburg, VA, project noise exposure is only calculated for projected high speed rail trains through this section.
(2) Night trains are those that operate between 10:00 p.m. and 7:00 a.m.
(3) 79 mph – Richmond to Chester; 90 mph – Chester, VA, to Petersburg, VA.
(4) Two freight trains per day (one round trip) are assumed between Petersburg, VA and Youngsville, NC, and four freight trains per day (two round trips) are assumed between Youngsville, NC and Raleigh, NC.

Table 4-14
Land Use Categories and Metrics for High Speed Rail Noise Impact Criteria

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq}(h)$*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)$*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category. Places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

Table 4-14
Summary Total of Rail Noise Impacts

Section/Preferred Alternative	Noise Impacts along Preferred Alternative					
	Land Use Category 1*		Land Use Category 2*		Land Use Category 3*	
	Moderate Impact	Severe Impact	Moderate Impact	Severe Impact	Moderate Impact	Severe Impact
AA / VA1	0	0	0	0	0	0
BB / VA1	0	0	0	0	0	0
CC / VA1	0	0	11	0	0	0
DD / VA3	0	0	0	0	0	0
A / VA2	0	0	4	1	0	0
B / VA1	0	0	13	0	0	0
C / VA1	0	0	9	0	0	0
D / VA4	0	0	4	2	0	0
E / VA1	0	0	22	6	1	0
F / VA1	0	0	6	0	0	0
G / VA3	0	0	2	0	0	0
H / VA1	0	0	18	2	0	0
I / VA1	0	0	49	5	1	0
J / VA2	0	0	21	1	0	0
K / VA1	0	0	9	0	0	0
L / VA1/NC1	0	0	20	1	0	0
M / NC1	0	0	41	6	0	0
N / NC1	0	0	4	0	0	0
O / NC3	0	0	10	5	0	0
P / NC1	0	0	77	11	1	0
Q / NC1	0	0	12	5	1	0
R / NC1	0	0	1	0	0	0
S / NC1	0	0	22	1	0	0
T / NC1	0	0	25	0	0	0
U / NC1	0	0	159	17	0	0
V / NC5	0	0	79	2	0	0
Total	**0**	**0**	**618**	**64**	**4**	**0**

4.7.1.2 *DIVERTED ROADWAY TRAFFIC NOISE IMPACTS*

The highway noise impact focused on the secondary/indirect impacts resulting from two build actions of the Project:

- The creation of grade-separated crossings (bridges and underpasses) and;
- The diversion of traffic to the grade-separated crossings from closed at-grade crossings.

The selection of a Preferred Alternative was primarily the choice of a preferred railroad alignment. Highway noise did not affect the decision process because of 84 proposed grade separations, about 80% were common to all alternatives. Furthermore, given the estimated traffic volumes, the diverted volumes and the rural land use at most crossings, it is highly unlikely that these changes will result in noise impacts and/or feasible and reasonable abatement measures according to North Carolina or Virginia policies. Less than 10% of the grade separations will have greater than 10,000 annual average traffic volumes (AADT) in the design year.

The grade separations are considered to be a Type I improvement under FHWA regulations because of the proposed substantial vertical change in the road alignment. An interagency screening process was developed to analyze the likely sound level environment changes in both qualitative and quantitative methods for the new crossings, appropriately addressing both the NCDOT and VDOT noise policies. FHWA has established noise abatement criteria (NAC), which are noise levels for various activities or land uses which represent the upper limit of acceptable traffic noise level conditions. These regulations do not require meeting the abatement criteria in every instance; rather, they require highway agencies make every feasible and reasonable effort to provide noise mitigation when the criteria are approached or exceeded.

The methodology for completing this assessment was developed in coordination with FHWA, NCDOT and US Environmental Protection Agency (USEPA). In summary, it applies a screening process so that all crossings are appropriately addressed per state transportation policies and 23 CFR 772. The screening process was conducted in the following manner for each crossing:

- Step 1 – Identify existence of receptors in the area of each proposed grade separation
- Step 2 – Identify receptors within 60 dBA cordon line (66 dBA is the NAC for categories B and C, which include residences, daycare centers, parks, and historic sites). The 60 dBA cordon was initially applied as a conservative measure. Ultimately, receptors with predicted levels of 66 or greater were identified. (Note: there were no "substantial increase" criteria impacts) Industrial and retail land uses were not analyzed because they do not have impact criteria.)
- Step 3 – Mitigation analysis, applying NCDOT reasonable and feasible criteria, as applicable.
- Step 4 – Reporting.

Road closure areas and crossings where there were no traffic volume changes nor physical realignment were not analyzed. For planning purposes, the 60 and 66 dBA contours for various AADT are presented in Table 4-15.

The results are shown in Table 4-16. In addition to the location and type of each crossing, the table also represents a fairly conservative estimate in terms of the number of projected highway traffic noise receptors within the 60 dBA contour. The number and type of these receptors was estimated based on Project mapping aerials and Google Earth data. Possible impacts (those within the 66 dBA contour) and mitigation rationale are also included in the table. There were no predicted impacts based on the criteria for a "substantial increase."

Table 4-15
Comparison of Sound Level Contours for Various Traffic Volumes
(for Planning/Screening Purposes)

Average Annual Daily Traffic (AADT)	Approximate Distance to Contour From the Edge of the Nearest Traveled Way (in feet):	
	60 dBA	66 dBA
1,000	<10	<10
2,500	<10	<10
5,000	55	<10
7,500	120	<10
10,000	140	30
15,000	185	65
20,000	225	85
25,000	250	105
30,000	260	115

Note: the sound level contour results are based on an operational speed of 45 mph. Distances for slower speeds will be slightly less and distances for faster speeds will be slightly greater. They are also based on a peak hour factor of 12% (the highest factor used for the analyzed crossings, many are 10% or less) and a truck factor of 5% (most of the analyzed crossings were less).

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
AA-2	Goodes Street	Petersburg, VA	Grade separated road over rail	-	-	0	No	Industrial land uses (no applicable criteria)
AA-3	VA 7521-East Commerce road	Petersburg, VA	Grade separated road over rail	-	-	0	No	Industrial land uses (no applicable criteria)
AA-4	Ruffin Road	Petersburg, VA	Underpass, grade separated rail over road	4,300	300’	3 residences 1 church	No	Receptors too far from bridge Low traffic volumes Road going under the RR bridge
AA-4.5	VA 161-West Bells Road	Petersburg, VA	Grade separated road over rail	15,400	200’	11 residences	No	Receptors too far from bridge
AA-6	VA 1479-Station Road	Chesterfield, VA	Grade separated road over rail	-	-	0	No	Industrial land uses (no applicable criteria)
AA-9	New Crossing-from Dorsey to Perrymount	Chesterfield, VA	New access road over rail	2,200	450’/200’	0	No	Receptors too far from bridge Low traffic volumes
BB-10	VA 145-Centralia Road	Chesterfield, VA	Grade separated road over rail	24,200	1000’/220’	17 residences	No	Receptors too far from bridge No traffic volume change
BB-12	Curtis Street	Chesterfield, VA	Realign, underpass, grade separated rail over road	5,770	700’	5 residences	No	Receptors too far from bridge Low traffic volumes Road going under the RR bridge
BB-16	VA 620-Woods Edge Road	Chesterfield, VA	Grade separated road over rail	-	-	0	No	Primarily Industrial land use (no applicable criteria) No receptors in vicinity

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
CC-16,17	VA 1144-Pine Forest Drive	Chesterfield, VA	Grade separated road over rail	3,000	330’	6 residences	No	Receptors too far from bridge Low traffic volume No traffic volume change
CC-18,19	VA 625 Branders Bridge Road	Chesterfield, VA	Grade separated road over rail	8,850	230’/120’	8 residences	No	Receptors too far from bridge Low traffic volume No traffic volume change
CC-19	VA 1106-Dupuy Road	Chesterfield, VA	Grade separated road over rail	700	300’	0	No	Receptors too far from bridge Low traffic volume
DD-31	VA 675-Vaughn Road	Dinwiddie, VA	Grade separated road over rail	1,100	200’	0	No	Receptors too far from bridge Low traffic volume
DD-32	VA 613-Squirrel Level Road.	Dinwiddie, VA	Grade separated road over rail	600	200’	0	No	Receptors too far from bridge Low traffic volume
A-34	VA 670-Duncan Road	Dinwiddie, VA	Grade separated road over rail	850	220’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change.
A-35	VA 613-Dabney Mill Road	Dinwiddie, VA	Grade separated road over rail	1,600	200’	0	No	Receptors too far from bridge. Low traffic volume No traffic volume change
A-37	VA 660-Quaker Road	Dinwiddie, VA	Grade separated road over rail	970	450’/110’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
B-39	VA 605-Honeycutt Road	Dinwiddie, VA	Grade separated road over rail	980	220’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
B-41	VA 703-Carson Road	Dinwiddie, VA	Grade separated road over rail	6,100	630’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
B-42,43	Gatewood Drive	Dinwiddie, VA	Underpass, grade separated rail over road	800	500’	0	No	Low traffic volume No traffic volume change Road is moved farther away from the receptors Road going under the RR bridge
C-45	VA 646-Glebe Road	Dinwiddie, VA	Grade separated road over rail	2,000	250’	0	No	Receptors too far from bridge Low traffic volume
C-47,48	Karla Drive	Dinwiddie, VA	Grade separated road over rail	50	300’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
C-49,50	VA 652-Asbury Road	Dinwiddie, VA	Grade separated road over rail	-	-	0	No	No receptors in vicinity.
C-50	VA 40-Doyle Boulevard	Dinwiddie, VA	Grade separated road over rail	4,400	130’	2 residences	No	Low traffic volume
D-55	VA 629 Rawlings Road	Brunswick, VA	Close road at new rail, realign, grade separated road over rail	700	240’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
D-60	VA 636-Kress Rd	Brunswick, VA	Grade separated over rail	-	-	0	No	No receptors in vicinity
D-62	VA 643-Flat Rock Road	Brunswick, VA	Grade separated over rail	1,100	350’	0	No	Receptors too far from bridge Low traffic volume
E-64	VA 726-Chestnut Road	Brunswick, VA	Grade separated over rail	460	680’	0	No	Receptors too far from bridge Low traffic volume
E-65	VA 628-Littlemont Road Church Street	Brunswick, VA	Grade separated over rail	570	500’	0	No	Receptors too far from bridge Low traffic volume
E-66	VA 136-Second Avenue	Brunswick, VA	Grade separated over rail	750	240’	0	No	Receptors too far from bridge Low traffic volume
E-66	VA 1401-Main Street	Brunswick, VA	Grade separated over rail	1,400	400’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
F-67	Rosebud Lane	Brunswick, VA	Grade separated over rail	-	-	0	No	No receptors in vicinity
F-68	US-1 SB Boydton Plank Road	Brunswick, VA	Grade separated over rail	-	-	0	No	No receptors in vicinity
F-70	VA 763-Millville Road	Brunswick, VA	Grade separated over rail	-	-	0	No	No receptors in vicinity
G-73	Old Indian Road	Brunswick, VA	Realign, grade separated road over rail	200	350’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
G-74	Old Indian Road.	Brunswick, VA	Grade separated over rail	-	-	0	No	No receptors in the area.
H-77	Tannertown Road	Brunswick, VA	Realign, underpass, grade separated rail over road	900	400’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change Road going under the RR bridge
H-78,79	VA 638-Wilson Road	Mecklenburg, VA	Realign grade separated road over rail	650	550’/130’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
I-82	Northington Road Connector	Mecklenburg, VA	New underpass, rail over road	380	600’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change Road going under the RR bridge
I-83	Jones Street	Mecklenburg, VA	Realign, underpass, grade separated rail over road	3,400	140’/100’	0	No	Low traffic volume No traffic volume change Road going under the RR bridge
J-84	VA 630-Belfield Road	Mecklenburg, VA	Realign, grade separated road over rail	-	-	0	No	No receptors in the area.
J-86	VA 618-Marengo Road.	Mecklenburg, VA	Realign, grade separated road over rail	1,750	500’/200’	0	No	Receptors too far from bridge Low traffic volume

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
J-87	VA 627-Gaulding Road	Mecklenburg, VA	Realign, grade separated road over rail	-	-	0	No	No receptors in the area.
K-89	VA 903	Mecklenburg, VA	Realign, grade separated road over rail	-	-	0	No	No receptors in the area.
L-92	VA 712-Paschall Road	Mecklenburg, VA	Realign, grade separated road over rail	500	500’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
L-93	NC 1302-Felts Road	Mecklenburg, VA	Grade separated road over rail	100	350’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
L-95	NC 1300-Wise Five Forks Road	Warren, NC	Realign, grade separated road over rail	1,900	200’	0	No	Receptors too far from bridge Low traffic volume
M-98,99	NC 1320-Warren Plains Road	Warren, NC	Realign, grade separated road over rail	-	-	0	No	No receptors in the area.
M-101,102	NC 1107-Ridgeway Warrenton Road	Warren, NC	New grade separated road over rail	3,000	400’/300’	0	No	Receptors too far from bridge Low traffic volume
N-104	NC 1151-Soul City Boulevard	Warren, NC	Realign, grade separated road over rail	1,200	500’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
N-105,106	NC 1101-Kimball Road	Warren, NC	Realign, grade separated road over rail	700	700’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
O-108	NC 1501-Carol Street	Warren, NC	Grade separated road over rail	-	-	0	No	No receptors in the area.
O-110	NC 1507-Brookston Road	Vance, NC	Realign, grade separated road over rail	1,100	450’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
O-111	NC 1508-Greystone Road	Vance, NC	Realign, grade separated road over rail	670	520’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
P-112	Warrenton Road	Vance, NC	Realign, underpass, replace existing rail over road	14,000	300’	2 residences	No	Receptors too far from bridge No traffic volume change Road going under the RR bridge
P-114	Main Street	Vance, NC	Realign, underpass grade separated rail over road	7,900	170’	30 residences	No	Low traffic volume No traffic volume change Road going under the RR bridge
P-114	NC 39-Andrews Avenue	Vance, NC	Realign, grade separated road over rail	19,840	180’	19 residences, 1 church	No	Receptors too far from bridge Road moved slightly farther away as a result of the realignment.

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
P-115	Alexander Avenue	Vance, NC	Realign, grade separated road over rail	12,535	700’	10 residences	No	Receptors too far from bridge.
P-116	NC 1139-JP Taylor Road	Vance, NC	Realign, grade separated road over rail and US1 BUSINESS	5,800	1660’/170’	9 residences	No	Receptors too far from bridge Low traffic volume No traffic volume change
P-117	NC 1115-Bear Pond Road.	Vance, NC	Realign, grade separated road over rail and US1BUS	5,900	100’	6 residences	No	Low traffic volume No traffic volume change
Q-119,120	Edwards Road	Vance, NC	Extend road underpass, grade separated rail over road	3,000	300’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change Road going under the RR bridge
Q-120	NC 1552-Chavis Road	Vance, NC	Close crossing, realign grade separated over rail	3,200	400’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
Q-121	McClannahan	Vance, NC	Realign, grade separated road over rail	3,100	420’/100’	2 residences	No	Receptors too far from bridge Low traffic volume
Q-122,123	Oak Ridge Church Road	Vance, NC	Realign, grade separated rail over road	650	250’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change Road going under the RR bridge

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
R-125	New Eric Medlin Road	Franklin, NC	Grade separated road over rail	1,100	200’	0	No	Receptors too far from bridge Low traffic volume No traffic volume change
S-127	New Winston-Main Street Connector	Franklin, NC	New underpass, grade separated rail over road	1,800	150’	0	No	Low traffic volume No traffic volume change Road going under the RR bridge
S-127,128	Green Street	Franklin, NC	Widen road, underpass, rail over road	1,900	100’	0	No	Low traffic volume No traffic volume change Road going under the RR bridge
S-128	NC 1125-Cedar Creek Road	Franklin, NC	Realign, grade separated road over rail	6,400	300’100’	2 residences	No	Receptors too far from bridge Low traffic volume
S-132	NC96	Franklin, NC	New alignment, grade separated road over rail	21,700	550’	0	No	Receptors too far from bridge
T-132	East Main Street/Holden Road	Franklin, NC	Grade separated road over rail	14,800	300’/60’	6 residences Youngsville Historic District	Yes	Receptors currently have sound levels above the criteria Mitigation not feasible, need to maintain direct driveway access
U-136	Holding Avenue	Wake, NC	Realign, underpass, grade separated rail over road	6,400	200’/100’	7 residences	No	Receptors too far from bridge Low traffic volume Road going under the RR bridge
U-137,138	NC 2052-Rogers Road	Wake, NC	Grade separated road over rail	19,900	650’	0	No	Receptors too far from bridge

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
U-138,139	NC 2044-Ligon Mill Road	Wake, NC	Realign grade separated road over rail	9,500	300'/70	7 residences	No	Receptors too far from bridge Low traffic volume Predicted dBA is 64, an increase of ~3 dBA.
U-142	NC 2006-Durant Road	Wake, NC	Realign, grade separated road over rail	19,800	300'	16 residences	No	Receptors too far from bridge No traffic volume change Proposed road is moved farther away, approximately twice the distance farther.
V-142,142	NC 2013-Gresham Lake Road	Wake, NC	Realign, grade separated road over rail	-	-	0	No	No receptors in vicinity Industrial/commercial retail land use (no applicable criteria)
V-145	Millbrook Road	Wake, NC	Underpass, grade separated rail over road	-	-	0	No	No receptors in vicinity. Industrial/commercial retail land use. (no applicable criteria)
V-46,147	New Hope Church Road	Wake, NC	Realign, grade separated road over rail	-	-	0	No	No receptors in vicinity Industrial/commercial retail land use (no applicable criteria)
V-147	Wolfpack Lane	Wake, NC	Close crossing, realign grade separated road over rail	-	-	0	No	No receptors in vicinity Industrial/commercial retail land use (no applicable criteria)

Table 4-16
Detailed Summary of Diverted Roadway Traffic Noise Impacts

Section-Map #	Road	City or County	Crossing Type	Build AADT*	Approximate Distance from Crossing/Local Access Road (where applicable)**	Number-type of receptors (within 60 dBA)	Possible Project Impact (66 dBA)	Rationale
V-148	Whitaker Mill Road	Wake, NC	Realign, grade separated road over rail	12,900	550’	0	No	Primarily Industrial /commercial retail land use (no applicable criteria) Receptors too far from bridge

* No AADT is listed when there are no applicable criteria that require analysis (e.g., all industrial or commercial land uses)
** If there is no local access road in the vicinity (i.e., there is only the rail crossing), the only distance provided is to the rail crossing.

4.7.1.3 OPERATION VIBRATION

FRA guidelines (FRA, 2012b) provide a calculation method for predicting vibration levels for a generalized assessment, but recommend field measurements for detailed analyses. Within the Project corridor, freight, intermodal, Amtrak, and high speed passenger trains will operate. This means that there are different vibration sources that need to be analyzed for vibration impact.

Currently, there are freight trains operating in the northern and southern portions of the Study Area. Field measurements of train passbys were taken at ten locations along the Study Area. At least one train passby was measured at each site. Measured results for the high speed passenger train were not taken because there are no high speed trains currently operating through the Study Area. The measured freight train values were compared to the generalized ground surface vibration curves presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (FTA Manual).[1] The vibration levels listed in the FTA Manual are higher than the measured data. The vibration levels in the FTA Manual are also higher than those presented for high speed trains in the 2012 FRA guidelines (see Table 4-17). After reviewing the data, it was determined that the FTA generalized ground surface vibration curve for a typical freight train should be used for operation impact assessment between Petersburg, VA, and Raleigh, NC, since the improvements that will be provided as part of the Project will not only add high speed passenger trains, it will also allow for freight traffic where it currently does not exist. Between Richmond, VA, and Petersburg, VA, the FRA generalized curve should be used since freight traffic currently operates through this area.

Table 4-17
Comparison of Ground Vibration Impact Curves

Ground Vibration Estimation Techniques	Distance to Human Annoyance Vibration Impacts (in feet)	
	Residential	Commercial
Measured Freight Train Passby	60	40
FTA Generalized Curve for Freight Trains (1)	80	64
FRA Generalized Curve for High Speed Passenger Trains (2)	47	30

Notes:
(1) The selected distances used to determine impacts between Petersburg and Raleigh.
(2) The selected distances used to determine impacts between Richmond and Petersburg.

Based on the FTA generalized curve (FTA. 1995), annoyance vibration impacts (i.e., where vibration levels will be 80 VdB or higher) would occur at residences located 47 feet or closer to the proposed track between Richmond, VA, and Petersburg, VA, and 80 feet or closer to the proposed track between Petersburg, VA, and Raleigh, NC. For commercial and institutional uses, annoyance vibration impacts (i.e., where vibration levels will be 83 VdB or higher) would occur at structures located 30 feet or closer to the proposed track between Richmond, VA, and Petersburg, VA, and 64 feet or closer to the proposed track between Petersburg, VA, and Raleigh, NC. The annoyance impact criteria for residences and commercial/institutional property established by the FRA apply to vibrations inside building structures. Table 4-18 provides a summary of the number and type of vibration sensitive structures that will be potentially impacted by the Project.

[1] http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf

The building damage criteria of 0.50 inch per second would not be exceeded at any building along the corridor due to train passbys. Therefore, the Project is not expected to cause damage, due to vibration, to any buildings in the Study Area.

Throughout the Study Area, the vibration levels would be 5 to 10 VdB higher when there are crossovers, turnouts, jointed track, switches, or other special trackwork present. These conditions can cause annoying sustained and/or forced vibration levels called "transients" that are characterized by a repetitive sounding, "thump-thump…thump-thump" that one would experience during a train passby. Vibration mitigation may be required for the areas were these conditions exist.

Table 4-18
Summary of Vibration Impacted Areas

Section / Preferred Alternative	Number of Sensitive Structures Impacted by Land Use Type for the Preferred Alternative		
	Single Family	Multi Family	Commercial
AA / VA1	0	0	1
BB / VA1	1	0	1
CC / VA1	7	7	1
DD / VA3	0	0	0
A / VA2	0	0	0
B / VA1	1	0	1
C / VA1	5	0	5
D / VA4	2	0	0
E / VA1	9	0	0
F / VA1	0	0	0
G / VA3	0	0	0
H / VA1	4	0	1
I / VA1	15	0	9
J / VA2	5	0	0
K / VA1	1	0	0
L / VA1/NC1	6	0	1
M / NC1	25	0	5
N / NC1	5	0	1
O / NC3	3	0	0
P / NC1	30	0	44
Q / NC1	16	0	4
R / NC1	2	0	1
S / NC1	17	0	5
T / NC1	2	0	3
U / NC1	24	0	21
V / NC5	0	0	4
Total	180	7	108

4.7.1.4 *CONCLUSION*

The effects of the proposed action were evaluated based on the number and type of impacts. The following impacts were identified for the Project Preferred Alternative:

Rail Noise

Noise impacts are projected for the Preferred Alternative. The FRA Manual rail noise criteria are divided into moderate impact and severe impact categories.

Based on FRA criteria, the Preferred Alternative is predicted to have zero moderate impacts and zero severe impacts for Category 1 receptors (studios, concert halls, etc.); 618 moderate impacts and 64 severe impacts for Category 2 receptors (residences, hospitals, hotels, etc.), and; four moderate impacts and 0 severe impacts for Category 3 receptors (schools, libraries, churches, etc.).

Rail Vibration

Vibration impacts are projected for the Preferred Alternative. Unlike the rail noise criteria with its differentiation of moderate impact and severe impact, there is only an impact condition for the FRA vibration criteria; therefore, all vibration impacts for the Project are considered to be of the same level. Vibration effects will be noticeable, but are not anticipated to result in property damage.

Based on FRA Manual vibration criteria, the Preferred Alternative potentially impacts 180 single family homes, 7 multi-family homes and 108 commercial sites. Vibration annoyance from the existing freight trains occurs within 80 feet or less for residential sites and 64 feet for commercial sites. Vibration annoyance from the proposed high speed passenger train would occur within 47 feet for residential sites and 30 feet for commercial sites.

Highway Noise

The noise associated with diverted roadway traffic at proposed grade-separated intersections is expected to cause an exceedance of the FHWA criteria for an estimated 6 residences in the proposed Youngsville, NC, Historic District. However, these residential sites are currently assessed with sound levels above the FHWA criteria. Additionally, since a noise barrier would have to be placed between the homes and the road, mitigation would not be practical.

No impacts due to "substantial increase" criteria were predicted as a result of the diverted traffic.

Mitigation was not required at other locations because there were no predicted impacts. The "no-impact" determinations were made as a result of noise receptors that were either too far away or were in the vicinity of roads with low traffic volumes and/or had no traffic volume changes as a result of the Project.

4.7.2 CONSTRUCTION IMPACT ASSESSMENT

4.7.2.1 *CONSTRUCTION NOISE*

The predominant construction activities associated with the Project are expected to be earth removal, hauling, grading, and paving. Temporary and localized construction noise impacts may occur as a result of these activities (see Table 4-19). During daytime hours, the effects of these impacts may be temporary speech interference for passers-by and those individuals living, working, or attending school near the Project. During evening and nighttime hours, if applicable, steady-state construction noise emissions such as from paving operations may be audible, and may cause impacts to activities such as sleep. Sporadic evening and nighttime construction equipment noise emissions such as from backup alarms, lift gate closures (slamming of dump truck gates), etc., may be perceived as distinctly louder than the steady-state acoustic environment, and may cause greater

impacts to the general peace and usage of noise-sensitive areas – particularly residences and hotels in the Study Area.

Extremely loud construction noise activities such as usage of pile-drivers and impact-hammers (jack hammer, hoe-ram) will provide sporadic and temporary construction noise impacts in the near vicinity of those activities. It is suggested that construction activities that will produce extremely loud noises be scheduled during times of the day when such noises will create as minimal disturbance as possible.

Generally, low-cost and easily implemented construction noise control measures should be incorporated into Project plans and specifications. These measures include, but are not limited to, work-hour limits, exhaust muffler requirements, haul-road locations, elimination of tail gate banging, ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication.

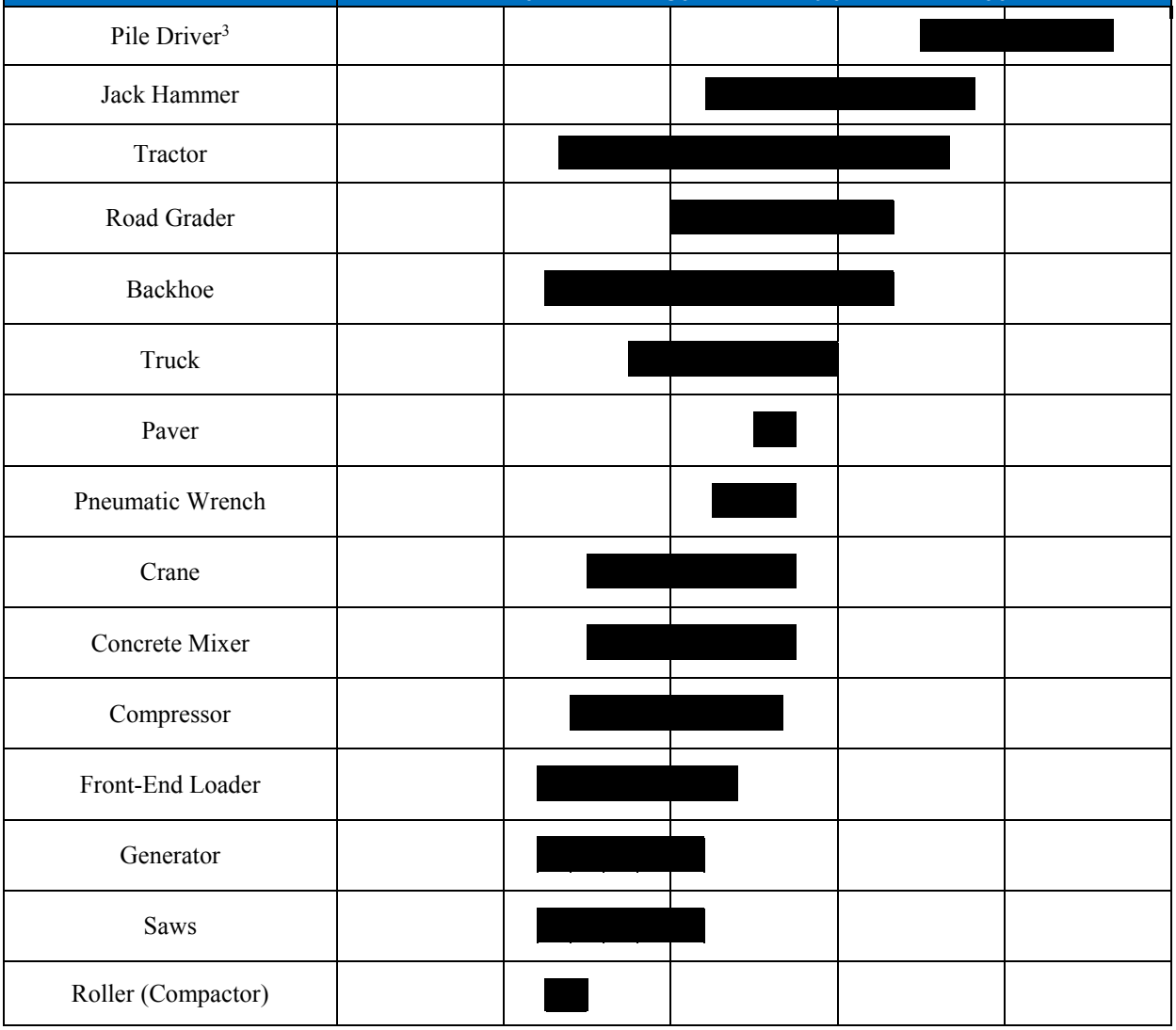
While discrete construction noise level prediction is difficult for a particular receiver or group of receivers, it can be assessed in a general capacity with respect to distance from known or likely Project activities. Although construction noise impact mitigation should not place an undue burden upon the financial cost of the Project or the Project construction schedule, it is suggested that:

- Earth removal, grading, hauling, and paving activities in the vicinity of residences should be limited to weekday daytime hours.
- If meeting the Project schedule requires that earth removal, grading, hauling and/or paving must occur during evening, nighttime and/or weekend hours in the vicinity of residences, the contractor shall notify the appropriate state agency (Virginia DRPT and/or VDOT, or NCDOT) as soon as possible. In such instance(s), all reasonable attempts shall be made to notify and to make appropriate arrangements for the mitigation of the predicted construction noise impacts upon the affected property owners and/or residents.
- If construction noise activities must occur during context-sensitive hours in the vicinity of noise-sensitive areas, discrete construction noise abatement measures including, but not limited to portable noise barriers and/or other equipment-quieting devices shall be considered.
- Some construction activities may create extreme noise impacts for nearby noise-sensitive land uses. It is the recommendation of this analysis that considerations be made for any nearby residences for all evening and/or nighttime periods (7:00 p.m. – 7:00 a.m.), and for all weekend hours throughout which extremely loud construction activities might occur.

For additional information on construction noise, please refer to the FHWA Construction Noise Handbook (FHWA-HEP-06-015) and the Roadway Construction Noise Model (RCNM), available online at http://www.fhwa.dot.gov/environment/noise/cnstr_ns.htm.

Table 4-19
Construction Equipment typical Noise Level Emissions[1]

Equipment	Noise Level Emissions (dB(A)) at 50 Feet From Equipment[2]
	70 80 90 100
Pile Driver[3]	
Jack Hammer	
Tractor	
Road Grader	
Backhoe	
Truck	
Paver	
Pneumatic Wrench	
Crane	
Concrete Mixer	
Compressor	
Front-End Loader	
Generator	
Saws	
Roller (Compactor)	



1. Adapted from Noise Construction Equipment and Operations, Building Equipment, and Home Appliances. USEPA. Washington D.C. 1971.
2. Cited noise level ranges are typical for the equipment cited. Noise energy dissipates as a function of distance between the source and the receptor. For example, if the noise level from a pile driver at a distance of 50 feet = 100 decibels (dB(A)), then at 400 feet, it might be 82 decibels (dB(A)) or less.
3. Due to project safety and potential construction noise concerns, pile driving activities are typically limited to daytime hours.

4.7.2.2 *CONSTRUCTION VIBRATION*

Vibration levels produced by construction equipment were obtained from FRA's *High Speed Ground Transportation Noise and Vibration Impact Assessment* (USDOT, 2012) (see Table 6-2) and from field measurements. Based on the typical vibration levels listed, calculations were performed to determine the distances at which vibration impacts would occur according to the

criteria discussed in Section 3.2. Table 4-20 shows the results of those calculations. The distances shown in Table 4-21 are the maximum distances at which short-term construction vibration impacts may occur. Mitigation measures will need to be considered if construction equipment will operate near wood-framed buildings within the distances shown in Table 4-21.

Two types of construction vibration impact were analyzed: (1) human annoyance and (2) building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Fragile buildings such as historical structures are generally more susceptible to damage from ground vibration. Normal buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet based on typical construction equipment vibration levels. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. The potential for vibration annoyance and building damage was analyzed for major vibration producing construction equipment that will be used on the Project.

Table 4-20
Vibration Source Levels for Construction Equipment

Equipment (projected use)	PPV 1 at 25 feet (in/sec)	Approximate Velocity Level 2 at 25 ft (VdB)
Large bulldozer	0.089	87
Loaded trucks	0.076	86
Vibratory compactor/roller	0.210	94

Source: USDOT, 2012

Notes:

1. Peak particle ground velocity measured at 25 feet unless noted otherwise
2. RMS ground velocity in decibel (VdB) referenced to 1 micro-inch/second

Table 4-21
Construction Equipment Vibration Impact Distances

	Distance to Vibration Annoyance Impact [1] feet	Distance to Vibration Building Damage [2] feet
Large bulldozer	43	15
Loaded trucks	40	13
Small bulldozer	<10	<10
Auger/drill rigs	45	<10
Vibratory hammer	130	25
Vibratory compactor/roller	73	26

Notes:

1. This is the distance at which the RMS velocity level is 80 VdB or less at the inside of the building structure. When propagating from the ground surface to the building structure foundation, there is a vibratory coupling loss of approximately 5 dB; however, this loss is offset by the building amplification in light-frame construction. Thus, no additional adjustments are applied.
2. This is the distance at which the peak particle velocity is 0.20 inch/sec or less.

4.7.3 MITIGATION

This section discusses the possible mitigation measures that can be implemented to either reduce or mitigate the impacts generated by the construction and operation of the Project.

4.7.3.1 MITIGATION DURING CONSTRUCTION

Noise and vibration impacts caused by construction activities are temporary. However, standard construction mitigation measures may be required to minimize these impacts. Construction activities conducted during daytime hours will have a lesser impact than nighttime construction. However, there may be locations where nighttime construction would be unobtrusive, such as commercial areas where the land use is unoccupied during nighttime hours, or industrial areas that are generally not sensitive to noise and vibration. Nighttime construction may be necessary to avoid unacceptable disruptions to current rail operations or street traffic during daytime hours. Once details of the construction activities become available, Virginia DRPT, NCDOT, and the contractor will work with local authorities to develop an acceptable approach to minimize interference with the business and residential communities, traffic disruptions, and the total duration of the construction.

There are a number of measures that can be taken to minimize intrusion without placing unreasonable constraints on the construction process or substantially increasing costs. These include noise and vibration monitoring to ensure that contractors take all reasonable steps to minimize impacts when near sensitive areas and that noise testing and inspection of equipment to ensure that all equipment on the site is in good condition and effectively muffled.

DRPT and NCDOT will determine appropriate noise mitigation control measures during the final design phase of the Project. The following are possible control measures that can be implemented in order to minimize noise and vibration disturbances at sensitive areas during construction:

- Use newer equipment with improved noise muffling and ensure that all equipment items have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational. Newer equipment will generally be quieter in operation than older equipment. All construction equipment should be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.).
- Perform all construction in a manner to minimize noise and vibration. Utilize construction methods or equipment that will provide the lowest level of noise and ground vibration impact, e.g., avoid impact pile driving near residences and consider alternative methods that are also suitable for the soil condition. The contractor should be required to select construction processes and techniques that create the lowest noise levels.
- Perform independent noise and vibration monitoring to demonstrate compliance with the noise limits, especially in particularly sensitive areas. Require contractors to modify and/or reschedule their construction activities if monitoring determines that maximum limits are exceeded at residential land uses.
- Conduct truck loading, unloading and hauling operations so that noise and vibration are kept to a minimum by carefully selecting routes to avoid going through residential neighborhoods to the greatest extent possible.
- Construction lay-down or staging areas should be selected in industrially zoned districts. If industrially zoned areas are not available, commercially zoned areas may be used, or locations that are at least 100 feet from any noise sensitive land use such as residences, hotels and motels. Ingress and egress to and from the staging areas should be on collector streets or greater (higher street designations are preferred).
- Turn off idling equipment.
- Minimize construction activities during evening, nighttime, weekend, and holiday periods. Permits may be required in some cities before construction can be performed in noise sensitive areas between 7:00 p.m. and 7:00 a.m.
- The construction contractor should be required by contract specification to comply with all local noise and vibration ordinances and obtain all necessary permits and variances.

It is expected that ground-borne vibration from construction activities would cause only intermittent localized intrusion along the rail corridor. Processes such as earth moving with bulldozers, the use of vibratory compaction rollers, and the operation of vibratory pile drivers can create annoying vibration. There are cases where it may be necessary to use this type of equipment in close proximity to residential buildings. DRPT and NCDOT will determine if mitigation measures are needed during the final design phase of the Project. Following are some procedures that can be used to minimize the potential for annoyance or damage from construction vibration:

- When possible, limit the use of construction equipment that creates high vibration levels, such as vibratory rollers and hammers, operating within 130 feet of building structures.
- Require vibration monitoring during vibration-intensive activities.
- Restrict the hours of vibration-intensive equipment or activities such as vibratory rollers so that impacts to residents are minimal (e.g., weekdays during daytime hours only when as many residents as possible are away from home).

A combination of the mitigation techniques for equipment noise and vibration control as well as administrative measures, when properly implemented, can be selected to provide the most effective means to minimize the effects of construction activity impacts. Application of the mitigation measures will reduce the construction impacts; however, temporary increases in noise and vibration would likely occur at some locations. DRPT and NCDOT will determine if mitigation measures are needed during the final design phase of the Project.

4.7.3.2 *MITIGATION DURING OPERATION*

The Richmond to Raleigh Project would provide a completely new, fully road/rail grade separated Class 6 railroad (speeds up to 110 mph) to allow high speed passenger and intermodal freight movement, as well as providing opportunities for conventional passenger service (i.e., same speeds and equipment, but more stopping locations), commuter passenger service, and standard freight service. Because of the potential for increased freight usage, the potential effects of this increase are discussed in this section.

Train Noise Mitigation. The noise results and recommendations for the Tier II FEIS are preliminary, as final mitigation requirements will be development based on final designs. DRPT and NCDOT will conduct a detailed noise analysis during the development of final designs. This analysis will reassess the potential impact of new intermodal and freight train service between Petersburg, VA, and Raleigh, NC; refer to Section 1.4 for Project assumptions regarding the number of passenger and freight trains that will operate in the corridor. As part of the analysis summarized in this document (with the results presented in Table 4-14 Summary Total of Rail Noise Impacts), it has been assumed that new freight and intermodal train traffic will occur south of Petersburg, VA, as a result of the Project. This projected freight and intermodal train traffic dominates the Project noise impact exposure. If only the new HSR trains were included in the Project noise impact exposure (as was modeled north of Petersburg, VA), the number of projected noise impacts would be reduced substantially. Therefore, the detailed noise assessment undertaken during development of final design for the Project will use any updated information on estimated freight operations.

Additionally, the train noise impact results previously shown in Table 4-14 represent a fairly conservative estimate in terms of the number of projected impacts because maximum operating speed was assumed throughout the corridor. During the design phase of the Project, when more detailed analysis will be conducted, operating speeds through applicable impacted areas will be evaluated further prior to DRPT and NCDOT making a final determination on mitigation.

During the final design study, the following mitigation measures should be considered and applied as appropriate per Federal and state regulations:

- **Wheel Treatments** – A major source from steel-on-steel high speed train systems is the wheel-rail interaction. Various wheel designs and other mitigation measures to reduce the wheel noise include: resilient or damped wheels, spin-slide control systems, and maintenance.
- **Rail Treatments** – Rail surfaces that are degraded over time due to wear generate noise levels that are significantly higher than those produced by a well-maintained system. Roughness of rail surfaces can be eliminated by grinding rails.
- **Vehicle Treatments** – Mechanical systems associated with rail cars themselves can be a source of noise. For example, fans necessary to ventilate the interior of cars can be a major noise source, especially when the cars are stopped, such as in a station and/or farther from the engines. Fan quieting, if required, can be accomplished by installation of one of several new designs of quiet, efficient fans. The vehicle body design itself can also provide shielding and absorption of noise generated by the vehicle components.
- **Building Insulation** – In cases where rights-of-way are restricted, the only practical noise mitigation measure may be to provide sound insulation for the building. The most effective treatments are to caulk and seal gaps in the building and to install windows that are specially designed to meet acoustical transmission-loss requirements.
- **Noise Barriers** – Noise reduction can be achieved by using noise barrier walls in areas along the corridor where significant train noise impacts have been identified. If the noise barrier walls are implemented prior to Project construction, the walls could then also serve as an effective means of mitigating construction noise impacts as well. The cost-effectiveness and optimum height of the walls would need to be determined by specific acoustical analysis for each area of impact identified. An important consideration in determining areas where noise mitigation might be appropriate is whether the railroad and any adjacent residential developments may have coexisted for many years. Some land uses may be less sensitive to train noise because of its established, long history in the communities, and because of the services the rail operation provides to the communities. The USEPA (1974) has indicated that these considerations would likely reduce community reactions to noise. Before implementation of a mitigation measure such as noise barrier walls, the FRA guidelines recommend that the agreement of the community should be obtained. Some communities would rather not have a wall because of adverse visual effects. For preliminary estimate purposes, an average noise barrier height of 8 feet is an assumed cost-effective height for high-speed rail noise impact. (16 feet if there are higher noise sources (such as propulsion units) or for protecting higher floors of residences, if desired.) The barrier length needs to extend long enough to shield the entire train length for an angle of at least 60 degrees in either direction from the impacted receptor. Unit costs are assumed to be $20 per square foot. Maximum costs (or square footage) per benefited unit are determined by the project sponsor or the sponsor can apply the respective State DOT criteria. Barrier effectiveness is achieved with an attenuation of 5 dBA for an 8-foot-high barrier and 8 dBA for a 16-foot-high barrier.

Both Virginia and North Carolina have traffic noise abatement policies that address impacts related to highway noise. While impacts associated with Project will be a result of rail activity, review of these abatement policies is useful in understanding how noise abatement is evaluated to determine if it will be cost-effective. Table 4-22 provides a summary of the noise abatement policies of the respective states.

Table 4-22
Summary of Highway Noise Abatement Policies*

Noise Abatement Criteria	Virginia	North Carolina
Feasibility	(1) At least a 5 dB(A) highway traffic noise reduction at impacted receptors. VDOT requires that fifty percent (50%) or more of the impacted receptors experience 5 dB(A) or more of insertion loss (the reduction of traffic noise levels that directly results from installation of a noise reduction measure) to be feasible; and; (2) The determination that it is possible to design and construct the noise abatement measure. The factors related to the design and construction include: safety, barrier height, topography, drainage, utilities, and maintenance of the abatement measure, maintenance access to adjacent properties, and general access to adjacent properties	(a) Any receptor that receives a minimum noise level reduction of five dB(A) due to noise abatement measures shall be considered a benefited receptor. Noise reduction of five dB(A) must be achieved for at least one impacted receptor. (b) Engineering feasibility of the noise abatement measure(s) shall consider adverse impacts created by or upon property access, drainage, topography, utilities, safety, and maintenance requirements.
Reasonableness	(1) Cost-Benefit Factors • Surface Area (Total square foot) of the proposed noise barrier. (ft²) • Total number of benefited receptors. • Surface Area per benefited receptor unit (ft²/BR) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600 • Must provide a decibel reduction of at least 7 decibels (dB(A)) for at least one impacted receptor in the design year (2) Community Desires Related to the Barrier • Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier?	The combination of social, economic, and environmental factors considered in the evaluation of a noise abatement measure. (a) Viewpoints of the property owners and residents of all benefited receptors shall be solicited. (b) The maximum allowable base quantity of noise walls and/or earthen berms per benefited receptor shall not exceed 2,500 ft2 and 7,000 yd3, respectively. (c) A noise reduction design goal of at least 7 dB(A) must be evaluated for all front row receptors. At least one benefited front row receptor must achieve the noise reduction design goal of 7 dB(A).

*As taken from the respective VDOT and NCDOT highway traffic noise policy guidance manuals.

Train Vibration Mitigation. The Tier II FEIS vibration results and recommendations are preliminary. DRPT and NCDOT will develop a more detailed vibration analysis during the final design phase of the Project, to determine:

- The soil characteristics and the efficiency at which the vibration propagates through the ground at various locations along the alignment,
- The most appropriate method of vibration mitigation, and
- The extent where mitigation would be required at specific locations.

In order to ensure that vibration is reduced to an acceptable level, FRA has established the following mitigation measures to be considered and applied according to the results of the final design study:

- **Maintenance** – Wheel and rail surfaces that are degraded over time due to wear generate vibration levels that are significantly higher than those produced by a well-maintained

system. However, these conditions are not uncommon on rail systems. Up to 20 VdB of vibration reduction can be gained when comparing new or well-maintained rail systems to older systems showing wear. The following measures would help to minimize vibration impacts if done regularly:

1. Rail grinding on a regular basis, especially on rails that tend to develop corrugations.
2. Wheel truing to re-contour the wheel and remove wheel flats. This can result in a dramatic vibration reduction. However, significant improvements can be gained from simply smoothing the running surface. Install wheel-flat detector systems to identify vehicles that are most in need of wheel truing.
3. Implement vehicle reconditioning programs, particularly with components such as suspension systems, brakes, wheels, and slip-slide detectors.

- **Relocation of Special Trackwork** – Crossovers, turnouts, and other special trackwork that cause an irregular rail surface should be considered for relocation to less vibration sensitive areas when feasible. The use of special "spring-loaded rail frogs" should be considered at turnouts and crossovers that cannot be relocated away from residential and commercial structures. The special frogs incorporate mechanisms that close the gaps between running rails. Frogs with spring-loaded mechanisms and frogs with movable points can significantly reduce vibration levels near crossovers.
- **Ballast Mats** – Ballast mats are rubber or another type of elastomer pads that are placed under the ballast. The mat must be placed on a concrete pad to be effective. They will not be effective if placed on the soil or the sub-ballast. Ballast mats can provide up to 10 to 15 VdB of reduction at frequencies above 35 to 40 hertz, but are generally ineffective at frequencies below 35 hertz.
- **Resiliently Supported Ties** – This is a system that consists of concrete ties supported by rubber pads. The rails are fastened directly to concrete ties using standard rail clips. This measure can provide a 10 VdB reduction at frequencies in the 15 to 40 hertz range.
- **High Resilience Fasteners** – These are used in conjunction with a concrete slab base. The fastener must be very compliant (resilient) in the vertical direction. If standard resilient fasteners are used (vertical stiffness of 200,000-lbs/inch; stiffness refers to the compressibility of the resilient material), little or no improvement in the vibration level would be achieved. Special soft fasteners with a vertical stiffness in the 30,000-lbs/inch range would reduce vibration levels as much as 5 to 10 VdB at frequencies above 30 to 40 Hz.
- **Floating Slab Trackbed** – This type of trackbed consists of a concrete base with 5-foot long floating concrete slabs supported above the base using resilient isolation elements such as rubber or similar elastomeric pads. The effectiveness of this method depends on the resonant frequency of the resilient pads and the mass of the concrete slab. These have been shown to be very effective at frequencies in the 5 to 20 hertz range. However, this method is very expensive and would normally be considered only in areas where irregular surfaces exist.

4.8 ENERGY

Overall, there is a positive impact on energy use from the Project. This improvement is due to a reduction in energy per passenger mile traveled within the corridor between Washington, DC, and Charlotte, NC. Generally speaking, rail is more energy efficient than both automobile and air travel; in fact, rail travel is one of the most energy efficient forms of transportation due to the low rolling resistance of steel wheels on steel rail.

The Tier II DEIS showed that the mileage differences between alternatives within each section of the Project between Richmond, VA, and Raleigh, NC, was relatively small. The discussion in Section 4.8

of the Tier II DEIS noted that because the difference in length between alternatives was so small, the difference in impact related to energy would be negligible. Table 4-22 of the Tier II DEIS showed that the shortest possible combination of alternatives for the 26 sections of the Project, would total 157.95 miles, and the longest possible combination of alternatives would total 159.90 miles. The total length of the Preferred Alternative (as described in Chapter 2) is 158.92 miles.

The Tier I EIS for the SEHSR Corridor between Washington, DC, and Charlotte, NC, estimated a net energy fuel reduction value for the implementation of the SEHSR Corridor compared to a no build alternative. This energy savings was based on projected ridership, and continues to be supported by results of the recently updated ridership and revenue model described in Chapter 1.

It should be noted that non-recoverable energy will be consumed during construction of the Project on a short term basis. This consumption will be related to construction activities as well as potential construction-related delays for freight and passenger trains in the areas with existing service. Best Management Practices (BMP) will be followed during construction which may include measures to minimize energy use such as:

- Use of energy-efficient equipment
- Restrictions on unnecessary idling of construction equipment
- Proper maintenance of equipment and machinery to meet original standards
- Consolidation of material delivery when possible, and use of local materials where possible.

4.9 VISUAL ENVIRONMENT

The following discussion of impacts to the visual environment provides a summary of the information presented in the Tier II DEIS and new analyses for areas where the Preferred Alternative was re-designed and not addressed in the Tier II DEIS analysis.

The regional landscape establishes the general visual environment of a Study Area (USDOT, 1981). Regional landscape is defined by the area's landform (topography) and land cover, including vegetation, water, and manmade development. Overall, the visual environment of the Project Study Area ranges from undeveloped natural areas to large expanses of agricultural areas and small towns to large-scale industrial development and vibrant urban districts. Section 3.9 identifies the existing visual elements of the Study Area, which have not changed substantively since publication of the Tier II DEIS.

4.9.1 OVERVIEW OF VISUAL IMPACTS OF THE PROJECT

FRA's Procedures for Considering Environmental Impacts states that an EIS should identify any significant changes likely to occur in the natural landscape and in the developed environment (64 FR 28545, May 26, 1999). The visual elements of the proposed Project include single or multiple sets of tracks, the supporting rock ballast, vegetated ROW, trains, and associated grade-separated bridge and road crossings. The actual configuration of the tracks often would be unnoticeable by the train passenger or bystander. A rail corridor is most visible when trains pass and or when one train is waiting on a siding for another train to pass. Passing siding improvements allow trains to pass more quickly through the view of the onlooker. The Project has been designed to include either double tracks or passing sidings (about five miles long, located approximately every ten miles between ends). A number of bridges will have to be constructed, reconstructed, or modified. Most bridges will be built adjacent to the existing bridge structure or the existing structure will be modified to accommodate the proposed Project.

The incremental addition of HSR service where passenger rail service and/or freight rail service is currently active will not substantially alter the visual setting, character, or experience for those adjacent to the rail line because they are already exposed to trains passing through. Thus, the overall

degree of change in the visual environment where rail service currently exists will be low. Maximizing the use of existing rail ROW further minimizes visual impacts.

In locations where rail service is not currently active (from the Burgess Connector in Dinwiddie County, VA, southward to Norlina in Warren County, NC), the physical components of the rail line itself (e.g., railroad tracks) will introduce a change to the existing visual environment. In some instances, the tracks have been removed and small portions of ROW sold for driveway access. Communities without active rail lines include the Dinwiddie, VA, Courthouse area, McKenney, VA, Alberta, VA, and La Crosse, VA, and Norlina, NC. Although each of these towns developed along the railroad and had active rail service until the 1980s, the return of rail operations in a community could serve as a visual intrusion, albeit a short and periodic one. Some individuals and communities adjacent to the new rail service may never get used to the sight of trains adjacent to their property and may perceive this as a negative impact on their quality of life. However, others may view the visual changes as a sign of progress and economic opportunity. Outside of the urbanized areas, dense stands of forest and agricultural operations dominate the landscape. The existing wooded areas would provide a visual barrier for those living in rural areas.

Throughout the Study Area along the rail alignment, landscaping will be consistent with what currently exists. Along road work, landscaping will be addressed during final design using VDOT or NCDOT standards/procedures. Details for landscaping in historic districts may be specified under the Section 106 Memorandum of Agreement (MOA), which is being developed with input from property owners and other consulting parties. Refer to Section 4.12 for additional discussion regarding mitigation for visual impacts relative to Section 106 historic resources.

Impacts to visual resources will also result from construction activities. Construction of physical improvements may cause some temporary degradation of visual quality. Construction BMPs often include use of silt fencing or construction barriers, which would have a temporary visual presence.

Section 4.9 of the Tier II DEIS provided an analysis of the area-specific and resource-specific visual impacts within each section of the Project for each of the alternatives presented in the Tier II DEIS. The methodology for that analysis focused on potential visual changes to cities, towns, communities, and scenic or visually sensitive resources along the Project corridor. Potential changes to the visual environment were described and ranked as either low, moderate, or high depending on the degree of visual change. Visual Impact Ratings are defined below.

- Low Visual Impacts: If rail or roadway features of the alignment are consistent with the existing line, form, texture, and color of other elements in the landscape and do not stand out.
- Moderate Visual Impacts: If rail or roadway features of the alignment are obvious but do not dominate the landscape or detract from existing visual features.
- High Visual Impacts: If the rail or roadway features of the alignment are obvious, thereby dominating the landscape and detracting from the existing landscape characteristics or scenic qualities.

The visual impacts of the Preferred Alternative are summarized by section in Table 4-23. As discussed in Section 4.9 of the Tier II DEIS, there was no difference between alternatives in terms of visual impacts, except in Project Section R (Franklin County, NC), and Project section V (Wake County, NC). Subsequent to the Tier II DEIS, a revision was made to the Preferred Alternative in Section R that results in a reduction of the visual impacts described in the Tier II DEIS, and an entirely new rail alignment was developed and selected as the Preferred Alternative in Section V; in addition, a new rail alignment was developed and selected as the Preferred Alternative in Section D (Brunswick County, VA). An analysis of the visual impacts for the Preferred Alternative in these three sections is provided below.

4.9.2 SECTIONS WITH NEW ANALYSES

4.9.2.1 *SECTION D, BRUNSWICK COUNTY, VIRGINIA*

Section D is located in northern Brunswick County, VA, where the visual setting is dominated by forested, agricultural, and rural residential uses. As described in Chapter 2, the Preferred Alternative (VA4) was developed subsequent to the Tier II DEIS, and follows an alignment on new location, predominantly east of the existing rail ROW, where the tracks have been removed. The Preferred Alternative will require construction of three new grade-separated crossings and the closure of one public at-grade crossing. Under the Preferred Alternative, new HSR service and road/rail features will be obvious elements on the landscape. However, the overall visual impacts will be low because dense forest cover dominants the landscape, and views of the new rail will be screened from view throughout the most of the section.

4.9.2.2 *SECTION S, FRANKLIN COUNTY, NC*

Section S is located in the northern portion of Franklin County, NC, where CSX operates freight service along the existing CSX S-Line railroad. South of the Tar River, the Preferred Alternative (NC1) shifts from existing rail ROW to new location east the existing railroad in order to flatten a curve, and then rejoins the existing rail ROW near Misty Way. The Preferred Alternative calls for one public road to be closed at the new rail alignment, and one bridge over the new rail alignment to be constructed.

The surrounding visual setting is dominated by agricultural and forest uses with homes sparsely dotting the landscape. The exception to this is the residential community located to the east of the rail line along Cornerstone Drive, which is buffered from the existing rail line (approximately 900 feet to the west) by vegetation and terrain.

The residential development along Cornerstone Drive was constructed after alternatives had been developed for the Tier II DEIS. The Alternative NC1 alignment shown in the Tier II DEIS crossed through the vegetated buffer behind the new neighborhood and through several residential properties, which would have resulted in a high visual impact to the community. Alternative NC1 was selected as the Preferred Alternative in this section. However, as described in Chapter 2 of this document, subsequent to the Tier II DEIS, the rail alignment for NC1 was revised to avoid impacting the new residential development. The revised alignment still flattens the curve of the existing rail, but a westward shift away from the residential properties retains the existing terrain and vegetated buffer behind the neighborhood, resulting in a low visual impact for the neighborhood.

Because the Preferred Alternative follows the active railroad ROW throughout the remainder of this section, it will not present an obvious visual intrusion; therefore, the visual impact will be low.

4.9.2.3 *SECTION V, WAKE COUNTY, NC*

Section V contains the southern terminus of the Project, and is located within Wake County, a rapidly suburbanizing county where the visual landscape is becoming dominated by residential, commercial, and industrial development. Large tracts of forested and agricultural lands are interspersed throughout the county, but are not the dominant landscape features.

As described in Chapter 2, the Preferred Alternative (NC5) was developed for Section V subsequent to the Tier II DEIS, and predominantly follows existing freight rail ROW. Nine new bridges or underpasses and one pedestrian bridge will be constructed, fourteen existing grade separated crossings will be maintained or replaced, and two public crossings will be closed. Much of the northern portions of this section are heavily wooded; however, the dominant landscape features vary from suburban residential and commercial to industrial to forested to dense urban

mixed-use development. From Gresham Lake Road to Whittaker Mill Road, the Preferred Alternative remains primarily within the existing rail ROW. Thus, the visual impact will remain low because freight rail is currently active on the tracks and the rail ROW and the adjacent land is heavily wooded.

The roadway improvements proposed for Gresham Lake Road will have a low visual impact given that the adjacent landscape is either heavily wooded or high density commercial/industrial. Similarly, the roadway improvements associated with new bridges over the rail at East Millbrook Road, New Hope Church Road, Wolfpack Lane and Whitaker Mill Road will be obvious, but not inconsistent with the existing urban commercial setting.

The Middle Crabtree Creek Greenway is a visually sensitive resource located just south of the I-440 Beltline. The Project will introduce new HSR service essentially within existing freight ROW. Under the Preferred Alternative, a new bridge will be constructed adjacent to the existing single-track bridge that spans the Middle Crabtree Creek Greenway, Crabtree Creek, and Hodges Street. The new adjacent, parallel bridge will not substantially alter the existing landscape and setting for individuals using the Middle Crabtree Creek Greenway. Therefore, the Preferred Alternative will result in a low degree of visual change.

South of Whitaker Mill Road to the CSX Capital Yard, the Preferred Alternative maximizes use of the existing, active CSX S-Line while incorporating a new HSR bridge parallel to the existing CSX bridge to cross over both the CNLA short line railroad and Capital Boulevard, before entering the west side of CSX Capital Yard. Because the alignment remains within or immediately adjacent to existing rail ROW, and because the existing rail line is active, the introduction of HSR will not create a visually intrusive feature nor will it be inconsistent with the historic Mordecai neighborhood, the historic Pilot Mill buildings, or the new urbanist Pilot Mill Village. Therefore, the Preferred Alternative will result in a low degree of visual change in this area.

Just south of the Wade Avenue/Capital Boulevard interchange, the Preferred Alternative branches west out of Capital Yard to cross back over Capital Boulevard and West Street on a new HSR bridge in a new location. The surrounding area is that of a commercial urban setting, which is not inconsistent with rail. However, because the bridge represents an entirely new structure, it will bring a moderate visual change to this location.

The Preferred Alternative then follows the active Norfolk Southern NS-Line southward within new, adjacent ROW, utilizing new parallel bridges to cross over Peace Street, West Johnson Street, Tucker Street, and West North Street. Because the alignment remains adjacent to the existing ROW, and because the existing rail line is active, the introduction of HSR service along this alignment will not be an obvious visual intrusion nor will it be visually inconsistent with the surrounding development patterns.

At Jones Street, the existing at-grade crossing will be closed and a pedestrian bridge will be constructed. While not inconsistent with the existing urban setting that is transitioning toward entertainment and office uses, the new structure will be obvious, and will have a moderate to high level of visual impact. Because of the close proximity to historic properties (the Carolina Power and Light Company Car Barn and Automobile Garage, and the Raleigh Electric Company Power House) the appearance of the bridge will be a condition of the MOA being developed as part of coordination under Section 106 of the NHPA. Refer to Section 4.12 for additional discussion.

At the approach to the Boylan Wye and the terminus of the Project, the immediate view to the east is of older brick buildings within the Warehouse District (another industrial area transitioning towards entertainment and office uses) with the Raleigh, NC, skyline in the background. The view to the south is of the current Amtrak station with the Boylan Heights Historic District on the hill behind. The view to the west is of an older neighborhood, the Boylan Avenue bridge and both NS

and NCRR rail corridors. Because this is an active freight rail area and the alignment is primarily within existing rail ROW, the visual impact will be low.

Table 4-23
Visual Impacts (Low, Moderate, High)

Section	VA Communities	Impacts
AA	Richmond, Chesterfield County, VA	Low to Moderate
BB	Chesterfield County, Centralia, Chester, VA	Low to Moderate
CC	Colonial Heights, Ettrick, Petersburg, VA	Low
DD	Dinwiddie County, VA	Low to Moderate
A	Dinwiddie County, VA	Low to Moderate
B	Dinwiddie County, Dinwiddie Courthouse, VA	Low to Moderate
C	Dinwiddie County, McKenney, VA	Moderate
D	Brunswick County, VA	Low
E	Brunswick County, Alberta, VA	Low to Moderate
F	Brunswick County, VA	Low
G	Brunswick County, VA	Low
H	Brunswick County, Mecklenburg County, VA	Low to Moderate
I	Mecklenburg County, La Crosse, VA	Low to Moderate to High
J	Mecklenburg County, VA	Low to Moderate
K	Mecklenburg County, VA	Low to Moderate
L (VA)	Mecklenburg County, VA, Lake Gaston area	Low to Moderate
Section	**NC Communities**	**Impacts**
L (NC)	Warren County, NC	Moderate to High
M	Warren County, Norlina, NC	Low to Moderate to High
N	Warren County, NC	Low to Moderate
O	Vance County, Middleburg, NC	Low to Moderate
P	Vance County, Henderson, NC	Low to Moderate
Q	Vance County, Kittrell, NC	Low to Moderate to High
R	Franklin County, NC	Low
S	Franklin County, Franklinton, NC	Low
T	Franklin County, Youngsville, NC	Low to Moderate
U	Wake County, Wake Forest, Raleigh, NC	Low to Moderate to High
V	Wake County, Raleigh, NC	Low to Moderate to High

4.10 BIOLOGICAL RESOURCES

Proposed Project impacts to the natural terrestrial communities occurring within the preferred alternative are described in the following sections (aquatic community impacts are summarized in Sections 4.1 and 4.2). Impact minimization, threatened and endangered species, and bald eagles are also addressed.

4.10.1 NATURAL COMMUNITIES

Project construction will have various impacts to the terrestrial and aquatic communities described in Section 3.10.1. Construction activities in or near these resources have the potential to impact biological functions. This section quantifies and qualifies potential impacts to the natural communities within the Study Area in terms of the area impacted and the plants and animals affected.

Temporary and permanent impacts are considered here along with recommendations to minimize or eliminate impacts.

4.10.1.1 *TERRESTRIAL COMMUNITY IMPACTS*

Clearing and paving for Project construction, and loss of terrestrial community area will potentially cause permanent impacts to terrestrial communities in the Study Area. Destruction of natural communities within the Study Area will potentially result in the loss of foraging and breeding habitats for the various animal species that utilize the area. Animal species will potentially be displaced into surrounding communities. Adult birds, mammals, and some reptiles are mobile enough to avoid mortality during construction. Young animals and less mobile species may suffer direct loss during construction.

Potential Project impacts (in acres) to the various different land cover types classified by the Southeast Gap Analysis for Virginia and North Carolina are summarized by Project section for each alternative in Appendix N. Appropriate land cover types were combined into "Mixed Forest," "Pine Forest," and "Maintained/Disturbed" to summarize the impacts in Table 4-24. Project impacts were calculated by determination of the acreage of applicable forested community types from the Southeast GAP data (BaSIC, 2008) within 25 feet of the slope-stake line. Impacts to "Maintained/disturbed" communities, though not "natural", are included for reference.

Table 4-24
Potential Project Impacts to Natural Communities (acres)

Section	Mixed Forest	Pine Forest	Forest Subtotal	Maintained/ Disturbed	Total
AA	34.09	8.48	**42.57**	181.26	**223.83**
BB	53.90	0.26	**54.16**	96.18	**150.34**
CC	40.24	4.81	**45.05**	127.85	**172.90**
DD	51.67	10.74	**62.41**	49.17	**111.58**
A	42.41	21.79	**64.20**	42.46	**106.66**
B	48.18	33.27	**81.45**	22.43	**103.88**
C	87.78	67.27	**155.05**	63.67	**218.72**
D	45.82	55.89	**101.71**	39.17	**140.88**
E	33.85	18.16	**52.01**	40.31	**92.32**
F	35.94	31.08	**67.02**	33.90	**100.92**
G	25.89	17.67	**43.56**	18.45	**62.01**
H	82.37	28.27	**110.64**	47.88	**158.52**
I	22.02	13.51	**35.53**	67.60	**103.13**
J	38.13	24.93	**63.06**	40.06	**103.12**
K	40.38	38.83	**79.21**	10.03	**89.24**
L (VA)	11.27	12.80	**24.07**	16.83	**40.90**
VA Subtotal	**693.94**	**387.76**	**1,081.7**	**897.25**	**1,978.95**
L (NC)	40.67	23.72	**64.39**	51.50	**115.89**
M	25.79	14.71	**40.50**	128.95	**169.45**
N	22.14	21.29	**43.43**	47.16	**90.59**
O	27.15	19.07	**46.22**	93.00	**139.22**
P	9.98	2.88	**12.86**	171.40	**184.26**
Q	38.04	11.18	**49.22**	100.03	**149.25**
R	8.18	21.27	**29.45**	14.91	**44.36**
S	54.68	37.51	**92.19**	57.99	**150.18**
T	6.91	18.74	**25.65**	37.35	**63.00**
U	40.69	31.25	**71.94**	92.89	**164.83**
V	10.63	6.42	**17.05**	162.62	**179.67**
NC Subtotal	**284.86**	**208.04**	**492.90**	**957.80**	**1,450.70**
Total:	**978.80**	**595.80**	**1,574.60**	**1,855.05**	**3,429.65**

The Project has minimized impacts to natural terrestrial communities by selecting to the maximum extent practicable, alternatives having the lowest impacts to jurisdictional wetlands, streams, and other waters, which generally coincide with the remnant forested habitats for each section. Plant and animal communities are also threatened by habitat fragmentation which can increase the risk of predation or the displacement of native species by invasive, exotic species.

Loss of habitat, mortality due to collisions, barrier effect, and reduction in habitat quality are the main impacts of habitat fragmentation by railroads. On a local scale, trains may affect wildlife habitats through the introduction of exotic plant species (e.g. seeds), emission of toxic contaminants

like heavy metals, or management (e.g. herbicides) (Wild Earth Guardians, 2014). Potential habitat fragmentation may occur in Section D, where the Preferred Alternative is on new location, bisecting existing forested tracts. Of concern in Section D is the potential constraining of the Michaux's sumac (Table 4-25) population and its ability to expand to the potential habitat on the other side of the rail line. However, the proposed location is over 80 feet from the sumac population and does not present an immediate barrier to expansion due to the extensive suitable habitat to the north and the south. To further minimize potential impacts here, herbicide application will be restricted in this vicinity.

Species requiring large, unbroken tracts of forest, offering deep interior forest conditions to carry out some portion of their life cycle may be impacted in Project sections on new location and to a lesser degree on existing inactive rail line. Review of 2010 aerial photography from Collier Yard, south of Petersburg, VA to the beginning of Section N, south of Norlina, NC (the only Project locations involving currently inactive rail line and/or new location within non-urban settings), revealed the following potential for habitat fragmentation and/or impacts to wildlife and riparian corridors. Potential impacts to forest interior-dependent species are also considered.

There are 27 areas in the Study Area where potentially natural habitat (mixed forest natural community exceeding 200 acres) is traversed by approximately 22.5 miles of existing inactive or proposed new rail corridor. Of these locations, 15 include existing inactive rail corridor where there is a berm with no ballast, ties, or rails; berm with ballast only; or berm with ballast and ties. New railroad is proposed at 16 of the 27 locations (4 of the locations include a combination of existing and new rail corridor). Where inactive rail corridor exists, the adjacent potential habitat is already fragmented by this variably maintained interruption and riparian corridors have been affected by culverts and, to a lesser extent, bridges. Habitat edge zones and wildlife travel, however, may be newly disturbed by reintroduction of train travel at these 15 locations. Re-activating the railway would increase collision mortality and toxic contaminants at these locations along approximately 11.2 miles of existing currently inactive railroad corridor through contiguous mixed forested areas.

The Preferred Alternative is located up to 5,000 feet from the existing rail corridor (but average maximum distance is about 1,500 feet) at 16 new locations through contiguous mixed forested habitat. Depending on the distance from existing natural community edges, there is variable potential for habitat fragmentation at each of these sites. Minimal impacts are anticipated due to the combination of stream-bridging, proximity to existing habitat barriers, and the size, orientation, and quality of the mixed forested communities. Approximately 2.15 miles of the 11.26-mile Preferred Alternative on new location within mixed forested community would be over 500 feet from the nearest existing potential habitat edge. Within these areas (at 8 locations) the 3 locations in North Carolina present the most significant potential for habitat fragmentation and/or impacts to wildlife and riparian corridors or forest interior-dependent species. In Sections L and M, location of the over 8,000 feet of Preferred Alternative up to 2000 feet west of the existing rail corridor would result in direct impacts to over 18 acres of mixed forest community within contiguous tracts over 50 acres in size, including over 1,000 linear feet of direct stream impacts. Avoidance and minimization of these areas is summarized in Section 2.2 but potential adverse effects to Section 4(f) resources necessitated the additional habitat (and stream) impacts.

As discussed above, the avoidance and minimization of environmental impacts, including forested areas, has been maximized throughout Project planning and design after consideration of variably competing priorities such that impacts of the Preferred Alternative to potential riparian and/or forest-interior habitat through fragmentation, are unavoidable.

4.10.1.2 *AQUATIC COMMUNITY IMPACTS*

Aquatic habitat in the Study Area will be both directly and indirectly affected by the construction of the Project. Direct impacts will include the destruction of habitat by the placement and replacement of culverts at stream crossings and clearing and filling of adjacent floodplain and wetlands (see Tables 4-1 through 4-7). Many of the historic railroad culverts were bottomless arched rockwork placed on bedrock with rock walls at the entrance and exit. These were morphologically stable. As a result of their bottomless design, the natural streambed was able to fully function and did not impede fish migration or impair benthic habitat. In subsequent years, the exterior rock walls on some culverts have been supplemented with concrete culvert extensions. These extensions have increased plunge pool depths at outfalls and downstream stream bank erosion. This erosion was observed to embed stream substrate typically for hundreds of linear feet downstream of the culverts. Many culverts are creating fish migration blockages either at their outfall or as a result of the shallow water that passes through them with swift currents and high velocities.

Impacts to aquatic communities for new construction would include fluctuations in water temperatures as a result of the loss of riparian vegetation. Shelter and food resources, both in the aquatic and terrestrial portions of these organisms' life cycles, would be affected by losses in the terrestrial communities. The loss of aquatic plants and animals will affect terrestrial fauna, which rely on them as a food source.

Temporary and permanent impacts to aquatic organisms may result from increased sedimentation. While aquatic invertebrates may be severely impacted, some may drift downstream during construction and recolonize the disturbed area once it has been stabilized. Sediments have the potential to affect fish and other aquatic life in several ways, including the clogging and abrading of gills and other respiratory surfaces, affecting the habitat by scouring and filling of pools and riffles, altering water chemistry, and smothering different life stages. Increased sedimentation may cause decreased light penetration through an increase in turbidity. Dissolved oxygen rates may be lower as well.

4.10.1.3 *NATURAL COMMUNITY IMPACT MINIMIZATION*

VDRPT and NCDOT will minimize terrestrial and aquatic impacts by including the following measures:

- Minimizing clearing and grubbing activity
- Limiting or eliminating discharges into streams
- Reducing fill slopes at stream/wetland crossings
- Placing drainage structures with care
- Using spanning structures or bottomless culverts over streams
- Reestablishing vegetation on exposed areas, with judicious pesticide and herbicide management
- Scheduling "in-stream" activity during dry or low flow periods
- Using responsible litter control practices

4.10.2 RARE AND PROTECTED SPECIES

Coordination with the USFWS is continuing through the design phase of the Project regarding Threatened and Endangered Species (16 U.S.C. §1531 *et seq.*), the Bald Eagle and Golden Eagle Protection Act, (16 U.S.C. 668-668c), and the Migratory Bird Treaty Act (16 U.S.C. §§ 703–712). The Chowanoke crayfish (*Orconectes virginiensis*) has been historically documented in the Study Area. Although the species is currently not listed as threatened or endangered by USFWS, Virginia

DRPT and NCDOT will review the status of the species during final design to determine if field surveys are necessary.

The USFWS recently listed the Northern Long-eared Bat (*Myotis septentrionalis*) as "Threatened" and issued an interim species-specific rule under Section 4(d) of the Endangered Species Act of 1973, effective May 4, 2015. Furthermore, this species is included in USFWS's current list of protected species for the project study area. Virginia DRPT and NCDOT will continue working closely with the USFWS to determine how this listing may impact the SEHSR project. Approximately 1,575 acres of trees (see Table 4-26) and numerous structures may be impacted by project construction over the anticipated three-year phased schedule. Prior to project permitting, Virginia DRPT and NCDOT will coordinate with USFWS to determine if this project will incur potential effects to the Northern long-eared bat and how to address these potential effects, if necessary.

4.10.2.1 *THREATENED AND ENDANGERED SPECIES*

The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 *et seq.*) requires Federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife.

Biological conclusions regarding potential Project impacts for the ten Federally protected species within the Study Area described in Section 3.10.2 are summarized in Table 4-25. More detailed information can be found in the natural resource technical reports for the Project (NCDOT and Virginia DRPT, 2004a, 2008).

Table 4-25
Biological Conclusions for Federally Protected Species in the Study Area

Scientific Name	Common Name	Status	County/State	Biological Conclusion
Haliaeetus leucocephalus	bald eagle	BGEPA	Richmond, Chesterfield, Mecklenburg/ VA Warren, Vance, Wake/ NC	No Effect for VA1, VA2, and VA3 in Virginia – see discussion below regarding population west of Petersburg, VA No Effect for NC1, NC2, or NC3 in North Carolina
Picoides borealis	red-cockaded woodpecker	E	Wake/NC	No Effect for all alternatives - No habitat in the project study area
Percina rex	Roanoke logperch	E	Dinwiddie, Brunswick, Mecklenburg/ VA	Informal Section 7 consultation is ongoing with USFWS; surveys will be conducted followed by additional coordination with USFWS
Alasmidonta heterodon	dwarf wedgemussel	E	Chesterfield, Dinwiddie/VA Warren, Vance, Franklin, Wake/NC	Informal Section 7 consultation is ongoing with USFWS; surveys will be conducted followed by additional coordination with USFWS
Pleurobema collina	James River spinymussel	E	Chesterfield/ VA	Informal Section 7 consultation is ongoing with USFWS; surveys will be conducted followed by additional coordination with USFWS
Elliptio steinstansana	Tar River spinymussel	E	Warren, Franklin/NC	May Affect – Not Likely to Adversely Affect for all alternatives
Rhus michauxii	Michaux's sumac	E	Chesterfield, Dinwiddie, Brunswick, Mecklenburg/ VA Franklin, Wake/NC	No Effect for VA2; May Affect – Is Likely to Adversely Affect for VA1/VA3 in Section D only (No Effect for VA1/VA3 in all other sections – see discussion below) No Effect for NC1, NC2, or NC3 in North Carolina
Ptilimnium nodosum	harperella	E	Mecklenburg/ VA	No Effect for all alternatives - No habitat in the project study area
Aeschyno-mene virginica	sensitive joint-vetch	T	Chesterfield/ VA	No Effect for all alternatives - No habitat in the project study area

The Roanoke logperch (*Percina rex*) is presumed to occur within the Study Area as it crosses over Nottoway River and Stony Creek. The species has been observed in streams above and below the Study Area and suitable habitat is present where the Study Area crosses these streams. At the request of USFWS, surveys along the Nottoway River and suitable tributaries where the Roanoke logperch may be found, will be scheduled as required when the Project is funded for construction. Construction of the Project should not impact Roanoke logperch populations in the Nottoway River or Stony Creek if in-stream activities and sedimentation are appropriately minimized.

Additional surveys for listed freshwater mussels will be scheduled prior to Project construction for Sappony Creek, Nottoway River, Tar River, Neuse River, and Cedar Creek in order to determine potential Project impacts to the dwarf wedgemussel (*Alasmidonta heterodon*), Tar River spinymussel (*Elliptio steinstansana*), and James River spinymussel (*Pleurobema collina*). The

results of these surveys will be coordinated with USFWS in continuing informal Section 7 consultation. Stringent erosion controls will be enforced during construction to minimize impacts to the dwarf wedgemussel population downstream of the Project crossing at Cedar Creek.

The area of the Michaux's sumac (*Rhus michauxii*) population described in Section 3.10.2 has been avoided in Section D Alternative VA4, with the limits of construction being approximately 80 feet from the closest extent of the population.

Based on informal Section 7 consultation, the USFWS stated in a letter dated November 8, 2004, that "…this project is not likely to adversely affect Michaux's sumac provided the following conditions apply:

- The railway footprint would be located a minimum of 20 feet from the closest extent of the population,
- No construction activity would occur within 20 feet of the closest extent of the population,
- During and following construction, no herbicide treatment would occur within 500 feet of the population…"

Based on this coordination, FRA has determined that Alternative VA4 within Section D of the Project would have no effect on the Michaux's sumac. As encouraged by USFWS, the Army National Guard Maneuver Training Center, Fort Pickett, was contacted regarding potential management of the sumac population and coordination is on-going.

The sumac population is located along an inactive portion of the CSX S-Line; therefore, the population area is not currently sprayed by CSX for maintenance. Following Project construction, typical practice along active lines with high density traffic would be to spray once in the spring, and perform heavy cutting and spraying of the ROW 25 feet from the centerline as needed. The spraying is done using Hi-Rail trucks with booms that can be raised and lowered. The equipment operators use railroad mile post numbers to identify locations along the line where they are prohibited from spraying. During and after construction, the Project Team will identify the sumac population area as an area where spraying is prohibited.

Although no suitable habitat was identified for harperella (*Ptilimnium nodosum*) and sensitive joint-vetch (*Aeschynomene virginica*) during field surveys, these surveys have expired or will expire prior to anticipated Project permitting and construction. Informal Section 7 consultation is ongoing with USFWS and additional surveys will be conducted (as required) when the Project is funded for construction, followed by further coordination with USFWS prior to the permitting phase of the Project. Additional survey for potential Michaux's sumac habitat will be similarly coordinated with USFWS.

4.10.2.2 *BALD EAGLE AND GOLDEN EAGLE PROTECTION ACT*

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs.

Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large, dominant trees are utilized for nesting sites, typically within one mile of open water. While conducting field surveys for Federally listed species, a pair of bald eagles was observed on September 14, 2005, along the Appomattox River, just west of the City of Petersburg, VA. The area was revisited on February 2, 2006 (after leaf fall), to survey nest locations. Two potential nests were found in mature loblolly pine trees along the north bank of the Appomattox River outside the Study Area. The nest locations were reported to USFWS and the Virginia Department of Game and Inland Fisheries. Because the Project will be located more than 1,000 feet from the nests, it is anticipated that Project will have no effect on the bald eagle.

4.10.2.3 *MIGRATORY BIRD TREATY ACT*

The Migratory Bird Treaty Act (16 U.S.C. §§ 703–712) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations.

The Project can have effects on migratory bird populations, including habitat loss, habitat degradation, and habitat fragmentation. The Preferred Alternative passes through areas of developed land, farm fields, and forested areas. However, in all Project sections, impacts are focused on the existing rail corridor and do not include large areas of undisturbed land.

4.11 COMMUNITY RESOURCES

This Section has been updated from the Tier II DEIS to address public and agency comments, unless otherwise noted.

In this section, direct impacts to the human environment and economy from the proposed Project are discussed. These issues are directly related to one another; as communities and neighborhoods are affected by development (be it transportation or urban uses), so too is the land on which we live and our local economies. This assessment analyzes and reviews critical areas such as socio-economics, communities, facilities, services, environmental justice, vulnerable populations and land use planning on a local and regional level.

4.11.1 SOCIO-ECONOMICS

This section assesses the economic benefits and consequences (negative impacts) that are likely to accrue within the Study Area from the Preferred Alternative.

4.11.1.1 *ECONOMIC CONSEQUENCES*

4.11.1.1.1 PROPERTY VALUE IMPACTS

A significant loss in adjacent property values is not anticipated from the Project, given that:

- Along active rail lines, residents are used to the sights and sounds of trains.
- Where the lines are currently inactive, the reactivation of rail service may be viewed negatively; however, the low number of trains and the speed at which they will be traveling will limit the exposure to rail activities.
- Along active lines in communities with planned stations, residents are not only used to trains, it is predicted that the demand for office, retail, hotel and higher density housing will increase sharply near the proposed stations. And, as demand for redevelopment and infill opportunities increase, property values may actually increase over the long term.
- Where crossings are planned to be closed or access to parcels modified, residents and businesses should not witness a loss in property values given that access to all uses will be retained and the overall change in travel patterns for the community will not be substantially altered because most of the consolidated crossings have been designed to be no more than one mile apart.
- Although train horn noise has been shown to affect property values, under the Preferred Alternative all crossings will be grade-separated which will eliminate horn noise in the Study Area (refer to Section 4.7 for additional discussion related to noise).

4.11.1.1.2 LOSS OF USE

As noted in other sections of this chapter, the Preferred Alternative will impact approximately 2,288 acres of potentially developable land (farm, forest, open, undeveloped), as shown on Table 4-26. This land will be indefinitely lost from existing and future agricultural uses as well as future development. In addition, it is anticipated that this land will be removed from the tax rolls, and as such will have a fiscal impact on both states.

Table 4-26
Potentially Developable Land Lost to Preferred Alternative

	Forest (ac)	Farmland & Other (ac)	TOTAL (ac)
VA	1,082	313	1,395
NC	493	400	893
TOTAL	**1,575**	**713**	**2,288**

Source: Baker GIS Analysis, 4-15-14

4.11.1.2 *ECONOMIC BENEFITS*

As discussed below and in Chapter 1, the addition of the HSR proposed by the Project will provide substantial transportation, environmental, and community benefits to the residents of Virginia and North Carolina. Although the economic consequences discussed above are not quantified, the economic benefits of the Project, as quantified in this section, would appear to far exceed any negative economic impacts.

Sections 1.1 and 1.8 summarize several detailed economic and fiscal analyses that have been prepared for the SEHSR Corridor, including two cost-benefit studies: one prepared in 1997 by FRA for the entire national HSR system (the SEHSR Corridor is only one segment); and, a second detailed feasibility study prepared by NCDOT in 1998 specifically for the Washington, DC, to Charlotte, NC, SEHSR Corridor. Table 4-27 presents the results of these studies, with inflation-adjusted values to the year 2014 based on the Consumer Price Index (Bureau of Labor Statistics). Although the two studies used different assumptions and methods, and a direct comparison is not feasible, this table shows that independent evaluations found implementation of HSR in the SEHSR Corridor to be economically justified.

Table 4-27 Results of SEHSR Cost-Benefit Studies – Updated to 2014 Dollars		
	1997 FRA Study*	**1998 SAIC Study****
Total Benefits (in millions)	$9,597	$1,789
Total Costs (in millions)	$3,779	$1,191
NET Benefits (Total Benefits – Total Cost)	$5,818	$598
Benefit Ratio^ (Total Benefits / Total Cost)	**2.54**	**1.46**

Sources: FRA 1997 Study; SAIC (Science Application International Corporation and Corporate Strategies, Inc.) "Cost Benefit Analysis of the Piedmont High Speed Corridor" (Dec 1998), as reported in NCDOT SEHSR Feasibility Study (1999).
Figures from the initial reports have been updated to 2014 Dollars based on the Consumer Price Index, Inflation Calculator, Bureau of Labor Statistics, http://www.bls.gov/data/inflation_calculator.htm Accessed 4/16/14
* Assumes 27 RTS (round trips) between Charlotte/NYC.
** This reports "Scenario 6", which assumed 4 RTS between Charlotte/Raleigh and 4 RTS Charlotte/NYC.
^ This ratio estimates the amount of benefits for every $1.00 spent to build and operate the SEHSR corridor. Thus, for the 1997 study, the project was estimated to provide $2.54 worth of benefits for every $1.00 spent to build and operate the project.

4.11.1.2.1 CONSTRUCTION AND OPERATION EFFECTS

Construction of the SEHSR Corridor would create 23,952 temporary full-time jobs for individuals to upgrade the railroad road bed, install signal and safety devices, build frontage/service roads, improve grade separated crossings, and build bridges to replace grade crossings (KPMG, 1995). Additional jobs, possibly within the Study Area, would be created within the manufacturing sector to produce the equipment and materials needed to make these improvements. The additional jobs would increase income, and benefit the regional economy.

During construction, the economic impact would depend on the location of the firms supplying labor and materials. It is estimated that a high percentage of the new employment during the construction phase would come from within the SEHSR Corridor. Communities along the SEHSR Corridor will also benefit as construction crews spend money in local hotels, restaurants, and shops.

The impact from operation expenditures would likely be more concentrated; the majority of new jobs would likely be created in communities served by the proposed service. Ticket agents and other railroad personnel are likely to be located in these communities and the secondary impacts of their employment would be spread throughout the areas in which stations are located. Once HSR service is in place there would be additional needs such as maintaining the equipment and the track.

However, it is feasible that once the system is up and running, railroad personnel could live anywhere along the corridor and use the system to get to their work location. In addition the installation of high speed compatible track will enable even communities without stops to benefit from potential freight enhancements, an added incentive to draw new industry locations. Communities without stops will have new potential freight access, providing enhanced incentives for new industrial locations. Together, these impacts would expand the economic benefits of the Project beyond those communities with stations.

As shown in Tables 4-28 and 4-29, it is estimated that in North Carolina alone, construction of the SEHSR Corridor will generate almost $800 million in economic (business sales, employee earnings and jobs) and fiscal benefits (tax and fee revenues). Over 20 years, the operation and maintenance of the system will create over 800 permanent full-time jobs and generate over $661

million in economic and fiscal benefits in North Carolina alone. Although the studies did not include the Virginia portion of the SEHSR Corridor, it can be assumed that Virginia will see similar economic and fiscal benefits from constructing and maintaining the proposed system.

Table 4-28
Estimate of Annual Economic and Fiscal Impacts (NC Only)

		1996 Dollars	2014 Dollars^
Economic Impacts	Earning Income	$10,507,629,189	15,824,596,700
Fiscal Impacts	State Income Taxes	$332,041,082	$500,057,256
	Corporate Income Taxes	$62,873,699	$94,684,932
	State Sales Tax	$204,898,768	$308,579,634
	Property Taxes / Recordation Fees	$44,874,257	$67,581,089
	Franchise Taxes	$2,124,158	$3,199,004
	Employment Security Taxes	$72,230,023	$108,779,151
	Sum of Fiscal Impacts	*$719,041,987*	*$1,082,881,066*
Total Economic and Fiscal Impacts		**$11,226,671,176**	**$16,907,477,766**

Source: From Tier I EIS, KPMG Economic Impact Analysis, 1995, using Net Present Value of 1996 dollar values. Covers NC only. Does NOT include station construction (see Table 4-29). Construction of SHSR and the Stations are assumed for a 1 year duration; Other impacts are over the 20 years after construction.
^ Updated to 2014 Dollars based on the Consumer Price Index, Inflation Calculator, Bureau of Labor Statistics, http://www.bls.gov/data/inflation_calculator.htm Accessed 4/14/14

Table 4-29 Economic and Fiscal Impacts of SEHSR by Project Activity (NC Only; Updated to 2014 Dollars)			
Activity	**Economic Impact (Earnings Income)**	**Fiscal Impacts (Fees & Taxes)**	**TOTAL**
SEHSR Construction (1 year duration)	$739,660,600	$52,902,034	**$792,562,634**
Operations & Maintenance (over 20 years)	$619,401,095	$41,791,367	**$661,192,462**
Station Construction^ (1 year duration)	$37,736,526	$38,772,233	**$76,508,759**
Construction Surrounding Stations (1 year duration)	$224,123,748	$16,713,764	**$240,837,512**
Recurring Employment (20 yrs)	$14,241,424,820	$971,477,399	**$15,212,902,219**
TOTAL	**$15,862,346,789**	**$1,121,656,797**	**$16,984,003,586**

Sources: ^ From NCDOT Feasibility Study Summary & Implementation Plan (April 1999); Other data originally presented by KPMG Economic Impact Analysis, 1995 (from Tier I EIS).
Note: Totals do not exactly total to figures in Table 4-28 due to application of inflation factors.

4.11.1.2.2 STATION DEVELOPMENT EFFECTS

Transportation investments like HSR will provide specific locations with improvements to attract growth. This growth is most likely around planned stations, but as discussed in Section 3.11, the Project's freight improvements along the Study Area have already been noted by affected local governments (with and without planned stations) as a benefit to their existing and planned industrial zones as well as a means to attract economic development.

As noted in the NCDOT Feasibility Study (NCDOT,1999), construction of the stations themselves in NC is projected to create 1,222 temporary construction jobs, and re/development surrounding the proposed stations will create 7,438 additional temporary construction jobs. Re/development surrounding the NC stations will also create 18,980 permanent jobs in the hotel, office, retail and residential management industries. The economic and fiscal benefits from constructing the stations in NC have been estimated to exceed $76 million and the resulting secondary development around the NC stations is projected to result in over $240 million in economic and fiscal benefits (one time benefits). However, the recurring employment in these station growth areas is expected to exceed $15 billion in economic and fiscal benefits over 20 years (see Table 4-29). Similar results are anticipated for the planned Virginia stations.

The following comments from affected local governments in the Study Area (in response to this Project's Tier II DEIS) support the long-standing assertion that the economic impacts of the Project will be significantly positive (See Tier II DEIS, Appendix A):

City of Richmond, VA

"Connecting multi-state urbanized areas with improved passenger rail service and eventual high speed passenger rail infrastructure will provide competitive travel alternatives, enhance the environment, attract jobs, promote tourism and bolster economic vitality. Passenger rail service provides safe and highly reliable transportation service between the downtown areas of multiple cities for all segments of the population. This type of transportation service is extremely desirable and in many cases rail travel is quicker, more convenient, reliable, comfortable and less expensive than air or automobile travel. A city connected by quality passenger rail service coupled with convenient public transportation services becomes a more attractive destination and the areas near downtown stations become prime locations for investment. Such stations invite transit oriented development and present the opportunity to improve the livability and sustainability of the communities that they serve. In this way passenger rail service fosters economic development for the city, state and nation.

The location of the Southeast high speed corridor directly connected to Amtrak's existing successful NEC provides a tremendous opportunity and further enhances the rail infrastructure investment. Federal and state agencies along with HSR supporters should continue their efforts to make the implementation of the Southeast high speed rail corridor project a priority and a reality."

Town of Henderson, NC

"The location of a passenger rail station in downtown Henderson, NC, would be a significant boost to the redevelopment of the local economic base that has been devastated by the loss of the traditional economic stalwarts of textiles and tobacco in the early part of the decade as well as the lingering negative effects of the current Recession."

City of Raleigh, NC

"The high speed train brings an additional dimension connecting the city to the Northeast Corridor and offers potential opportunity for creating a powerful economic zone with Virginia. The Raleigh 2030 Comprehensive Plan establishes this aspiration by providing density and better connectivity to the city fabric in the hope to invigorate urban and economic development. The city's goals of urban development and excellence need to be fully integrated with the rail project to yield an overall positive result and sustainable economic development."

Also, the EA for the proposed Raleigh Union Station in Raleigh, NC, made the following conclusions of the economic impact of the proposed station (Proposed Raleigh Union Station, Phase I and Associated Track Improvements, TIP NO. P-5500; Draft Environmental Assessment & Section 4(f) Evaluation, NCDOT Rail Division, Dec 2013.):

- The Raleigh Union Station will provide economic development benefits to Raleigh, NC, and the surrounding region in the form of jobs, increases in tourism, and development opportunities.
- Centrally located in downtown Raleigh, NC, the site is surrounded by property offering tremendous development potential.
- The project will benefit the local economy by creating jobs and the housing, goods and services that these workers will need.
- The return on investment is profound and is estimated to impact the area for years to come.

4.11.1.2.3 CHANGES IN ECONOMIC ACTIVITY

In addition to impacts from direct expenditures on system construction and operation, and construction of the stations and surrounding induced development around the stations, the proposed HSR system will increase the flow of travelers between cities along the route and thus enhance economic activity in those communities with station stops.

The Ridership/Revenue projection model recently updated for the Project by AECOM estimated current demand and projected future travel between cities along the travel corridor, as well as along the entire Atlantic Coast for all modes of travel; refer to Section 1.5 for additional discussion regarding the updated ridership and revenue forecasts. Over 10,000 auto, air, and rail travelers were surveyed to find their stated and revealed preferences. The study estimated over two million annual riders will be utilizing North Carolina service trains by 2030. Most of these trips were for personal and other discretionary travel. The next largest category was recreation trips, closely followed by business trips. Based on current trends and experience along the high speed corridor between New York and Washington, DC, business travel is anticipated to be the fastest growing sector of rail travel.

4.11.1.3 *NET ECONOMIC IMPACTS*

As discussed above and in Chapter 1, the previous economic and fiscal studies on the SEHSR Corridor repeatedly concluded that the tangible and intangible benefits of the planned improvements for the SEHSR Corridor (to rail users as well as the public at large) exceed its costs. And, specific to the most recent ridership and revenue study completed for the Preferred Alternative for the Project (see Section 1.5), projected revenues of the SEHSR system are projected to exceed annual operating costs by the design year (2030).

Overall, it is estimated that in North Carolina alone, over the first 20 years of operation, SEHSR Corridor service would bring over $1 billion in new state and local tax revenues, $15.8 billion in employee wages (Table 4-28), over 32,600 new one-year construction jobs, more than 800 permanent new railroad operation positions, and nearly 19,000 permanent fulltime jobs from businesses which choose to locate or expand in North Carolina because of the SEHSR service (KPMG, 1995). And this 20-year period is a conservative cut-off assumption, since a HSR system's components (apart from the track) have a life of 30 to 40 years.

A similar evaluation was not prepared for Virginia as part of the original study; however, it can be reasonably assumed that similar, if not greater, positive benefits would accrue in Virginia, given that it will initially have one more station than NC.

In summary, the substantial long term positive economic, environmental, and fiscal benefits of HSR in the SEHSR Corridor will include:

- Creation of jobs in the railroad, roadway, commercial and residential construction industries, as well as railroad operation and maintenance;
- Increased manufacturing jobs in the rail passenger transportation industry, including car, equipment and part manufacturers;
- Enhanced economic development and revitalization of urban areas around stations, creating jobs in the office, commercial, hotel and housing management industries;
- Increased tourism;
- Improved transportation safety, including enhanced safety at rail crossings;
- Improved speed and reduced cost of service for freight-rail commerce;
- Reduced dependence on highways and airports, leading to:
    - Reduced use of carbon fuel, leading to:
        - Reduced greenhouse gas emissions, and

        - Reduced dependence on foreign oil;
      - Reduced need to build new (or widen existing) highways;
      - Deferred need to invest in airport expansions;
      - Reduced transportation delays, including reduced truck congestion on interstates;
- Increased productivity of business travel through consistently reliable and comfortable travel combined with the potential for reduced business-travel expenses;
- Increased generation of personal and business income and sales;
- Additional generation of tax revenues for both Virginia and North Carolina; and
- Billions of dollars in sustainable economic development.

4.11.2 NEIGHBORHOOD AND COMMUNITY IMPACTS

The neighborhoods and communities along the Project corridor are of many types, ranging from mobile home parks to upscale neighborhoods. Surrounding land uses range from agricultural to commercial to densely developed industrial areas. Commercial, industrial, upscale residential and mixed uses are found along the southern reaches of the Project. Medium sized communities are found in towns such as Dinwiddie, VA, La Crosse, VA, and Henderson, NC. They are typified by older grid patterned street systems close to the heart of the original town center or central business district (CBD). The larger, urbanized communities such as Richmond, VA, Petersburg, VA, Colonial Heights, VA, Wake Forest, NC, and Raleigh, NC, have residential areas typified by a mixture of distinct urban and suburban areas.

Table 4-30 provides an overview of the rail and road impacts and benefits; it puts the discussion of community impacts in context and aids in understanding the intensity of the proposed improvements relative to each community and the Project in its entirety.

4.11.2.1 *COMMUNITY CONCERNS*

Overall, community officials and citizens who provided input during the public outreach effort for the Project agreed that it would enhance and improve most areas along the corridor and surrounding areas. The Project is seen as providing an opportunity for business, retail, tourism, and residential growth possibilities. While there was overall support for the Project, the following concerns still remained.

4.11.2.1.1 HIGH SPEED RAIL (HSR) BYPASSING A COMMUNITY

Communities not identified as receiving a stop as a part of the Project were concerned they would miss out on the economic and community benefits associated with HSR. While only five locations are proposed to receive HSR stops (Richmond, VA, Petersburg, VA, and La Crosse, VA; Henderson, NC, and Raleigh, NC), this does not preclude the addition of other stations in the future. Table 4-30 provides a list of communities with an existing rail station, those for which a rail station is proposed, and those without a rail station (refer to section 1.4.3 for additional discussion about proposed station locations). While not all communities will have a rail station in their own backyards, the addition of two more stations will reduce the distance many must travel to access a station. While multiple communities will not have a station within their community limits, new freight rail service will be available to communities in Dinwiddie County, VA, Brunswick County, VA, Mecklenburg County, VA, and Warren counties, NC (Table 4-30). For those communities with industries that already have access to industrial freight, those services will be improved. Overall, new and improved freight rail service will provide economic benefits that would not otherwise be possible without the Project.

The new or improved rail lines constructed for the Project would be available for future, conventional passenger rail service once the Project is developed. This would allow residents not

served by high speed service to utilize conventional speed service to access the high speed stops. This option will be given further consideration as the system develops based on user demand along the route.

Table 4-30
Rail and Road Impacts and Benefits of Preferred Alternative by Community

Section	Community	Minority	Low-Income	Elderly Populations* Higher than Average Presence	Existing** Freight | *Passenger* Trains per Day	Existing Public Pedestrian Structures (to be Retained)	*Impacts*			*Benefits*				
							Projected* * * Freight | *Passenger* Trains per Day	Existing At-Grade Public RR Corridor / Crossings	Existing Public Roads Closed (Crossed by New Build)	SEHSR Station	Existing Public Grade Separations Maintained /	Additional Public Grade Separations	Additional Public Pedestrian Structures	Freight Rail Service Available for Industries
A A	City of Richmond, VA	✓	✓	---	29 | *10*	0	29 | *24*	3	0	Existing Station	20	8	0	Enhanced
B B	Chesterfield Co. between Richmond, VA and Colonial Heights, VA (includes Chester)	□	□	---	29 | *10*	0	29 | *24*	1	0	---	3	3	1	Enhanced
C C	City of Colonial Heights, VA	□	□	✓	29 | *10*	0	29 | *24*	0	0	---	2	1	0	Enhanced
C C	Chesterfield County between Colonial Heights, VA, and Petersburg, VA (includes Ettrick, VA)	✓	✓	✓	29 | *10*	0	29 | *24*	0	0	Existing Station[1]	1	2	0	Enhanced
	City of Petersburg, VA	✓	✓	✓	29 | *10*	0	29 | *24*	2	0	Existing Station[1]	7	0	1	Enhanced
D D	Dinwiddie Co. from Petersburg, VA, to Gatewood Road, VA (includes community of Dinwiddie, VA)	□	□	✓	---	0	10 | *8*	0	0	---	1	3	0	New
A, B, C	Dinwiddie Co. from south of Gatewood Road to Brunswick County line, VA (includes McKenney)	□	□	✓	---	0	10 | *8*	4	0	---	5	10	0	New
D, E	Brunswick Co. from Dinwiddie Co. to I-85, VA (includes of Alberta)	✓	✓	✓	---	1	10 | *8*	3	0	---	0	7	0	New

Table 4-30
Rail and Road Impacts and Benefits of Preferred Alternative by Community

Section	Community	Minority	Low-Income	Elderly Populations* Higher than Average Presence	Existing** Freight | *Passenger* Trains per Day	Existing Public Pedestrian Structures (to be Retained)	*Impacts*			*Benefits*				
							Projected* * * Freight | *Passenger* Trains per Day	Existing At-Grade Public RR Corridor / Crossings	Existing Public Roads Closed (Crossed by New R	SEHSR Station	Existing Public Grade Separations Maintained /	Additional Public Grade Separations	Additional Public Pedestrian Structures	Freight Rail Service Available for Industries
F, G	Brunswick Co. from south of I-85 to Mecklenburg Co. line, VA	✓	✓	✓	---	0	10 | *8*	0	0	---	6	4	0	New
H, I, J	Mecklenburg Co. from Brunswick Co. to Bellfield Rd, VA (includes La Crosse)		✓	✓	---	0	10 | *8*	6	1	Recommended Station	2	7	1	New
K	Mecklenburg Co. from south of Bellfield Rd, VA to NC state line	□	□	✓	---	0	10 | *8*	0	0	---	1	1	0	New
L	Warren Co. from VA state line to Norlina, NC	✓	✓	✓	---	0	10 | *8*	2	0	---	0	2	0	New
M	Town of Norlina, NC (Warren County)	✓	✓	✓	2 | *0*	0	12 | *8*	1	4	---	1	2	0	Enhanced
N	Warren Co. from Norlina to Vance Co. line, NC (includes Ridgeway)	✓	✓	✓	2 | *0*	0	12 | *8*	2	1	---	0	2	0	Enhanced
O	Vance Co. from Warren Co. line to Henderson, NC (includes Middleburg)	✓		✓	2 | *0*	0	12 | *8*	0	1	---	0	3	0	Enhanced
P	City of Henderson, NC (Vance County)	✓		✓	2 | *0*	0	12 | *8*	11	0	Recommended Station	2	3	1	Enhanced
	Vance Co. between Henderson and Kittrell, NC	✓	✓	✓	2 | *0*	0	12 | *8*	1	0	---	1	3	0	Enhanced
Q	Town of Kittrell, NC (Vance County)		✓	✓	2 | *0*	0	12 | *8*	1	0	---	0	1	0	Enhanced
	Vance Co. south of Kittrell to Franklin Co. line, NC	✓	✓	✓	2 | *0*	0	12 | *8*	3	0	---	1	3	0	Enhanced

Table 4-30
Rail and Road Impacts and Benefits of Preferred Alternative by Community

Section	Community	Minority	Low-Income	Elderly Populations* Higher than Average Presence	*Impacts*				*Benefits*				
					Existing** Freight | *Passenger* Trains per Day	Existing Public Pedestrian Structures (to be Retained)	Projected* * * Freight | *Passenger* Trains per Day	Existing At-Grade Public RR Corridor / Crossings	Existing Public Roads Closed (Crossed by New R	SEHSR Station	Existing Public Grade Separations Maintained /	Additional Public Grade Separations	Additional Public Pedestrian Structures	Freight Rail Service Available for Industries
R	Franklin Co. from Vance Co. line to Franklinton, NC	□	□	---	2 | *0*	0	12 | *8*	1	1	---	0	1	0	Enhanced
S	Town of Franklinton, NC (Franklin County)	✓	✓	---	2 | *0*	0	12 | *8*	4	0	---	1	1	2	Enhanced
S	Franklin Co. between Franklinton and Youngsville, NC	□	□	---	2 | *0*	0	12 | *8*	1	1	---	0	3	1	Enhanced
T	Town of Youngsville, NC (Franklin County)	□	□	---	4 | *0*	0	16 | *8*	2	0	---	0	1	2	Enhanced
T	Franklin Co. from Youngsville, NC to Wake County line	□	□	---	4 | *0*	0	16 | *8*	0	0	---	0	0	0	Enhanced
U	Wake Co. from Franklin Co. line to Wake Forest, NC	□	□	---	4 | *0*	0	16 | *8*	0	0	---	0	0	0	Enhanced
U	Town of Wake Forest, NC (Wake County)	□	□	---	4 | *0*	0	16 | *8*	3	0	---	2	2	2	Enhanced
U	Wake Co. between Wake Forest and Raleigh, NC	□	□	---	4 | *0*	0	16 | *8*	1	0	---	1	2	0	Enhanced
V	City of Raleigh, NC (Wake County) (includes unincorporated islands south of northern city limit)	□	□	---	6 (CSX) | 18 (NS) | *8*	0	20 (CSX) | 18 (Norfolk Southern) | *16*	2	0	Existing Station	14	9	1	Enhanced
Project Totals		---	---		---	1	---	54	9	3 Existing and 2 Recommended	71	84	12	7 New 21 Enhanced

Table 4-30
Rail and Road Impacts and Benefits of Preferred Alternative by Community

Section	Community	Minority	Low-Income	Elderly Populations* Higher than Average Presence	Existing** Freight | *Passenger* Trains per Day	Existing Public Pedestrian Structures (to be Retained)	*Impacts*			*Benefits*				
							Projected* * * Freight | *Passenger* Trains per Day	Existing At-Grade Public RR Corridor / Crossings	Existing Public Roads Closed (Crossed by New Public Roads)	SEHSR Station	Existing Public Grade Separations Maintained /	Additional Public Grade Separations	Additional Public Pedestrian Structures	Freight Rail Service Available for Industries
	Project Totals - EJ Only	---	---		---	1	---	39	7	2 Existing and 2 Recommended	42	48	5	4 New 11 Enhanced
	% Impacts to EJ Pop.	---	---		---	1	---	72.2 %	77.8 %	80.0%	59.2 %	57. 1%	41. 7%	57.1% New 52.4% Enhanced

= EJ Populations (see Section 4.11.5)

= Disproportionately High Impacts Relative to % Miles within Section having EJ community

61.6 % = Threshold value used to determine if impacts are disproportionate within Section having EJ community

*Elderly Populations are those age 65 and older whose total percentages in their demographic study area are greater than the percentage of elderly reflected in their respective city, county, and/or state. See Section 3.11.1.3, Age, Table 3-23 for elderly population data.

Notes –

* * Existing freight trains are estimates only due to the nature of freight service which does not run on specific, published schedules. The number of existing total train trips is up to the noted figures per day. It is estimated that up to 29 freight trains per day currently use the CSX corridor between Richmond, VA and Petersburg, VA; up to 2 freight trains per day use the CSX corridor between Norlina, NC, and Youngsville, NC; and up to 4 freight trains per day use the CSX corridor between Youngsville, NC, and Raleigh, NC. There are also up to 2 additional freight trains a day estimated to use the CSX corridor between the CSX rail yard in downtown Raleigh and points south and west (for a total of up to 6 freight trains per day in the SEHSR project study area in Raleigh). In addition, it is estimated that up to 8 freight trains per day use the Norfolk Southern corridor in downtown Raleigh, NC, between the Norfolk Southern rail yard and the Boylan railroad wye, and an additional estimated 10 freight trains per day leave the Boylan Wye for points south and west (for a total of up to 18 freight trains per day in the SEHSR project study area in Raleigh). Note that the 8 existing passenger trains in Raleigh are Amtrak trains headed west or south out of the existing Raleigh, NC, station (Carolinian / Piedmont and Silver Service / Palmetto).

* * * Projected freight (including intermodal) and passenger trains are based on assumptions in DEIS, which assumes projected HSR passenger trains are in addition to existing Amtrak trains. Eight intermodal trains were estimated to use the corridor south of Petersburg, VA. In addition, two non-intermodal freight trains per day (one round trip) are assumed to use the corridor between Petersburg, VA, and Youngsville, NC, and four non-intermodal freight trains per day (two round trips) are assumed to use between Youngsville, NC and Raleigh, NC, for a total of 10 additional freight trains in the corridor between Petersburg, VA, and Youngsville, NC, and 12 additional freight trains in the corridor between Youngsville, NC, and Raleigh, NC. In Raleigh, it is assumed all additional freight trains would remain in the CSX corridor and not cross over Capital Boulevard with the SEHSR passenger trains.

Between Petersburg, VA, and Raleigh, NC, it is assumed the SEHSR project would operate 8 passenger trains per day (4 round trips). Between Richmond, VA, and Petersburg, VA, it is assumed an additional 6 trains per day (3 round trips) would operate on the SEHSR corridor originating in Hampton Roads as part

Table 4-30
Rail and Road Impacts and Benefits of Preferred Alternative by Community

Section	Community	Minority	Low-Income	Elderly Populations* Higher than Average Presence	Existing** Freight | *Passenger* Trains per Day	Existing Public Pedestrian Structures (to be Retained)	*Impacts*			*Benefits*				
							Projected* * * Freight | *Passenger* Trains per Day	Existing At-Grade Public RR Corridor / Crossings	Existing Public Roads Closed (Crossed by New Rail)^	SEHSR Station	Existing Public Grade Separations Maintained /	Additional Public Grade Separations	Additional Public Pedestrian Structures	Freight Rail Service Available for Industries

of the planned Richmond, VA, to Hampton Roads, VA, Passenger Rail Project (for a total of 14 additional trains per day).

^ "Existing At-Grade Public RR Corridors / Crossings Closed" are those locations, under the Preferred Alternative, where existing roads intersect with existing railroad corridors (including those with, as well as without, existing active rail) at at-grade crossings, and those intersections/crossings are proposed to be closed and all traffic would be rerouted. "Existing Public Roads Closed (Crossed by New Rail)" are those locations, under the Preferred Alternative, where existing roads are proposed to be crossed by new constructed rail lines. In those instances, the roads on both sides of the new rail location would be closed and all traffic would be rerouted.

[1] The Tri-Cities Area Metropolitan Planning Organization and FRA are addressing the issue of whether the existing station in Ettrick or another location in the Petersburg area should serve as the SEHSR station.

[2] There are 2 additional public grade separations proposed just outside of Franklinton, NC, Town Limits. Those additional grade separations are counted within the Franklin County figures because they were not within the official Corporate Limits of Franklinton, NC.

4.11.2.1.2 NEIGHBORHOOD DISRUPTIONS

Because the Project maximizes the use of existing rail corridors, neighborhood disruptions and relocations have been minimized to the greatest extent practicable. Along active rail lines, overall impacts to neighborhoods and communities from the operation of SEHSR trains is expected to be minor because residents are used to the sights and sounds of trains through their communities, the introduction of high speed passenger rail would not substantially alter their current quality of life.

In addition, the Project accommodates pedestrian traffic in that all new bridges and underpasses are designed to have sufficient width so as not to create a hazard for pedestrian movement. In locations where existing pedestrian accommodations (e.g., sidewalks) currently exist, these accommodations will be provided on the bridges/underpasses. At other locations,NCDOT and VDOT will evaluate pedestrian accommodations on the bridges/underpasses during final design based on the current NCDOT and VDOT pedestrian policies. Both NCDOT and VDOT have established Complete Streets policies which provide for consideration of all modes of transportation including pedestrians and cyclists, when building new projects or making improvements to existing infrastructure.

From the Burgess Connector in Dinwiddie County, VA, southward to Norlina, NC, in Warren County, NC, the rail corridor is inactive and, in some instances, the tracks have been removed and small portions of ROW sold for driveway access. Communities without active rail lines include the Dinwiddie, VA, Courthouse area, McKenney, VA, Alberta, VA, and La Crosse, VA, and Norlina, NC. In these communities and other areas adjacent to the inactive rail line, residents may view the reactivation of rail service as a negative impact on their quality of life. The sights and sounds of the rail would require a degree of adjustment for the families and businesses adjacent to it. However, given the number of trips planned (eight high speed trains and up to eight additional intermodal trains and two to four additional freight trains), and the speed at which

the trains will be traveling, exposure to rail activity would be of a limited duration and frequency for those communities without a rail stop. In La Crosse, VA, and Henderson, NC, the duration of exposure to HSR trains will be greater given that two stops daily are planned for each town.

Residents and businesses within the communities not currently living with an active rail line could also experience a sense of their community being split by the newly active rail line. What has in recent years been a situation of unencumbered access to and from either side of the tracks would now only be possible at designated bridges and underpasses. Given that the vast majority of consolidated crossings were designed to be no more than one mile apart, the change in community travel patterns would not be substantially altered.

There will also be some changes to the visual environment within communities. The required minimum clearance for a road over a rail line is 24 feet three inches from the bottom of the bridge. The required minimum clearance for a rail line over a road is 17 feet. Because of these vertical clearance requirements and topographical constraints, the average new bridge will be between 25 feet and 38 feet high at its tallest point. This is about the height of a three to four-story building. Even in the rural communities with existing rail activity, the new bridge structure will be an obvious, new landmark. Some may see the new structures as a sign of progress whereas others may find it to be inconsistent with their community's setting and sense of place.

Relocations are discussed in detail in Section 4.11.6.

4.11.2.1.3 SAFETY AND FENCING

Because of the speeds at which the SEHSR trains will be traveling, fencing on both sides of the rail line may be necessary in some areas, particularly in urban areas. NCDOT and VDOT will determine the location and type of fencing during final design. While such fencing would serve as a physical barrier between communities on either side of the tracks, it would provide a necessary measure of safety to keep vehicles, pedestrians, and animals off of the tracks. Refer to Section 4.16 for additional discussion about fencing.

4.11.2.1.4 RAIL NOISE AND VIBRATION

An analysis was completed to identify and evaluate the potential noise and vibration impacts associated with the operation of trains in the Study Area. (See Section 4.7 for more information.) The conclusions of that analysis are as follows:

- Rail Noise – Based on FRA Manual noise criteria, the Preferred Alternative is predicted to have zero moderate impacts and zero severe impacts for Category 1 receptors (studios, concert halls, etc.); 618 moderate impacts and 64 severe impacts for Category 2 receptors (residences, hospitals, hotels, etc.), and; four moderate impacts and 0 severe impacts for Category 3 receptors (schools, libraries, churches, etc.).
- Highway Noise – For vehicular noise associated with the diversion of traffic, no impacts due to "substantial increase" criteria were predicted. The noise associated with diverted roadway traffic at proposed grade-separated intersections is expected to cause an exceedance of the FHWA criteria for an estimated 6 residences in the proposed Youngsville, NC, Historic District. However, these residential sites are currently assessed with sound levels above the FHWA criteria. Additionally, since a noise barrier would have to be placed between the homes and the road, mitigation would not be feasible because of the need to maintain driveway access
- Rail Vibration – Based on FRA Manual vibration criteria, the Preferred Alternative potentially impacts 180 single family homes, 7 multi-family homes and 108 commercial sites. Vibration annoyance from the existing freight trains occurs within 80 feet or less for residential sites and 64 feet for commercial sites. Vibration annoyance from the proposed

high speed passenger train would occur within 47 feet for residential sites and 30 feet for commercial sites.

It should be noted that for safety reasons, trains are required to sound their horns when approaching at-grade crossings. Train horn noise will decrease or be eliminated in locations with active rail traffic under the Project as a result of grade-separating all rail crossings within the corridor. Communities without active rail would not experience any new grade-crossing related horn noise for the same reason. As stated previously, mitigation for noise and vibration impacts will be determined during final design.

4.11.2.1.5 TRAFFIC CHANGES & PUBLIC ROAD AND PRIVATE DRIVE CLOSURES

This section on traffic changes, public road and private drive closures is repeated in its entirety from the Tier II DEIS.

Travelers in areas with active rail lines are accustomed to waiting at at-grade crossings for stopped or passing trains. While construction activities and the consolidated or realigned closings may be an initial inconvenience for these travelers, the short-term inconvenience will be offset by having a grade-separated rail crossing that allows for continuous, unimpeded access to and from both sides of the rail line. Owners of parcels with current, legal access to existing roads will have access to their parcels maintained (or will be compensated if it is not possible to maintain the access); driveway access to these parcels will be determined during final design when detailed survey level data is available.

Whether the existing rail line is active or inactive, rail crossing consolidations and associated improvements to adjacent roadways could have an impact on community cohesion within neighborhoods and communities. Potential impacts were identified and described if an alternative created a new physical barrier that isolated one part of an established community from another and potentially resulted in a physical disruption to community cohesion. However, the railroad line predates existing development and the railroad already acts as a boundary for many neighborhoods and businesses along the corridor. With the rail line already in existence, such adverse impacts are expected to be minor. The impacts of the Preferred Alternative within each community are addressed in the discussion that follows.

4.11.2.2 *IMPACTS FROM CHANGES TO THE TRANSPORTATION NETWORK*

The proposed improvements to existing at-grade crossings included in the Project are in response to documented needs for increased safety. Safety improvements are currently underway on active rail lines in North Carolina and Virginia to consolidate and close crossings where possible, and grade-separate those that remain (i.e., replace with bridges or underpasses) to separate vehicular and pedestrian traffic from rail traffic. The effect of these grade crossing closures is enhanced community safety.

One of the benefits of the Project is the opportunity to consolidate unsafe and redundant at-grade rail crossings along the corridor into safer, grade-separated crossings that do not adversely affect the surrounding communities. Increased train speeds and frequencies along the Project corridor will require an increased degree of protection at crossings. The safest such measure is the closure and consolidation of at-grade crossings in proximity to each other, rerouting traffic to new or existing bridges or underpasses. In addition, crossing closures can save money by eliminating installation and maintenance costs associated with warning devices, crossing surfaces, and foliage removal to improve sight distance. Consolidating crossings also improves a community's quality of life by eliminating noise from train horns sounded at crossings. An additional benefit is that grade separations are an “always open” crossing of the rail line for the community.

The construction of new railroad bridges and underpasses and the associated roadwork would impact highway traffic through temporary lane closures and changes to traffic patterns. The degree of impact will vary based on the level of service of the roadway, the proximity of alternate routes, and the extent of construction required at a given crossing.

Communities and neighborhoods along the Project corridor have a deep interest in the impacts of the proposed at-grade crossing changes, access consolidations, and road closures. Throughout the design process, meetings were held with local government representatives along the corridor to obtain input on local conditions that would affect design considerations. This information was used to refine proposed designs to better suit the needs of the local communities; comments on Tier II DEIS were used to further refine many of the railroad crossing designs for the Preferred Alternative. The decision to consolidate a crossing in a community considered accessibility and connectivity to the larger transportation network. Local and regional land use and transportation plans were taken into account and natural resource constraints, such as wetlands and cultural resources, were also considered. Descriptions for each crossing and associated roadwork, are included in Appendix F. Maps displaying the proposed roadwork are included in Appendix R.

To examine potential impacts to the transportation network from the Preferred Alternative, the proposed improvements were divided into the following categories and tabulated by section (Table 4-31).

- Existing Bridge / Underpass Maintained - In some instances, an existing bridge is proposed to be expanded or replaced in the same location.
- New Bridge / Underpass Provided
- Public Crossing Relocated - "Relocated" means the current public road crossing location will be closed and the traffic re-routed to an adjacent, grade-separated, public road crossing via improved roadways, as appropriate.
- Private Crossing Closed, Alternative Access Provided
- Existing Pedestrian-Only Bridge / Underpass Maintained
- New Pedestrian-Only Bridge / Underpass Provided

Undocumented rail crossings such as informal footpaths across the rail line are considered trespassing and, for safety reasons, will be eliminated.

Table 4-31
Crossing Consolidations for Preferred Alternative by Section

Location			Action						
Section	From	To	Existing Bridge / Underpass	New Bridge / Underpass	Public Crossing Relocated	Private Crossing Closed (Alternate Access Provided)	Existing Public Pedestrian Bridge / Underpass	New Pedestrian Bridge / Underpass	Public Road Closed at New Rail
AA	Main Street Station	Centralia	20	8	3	3	0	0	0
BB	Centralia	North of Dunlop	3	3	1	1	0	1	0

Table 4-31
Crossing Consolidations for Preferred Alternative by Section

Location			Action						
Section	From	To	Existing Bridge / Underpass	New Bridge / Underpass	Public Crossing Relocated	Private Crossing Closed (Alternate Access Provided)	Existing Public Pedestrian Bridge / Underpass	New Pedestrian Bridge / Underpass	Public Road Closed at New Rail
CC	North of Dunlop	Collier Yard	10	3	2	4	0	1	0
DD	Collier Yard	North of Burgess	1	3	0	1	0	0	0
A	North of Burgess	North of Dinwiddie	2	3	0	1	0	0	0
B	North of Dinwiddie	South of Dinwiddie	1	3	0	3	0	0	0
C	South of Dinwiddie	South of Nottaway River	2	4	4	7	0	0	0
D	South of Nottaway River	North of Alberta	0	3	1	1	0	0	0
E	North of Alberta	South of Alberta	0	4	2	2	1	0	0
F	South of Alberta	South of Tower Rd.	5	2	0	4	0	0	0
G	South of Tower Rd.	Meherrin River	1	2	0	0	0	0	0
H	Meherrin River	North of Wray Rd.	0	2	1	2	0	0	0
I	North of Wray Rd.	South of La Crosse	2	2	5	9	0	1	1
J	South of La Crosse	North of Bracey	0	3	0	5	0	0	0
K	North of Bracey	Roanoke River	1	1	0	0	0	0	0
L	Roanoke River	North of Norlina	0	2	2	3	0	0	0
M	North of Norlina	Southwest of Norlina	1	2	1	6	0	0	4
N	Southwest of Norlina	North of Middleburg	0	2	2	2	0	0	1

Table 4-31
Crossing Consolidations for Preferred Alternative by Section

Location			Action						
Section	From	To	Existing Bridge / Underpass	New Bridge / Underpass	Public Crossing Relocated	Private Crossing Closed (Alternate Access Provided)	Existing Public Pedestrian Bridge / Underpass	New Pedestrian Bridge / Underpass	Public Road Closed at New Rail
O	North of Middleburg	North of Henderson	0	3	0	1	0	0	1
P	North of Henderson	North of Kittrell	3	6	12	3	0	1	0
Q	North of Kittrell	Tar River	1	4	4	3	0	0	0
R	Tar River	North of Franklinton	0	1	1	0	0	0	1
S	North of Franklinton	North of Youngsville	1	4	5	0	0	3	1
T	North of Youngsville	North of Wake Forest	0	1	2	0	0	2	0
U	North of Wake Forest	North Raleigh	3	4	4	2	0	2	0
V	North Raleigh	Boylan Wye	14	9	2	0	0	1	0

In general, public road and private drive closings and consolidations could result in slightly longer travel distances and time, but not to the extent that the impact would be considered adverse. As noted in Chapter 2, all existing at-grade crossings located between proposed and existing bridges or underpasses will be closed and vehicular traffic rerouted to the nearest bridge or underpass. Bridges or underpasses will be located at a maximum distance of approximately one mile apart. In addition, the Annual Average Daily Traffic (AADT) of roads proposed for closure is typically very low, indicating that the numbers of drivers inconvenienced by the consolidations and reroutes would not be substantial. Drivers and pedestrians would experience the benefits of safety improvements via the elimination of at-grade road and pedestrian crossings and improvements to existing access roads for better sight distance and roadway geometrics. In addition, by replacing at-grade crossings with bridges and underpasses, driver and pedestrian access will not be impeded by a passing or stopped train.

The following discussion identifies how the individual communities will be changed and challenged by the Preferred Alternative. Impacts to communities and their resources are described below. Impacts from proposed changes to the transportation network from a traffic perspective are provided in Section 4.14.2. Impacts from potential relocations are discussed in Section 4.11.6.

The communities discussed below were chosen because they are formally recognized as communities, towns, or cities, and have the potential to be impacted by the alignments under consideration for the Project.

4.11.2.2.1 CITY OF RICHMOND, VA

The areas along the corridor in the City of Richmond, VA, are located on the "Southside" between Richmond, VA, and Petersburg, VA. Most of the area is developed with industrial and commercial establishments. The Preferred Alternative maximizes the use of existing rail ROW through Richmond, VA. Because the rail line is active, the proposed rail improvements within the City of Richmond, VA, are not expected to divide communities or create community barriers. Impacts would primarily be associated with road closures and consolidations and new, grade-separated crossings.

The proposed ROW for the new Maury Street bridge over the existing rail line may require the removal or relocation of several large petroleum storage tanks and small businesses. The existing I-95 ramps will be shifted slightly to the south of their current location, and a new roundabout will be constructed at the intersection of Maury Street/I-95 ramps/E. 4th Street.

Relocation of East Commerce Road and a new bridge over the rail line may require the relocation of several businesses in this heavily industrialized part of the city. In these industrial areas, a safe and unimpeded crossing of the rail line should be a welcome improvement to businesses.

Further to the south, the Study Area is a combination of residential, commercial, and industrial uses. At Ruffin Road, the rail line would bridge the road. The ROW needed for this underpass may require the relocation of several residences and commercial facilities. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced. At Bells Road, a new bridge over the rail line will be constructed. Roadway improvements and ROW may require the acquisition of a portion of the Philip Morris parking lot to the east of the rail line, as well as the relocation of several residences to the west of the rail line. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

4.11.2.2.2 CHESTERFIELD COUNTY, VA

The Preferred Alternative maximizes the use of existing rail ROW through Chesterfield County. Because the rail line is active, the proposed rail improvements within Chesterfield County are not expected to divide communities or create community barriers. Impacts would primarily be associated with road closures and consolidations and new, grade-separated crossings. Station Road is an existing at-grade crossing and serves as the only point of access to Chesterfield County's water treatment plant. Station Road will be realigned with a new, grade-separated crossing provided to maintain access to the plant. A new road connecting Thurston Road with Chester Road will improve access within the Bellwood community. Near the southern boundary of Chesterfield County, the designs shown in the Tier II DEIS called for a closure of the existing Woods Edge Road at-grade rail crossing. However, in response to comments on the Tier II DEIS, the designs have been revised to include a bridge over the railroad, which will maintain community connectivity in this location.

4.11.2.2.3 CHESTER, VA

The Preferred Alternative maximizes use of the existing rail ROW through Chester, VA. Because the rail line is active, the proposed rail improvements within the community of Chester are not expected to divide communities or create community barriers. Impacts would primarily be associated with road closures and consolidations and new, grade-separated crossings.

Centralia Road will be relocated with a bridge that crosses both the rail line and Chester Road with a connection to Chester Road. For those traveling on Centralia Road, access to Centralia Road across the tracks would be slightly circuitous in that drivers would be rerouted to Chester Road to reconnect to Centralia Road. In response to comments received from the County, the

designs for West Street closure have been revised to include a pedestrian bridge over the railroad, maintaining pedestrian access between the communities on either side of the rail.

4.11.2.2.4 CITY OF COLONIAL HEIGHTS, VA

The Preferred Alternative maximizes the use of existing rail ROW through the City of Colonial Heights, VA. There are no road closures or realigned roadways within Colonial Heights, VA. An additional rail bridge over Cedar Lane will not have a negative effect on travel or adjacent communities. The rail alignment is proposed to cross over Boulevard US-1 on expanded new adjacent rail bridge.

4.11.2.2.5 ETTRICK, VA

The community of Ettrick, VA, straddles the existing railroad corridor. Although located within Chesterfield County, it is a small bedroom community for the City of Petersburg, VA. Recent development within this community has been driven by Virginia State University, which is located within Ettrick, VA.

The Preferred Alternative maximizes the use of existing rail ROW through Ettrick, VA. Because the rail line is active and the Amtrak passenger rail station at Ettrick, VA is currently in operation, the proposed rail improvements within the community of Ettrick, VA, are not expected to divide communities or create community barriers. Impacts would primarily be associated with road closures and consolidations and new, grade-separated crossings.

ROW required for the realignment and new bridge crossing for Branders Bridge Road, along with the associated roadway improvements, may require the relocation of approximately two homes in the residential development along Maurer Lane. The realignment and new bridge crossing for Dupuy Road will potentially displace between 15 and 20 homes on the north side of the road between Roosevelt Avenue and Laurel Road. While these homes may be displaced, the Ettrick, VA, community as a whole will experience improved access through the area. During final design, further measures to avoid and minimize displacements will be implemented; this will likely lower the numbers ultimately displaced.

4.11.2.2.6 CITY OF PETERSBURG, VA

The Preferred Alternative maximizes use of the existing rail ROW through the City of Petersburg, VA. Because the rail line is active, the proposed rail and roadway improvements within Petersburg, VA, are not expected to divide communities or create community barriers. Impacts would primarily be associated with road closures and consolidations and new, grade-separated crossings. While the Washington Street underpass will be realigned and the existing rail bridge widened, these improvements will not have a negative effect on travel or adjacent communities. At Lincoln Street, the at-grade crossing will be closed but a pedestrian crossing will be provided, maintaining pedestrian access between the communities on either side of the rail.

4.11.2.2.7 DINWIDDIE COURTHOUSE COMMUNITY, VA

The Dinwiddie, VA, Courthouse community is clustered around the intersection of Boydton Plank Road (US-1) and Courthouse Road, approximately 600 feet to 2,000 feet to the west of the inactive CSX S-Line rail line. It is a small community whose main business and residential core is along Boydton Plank Road. The Preferred Alternative diverges from the existing rail alignment onto new alignment; the new alignment provides improved train performance by straightening two curves. The Preferred Alternative will require a new bridge over the railroad for Carson Road. There are no communities within the new alignment area. Therefore, the portion of new rail alignment would not be considered adverse or disruptive.

4.11.2.2.8 MCKENNEY, VA

Although the rail line is currently inactive, the Town of McKenney, VA, is historically an old railroad village and most of the development in town has occurred along the rail line and Factory Street. The Preferred Alternative maximizes the use of the existing rail line and ROW through McKenney, VA. Town officials were concerned about preserving the historic nature and features of their town with any proposed grade-separated rail crossing. The design for a bridged crossing of the railroad at Doyle Boulevard was developed through coordination efforts with the Town. The designs call for lowering the existing rail alignment approximately 15 feet, and raising the elevation of Doyle Boulevard approximately 15 feet, so that Doyle Boulevard can cross over the railroad on a bridge in the existing location. This design feature will help to maintain the historic setting of Doyle Boulevard and the surrounding area. Aside from the short-term disruption from construction activities, the proposed road and rail improvements will have minor adverse effects on community cohesion.

4.11.2.2.9 ALBERTA, VA

The Town of Alberta, VA, is historically a former railroad village with the intersection of the inactive CSX and NS rail lines at its core. The town has minimal development in terms of industrial, commercial, and retail establishments. Development and neighborhoods are relatively evenly dispersed within the town limits. The Town of Alberta, VA, is actively pursuing downtown revitalization and is hopeful that the Project will provide positive economic benefits to the town.

Through town, the Preferred Alternative maximizes the use of the existing rail ROW. Because of this, improvements to the rail corridor itself will have minimal effect on adjacent neighborhoods and businesses. However, roadway improvements associated with the Project will be substantial, including road closings, road realignments, and grade-separated rail crossings.

The current at-grade rail crossing of Church Street will be closed and Church Street will be realigned approximately 1,700 feet to the northeast, crossing over the railroad on a bridge. This realignment will provide a better connection with Littlemont Road and the new residential development currently under construction around Brunswood Avenue. The new Littlemont Road bridge over the rail line will be approximately 31 feet high. Several of the homes on the southeast side of Littlemont Road may be displaced because of the need for ROW for the new bridge approach. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

The current at-grade rail crossing of Second Avenue will be closed and the road realigned through an undeveloped parcel approximately 500 feet to the northeast. While this undeveloped parcel has been subdivided, the realignment of Second Avenue through it will not disrupt any existing neighborhoods. The realigned road will include an approximately 30-foot high bridge over the railroad.

The current at-grade rail crossing of Main Street will be closed and Main Street will be realigned approximately 200 feet to the north, crossing over the railroad on a bridge. This roadway improvement will not separate communities or have an adverse effect on community cohesion.

The Tobacco Heritage Trail follows the inactive NS rail line through town. The Town of Alberta, VA, includes the Tobacco Heritage Trail as a vital component of its downtown revitalization effort as it would stimulate tourism in the region. To ensure the safety of those using the Tobacco Heritage Trail, the Preferred Alternative proposes to replace the existing railroad superstructure to provide an improved pedestrian underpass where the Tobacco Heritage Trail intersects with the Preferred Alternative railroad alignment. Given that the Tobacco Heritage Trail follows an inactive rail line through a town built around the railroad, the re-introduction of passenger rail in

the area would be in keeping with the historic context of the Town of Alberta, VA, and will not likely have a negative impact on the trail user's experience.

4.11.2.2.10 LA CROSSE, VA

The Town of La Crosse, VA, is becoming a suburb of South Hill, VA, a larger town approximately 2.5 miles to the northwest. La Crosse, VA, was originally built around the now inactive railroad corridor.

Through town, the Preferred Alternative follows the inactive rail corridor and maximizes the use of the existing rail ROW. Improvements to the rail corridor itself would have minimal disruptive effects on adjacent neighborhoods and businesses. However, there are several roadway improvements associated with the rail improvements, including road closings, road realignments, and grade-separated rail crossings.

The current at-grade rail crossing of Main Street will be closed and relocated to a new, grade-separated crossing (rail-over-road) approximately 1,000 feet to the south. This crossing will connect to a traffic circle that will include the intersections of Meredith Street and St. Tammany Road. The traffic circle element was designed in response to community requests that traffic be maintained on downtown roads, especially Main Street. Closing the existing Main Street rail crossing and relocating the feeder roads to it will alter the character of the downtown area. However, the change was designed with input from town residents with the idea that passenger rail service and a future rail stop will encourage business, residential, and tourism development opportunities.

As with Alberta, VA, the Tobacco Heritage Trail follows the inactive NS rail line through town. To ensure the safety of those using the Tobacco Heritage Trail, a railroad bridge will be constructed where the Tobacco Heritage Trail intersects with the Preferred Alternative railroad alignment, providing a pedestrian-only underpass. Given that the Tobacco Heritage Trail follows an inactive rail line through a town built around the railroad, the re-introduction of passenger rail in the area will be in keeping with the historic context of the Town of La Crosse, VA, and will not likely have a negative impact on the trail user's experience.

4.11.2.2.11 NORLINA, NC

Like Alberta, VA, and La Crosse, VA, the Town of Norlina, NC, is an old railroad town and its development has been evenly divided along either side of the now-inactive CSX S-Line and the inactive CSX SA-Line which join together in the middle of the town. The Preferred Alternative diverges from the CSX S-Line to the east, then joins the old CSX SA-Line ROW near Town and Country Road, thereby improving train performance by straightening curves.

Close to Main Street and US-158, the Preferred Alternative re-joins the CSX S-Line ROW crossing over US-158 on a bridge; improvements to the existing US-158 underpass (rail over road) are proposed by the Preferred Alternative. There is active freight service on the CSX S-Line just south of Norlina, NC, and the rails remain in place through town, however rail operations through the town have been inactive for over 20 years. Therefore, in general, reactivation of rail operations in Norlina, NC, would be disruptive to the community. The proposed relocation of Warren Plains Road just north of the Town limits, will create new travel patterns for access across the rail line; however, the proposed realignment includes construction of a bridge over the railroad to provide safe access.

4.11.2.2.12 MIDDLEBURG, NC

Middleburg, NC, is an old town that developed along US-1 and what is now the current, active CSX line. Most of the town's development is located west of US-1 and the railroad corridor.

The Preferred Alternative is on new location to the southeast. Under the Preferred Alternative, Carroll Street will bridge over the rail line on new alignment further to the east. Because of the existing terrain, this new road-over-rail crossing will be raised approximately 30 feet. Overall, the proposed road consolidations and crossings would not have an adverse effect on travel patterns and quality of life within this predominately agricultural community.

4.11.2.2.13 CITY OF HENDERSON, NC

Henderson, NC, is equally developed on either side of the existing CSX S-Line. The Preferred Alternative maximizes the use of existing rail ROW through the city. Because the rail line is active, the proposed rail improvements within Henderson, NC, are not expected to divide communities or create community barriers. Impacts will primarily be associated with road closures and consolidations and new bridges or underpasses.

In response to comments on the Tier II DEIS, several revisions have been made to the roadwork designs in Henderson, NC (refer to Chapter 2 for a description of the changes). Of the 15 existing, public at-grade road/rail crossings within the vicinity of Henderson, NC, 10 will be closed and consolidated into 7 new or existing grade-separated crossings. The new crossings include Main Street, Andrews Avenue, Alexander Avenue, JP Taylor Road, and Bear Pond Road. The existing crossings include Charles Street and the US-1 Bypass. A new pedestrian crossing will be located at Peachtree Street.

The ROW required for the construction of an underpass at Main Street with connections to a new roundabout on the west side of the railroad, and construction of the other grade separated crossings will require the relocation of approximately eleven residences. However, the designs provide improved access across the rail line and the roundabout will improve the transportation network for the community on the west side of the railroad. The designs for an Andrews Avenue bridge over the railroad will also require the relocation of several residences and approximately two businesses; however, the designs provide improved access across the rail line. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

The Alexander Avenue bridge over the rail line and its extension to Dabney Drive will potentially require the relocation of between one and five businesses. However, this will improve access for both sides of the rail line in this area. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

Because the roadway network is well developed within Henderson, NC, the road closures and travel reroutes would not have an adverse effect on travel patterns or the quality of life within Henderson, NC. The City of Henderson, NC, has been supportive of the Project in hopes that a future rail stop will encourage business, residential, and development opportunities.

4.11.2.2.14 KITTRELL, NC

The Preferred Alternative maximizes the use of existing rail ROW through Kittrell, NC. The majority of Kittrell, NC, development is to the east of the existing rail line. Because the rail line is active, the proposed rail improvements within Kittrell, NC, are not expected to divide communities or create community barriers. As such, impacts will primarily be associated with road closures and consolidations and new, grade-separated crossings.

Under the Preferred Alternative, the existing at-grade crossing of E. Main Street will be closed. In response to comments on the Tier II DEIS, the designs for a grade separated crossing in Kittrell, NC, have shifted from a location near Church Street to McClannahan Street. The new designs reduce the number of potential residential relocations from approximately seven to one,

and would potentially require one business relocation. During final design, further measures to avoid and minimize displacements will occur.

4.11.2.2.15 FRANKLINTON, NC

The Town of Franklinton, NC, is an old railroad town that historically developed along the current, active rail line and old US-1. Commercial development is primarily west of the rail line. The Preferred Alternative maximizes the use of existing rail ROW; because the rail line is active, the proposed rail improvements within Franklinton, NC, are not expected to divide communities or create community barriers. Impacts will primarily be associated with road closures and consolidations and new, grade-separated crossings.

Existing at-grade crossings at Pearce, Joyner, Mason, College, and Hawkins Streets will be closed. Automobile travelers needing to cross the rail line will use the existing (but improved) Green Street underpass or the realigned and new Cedar Creek Road bridge over rail that connects to Main Street. The design for a pedestrian bridge at Mason Street has been revised in response to comments on the Tier II DEIS; the Preferred Alternative now provides a pedestrian-only underpass with ramps at Mason Street. Pedestrian underpasses are also provided between E. College and W. College Streets, and south of Hawkins Street. An additional design revision affecting the Franklinton, NC, road network was made in response to comments; the proposed improvements to Tanyard Street have been eliminated from the designs. An alternative design was developed for a north-south connection east of the railroad between East Green Street and East College Street, near the eastern boundary of the Sterling Mill historic resource.

Because the roadway network is well developed within Franklinton, NC, the road closures and travel reroutes would not have an adverse effect on travel patterns or the quality of life within Franklinton, NC.

4.11.2.2.16 YOUNGSVILLE, NC

This small community is located adjacent to the active rail corridor and old US-1. It is a bedroom community of the Raleigh, NC, and Wake Forest, NC, areas. Through town, much of the development faces the railroad line. The Preferred Alternative maximizes the use of existing rail ROW through the town. Because the rail line is active, the proposed rail improvements within Youngsville, NC, are not expected to divide communities or create community barriers. Impacts will primarily be associated with road closures and consolidations and new, grade-separated crossings.

A major feature of the proposed improvements will be the lowering of the rail corridor by approximately 30 feet between Main Street and Winston Street in order to maintain the architectural and historic integrity of the town. The lowering of the rail line through this area will require the closing of both East Railroad Street and West Railroad Street on both sides of the rail line. The end result will be a new Main Street bridge over the rail line; however, the crossing will maintain its current grade. The Winston Street and Pine Street at-grade crossings will be closed, while a new pedestrian bridge will be built over the railroad connecting E. Franklin Street to W. Franklin Street. In response to comments on the Tier II DEIS, an additional pedestrian crossing in town has been added to the designs; a bridge with ramps will be built at Pine Street. Additional revisions include elimination of the proposed extension of Nassau Street. Instead, Cross Street will be extended northward to intersect the Future NC 96 Bypass alignment that will cross over the railroad on a bridge, and will be used for the detour route during construction of the Main Street bridge over the railroad. The inconvenience of the road closures and consolidations in Youngsville, NC, will be offset by the improved connectivity and safety of roads and the maintenance of the historic integrity of the town.

4.11.2.2.17 WAKE FOREST, NC

The Town of Wake Forest, NC, is the second largest urban area in the North Carolina Study Area and is considered a bedroom community for the City of Raleigh, NC,. Development has occurred on both sides of the active CSX railroad corridor over the years. The Preferred Alternative maximizes the use of existing railroad ROW. Because the rail line is active, the proposed rail improvements within Wake Forest, NC, are not expected to divide communities or create community barriers. Impacts will primarily be associated with road closures and consolidations and new, grade-separated crossings.

Wake Forest, NC, officials expressed concern about maintaining pedestrian access across the rail line. Undocumented pedestrian crossings will be eliminated near Brick/N. White Streets and near Cedar Avenue/ Brewer Avenue/N. White Street, and a new grade-separated, pedestrian-only bridge over the railroad will be constructed near the latter of the two. While the Elm Avenue crossing will be closed, new crossing access will be available nearby at a realigned Holding Avenue. The realignment will connect E. Holding to W. Holding Avenue which may require the displacement of several homes along W. Holding Avenue and S. Main Street. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

Comments on the Tier II DEIS from the public and the Town of Wake Forest, NC, indicated a strong desire to maintain access across the railroad at Elm Avenue, if not vehicular, at least pedestrian. Refer to Chapter 2 for a description of coordination that has occurred subsequent to the Tier II DEIS that led to inclusion of new designs for a pedestrian-only bridge at Elm Avenue. The new design maintains pedestrian connectivity across the railroad for the community located along Elm Avenue.

The existing crossing at Friendship Chapel Road will be closed and a new road will be constructed to the east that connects to the NC 98 Bypass. This new access point to NC 98 will provide an improvement to the traffic network and would not disturb residential communities.

The Preferred Alternative provides improved access to Heritage Middle and Elementary Schools to the east of the crossing and Wake Forest – Rolesville Middle School to the west of the new crossing. The alignment will impact private baseball fields west of the railroad, and will likely require the displacement of a private school (Thales Academy) on the east side of the railroad. During final design, further measures to avoid and minimize displacements will occur.

4.11.2.2.18 CITY OF RALEIGH, NC

As North Carolina's state capitol, Raleigh, NC, is the largest urban area in North Carolina within the Project corridor. A variety of residential, commercial, and industrial development has occurred on both sides of the active railroad corridor over the years. The Preferred Alternative maximizes the use of existing rail ROW, while crossing over Capital Boulevard on a new passenger train-only rail bridge, adjacent to the existing CSX S-Line bridge, just north of the downtown area. Because the rail line is active, the proposed rail improvements within Raleigh, NC, are not expected to divide communities or create community barriers. Impacts will primarily be associated with road closures and consolidations and new, grade-separated crossings.

Outside the Route I-440 Beltline, Durant Road will become grade-separated with a bridge over the rail line. The designs for Durant Road improvements have been revised subsequent to the Tier II DEIS (refer to Chapter 2). The improvements minimize ROW impacts to homes and businesses on the south side of Durant Road, however the relocation of one or two homes at the entrance to the Windsor Forest neighborhood will be required. In addition, the Preferred Alternative will require relocation of the City of Raleigh, NC, Fire Station 22. The new Durant Road bridge will provide unimpeded access across the rail line; a feature that will be beneficial to

Durant Road Middle School, Durant Road Elementary School, and Durant Road Park, all located west of the railroad.

The Preferred Alternative will require a new Gresham Lake Road bridge over the rail line. The new bridge and associated roadway improvements will provide unimpeded ingress and egress to the adjacent industrial areas on either side of the rail.

The Preferred Alternative will maintain the existing bridges at I-540, Old Wake Forest Road, Spring Forest Road, and Atlantic Avenue. Therefore, there will be no disruption to existing access at these crossings. A new rail bridge over Millbrook Road will be required by the Preferred Alternative. Aside from the temporary inconveniences associated with construction activities, the new rail bridge will improve ingress and egress through this commercial/industrial area.

The Preferred Alternative will require a new bridge over the rail line at New Hope Church Road. Design revisions subsequent to the Tier II DEIS include a small southward shift for New Hope Church Road, to allow more lanes of traffic to remain open during construction and to provide room for bike lane. Roadway improvements associated with the grade-separated crossing will include St. Albans Drive, Tarheel Drive, Craftsman Drive, and New Hope Church Road. These improvements will provide unimpeded access between the commercial area to the west of the rail line and the many residential communities to the east of the line.

The Preferred Alternative has been revised to include a realignment and bridge over the railroad at Wolfpack Lane, which will retain connectivity across the railroad (refer to Chapter 2 for more information).

Given the well-developed roadway network in the downtown area, inconveniences associated with reroutes will be minimal. Inside the Beltline, the Preferred Alternative will maintain the existing I-440 bridge, replace the existing bridges over Six Forks Road, and construct a second bridge adjacent to the existing bridge over Hodges Street. This will result in minimal community disruption.

The Preferred Alternative will require a new Whitaker Mill Road bridge over the rail line. This will likely result in the displacement of several industrial buildings for the realignment of Whitaker Mill Road. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

In the downtown area, the Preferred Alternative will maintain grade separated crossings at Capital Boulevard, Hodges Street, Hillsborough Street, Morgan Street, and Boylan Avenue; a new separate parallel rail bridge will be built east of existing NS rail bridges, to span Peace Street, W. Johnson Street, Tucker Street, and North Street, therefore disruptions and reroutes will be avoided. New grade separated crossings will be provided at Old Williamson Road, and a new bridge spanning both Capital Boulevard and West Street, south of the CSX Capital Yard. Both Jones Street and Hargett Street will be closed under the Preferred Alternative. However, to accommodate strong public interest in maintaining pedestrian access across the railroad at Jones Street, the Preferred Alternative includes a pedestrian-only bridge at this location, near the heart of the burgeoning Glenwood South downtown development.

4.11.3 COMMUNITY FACILITIES AND SERVICES

The effect of rail crossing consolidations and road closures on community facilities and services such as schools, places of worship, and emergency services are evaluated in this section. Noise and vibration impacts to community facilities and services are discussed in Section 4.7. An evaluation of impacts to parks and recreation areas is provided in Section 4.13.

4.11.3.1 *PUBLIC EDUCATIONAL FACILITIES*

There are 27 public educational facilities located within the designated communities of the Study Area, with 11 in Virginia and 16 in North Carolina. In the Tier II DEIS, schools potentially impacted by the proposed alternatives were evaluated in light of changes in accessibility and safety improvements due to elimination of at-grade crossings. Section 3.11 of this Tier II FEIS noted that the Tier II DEIS mistakenly included Bensley Elementary School in Richmond, VA, in the list of schools located in the Study Area. This school is not included for evaluation in this chapter. In addition, the three schools previously located within the Study Area have subsequently moved to locations outside the Study Area; although one former site is being re-used for a different school. Table 4-32 provides a summary of the impacts associated with the Preferred Alternative by section. As mentioned above, noise and vibration impacts at these sensitive receptors are addressed in Section 4.7.

Overall, there will be a net benefit to all schools from roadway safety improvements provided by grade-separated rail crossings (bridges and underpasses), the elimination of at-grade rail crossings, and the addition of pedestrian-only crossings. Inconveniences associated with construction activities will be temporary. The negative impacts of potentially longer driving distances to cross the rail line would be minimal and offset by the benefits gained in safety and unimpeded "always open" access.

Table 4-32
Impacts to Schools

Section	Map Sheet	Location	School	Impacts from Preferred Alternative
AA	4	Richmond, VA	Ruffin Road Elementary	Replacement of existing Ruffin Road at-grade crossing with new underpass will provide safer travel and unimpeded access
	8	Chesterfield County, VA	Perrymont Middle	Realignment and new grade-separated bridge for Kingsland road will improve safety and provide better access to the school at Perrymont Road
BB	12	Chesterfield County, VA	Chester Middle	No impact
CC	17	Colonial Heights, VA	North Elementary	No impact
	18	Colonial Heights, VA	Lakeview Elementary	No impact
	20	Ettrick, VA	Ettrick Elementary	No impact
	24	Petersburg, VA	JEB Stewart Elementary	No impact
	25	Petersburg, VA	Westview Elementary	No impact
DD	37	Dinwiddie County, VA	Southside Elementary	Quaker Road realignment with new grade separated bridge over rail and new intersection with Boydton Plank Road provides improved, safer access from the east
	39	Dinwiddie County, VA	Dinwiddie Middle	Honeycutt Road realignment with new grade separated bridge over rail provides improved, safer access from the southeast

Table 4-32
Impacts to Schools

Section	Map Sheet	Location	School	Impacts from Preferred Alternative
A & B	--	Dinwiddie County, VA	There are no schools in these sections	N/A
C	51	McKenney, VA	Sunnyside Elementary	Doyle Boulevard would have new grade separated bridge over rail, improving access to Sunnyside Road and Sunnyside School
D - L	--	Brunswick & Mecklenburg County, VA	There are no schools in these sections	N/A
M	99	Norlina, NC	Northside Elementary	Realignment of Warren Plains Rd with bridge over new rail alignment and direct connection to US 1 improves safety and access from the southeast
N & O	--	Warren & Vance County, NC	There are no schools in these sections	N/A
P	108	Middleburg, NC	E.O Young Elementary	Closure of existing Carroll Street crossing and realignment, with new bridge over existing rail improves access to school from the south
	110	Middleburg, NC	Carver Elementary	Realignment of Carver School Road improves access to school
	112	Henderson, NC	Northern Vance High	Improvements to Warrenton Road (realignment and new rail bridge) improve access to school
	115	Henderson, NC	Henderson Middle	No impact to nearby existing Charles Street underpass, which provides access to school
	116	Henderson, NC	L.B. Yancey Elementary	No impact
Q	118	Henderson, NC	Zeb Vance Elementary	Direct access from east of the railroad via Peter Gill Road will be eliminated and traffic rerouted less than 0.5 miles to new Wildlife Lane extension and underpass of the rail. New route will be longer, but unimpeded and safer with removal of at-grade rail crossing
	121	Kittrell, NC	Kittrell Job Corps Center	Extension of Church Street and bridging of rail line will provide improved, unimpeded access from the east
R	--	Franklin County, NC	There are no schools in this section	N/A
S	127	Franklinton, NC	Franklinton Middle School	Direct access from east of the railroad at Mason Street, located one block away, will be restricted to pedestrian and bicycle access via new underpass with stairs and ramps. Existing underpass at nearby Green Street located two blocks away, would be replaced for better clearance
	128	Franklinton, NC	Franklinton Elementary	Pedestrian access to school from east of rail line will be safer and unimpeded with two new pedestrian-only underpasses near College Street (approximately 0.25 miles north) and Hawkins Street (approximately 0.15 miles south)

Table 4-32
Impacts to Schools

Section	Map Sheet	Location	School	Impacts from Preferred Alternative
T	132	Youngsville, NC	Youngsville Elementary	Access to school from east of rail line will be safer and unimpeded with new Main Street bridge over rail. Main Street connects to US 1 where school is located
U	136	Wake Forest, NC	Wake Forest Elementary	The closure of the nearby existing Elm Avenue at-grade crossing will re-route vehicular traffic to the existing Roosevelt Avenue underpass approximately 0.3 miles north, and to the new underpass at Holding Avenue, approximately 0.3 miles south; The new pedestrian bridge at Elm Avenue will provide direct, safe, pedestrian access to the school
	137	Wake Forest, NC	Heritage Elementary	New Rogers Road bridge over rail line provides improved, safer, and unimpeded access to school from west of rail line
	137	Wake Forest, NC	Heritage Middle	New Rogers Road bridge over rail line provides improved, safer, and unimpeded access to school from west of rail line
	138	Wake Forest, NC	Wake Forest – Rolesville Middle	New Rogers Road bridge over rail line provides improved, safer, and unimpeded access to school from west of rail line
V	144	Raleigh, NC	Millbrook High	No impact
	149	Raleigh, NC	Peace College	No impact

4.11.3.2 *PLACES OF WORSHIP AND CEMETERIES*

In terms of the human environment, places of worship are very important to the lifestyle and overall health of the population of a community. In the Tier II DEIS, potential impacts of the Project alternatives related to changes in accessibility and safety from elimination of at-grade crossings were evaluated for places of worship and cemeteries within the corridor. Property impacts related to ROW required for new rail and road work were also addressed. Noise and vibration impacts were addressed separately in Section 4.7 of the Tier II DEIS.

The Tier II DEIS identified 100 places of worship and/or cemeteries located within the Project corridor. As noted in Section 3.11.5, the list of resources has been revised to reflect inclusion of new listings based on information and comments received after publication of the Tier II DEIS. In addition, 10 churches either moved or are no longer in existence, and have been removed from the list. Table 4-33 provides a summary of impacts from the Preferred Alternative to the 98 places of worship and cemeteries within the Study Area.

Overall, there will be a net benefit to all places of worship from roadway safety improvements provided by grade-separated rail crossings, the elimination of at-grade rail crossings, and the addition of pedestrian-only crossings. Inconveniences associated with construction activities will be temporary. The negative impacts of potentially longer driving distances to cross the rail line will be minimal (less than 1 mile) for most places of worship, and offset by the benefits gained in safety and unimpeded access. However, as shown in Table 4-33, there are 17 churches where the Preferred Alternative may require ROW and/or where driveway access may be changed as part of the final design process. Of these, the Preferred Alternative will result in the relocation of two

churches: God Mission of Faith Church in Ettrick, VA; and EMI New Covenant Global Ministries in Raleigh, NC.

In February 2013, letters were sent to Chesterfield County, VA property owners within the Study Area, to announce the February 26, 2013 Project Update Meeting in Chesterfield. God Mission of Faith Church was included in the mailing. Following the mailing, Virginia DRPT staff attempted to contact the church to discuss the potential impacts from relocating the church. Two phone calls were made, and two voicemails were left that mentioned the letter and the upcoming meeting. The message included an invitation to discuss the impacts of relocating, either by telephone, or at the Project Update Meeting. The telephone calls were not returned, and church representatives did not attend the Project Update Meeting. Future coordination will be undertaken as needed, as part of Virginia's right of way procedures for relocation assistance. It appears from current parcel data, that the Church owns a larger vacant tract of land next to the church building that may be suitable for relocation.

EMI New Covenant Global Ministries rents space in a commercial building at 909 N. West Street in Raleigh, NC. In summer 2013, NCDOT staff attempted to contact the church in order to discuss the fact that the Project designs impact the property where the church is currently located, and the fact that implementation of the Project will result in a need for the church to relocate. No phone number is listed on the church's website, but emails were sent to links provided on the website. In addition, a certified letter was sent to the owner of the property, but was not claimed. Although there was no response to this outreach, future coordination will be undertaken as needed, as part of NCDOT's right of way procedures for relocation assistance. An internet search in spring 2013 found that similar suitable rental properties are available throughout downtown Raleigh, NC; therefore, it appears the church should be able to relocate within the community.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
AA	3	Richmond, VA	All Saints Apostolic Church, 2001 Royall Ave.	Access to the church across the railroad from the east will be unimpeded via the new bridge and realignment of Commerce Road.
	4	Richmond, VA	Church of God in Christ, 2208 Summer Hill Ave.	ROW may be required for the extension of Lynnhaven Avenue along west side of the church. Access to the church will be improved through the new bridge over the railroad at Ruffin Road, one block south.
	8	Near Bellwood in Chesterfield County, VA	Kingsland Baptist Church, 8801 Perrymont Rd.	Access to the church will be improved due to an extension of Kingsland Road, which will cross the railroad on a bridge.
	10	Chester, VA	Historic First Baptist Church, 4412 Centralia Rd.	ROW is required for new access roads west of the church property through adjacent undeveloped property, and along the southern parcel boundary. Access across the railroad will be improved through realignment of Centralia Road, which includes a bridge over the railroad and Chester Road.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	10	Chester, VA	Centralia Presbyterian Church, 4625 Centralia Rd.	ROW is required along the northern property for the realignment of Centralia Road. Access across the railroad will be improved through realignment of Centralia Road, which includes a bridge over the railroad and Chester Road.
BB	12	Chester, VA	Chester Church of Christ, 12100 Winfree St.	Access from the north will not be altered, while there will be improved access from the south due to the new underpass at Curtis Street.
	12	Chester, VA	St. John's Episcopal Church, 12201 Richmond St.	Access from the north will not be altered, while there will be improved access from the south due to the new underpass at Curtis Street.
CC	17	Near Colonial Heights in Chesterfield County, VA	Calvary Baptist Church, 17001 Jefferson Davis Highway	Access across the railroad from the east will be improved due to a new bridge over the railroad on Pine Forest Drive.
	18	Colonial Heights, VA	Church of Nazarene, 601 Ellerslie Ave.	No impact
	18	Colonial Heights, VA	St. Michael's Episcopal Church, Old Town Rd.	No impact
	20	Near Ettrick in Chesterfield County, VA	Macedonia Tabernacle, 3615 E. River Rd.	No impact
	20	Near Ettrick in Chesterfield County, VA	God Mission of Faith Church, 3718 East River Rd.	The DEIS stated there would be no substantive change in access, but failed to account for ROW impacts. Rail ROW requirements will displace the church. Assistance with relocation is provided as needed as part of Virginia right of way acquisition procedures.
	24	Petersburg, VA	Shining Light Pentecostal Holiness Church, 1417 Farmer St.	There will be no substantive change in access.
	24	City of Petersburg, VA	Third Presbyterian Church, 1660 Dupuy Rd.	There will be no substantive change in access.
	25	City of Petersburg, VA	Greater Faith AME Zion Church, 1301 Youngs Rd.	Vehicular access will be altered due to the closure of the Lincoln Street at-grade crossing. Vehicular traffic from east of the rail line will be rerouted a maximum of 1.5 miles to access the church. Pedestrian access will be improved with a pedestrian-only, grade-separated crossing at Lincoln Street.
	25	City of Petersburg, VA	New First Baptist Church, 1346 Grant Ave.	There will be no substantive change in access.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	25	City of Petersburg, VA	Zion Apostolic Church, 1601 Youngs Rd.	There will be no substantive change in access.
DD	--	N/A	N/A- no places of worship in Section	N/A
A	38	Dinwiddie County, VA	Olive Branch Baptist Church, 11119 Boydton Plank Rd.	There will be no impact to the parcel on which the church is located or to the outlying parcel behind the church, which lies close to the rail ROW.
B	41	Near the County courthouse in Dinwiddie County, VA	Smyrna Baptist Church, 18725 Carson Rd.	There will be improved access from the east across the railroad via a new bridge over the railroad on Carson Road.
C	45	Dinwiddie County, VA	Mount Calvary Baptist Church, 16609 Glebe Rd.	ROW is required along the front of the church property to accommodate the realignment of Glebe Road. Access across the railroad will be improved due to new bridge over railroad on Glebe Road.
D	54	Between McKenney and Alberta in Brunswick County, VA	Lovely Zion Baptist Church, Lovely Zion Rd.	Access will be altered slightly due to a realignment of Rawlings Road; however, access to the church will continue to be provided via the old Rawlings Road alignment on the west side of the railroad. A bridge over the railroad on the new Rawlings Road alignment will provide improved access from the east across the railroad.
	60	North of Alberta in Brunswick County, VA	Mercy Seat RZUA Church, Waqua Creek Rd.	The rail alignment will be located near the back of the church property, but there will be no direct impact and no substantive change in access.
	62	North of Alberta in Brunswick County, VA	Warfield Baptist Church and Cemetery, 7318 Flat Rock Rd.	ROW will be required for road work associated with new Flat Rock Road bridge.
E	66	Alberta, VA	United Methodist Church, 304 Church St.	Church Street will be realigned beginning just north of the church to cross the railroad on a bridge. Road work will end near the church, but no ROW will be required and there will be no substantive change in access.
	66	Alberta, VA	Trinity-St. Mark's Episcopal Church, 194 Connelly St.	There will be no substantive change in access.
F to H	--	N/A	N/A- no places of worship in Sections	N/A
I	83	South of La Crosse in Mecklenburg County, VA	First Baptist Church, Marengo Rd.	Access will be altered due to the closure of the Morris Town Circle crossing south of the church. Travelers west of the railroad tracks will utilize a new underpass at a re-configured Main Street, less than 0.5 miles north.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	83	South of La Crosse in Mecklenburg County, VA	La Crosse Cemetery, Marengo Rd. (New listing)	Access will be altered due to the closure of the Morris Town Circle crossing next to the cemetery. Travelers west of the railroad tracks will utilize a new underpass at a re-configured Main Street, approximately 0.6 miles to the north.
	83	South of La Crosse in Mecklenburg County, VA	Morning Star Apostolic Church, 142 Morris Town Circle	Access will be altered due to the closure of the Morris Town Circle crossing. Travelers from the east of the railroad tracks will have to travel northward to Hillcrest Road (maximum reroute of 1.25 miles) to access the church.
	83	South of La Crosse in Mecklenburg County, VA	Mecklenburg United Methodist Church, 6503 Marengo Rd.	Access will be altered due to the closure of the Morris Town Circle crossing north of the church will be closed. Travelers west of the railroad tracks will utilize a new underpass at a re-configured Main Street, less than 0.75 miles north.
J	85	South of La Crosse in Mecklenburg County, VA	Pleasant Hill Reformed Zion Union Apostolic Church, 4143 Marengo Rd.	The DEIS stated no impact, but failed to note a change in access. Access will be altered in that the private crossing in front of the church will be closed, with a new access road provided on the west side of the railroad. Travelers will have to travel approximately 0.35 miles south to new bridge over the railroad for Marengo Road (maximum reroute of approximately .75 miles).
	86	South of La Crosse in Mecklenburg County, VA	Sardis United Methodist Church, 3152 Marengo Rd.	The existing at-grade access across the railroad will be closed, with alternate access provided on the east side of the railroad. Travelers will have to travel approximately 0.5 miles north to new bridge over the railroad for Marengo Road (maximum reroute of approximately 1.25 miles).
K	--	N/A	N/A- no places of worship in Section	N/A
L	93	Community of Wise in Warren County, NC	Jerusalem United Methodist Church, 850 Paschall Station Road	No impact
	94	Community of Wise in Warren County, NC	Bethlehem Baptist Church, 1258 Cole Farm Road	No impact
	95	Community of Wise in Warren County, NC	Locust Grove Baptist Church, Paschall Station Road	There will be no substantive change in access.
	95	Community of Wise in Warren County, NC	Providence Church, 1908 US Hwy 1 North	A new public access road will intersect US 1 just south of the church property and existing driveway, but no ROW will be required and access will be improved through a new bridge over the railroad on the nearby Wise-Five Forks Road.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	95	Community of Wise in Warren County, NC	Wise Baptist Church, 1840 US Hwy 1 North	A small amount of ROW may be required for realignment of Wise Five Forks/Carrie Dunn Road, but access will be improved through new bridge over railroad.
M	99	Norlina, NC	First Baptist Church, 300 Washington St.	Existing access from the west side of the railroad via Jerman Lane will remain unaltered. However, access from the east will be rerouted to the realigned Warren Plains Road and new bridge.
	100	Norlina, NC	Norlina United Methodist Church, 401 US 1 N.	Access from the east of the rail line will be slightly modified.
	101	East of Ridgeway Community in Warren County, NC	Chapel of the Good Shepherd, NC Rt.1107/ Ridgway Warrenton Road	The impacts described here represent a change from the DEIS due to new designs for roadwork developed subsequent to the DEIS. Access to the church from across the rail line will be changed from the existing Ridgway Warrenton Road at-grade crossing near the church to a new bridge over the railroad approximately 2,000 feet south via a realigned Ridgeway Drewry Road connecting to a realigned Ed Petar Road/Ridgeway Warrenton Road.
	102	Ridgeway Community in Warren County, NC	Ridgeway Baptist Church, 156 Wycoff Rd.	The impacts described here represent a change from the DEIS due to new designs for roadwork developed subsequent to the DEIS. Access from across the rail line will be less direct, utilizing a new bridge over the railroad for realigned Ridgway Drewry Road, located approximately halfway between two existing at-grade crossings at Ridgeway Warrenton Road and Axtell Ridgeway Road, which are approximately one mile apart.
N	106	Manson Community in Warren County, NC	Manson Baptist Church, Kimball Rd.	The railroad is proposed to be on new alignment south of the church. The Kimball Road design has been revised since the DEIS. The new alignment bridges the railroad southwest of the NC1 alignment shown in DEIS (away from the church), and unlike the DEIS alignment, does not require ROW from church.
O	108	Middleburg, NC	Middleburg Baptist Church, 80 N. Plummer Ave.	The following is a correction to the DEIS: there would be no change in access to the church. The preferred alternative is on new alignment to the east of existing railroad ROW. Access across the railroad from the east will be provided via Carol Street, which crosses the railroad on a bridge.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	110	Between Middleburg and Henderson in Vance County, NC	Young's Memorial Holy Church, 1379 Brookston Rd.	The following is a correction to the DEIS: a small amount of ROW may be required from the front of church property for the realignment of Brookston Road and the new bridge over the railroad. The railroad is proposed to be on new alignment east of the existing rail ROW. Access from north and south will be unimpeded.
	111	Between Middleburg and Henderson in Vance County, NC	Brookston Baptist Church and Cemetery, 242 Baptist Church Rd.	Access from the west of the rail line will be improved and unimpeded with the realignment of Brookstone Road and a new bridge over the rail line. The DEIS failed to note that the church property abuts the existing rail ROW and rail improvements may require ROW from rear of the church property. However, this will not change access to the church front driveway. Driveway access to the rear of the church will be addressed during the ROW acquisition phase of the project.
P	112	North of Henderson in Vance County, NC	North Henderson Church of God, 305 John Deere Rd.	There will be no substantive change in access.
	114	Henderson, NC	Calvary Temple Holy Church, 215 Kitchen Ave.	There will be no substantive change in access.
	114	Henderson, NC	North Henderson Baptist Church, 1211 North Garnett Street	ROW may be required from the front of the church property for the realignment of North Garnett Street. There is no substantive change in access.
	114	Henderson, NC	St. John's Episcopal Church, 100 Main Street	A small amount of ROW may be required from the rear of the church property for realignment of N. Garnett Street. In addition, ROW may be required from the church parking across Main Street for the realignment of Main Street. Access across the railroad will be improved with new Main Street underpass.
	114	Henderson, NC	Cotton Memorial Presbyterian Church, 511 Chestnut Street	A small amount of ROW may be required for the vertical realignment of Chestnut Street. There is no substantive change in access.
	114	Henderson, NC	Mt Zion Christian Church of Henderson 995 Burr St.	The project would have no direct impact to the church. Access in the surrounding area will change from four at-grade rail crossings to two grade separated rail crossings. However, access from the west will be improved with a new round-about intersection at N. Garnett Street, N. Beckford Drive, N. Chestnut Street and Main Street, including a road underpass on Main Street at the railroad.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	114	Henderson, NC	* City Road United Methodist Church, N. Garnett St. (New listing)	There is no direct impact. The surrounding area will change from four at-grade rail crossings to two grade separated rail crossings. However, access from the east will be improved with new round-about intersection at N. Garnett Street, N. Beckford Drive, N. Chestnut Street and Main Street, including a road underpass on Main Street at the railroad.
	114	Henderson, NC	Davis Chapel 742 N. Chestnut St.	There is no direct impact. The surrounding area will change from four at-grade rail crossings to two grade separated rail crossings. However, access from the east will be improved with new round-about intersection at N. Garnett Street, N. Beckford Drive, N. Chestnut Street and Main Street, including a road underpass on Main Street at the railroad.
	114	Henderson, NC	First Congregational Christian Church, 427 Rowland St.	There is no direct impact. Realignment of Andrews Avenue and new road over rail bridge improves safety and provides unimpeded access from the west.
	115	Henderson, NC	First Presbyterian Church, 222 Young St.	There will be no substantive change in access.
	115	Henderson, NC	First United Methodist Church, 114 Church Street	There will be no substantive change in access because the existing Charles Street underpass, which is located directly across the street from the church, will be maintained.
	115	Henderson, NC	First Baptist Church, 205 W. Winder St.	Several nearby existing at-grade crossings will be closed, but vehicular access across the railroad will be maintained through the nearby existing underpass at Charles Street and the new bridge on E. Andrews Avenue. Additional access will be provided to the south through a new pedestrian only underpass at Burwell Avenue/Peachtree Street.
	115	Henderson, NC	Shiloh Baptist Church, 635 S. College St.	There will be no substantive change in access.
	116	Henderson, NC	Fisher of Men Church of Our Lord Jesus Christ, 163 Elsie St.	There is no direct impact. Vehicular access will be altered in that the nearby at-grade rail crossing of Nichols Street, which intersects with St. Matthews Street, will be closed. Traffic rerouting will be minimal because new bridges over the railroad are proposed less than a mile to the north and south.
	116	Henderson, NC	United Prayer of Faith Church, Miriam St.	There is no direct impact. Vehicular access will be altered in that the nearby at-grade rail crossing of Nichols Street which intersects with St. Matthews Street will be closed. Traffic rerouting will be minimal because new bridges over the railroad are proposed less than a mile to the north and south.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	116	Henderson, NC	Cooks Chapel Zion Church, 210 Center St.	There is no direct impact. Vehicular access will be altered in that the nearby at-grade rail crossing of Nichols Street which intersects with St. Matthews Street will be closed. Traffic rerouting will be minimal because new bridges over the railroad are proposed less than a mile to the north and south.
	116	South of Henderson in Vance County, NC	Victory Baptist Church, 475 J P Taylor Rd.	A small amount of ROW may be required along the church parcel frontage for road work associated with J P Taylor Road. Vehicular access will be improved through a new bridge over the railroad for J P Taylor Road, with an extension west of the railroad to Belmont Drive. The extension of Nicholas Street to J P Taylor Road will also improve connectivity.
	116	South of Henderson in Henderson, NC	Welcome Chapel Baptist Church, 237 Welcome Ave.	The closure of the Welcome Avenue at-grade crossing will create reroute traffic from the west. The reroute will divert traffic to realigned JP Taylor Road and its new road-over-rail bridge to a new intersection with Belmont Drive.
	117	South of Henderson in Vance County , NC	Raleigh Road Baptist Church, 3892 Raleigh Rd.	There is no direct impact. The church property also fronts Bear Pond Road, which will be realigned away from the church, and will cross the railroad on a bridge.
Q	120	Vance County, NC	Union Chapel United Methodist Church, 6479 Raleigh Rd.	Access to the church will be altered, but traffic re-routing will be minimal in that the crossing at Chavis Road will be closed and the road realigned to connect with a new underpass at Edwards Road; the new underpass will be located within the adjacent parcel northeast of the church. No ROW will be required from the church for road work. However the church abuts the existing railroad, and a sliver of ROW will be required along the back of the church property for rail improvements. The private dirt crossing located at the back of the church parking lot will be closed.
	120	Vance County, NC	New Hope Baptist Church, Raleigh Rd.	Access to the church will be altered, but traffic re-routing will be minimal in that the crossing at Chavis Road will be closed and the road realigned to connect with a new underpass at Edwards Road less than a half a mile to the north.
	121	Kittrell, NC	Taylor's Chapel AME Zion Church, 106 William St.	The impact to the church is slightly different than what was shown in the DEIS. The bridge over the railroad at nearby Church Street shown in the DEIS has been replaced with a bridge over the railroad less than a quarter mile to the south at McClannahan Street at the request of the town. The difference to the church should be minimal.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	121	Kittrell, NC	* Confederate Cemetery, West Chavis Rd. (New listing)	No impact
	121	Kittrell, NC	* Kittrell Baptist Church, 100 W. Williams St. (New listing)	The bridge over the railroad at Church Street shown in the DEIS has been replaced with a bridge over the railroad at nearby McClannahan Street at the request of the town. The difference to the church should be minimal.
	121	Kittrell, NC	St. James Episcopal Church, William St.	The bridge over the railroad at nearby Church Street shown in the DEIS has been replaced with a bridge over the railroad less than a quarter mile to the south at McClannahan Street at the request of the Town. The difference to the church should be minimal.
	121	South of Kittrell in Vance County, NC	* Grace Missionary Baptist Church, 1625 US Hwy 1 South (New listing)	A small amount of ROW may be required for the improvements to US Hwy 1 South as part of the project. There will be no substantive change in access.
	122	South of Kittrell in Vance County, NC	* Oak Ridge Baptist Church and Cemetery, Oak Ridge Church Rd. (New listing)	There is no direct impact. Access will change with the closure of the nearby Beechtree Trail Road at-grade crossing and with a new bridge over the railroad provided approximately one mile to the south at Egypt Mountain Road.
	122	South of Kittrell in Vance County, NC	Kittrell Church of God, 2540 US Hwy 1 South	Access will be altered due to the closing of the crossing at Beechtree Trail Road. Travelers will utilize a new bridge over the railroad at Egypt Mountain Road approximately 1 mile south.
R	--	N/A	No places of worship in this section	N/A
S	127	Franklinton, NC	Franklinton United Methodist Church, 109 N. Main St.	From the east, the closure of the Mason and Joyner Street at-grade rail crossings will redirect vehicular traffic to an expanded Green Street underpass. A new pedestrian underpass will provide safe pedestrian crossing at Mason Street.
	127	Franklinton, NC	First United Church of Christ, 20 W. Green St.	The existing Green Street underpass located two blocks to the east will be expanded, providing improved vehicular access. The pedestrian underpasses at Mason Street, one block north of Green Street, and College Street, one block south, will provide safe pedestrian access across the railroad.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	127	Franklinton, NC	Franklinton Baptist Church, 102 W. Mason St.	From the east, the closure of the Mason and Joyner Street at-grade rail crossings will redirect vehicular traffic to an expanded Green Street underpass. A new pedestrian underpass will provide a safe pedestrian crossing at Mason Street.
	127	Franklinton, NC	Mt. Pleasant Presbyterian Church, S. Main St.	From the west, the closure of College Street at-grade rail crossing will redirect vehicular traffic to an expanded Green Street underpass, one block north. A new pedestrian underpass will provide safe pedestrian crossing at College Street.
	127	Franklinton, NC	Holy Trinity Church, 118 S. Hawkins St. (New listing)	New listing for FEIS- from the west, closure of College Street at-grade crossing will redirect vehicular traffic to an expanded Green Street underpass, one block north. A new pedestrian underpass will provide safe pedestrian crossing at College Street.
	128	Franklinton, NC	First Baptist Church, S. Main St.	The existing Green Street underpass located one block to the east will be expanded, providing improved vehicular access. The pedestrian underpasses at Mason Street, one block north of Green Street, and College Street, one block south, will provide safe pedestrian access across the railroad.
	132	North of Youngsville, in Franklin County NC	Union Grove Baptist Church, 552 N. College St.	ROW may be required from the eastern property boundary for improvements to the railroad. From the east, access will improve via the new NC 96 realignment and bridge over the railroad, as well as new Main Street bridge over the railroad.
T	132	Youngsville, NC	** Youngsville Baptist Church, 315 E. Main St.	From the west, access will improve due to the new bridge over the railroad at Main Street, as well as the new NC 96 realignment to the north with a new bridge over the railroad.
	13	Wake Forest, NC	** Holy Redeemer Catholic Church, 1841 N. White St.	No impact
U	133	Wake Forest, NC	Wake Forest Cemetery, N. White Street	There will be no substantive change in access.
	135	Wake Forest, NC	Glen Royal Baptist Church, 731 Elizabeth Ave.	There is improved pedestrian access via a new pedestrian-only bridge over railroad near Cedar Avenue and White Street.
	135	Wake Forest, NC	Wake Forest Church of God, 155 E. Cedar Ave.	There is improved pedestrian access via a new pedestrian-only bridge over railroad near Cedar Avenue and White Street.
	135	Wake Forest, NC	Olive Branch Baptist Church, 326 E. Juniper Ave.	There is improved pedestrian access via a new pedestrian-only bridge over railroad near Cedar Avenue and White Street less than one quarter mile to the north.

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
	136	Wake Forest, NC	Spring Street Christian Church, E. Spring St.	There will be no substantive change in access.
	136	Wake Forest, NC	Hope Baptist Church, new temporary location at 403 Brooks St.	The closure of the Elm Avenue at-grade rail crossing will redirect traffic to existing underpass at Roosevelt Avenue to the north, and new underpass at realigned Holding Avenue to the south. New pedestrian underpass will also provide a safe pedestrian crossing at Elm Avenue.
	136	Wake Forest, NC	Tri-Area Ministry, 149 E. Holding Ave.	A portion of the church's front property may be acquired for ROW associated with the realignment of E. Holding Avenue. Driveway access and parking will be determined during the ROW acquisition phase of the project. From the west, access across the railroad will be altered due the southward realignment of Holding Avenue, which will cross under the railroad via an underpass.
	136	Wake Forest, NC	Wake Forest Baptist Church, 107 E. South St.	There will be no substantive change in access.
	136	Wake Forest, NC	Wake Forest United Methodist Church, 905 S. Main St.	Access will be improved via a realignment and new underpass (road under railroad) for Holding Avenue. (Note that the DEIS incorrectly stated that Holding Avenue will cross the railroad on a bridge.)
	136	Wake Forest, NC	South Main Baptist Chapel Church, S. Main St	Vehicular access from east of the rail line will be altered with the closure of the at-grade rail crossing of Elm Avenue to the north, but the realignment and new underpass (road under rail) at Holding Avenue will provide improved access. (Note that the DEIS incorrectly stated that Holding Avenue will cross the railroad on a bridge.) Pedestrian access across the railroad at Elm Avenue will be maintained via a new pedestrian bridge with stairs and ramps.
	137	Wake Forest, NC	Friendship Chapel Baptist Church, 237 Friendship Chapel Rd.	From the east, access will be improved via a new access road connecting Friendship Chapel Road to Franklin Street at the NC 98 Bypass. A small amount of ROW may be required from the corner of the church property for the road improvements. From the southwest, access will be altered in that the existing at-grade rail crossing of Friendship Chapel Road will be closed with traffic redirected to the NC 98 bypass, resulting in approximately one additional mile of travel distance to the church as a result the closed crossing.
	139	Between Wake Forest and Raleigh in Wake County, NC	Living Word Family Church, Capital Boulevard	No impact

Table 4-33
Impacts to Places of Worship and Cemeteries

Section	Map Sheet	Location	Name	Impacts from Preferred Alternative
V	145	Raleigh, NC	** Millbrook United Methodist Church, 1712 E. Millbrook Rd.	Access will be improved via new Millbrook Road bridge over the railroad.
	149	Raleigh, NC	* EMI New Covenant Global Ministries, 911 N. West St.	Rail ROW requirements will displace church. Assistance with relocation is provided as needed as part of NCDOT right of way acquisition procedures.
	149	Raleigh, NC	Powerhouse Church of Jesus Christ, 1130 N. Blount St.	No impact
	150	Raleigh, NC	St Paul AME Church, 402 W. Edenton St.	Vehicular access from the east will be altered somewhat with the closure of the existing at-grade crossing at Jones Street (one block north). However, traffic re-routing will be minimal because the existing bridge over the railroad at Hillsborough Street (one block south) will retained. Pedestrian access across the railroad will be maintained via a new pedestrian bridge at Jones Street.
	150	Raleigh, NC	Victory Tabernacle Church, W. South St.	No impact

* Listing was mistakenly not included in DEIS
** Project section listed in DEIS was incorrect; correct section shown here

4.11.3.3 *POLICE, FIRE, AND EMS*

Closing existing at-grade railroad crossings and consolidating access across the Project corridor will have some effect on police, fire, and EMS response in the communities along the Project. Section 4.11.3.3 of the Tier II DEIS provided a discussion about seven facilities that were studied to determine the impact that changes in access would have on EMS service coverage. The seven facilities are close to the corridor and would experience changes in access across the railroad. They are representative of the worst-case changes that may occur; changes at other locations should be less substantial. In locations near existing rail operations where freight trains may block existing at-grade rail crossings, all alternatives, including the Preferred Alternative, provide better conditions for emergency service response than existing conditions. Throughout the corridor, police, fire, and emergency response times may be temporarily affected during construction. Coordination with public response agencies serving the Study Area will continue during construction to avoid and minimize disruptions to emergency response.

To determine the effect that changes in access would have on EMS services, a service area analysis was completed in ArcGIS using the Network Analyst extension. A road network was developed corresponding to the expected changes that would be made for each alternative and a No Build scenario (i.e., if the Project were not constructed). These road networks were used to develop an approximate service area that could be reached within about five minutes. The difference between the service areas for the alternatives were compared to the service area of a No Build scenario to

provide insight into what effects the access changes associated with each alternative would have on response times.

For five of the seven facilities studied in the Tier II DEIS, the service area analysis showed little difference between the overall EMS service area for a No Build scenario compared to the Project alternatives, including the Preferred Alternative. Results of the analysis for these facilities was detailed in Section 4.11.3.3 of the Tier II DEIS, and is summarized below.

For two facilities, the Tier II DEIS analysis revealed a substantial difference between the overall service area for a No Build scenario compared to the Project alternatives: the Bensley-Bermuda Volunteer Rescue Squad South Station in Chesterfield, VA; and the Ridgeway Volunteer Fire Department in Warren County, NC. Subsequent to publication of the Tier II DEIS, road work design revisions for the Preferred Alternative were made near these two facilities, which has resulted in a change to the service area analysis that was presented in the Tier II DEIS. These changes are discussed below; new discussion is also provided below for Henderson, NC, and Raleigh, NC.

4.11.3.3.1 BENSLEY-BERMUDA VOLUNTEER RESCUE SQUAD SOUTH STATION

This facility provides emergency medical response for the southern section of the Bensley-Bermuda Volunteer Rescue Squad coverage area in Chesterfield County, VA. It is located very near and to the east of the existing Woods Edge Road at-grade crossing of the Project corridor. The designs presented in the Tier II DEIS showed that the Woods Edge Road crossing would be closed under all Project alternatives, which are on common alignment in this section. Results of the service area analysis shown in Section 4.11.3.3.1 of the Tier II DEIS revealed a substantial difference between the overall EMS service area for the Bensley-Bermuda Volunteer Rescue Squad South Station under the Project alternatives compared to a No Build scenario. There were some sizeable shifts in the five-minute response area with most being attributable to the closure of the Woods Edge Road crossing.

In response to comments on the Tier II DEIS, the Preferred Alternative (VA1) was revised to include a grade-separated crossing at Woods Edge Road. The new bridge over the railroad will provide improved access for emergency responders compared to existing conditions.

4.11.3.3.2 ALBERTA, VA, VOLUNTEER FIRE DEPARTMENT

The Town of Alberta, VA, in Brunswick County, VA, straddles the inactive CSX S-Line. The Project will affect several crossings that are proposed for consolidation. The Alberta, VA, Volunteer Fire Department facility is very near and to the east of the existing rail ROW. Results of the service area analysis shown in Section 4.11.3.3.12 of the Tier II DEIS revealed very little change in the five-minute response window between a No Build scenario and the Project alternatives, including the Preferred Alternative (VA1). For all Project alternatives, the total area covered is essentially identical to a No Build coverage area and there is no indication that areas to the west of the corridor would be subjected to reduced coverage. Thus, there is almost no difference between the overall EMS service area for the Alberta, VA, Volunteer Fire Department under the Preferred Alternative compared to a No Build scenario.

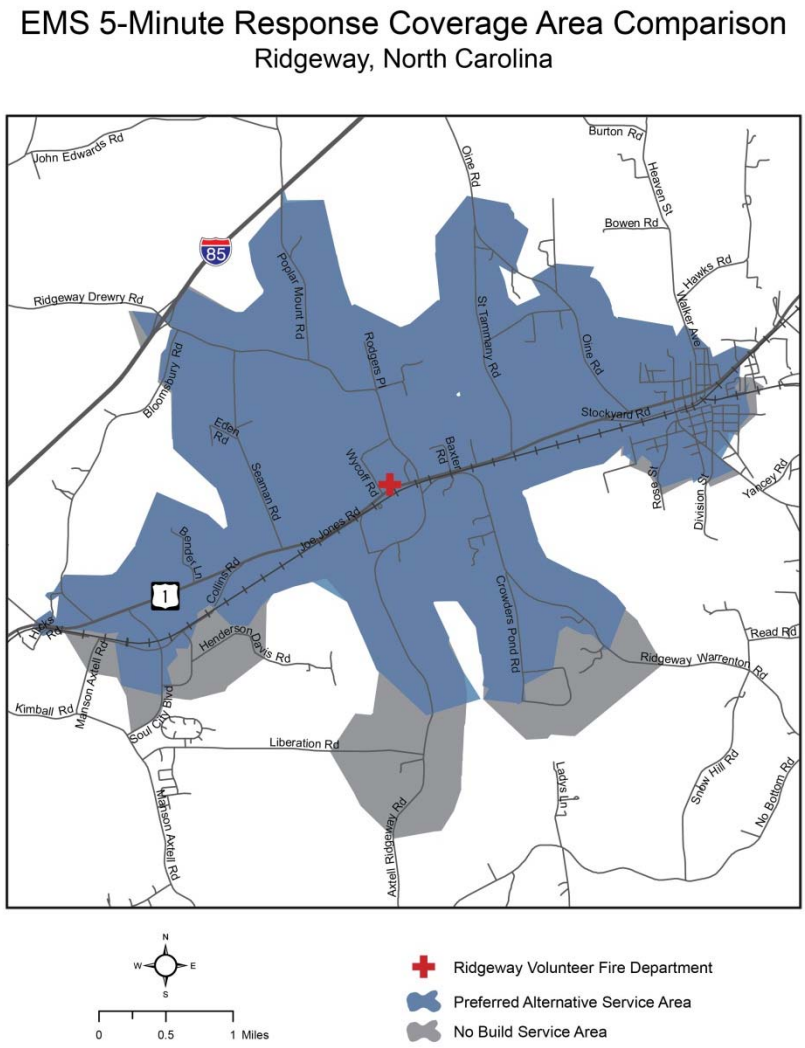
4.11.3.3.3 RIDGEWAY VOLUNTEER FIRE DEPARTMENT

This facility provides fire response for the Ridgeway area, southeast of Norlina, NC, in Warren County, NC. It is located along US-1, just north of the Project corridor. The designs presented in the Tier II DEIS showed that nearby crossings at Joe Jones Road and Axtell Ridgeway Road would be consolidated, and the nearby Ridgeway Warrenton Road crossing would be realigned under all Project alternatives. As discussed in Section 4.11.3.3.3 of the Tier II DEIS, there is a

notable difference between the overall EMS service area for the Ridgeway Volunteer Fire Department under the Project alternatives presented in the Tier II DEIS compared to a No Build scenario.

Subsequent to the Tier II DEIS, revisions were made to road work designs in the Ridgeway area for the Preferred Alternative (NC1). The revisions were made in response to comments on the Tier II DEIS and input from local officials, and are outlined in Section 2.2. A service area analysis was conducted for the revised designs and the results are shown below in Figure 4-1. The results indicate some difference between the overall EMS service area for the Ridgeway Volunteer Fire Department under the Preferred Alternative compared to a No Build scenario. However, the difference is less substantial than the difference for the designs in the Tier II DEIS. It should be noted that the new road work was developed in coordination with Warren County, NC, Kerr-Tar Council of Governments (the Rural Planning Organization) and the NCDOT Transportation Planning Branch to serve the needs of the local community and Warren County, NC, as a whole.

Figure 4-1 EMS 5- Minute Response Coverage Area Comparison Ridgeway, NC



4.11.3.3.4 VANCE COUNTY, NC, AMBULANCE AND FIRE SERVICE

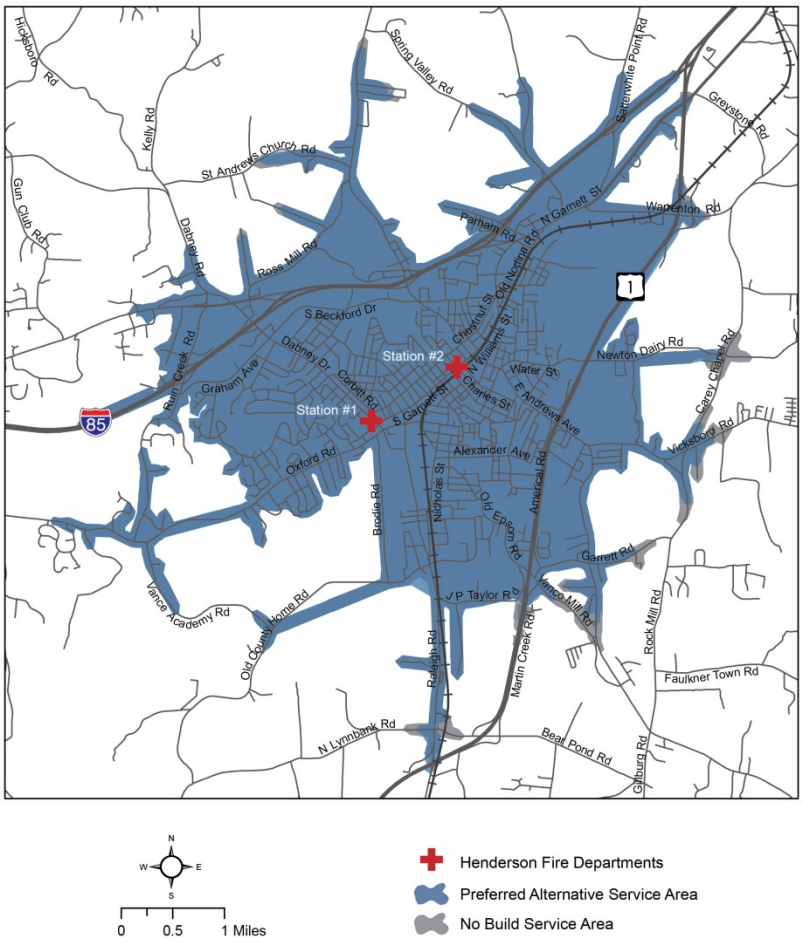
Located in Henderson, NC, this facility provides fire response for Vance County, NC. It is located near US-158, just north of the Project corridor. All Project alternatives, including the Preferred Alternative (NC1) are on common alignment in this location. The Project will affect several crossings that are proposed for consolidation, and several roads that will be realigned. Results of the service area analysis shown in Section 4.11.3.3.4 of the Tier II DEIS reveal that the overall service area of all alternatives including the Preferred Alternative is largely the same compared to a No Build scenario. Although revisions to road work have been made in Henderson, NC, for the Preferred Alternative (as described in Section 2.2), the revisions do not affect which crossings are to be consolidated and will not substantially alter the response time service area of the Preferred Alternative.

4.11.3.3.5 CITY OF HENDERSON, NC, FIRE STATION 1 AND CITY OF HENDERSON, NC, FIRE STATION 2

Subsequent to the publication of the Tier II DEIS, a service area analysis was conducted for the combined service area of City of Henderson, NC, Fire Station 1 and City of Henderson, NC, Fire Station 2. The analysis was conducted in response to concerns expressed by the City of

Henderson, NC, regarding impacts to response time for City fire stations from the proposed closure of the Chavasse Avenue at-grade rail crossing. The analysis took into account design revisions that include a connection between Alexander Avenue (south of Chavasse Avenue), which will cross over the railroad on a bridge, and Nicholas Street which runs parallel to the railroad on the east side (refer to Section 2.2 for more information on the design changes). A comparison of potential coverage areas is shown in Figure 4-2. The analysis shows that the existing Charles Street underpass north of Chavasse Avenue and the new Alexander Avenue bridge adequately compensate for the nearby crossing consolidations with regard to response time. There is very little change in the five-minute response area of the Preferred Alternative (NC1) compared to a No Build scenario.

Figure 4-2 EMS 5- Minute Response Coverage Area Henderson, NC



4.11.3.3.6 FRANKLINTON, NC, FIRE DEPARTMENT

The Town of Franklinton, NC, in Franklin County, NC, straddles the active CSX S-Line about 30 miles northeast of Raleigh, NC. The Franklinton, NC, Fire Department facility is very near and to the west of the existing rail ROW. All Project alternatives, including the Preferred Alternative (NC1) are on common alignment in this location. The Project will affect several crossings that are proposed for consolidation. Results of the service area analysis shown in Section 4.11.3.3.5 of

the Tier II DEIS reveal that there is very little difference between the EMS service area for the Franklinton, NC, Fire Department under a No Build scenario or the Preferred Alternative (NC1).

Although revisions to road work have been made in Franklinton, NC, for the Preferred Alternative (as described in Section 2.2), the revisions do not affect which crossings are to be consolidated and will not substantially alter the response time service area of the Preferred Alternative.

4.11.3.3.7 YOUNGSVILLE, NC, EMS RESCUE STATION

The Town of Youngsville in Franklin County, NC, straddles the active CSX S-Line northeast of Raleigh, NC. The Project will affect several crossings that are proposed for consolidation. The Youngsville, NC, EMS Rescue Station is very near and to the west of the existing rail ROW. The designs for the three alternatives, including the Preferred Alternative (NC1), are on common alignment near the EMS station. Under the Preferred Alternative, the rail ROW and new Main Street ROW will affect the existing entrances for the station; however, new access will be provided for and determined through negotiations during final design.

Results of the service area analysis shown in Section 4.11.3.3.6 of the Tier II DEIS reveal that the five-minute response area is slightly larger under the Preferred Alternative compared to a No Build scenario. Thus, there is no negative impact to the EMS service response area for the Youngsville, NC, EMS Rescue Station in Franklin County, NC, under the Preferred Alternative and there are improvements in response coverage area.

Although revisions to road work have been made in Youngsville, NC, for the Preferred Alternative (refer to Section 2.2) the revisions do not affect which crossings are to be consolidated and will not substantially alter the response time service area of the Preferred Alternative NC1.

4.11.3.3.8 WAKE FOREST, NC, FIRE DEPARTMENT STATION #1

The Town of Wake Forest, NC, in Wake County, NC, straddles the active CSX S-Line just northeast of Raleigh, NC,. The Wake Forest, NC, Fire Department facility is very near and to the east of the existing rail ROW. The designs for the three alternatives, including the Preferred Alternative (NC1), are on common alignment near the fire station. The Project will affect several crossings that are proposed for consolidation.

Results of the service area analysis shown in Section 4.11.3.3.7 of the Tier II DEIS reveal that there is very little change in the five-minute response area between a No Build scenario and the Preferred Alternative; the total area covered is 99.6 percent of the coverage area of a No Build scenario. Thus, there is essentially no difference between the EMS service coverage areas for the Wake Forest, NC, Fire Department under the Preferred Alternative compared to a No Build scenario.

Although revisions to road work have been made in Wake Forest, NC, for the Preferred Alternative (refer to Section 2.2) the revisions do not affect which crossings are to be consolidated and will not substantially alter the response time service area of the Preferred Alternative.

4.11.3.3.9 RALEIGH, NC, FIRE STATION NO. 22

In north Raleigh, NC, Raleigh Fire Station No. 22 is located near the active CSX railroad, on Durant Road. All alternatives are on common alignment in the Durant Road area, including the Preferred Alternative (NC1). The designs shown in the Tier II DEIS had ROW impacts along the front of Fire Station No. 22 property, but they included a new access road to provide driveway

access for the station, which will allow the station to continue operating. Subsequent to the publication of the Tier II DEIS, a revised bridge and road alignment was designed for this location for the Preferred Alternative, in response to comments from the City of Raleigh, NC,. The northward shift of the new alignment will take the road through the City of Raleigh, NC, Fire Station No. 22, requiring the fire station to be relocated. The new designs were developed in coordination with the City of Raleigh, NC, and will result in the City having a relocated station that can better serve this rapidly growing area (refer to Section 2.2).

4.11.4 LAND USE PLANNING

This section has been revised from the Tier II DEIS to address comments and updated to include the most recent adopted plans and studies from each agency (as relevant to the Project, which were presented in Section 3.11), as well as an expanded discussion of relevant planning activities by state, regional and local agencies. In this section, specific focus has been placed on evaluating these current plans for consistency with the Project as a whole, as well as on whether specific projects proposed by these entities are consistent with Project's designs for the Preferred Alternative.

4.11.4.1 *LAND USE PLANS*

Land use plans are important to the overall development of a community. This is achieved through comprehensive/master plans, neighborhood/special area plans and other land use and transportation studies that examine existing development trends, desired community growth and the infrastructure demands of planned development. Section 3.11.3 identifies those communities affected by the Project and discusses how their respective land use, transportation, and comprehensive plans address the SEHSR Corridor. The following section summarizes the most recent plans and studies in the Study Area and notes their consistency with the Project.

At the time the Tier II DEIS was published, several communities in the Study Area had not acknowledged the Project, and although some had acknowledged the Project, many organizations had not yet developed plans to address its effects. This appears to be the result of the age of those plans, which preceded the Tier II DEIS. All of the most recent plans and studies adopted by the communities and planning agencies in the Study Area now acknowledge and address the Project, as noted below.

4.11.4.2 *CHANGES IN LAND USE*

The potential for direct impacts on land use and development resulting from the Project is generally a function of:

- Existing land uses and current zoning;
- Availability of undeveloped land for new development;
- Regional and local markets;
- Proposed station locations;
- Local effect of crossing closures and redirected traffic patterns;
- Potential for existing uses to be redeveloped; and
- Local land use plans, economic development programs and land use controls such as zoning and land development ordinances.

To the greatest extent practicable, the Preferred Alternative utilizes existing rail lines and existing railroad right of way (ROW) that extend through established cities and towns. To some degree, this helps minimize impacts to current and future land uses, although some individual existing land uses may be directly impacted (as discussed in Section 4.11.6).

As noted in the Tier I EIS for the SEHSR Corridor between Washington, DC and Charlotte, NC, and as demonstrated in the local planning efforts undertaken since the Tier II DEIS was published (summarized below), the long range planning effects of the implementation of the Project will increase transportation opportunities, as communities increase transit services at planned stations, and some communities consider adding conventional passenger and commuter service in addition to SEHSR service. This has already prompted communities within the Study Area to use land use planning to spur new development and increase redevelopment efforts nearest planned rail stations.

The presence of these opportunities will create a favorable environment for new economic activity and investment possibilities. In a few communities without proposed stations, the increase in train activities and improvement of freight service from the Project has already prompted the adoption of plans to decrease the amount of residential uses and increase the amount of industrial uses nearest the rail lines. Other communities have adopted specific area plans to better address the land use opportunities and transportation changes in areas where crossings will be closed.

In communities with stations that will serve SEHSR trains, some major direct land use impacts may occur, as those properties nearest the stations gain value and are either developed (if vacant) or redeveloped to more dense uses to facilitate transit oriented uses. Such planning efforts are underway for Raleigh, NC, and recommended for other smaller communities with planned stations, as described further below. Especially in the larger center cities of Richmond, VA, and Raleigh, NC, redevelopment pressures around the stations could displace existing residents and small businesses in favor of higher density (and more costly) residential uses and higher cost lease space for businesses. However, positive land use changes also should be expected, as business development and investment is triggered to serve passenger needs. These changes should be evaluated in the future environmental documentation developed for the stations.

4.11.4.3 *COMPATIBILITY WITH FUTURE LAND USE PLANS*

This section examines the future land use plans throughout the Study Area. As noted below, the proposed Project and the Preferred Alternative are consistent and compatible with future land use plans (Tables 4-34 and 4-35).

Table 4-34
Virginia – SEHSR Compatibility with Future Land Use Plans

City or County	Future Land Use Plan	Reference SEHSR?	Compatible with Preferred Alternative?	Notes
City of Richmond	2020 Richmond Master Plan (2000)	Yes*	Yes	*Plan does not specifically mention SEHSR, but does support "establishing high speed rail through downtown Richmond as part of Amtrak's northeast corridor service."
	Richmond Connects (Strategic Multimodal Transportation Plan, 2013)	Yes	Yes	The Plan's Transit and Rail Recommendations include MSS as the city's "Multimodal Hub', with the SEHSR's Preferred Alternative connecting to MSS along the "High Speed Rail Corridor".
	Downtown Master Plan, 2009	Yes	Yes	Main Street Station is recommended as a multi-modal transportation hub for Downtown Richmond.

Table 4-34 Virginia – SEHSR Compatibility with Future Land Use Plans				
City or County	**Future Land Use Plan**	**Reference SEHSR?**	**Compatible with Preferred Alternative?**	**Notes**
	Richmond Riverfront Plan, 2012	No	Yes	The CSX S-line and bridge over the James River is shown in the plan. The preferred alternative is within the existing rail ROW in this location.
	GRTC Broad Street Bus Rapid Transit Study	No+	Yes	+This is a study, not a locally adopted plan. The SEHSR project is referenced in relation to MSS in the station evaluation memo on the project website http://study.ridegrtc.com/
Chesterfield County	Chesterfield County Comprehensive Plan (2012)	Yes	Yes	SEHSR station is identified as Ettrick Station.
	Ettrick Village Plan (2004)	Yes	Yes	SEHSR crossing of Appomattox River should not be impacted by proposed riverfront park.
City of Colonial Heights	Comprehensive Community Development Plan (1996)	No^	Yes^	^Plan currently being updated; no drafts available for review. No policies in old plan would preclude SEHSR and several policies support concepts behind SEHSR.
City of Petersburg	Comprehensive Plan (2011)	Yes	Yes	Includes policies for the city to become "transit ready" and adopt transit oriented development zoning overlay district at proposed SEHSR station to make high speed rail feasible.
Dinwiddie County	Comprehensive Land Use Plan (2007)	Yes	Yes	Includes several policies and implementation items specifically to accommodate SEHSR.
Brunswick County	Vision 2015 Brunswick County Comprehensive Land Use Plan Update (2006)	Yes	Yes	Contains policies that support development of rail facilities, including SEHSR, to promote balanced transportation systems that support growth.
Mecklenburg County	Economic Development Plan (2011)	Yes	Yes	Recommends coordination with Federal and state agencies for adequate funding to build SEHSR. Recommends a SEHSR station in La Crosse.
	2035 Comprehensive Plan (2012)	Yes	Yes	Recommends careful land use planning along SEHSR. Recommends dedicated SEHSR station in La Crosse.

Table 4-35 North Carolina – SEHSR Compatibility with Future Land Use Plans				
City or County	**Future Land Use Plan**	**Reference SEHSR?**	**Compatible with Preferred Alternative?**	**Notes**
Warren County	2022 Comprehensive Development Plan (2002)	Yes	Yes	Recommends several actions to plan for SEHSR.
Vance County	Vance County Land Use Plan (2010)	Yes	Yes	Recommends several actions to plan for SEHSR. Acknowledges SEHSR stop in Henderson.
City of Henderson	2030 Comprehensive Plan (2010)	Yes	Yes	Recommends several actions to plan for SEHSR, including station in Henderson. @ Notes challenge related to SEHSR – maintaining access across RR tracks.
Franklin County	Comprehensive Land Use Plan (2000)	No	Yes	No specific SEHSR reference (due to plan age) but contains no policies that would preclude SEHSR.
Town of Franklinton	Franklinton Comprehensive Plan (2006)	No	Yes	No specific SEHSR reference (due to plan age) but contains no policies that would preclude SEHSR.
	US 1 Corridor Phase II Study (2012)	Yes	Yes	Includes Preferred SEHSR alignment and proposed crossing closures and road realignments into detailed land use plan at major development node around rail corridor.
Town of Youngsville	2000-2010 Land Use Plan (2000)	Yes	Yes	Recommends several actions to plan for SEHSR.
Town of Wake Forest	Community Plan (2009)	Yes	Yes	Recommends several actions to plan for SEHSR.
	NC 98 Bypass Corridor Master Plan (2003)	No	Yes	No specific SEHSR reference (due to plan age). Recommends several pedestrian and vehicular grade-separated crossings over/under RR that are consistent with SEHSR Preferred.
City of Raleigh	2030 Comprehensive Plan (2009)	Yes	Yes	Future growth framework map and policies follow sustainable city model whereby 60% of future growth would be redirected to infill centers based on location of SEHSR and TT stations and other transit nodes. Contains policy to grade-separate all rail crossings.

4.11.4.4 *COMPATIBILITY WITH TRANSPORTATION PLANS*

This section examines the transportation plans throughout the Study Area to ensure that the proposed Project, and specifically the Preferred Alternative, is consistent and compatible with current plans (Tables 4-36 and 4-37).

Table 4-36
Virginia – SEHSR Compatibility with Transportation Plans

Planning Organization	Transportation Plan	Does Plan Acknowledge SEHSR?	Is Preferred Alternative Compatible w/ Plan's Policies?	Is Preferred Alternative Consistent w/ Plan's Listed Project(s)?	Notes
State of Virginia	2035 Surface Transportation Plan (2013)	Yes	Yes	Yes	No projects required detailed coordination with SEHSR.
	Statewide Rail Plan (2013)	Yes	Yes	Yes	Plan acknowledges all SEHSR projects in Virginia.
Richmond Regional PDC/RAMPO	Plan 2035: RRPDC Regional Long Range Transportation Plan (2012)	Yes	Yes	Yes	Coordination with SEHSR was required for one listed project (Project 74 – Commerce Rd)
	FY 12-15 Transportation Improvement Program	Yes	Yes	Yes	RAMPO is working to fund projects that benefit SEHSR
	Regional Transportation Priority Projects (2011)	Yes	Yes	Yes	Funding is included for Main Street Station Improvements
	Richmond Rail Transit Feasibility Study (2003) and Executive Summary (2008)	Yes	Yes	Yes	Commuter rail and bus options in region were evaluated for consistency with SEHSR
	2035 Rural Long Range Transportation Plan (2011)	Yes	Yes	Yes	No projects required detailed coordination with SEHSR.
Crater PDC / Tri-Counties MPO	Tri-Cities Area Year 2035 Transportation Plan (2012)	Yes	Yes	Yes	No projects required detailed coordination with SEHSR.
	Tri-Cities Multi-Modal Station Study	Yes	Yes	Yes	See Section 1.4.3.2 for study results.
	Crater PDC 2035 Long Range Transportation Plan (2011)	Yes	Yes	Yes	Covers rural transportation network in Crater planning area. No projects required detailed SEHSR coordination.
Southside PDC	2035 Regional Long Range Transportation Plan (2011)	Yes	Yes	Yes	Preferred locations for SEHSR stations: Alberta and La Crosse. No projects required SEHSR coordination.

Table 4-37
North Carolina - Compatibility with Transportation Plans

Planning Organization	Transportation Plan	Does Plan Acknowledge SEHSR?	Is Preferred Alternative Compatible w/ Plan's Policies?	Is Preferred Alternative Consistent w/ Plan's Recommended Project(s)?	Notes
State of North Carolina	State Transportation Improvement Program: 2013-2023 (STIP)	Yes	Yes	Yes	No projects required detailed coordination with SEHSR.
	Strategic Highway Corridors	Yes	Yes	Yes	SEHSR will not impact mobility on critical corridors in the project area (US 1, I-440 or I-540).
Kerr-Tar Regional COG (Region K) / Kerr-Tar RPO	Warren County Comprehensive Transportation Plan (CTP) 2008	Yes	Yes	Yes	Recommends SEHSR station in Norlina. No projects required detailed coordination with SEHSR.
	Vance County CTP (2012)	Yes	Yes	Yes	Plan shows recommended SEHSR station in Henderson. No projects required detailed coordination with SEHSR.
	Franklin County CTP (2011)	Yes	Yes	Yes	Includes future commuter rail stops in Franklinton and Youngsville. No projects required detailed coordination with SEHSR.
	Kerr-Tar Project Priority Listing (2014-2020)	Yes	Yes	Yes	No projects required detailed coordination with SEHSR.
Triangle J COG / CAMPO	2035 Long Range Transportation Plan (Joint Plan with Durham-Chapel Hill-Carrboro MPO) (amended 2011)	Yes	Yes	Yes	Plan specifically supports the SEHSR and other passenger rail initiatives with a clear goal of prioritizing transit facilities and services, including bus and rail, to create a more modally balanced and interconnected system. A few projects required detailed coordination with SEHSR.

Table 4-37 North Carolina - Compatibility with Transportation Plans					
Planning Organization	**Transportation Plan**	**Does Plan Acknowledge SEHSR?**	**Is Preferred Alternative Compatible w/ Plan's Policies?**	**Is Preferred Alternative Consistent w/ Plan's Recommended Project(s)?**	**Notes**
	US 1 Corridor Study - Phase I (2006) and Phase II (2012)	Yes	Yes	Yes	Included long range transportation improvements to support development near SEHSR to take advantage of enhanced freight access.
	2012-2018 CAMPO Transportation Improvement Program (TIP) (2011)	Yes	Yes	Yes	No projects required detailed coordination with SEHSR.
	Capital Area Bus Transit Development Plan (2011)	Yes	Yes	Yes	No projects required detailed coordination with SEHSR.
Town of Wake Forest, NC	Wake Forest Transportation Plan (2010)	Yes	Yes	Yes	In reference to no planned SEHSR stop, the plan calls for bus service to Raleigh to include a stop at the Raleigh SEHSR station.
Triangle Transit (TT)	Regional Light Regional Rail Project	Yes	Yes	Yes	This project and Wake Forest, NC, commuter rail line will potentially share same ROW as SEHSR. SEHSR has closely coordinated with the two projects where alignments overlap.
TT/CAMPO/Durham-Chapel Hill-Carrboro MPO	Station Area Development Guidelines	Yes	Yes	Yes	Land use and transportation guidelines for rail stations, including SEHSR and regional rail.

Table 4-37
North Carolina - Compatibility with Transportation Plans

Planning Organization	Transportation Plan	Does Plan Acknowledge SEHSR?	Is Preferred Alternative Compatible w/ Plan's Policies?	Is Preferred Alternative Consistent w/ Plan's Recommended Project(s)?	Notes
City of Raleigh, NC	Raleigh Union Station Project	Yes	Yes	Yes	Funded project to replace existing Amtrak Station in downtown Raleigh, NC, with this multi-modal passenger train station that will accommodate SEHSR, TT regional rail, bus, taxis, bicycles and other forms of transportation. Project will also improve downtown freight storage tracks.
	Bicycle Transportation Plan (2009)	No*	Yes	Yes	* No specific SEHSR reference (due to plan age). Post-DEIS coordination with the City resulted in Preferred Alternative that includes a bike/pedestrian crossing at Jones St, a grade separated Wolfpack Lane and no closure of Fairview Street. With these changes, the Preferred Alternative is consistent with this plan.

4.11.5 VULNERABLE POPULATIONS / ENVIRONMENTAL JUSTICE

4.11.5.1 *ELDERLY & DISABLED POPULATIONS*

As presented in Section 3.11.1.3, the age dependency ratio is defined as the ratio of the dependent-age population (young or old) to the working-age population. Between 2000 and 2010, the ratios in NC and VA were less than the US averages (Table 1-7). Consistent with the nationwide trend, both NC and VA have been gaining a greater percentage of old-age dependents as the baby boomers continue to age and retire. The ratio of dependent youth has decreased slightly between 2000 and 2010, but is expected to increase above current levels in the coming decades. By the year 2050, the youth and old-age dependency ratios nationally are projected to stabilize at 48:100 and 37:100, respectively, but not before reaching a total dependency ratio of 85:100, a 37% increase in overall dependency from 2000 (Figure 1-5). Following this national trend, North Carolina and Virginia are projected to experience significant increases in the under 20 and over-65 populations between now and 2050. This means that fewer and fewer working age people will be taking care of even more dependents in the coming decades, and a greater percentage of the population may be dependent on others for their transportation needs. The increase in the over-65 population is important because of the reduced mobility within this age group and the resulting increase in demand this will place on public transportation alternatives to meet their transportation needs.

Current studies indicate changes in transportation systems and local roadway connectivity may have a greater impact on older populations who rely more heavily on pedestrian infrastructure and/or transit (Balfour and Kaplan, 2002). There are numerous communities in the area where the percentage of elderly (age 65 and older) in their demographic Study Area are greater than the percentage of elderly reflected in their respective city, county, and/or state (Table 4-30 Rail and Road Impacts and Benefits of Preferred Alternative by Community, above). In Virginia, communities with higher than average elderly populations within the Study Area are in the cities of Colonial Heights, VA, and Petersburg, VA, and the counties of Dinwiddie, VA, Brunswick, VA, and Mecklenburg, VA. In North Carolina, higher than average elderly populations in the Study Area are found in Warren and Vance counties, NC. In addition to the elderly, persons with some form of disability or impairment constitute another sensitive category with important transportation needs.

Additional transportation opportunities afforded by the Project will be equally available to the elderly and disabled and will provide additional transportation options. To accommodate the needs of these special populations, future designs should take into consideration the alteration of existing facilities, locomotives, stations, and rail cars in order to make them accessible for the elderly and persons with disabilities, such as modifying doorways, adding or modifying lifts, constructing access ramps and railings, modifying restrooms, and constructing accessible platforms.

The Project will not create barriers specific to elderly or disabled populations. As described in Section 4.11.2, all new bridges and underpasses are designed to have sufficient width so as not to create a hazard for pedestrian movement. In locations where existing pedestrian accommodations (e.g., sidewalks) currently exist, these accommodations will be provided on the bridges/underpasses. At other locations, pedestrian accommodations on the bridges/underpasses will be evaluated during final design based on the current NCDOT and VDOT pedestrian policies. Both NCDOT and VDOT have established “Complete Streets” policies that provide for consideration of all modes of transportation, including pedestrians and cyclists, when building new projects or making improvements to existing infrastructure. Therefore, the Project is not anticipated to introduce any barriers to the elderly or disabled or have adverse impacts to either of these special populations.

4.11.5.2 *ENVIRONMENTAL JUSTICE*

An updated Environmental Justice (EJ) analysis was prepared for this Tier II FEIS as a result of the availability of 2010 Census data and USDOT EJ Guidance (USDOT, 2012). The EJ analysis in the 2010 Tier II DEIS was based on 1990 and 2000 US Census because the 2010 Census had yet to be completed. Since the release of the 2010 Tier II DEIS, the 2010 Census data is available and is the basis of the updated EJ analysis for this Tier II FEIS. In addition to the change in time period, there are also differences in the data collection. From 1970 to 2000, the decennial Census "Long Form" was used, providing a 1-in-6 population sample of demographic and socioeconomic characteristics such as income and poverty. This form is no longer collected as part of the Decennial Census. It has been replaced by the American Community Survey (ACS). The ACS is a nationwide, continuous survey designed to provide demographic, housing, social, and economic data every year; however, it is subject to larger margins of error and is only provided for larger geographies such as counties and large cities and, therefore, is not available at the Census Block Group (CBG) level. For the ACS, the margin of error is the difference between an estimate and its lower or upper confidence bound. All ACS published margins of error are based on a 90 percent confidence level calculated using a standard error formula. This margin of error is included in the EJ tables presented in this section.

Since the release of the 2010 Tier II DEIS, the US Department of Transportation (USDOT) issued an update to its guidance on carrying out Executive Order 12898 on Environmental Justice in Minority and Low-Income Populations (USDOT, 2012). This order requires Federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health or environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations in the United States. Effective August 15, 2012, FTA issued its first EJ guidance, "Environmental Justice Policy Guidance for FTA Recipients." In 2011, FHWA issued "Guidance on Environmental Justice in NEPA" and in 2012 issued "FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The new guidance expands minority definitions to match those of the Census. Hispanic populations (an ethnicity), were added to the category of minority populations (a race of people). In addition, clarifications were provided regarding identifying disproportionately high and adverse effects. FRA has elected to apply these guidance documents for this Tier II FEIS.

A summary of the USDOT guidance on the application of Executive Order 12898 to transportation projects includes the following points:

- Low-Income: A person whose median household income is at or below the Department of Health and Human Services (DHHS) poverty guidelines. The 2012 DHHS poverty guideline for an individual is $11,170 and a family/ household of four persons is $23,050.
- Low-Income Population: Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed USDOT program, policy, or activity.
- Minority: A person who is
    - Black: a person having origins in any of the black racial groups of Africa;
    - Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
    - Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent;
    - American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who

maintains cultural identification through tribal affiliation or community recognition; or
    - Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- Minority Population: Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed USDOT program, policy, or activity.
- Adverse Effects: The totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of human-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of USDOT programs, policies, or activities.
- Disproportionately High and Adverse Effects on Minority and Low-Income Populations are adverse effects that:
    - Are predominately borne by a minority population and/or a low-income population; or
    - Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.

This EJ analysis was carried out in accordance with the guidance and requirements set forth in the USDOT Order 5610.2(a) and Executive Order 12898. The locations of minority and/or low-income populations are identified and referred to as EJ communities. A minority and/or low-income population is defined as an EJ community if it meets one or both of the following criteria:

- The Census block group contains 50 percent or more minority persons and/or the Census block group contains 25 percent or more low-income persons.
- The percentage of minority and/or low-income persons in any Census block group is more than 10 percent greater than the county average.

The presence of these two types of EJ populations was determined based on 2010 Census data and the most recent data available from the ACS. The EJ Study Area included all Census blocks, block groups, and tracts within or adjacent to the Project corridor. Extensive public outreach efforts were undertaken equally along the entire Study Area and throughout the life of the Project. These efforts are documented in Chapter 7.

In addition to the changes in Census and ACS data and the new Federal EJ guidance, this Tier II FEIS EJ analysis differs from the 2010 Tier II DEIS analysis for several reasons:

- For this Tier II FEIS, minority communities now include white and non-white Hispanic populations, whereas the 2010 Tier II DEIS addressed Hispanic populations as a separate, disadvantaged population in the EJ analysis.
- For this Tier II FEIS, low-income communities are determined based on the updated 2012 Health and Human Services (HSS) poverty threshold, whereas the Tier II DEIS used the HSS 2010 poverty threshold.

- This Tier II FEIS uses a Project-level EJ threshold value (58%, as explained below in 4.11.5.2.1) to determine if impacts are disproportionately high, whereas the Tier II DEIS did not use a threshold value (see Section 4.11.5.2.1 for an explanation of the derivation of this threshold value.)
- The EJ analysis in the 2010 Tier II DEIS was more generic in its approach than this Tier II FEIS EJ analysis. In other words, the Tier II DEIS did not make comparisons of disproportionately high and adverse impacts by multiple EIS topics, whereas this Tier II FEIS addresses EJ impacts by specific topics such as traffic changes & road closures, displacements, neighborhood disruptions, air, noise, and vibration.

Beneficial and adverse impacts to EJ communities are addressed by topic in the text that follows. Overall, this analysis shows that EJ communities would experience disproportionately high and adverse impacts in the areas of residential relocations, rail operation noise impacts to Category 2 receptors (residences and buildings where people normally sleep), rail noise vibration impacts to sensitive receptors, and the need for housing of last resort. Use of the housing of last resort provision is required where an owner, occupant, or tenant cannot otherwise be appropriately housed within the monetary limits. This is a common situation in high-cost housing areas or with very low income tenants who do not live in subsidized housing at the time of displacement. A discussion of avoidance, minimization, and potential mitigation measures for noise impacts is also included, where appropriate.

4.11.5.2.1 EJ COMMUNITIES IN THE PROJECT STUDY AREA

Table 4-38 presents the percentage of minority and low-income populations by state, locality, and community. Community-level data reflect the Census block groups within or adjacent to the Study Area. On Table 4-38, EJ communities are identified with bold text. Table 4-39 lists the EJ communities and indicates if the communities are minority and/or low-income. Of the 26 sections of the Study Area (AA through V), more than half qualify as having EJ communities. Overall, the percentage of minority and/or low-income populations in the Census block groups within or adjacent to the Study Area is equal to or greater than it is for the entire locality within which the block groups are located. In other words, there are more EJ communities adjacent to the existing railroad tracks than there are away from the tracks. The exception to this is Wake County, NC, where the percentage of minority populations is much less adjacent to the railroad than it is for the county as a whole.

The percentage of the Project located within EJ communities (as defined above) was evaluated to determine if the Project is disproportionately located within them. Table 4-40 identifies each Project section as either having or not having EJ communities, as well as the number of miles of rail and road improvements proposed within each section of the Preferred Alternative. Based on the data provided in Table 4-40, there are 234.43 combined miles of road and rail mainline track to be improved within the Study Area, of which 57 percent of these improvements would be located within EJ communities. While the Project is disproportionately located within EJ communities based on this criteria, it is important to note that the Study Area, which uses existing railroad rights of way to the extent practical, was selected in the Tier I EIS because it would minimize impacts to the human and natural environment. Additionally, the presence of the Project improvements does not necessarily result in impacts, particularly in locations where the designs are located entirely within the existing railroad corridor. The Tier II EIS efforts to further minimize impacts involved extensive community outreach to all communities along the Project, including EJ communities (see Chapter 7 for details on community involvement). Minimization and mitigation to EJ communities are summarized in Section 4.11.5.2.11, Community Involvement Process and Resulting Mitigation.

Representing 57 percent of the Study Area, EJ communities have the potential to receive a disproportionately high level of adverse impacts in comparison to non-EJ communities. On the other hand, EJ communities also have the potential to be the recipients of a disproportionately high level of Project benefits compared to non-EJ communities. To determine if EJ impacts are disproportionately high, a threshold of 58 percent or greater percent was used to evaluate impacts. Table 4-30 (Rail and Road Impacts and Benefits of Preferred Alternative by Community) presents summaries of the road and rail impacts and benefits to EJ communities. Table 4-41 presents a summary of the community-level impacts to EJ communities.

Table 4-38
Environmental Justice: Minority and Low-Income Data*

State and Locality				Study Area and Community				
Locality	% Minority	Persons Whose Income is Below Poverty Level (2010)		Section	Study Area / Community	% Minority	Persons Whose Income is Below Poverty Level (2010)	
		%	Standard Error (SE)				%	Standard Error (SE)
Virginia	31.4%	10.3%	0.12	Census Block Groups Within or Adjacent to Project Corridor				
City of Richmond, VA	**59.2%**	**25.3%**	0.67	AA	**City of Richmond, VA**	**70.1%**	**25.3%**	0.7
Chesterfield County, VA	31.7%	5.9%	0.36	AA - CC	Chesterfield County, VA	39.3%	5.9%	0.4
				CC	**Ettrick, VA**	**75.8%**	7.5%	3.3
City of Colonial Heights, VA	17.7%	7.5%	1.2	CC	City of Colonial Heights, VA	23.3%	7.5%	1.2
City of Petersburg, VA	**83.9%**	20.2%	1.7	CC - DD	**City of Petersburg, VA**	**85.1%**	20.2%	1.7
Dinwiddie County, VA	36.1%	11.8%	1.3	DD - C	Dinwiddie County, VA	36.6%	11.8%	1.3
				C	McKenney, VA	36.5%	14.5%	5.4
Brunswick County, VA	**59.6%**	21.0%	3.1	D - G	**Brunswick County, VA**	**63.8%**	21.0%	3.1
				E	**Alberta, VA**	**62.7%**	**35.5%**	13.1
Mecklenburg County, VA	40.0%	18.8%	1.6	H - L	Mecklenburg County, VA	29.5%	18.8%	1.6
				I	**La Crosse, VA**	43.9%	**27.0%**	8.7
North Carolina	31.5%	15.5%	0.1	Census Block Groups Within or Adjacent to Project Corridor				
Warren County, NC	**60.6%**	**27.0%**	2.6	L - N	**Warren County, NC**	**64.9%**	**27.0%**	2.6
				M	**Norlina, NC**	**55.9%**	**34.0%**	7.9
Vance County, NC	**61.8%**	**27.5%**	1.7	O - Q	**Vance County, NC**	**57.2%**	**27.5%**	1.7
				O	**Middleburg, NC**	**61.7%**	8.4%	6.4
				P	**Henderson, NC**	**71.6%**	12.7%	0.9

Table 4-38
Environmental Justice: Minority and Low-Income Data*

State and Locality				Study Area and Community				
Locality	% Minority	Persons Whose Income is Below Poverty Level (2010)		Section	Study Area / Community	% Minority	Persons Whose Income is Below Poverty Level (2010)	
		%	Standard Error (SE)				%	Standard Error (SE)
				Q	**Kittrell, NC**	42.1%	**78.6%**	7.9
Franklin County, NC	30.8%	15.0%	1.2	R	Franklin County, NC	35.4%	15.0%	1.2
				S	**Franklinton, NC**	**44.3%**	**28.0%**	6.4
				S - T	Youngsville, NC	22.8%	5.2%	2.6
Wake County, NC	36.7%	9.7%	0.2	T - V	Wake County, NC	15.0%	9.7%	0.2
				U	Wake Forest, NC	23.9%	7.5%	1.3
				U - V	City of Raleigh, NC	45.7%	14.6%	0.5

Source: State and county data from 2010 Census, QTP4 for Minority and DP03 (All Persons) for Poverty. Community data at the Census block group and tract level from 2010 American Community Survey S1701 by Place.

Note: Bolded text indicates an EJ community.

Table 4-39
Environmental Justice Communities within Study Area Block Groups

State	Section	Study Area / Community	Minority	Key Minority Demographic	Low-Income
Virginia	AA	City of Richmond, VA	✓	Black	✓
	CC	Ettrick, VA	✓	Black	-
	CC, DD	City of Petersburg, VA	✓	Black	-
	D, E, F, G	Brunswick County, VA	✓	Black	-
	E	Alberta, VA	✓	Black	✓
	I	La Crosse, VA	-	-	✓
North Carolina	L, M, N	Warren County, NC	✓	Black	✓
	M	Norlina, NC	✓	Black	✓
	O, P, Q	Vance County, NC	✓	Black	✓
	O	Middleburg, NC	✓	Black	-
	P	Henderson, NC	✓	Black	-
	Q	Kittrell, NC	-	-	✓
	S	Franklinton, NC	✓	Black	✓

Source: State and county data from 2010 Census, QTP4 for Minority and DP03 (All Persons) for Poverty. Community data at the Census block group and tract level from 2010 American Community Survey S1701 by Place.

Table 4-40
Project Area of Preferred Alternative within Environmental Justice Communities

Section	Area	Minority	Low-Income	Rail Mainline Track	Roadwork	Combined Rail/Road
				Miles	Miles	Miles
AA	**City of Richmond, VA**	✓	✓	**11.31**	**4.88**	**16.19**
BB	Chesterfield County VA	□	□	6.91	3.18	10.09
CC	**Ettrick, Petersburg VA**	✓	□	**8.91**	**3.25**	**12.16**
DD	**Petersburg VA**	✓	□	**5.66**	**1.80**	**7.46**
A	Dinwiddie County VA	□	□	4.95	1.97	**6.92**
B	Dinwiddie County VA	□	□	5.71	1.44	7.15
C	Dinwiddie County VA	□	□	10.74	3.99	14.73
D	**Brunswick County VA**	✓	□	**6.17**	**1.96**	**8.13**
E	**Brunswick County, Alberta VA**	✓	✓	**4.21**	**1.66**	**5.87**
F	**Brunswick County VA**	✓	✓	**4.28**	**1.55**	**5.83**
G	**Brunswick County VA**	✓	✓	**3.55**	**0.58**	**4.13**
H	Mecklenburg County VA	□	□	5.53	4.60	10.13
I	**La Crosse VA**	□	✓	3.78	**3.77**	7.55
J	Mecklenburg County VA	□	□	4.10	2.67	6.77
K	Mecklenburg County VA	□	□	4.96	0.13	5.09
L	**Warren County, NC**	✓	✓	**5.69**	**4.84**	**10.53**
M	**Warren County, Norlina, NC**	✓	✓	**6.14**	**5.37**	**11.51**
N	**Warren County, NC**	✓	✓	**3.71**	**2.61**	**6.32**
O	**Vance County, Middleburg, NC**	✓	✓	**4.70**	**3.94**	**8.64**
P	**Vance County, Henderson, NC**	✓	□	**7.99**	**8.50**	**16.49**
Q	**Vance County, Kittrell, NC**	□	✓	**7.70**	**3.32**	**11.02**
R	Franklin County, NC	□	□	3.21	**0.23**	3.44
S	**Franklinton, NC**	✓	✓	**6.88**	**2.80**	**9.68**
T	Franklin County, NC	□	□	2.83	0.55	3.38
U	Wake County, NC	□	□	8.88	3.67	12.55
V	Wake County, NC	□	□	9.88	2.79	12.67
	Project Totals	-	-	158.38	76.05	234.43
	Project Totals - EJ Communities Only	-	-	86.90	47.06	133.96
	% Impacts to EJ Communities Only	-	-	55%	62%	57%

Note: Bolded text indicates an EJ community.
58% = Threshold value used to determine if impacts are disproportionate within Section having EJ communities

Table 4-41
Community Impacts of Preferred Alternative within Environmental Justice Communities

Section	Area	Residential Relocations	Housing of Last Resort	Business Relocations	Public Schools Impacted	Hazmat Sites
		#	Yes or No	#	#	#
AA	**City of Richmond, VA**	**40**	**No**	**7**	**0**	**59**
BB	Chesterfield County, VA	7	No	1	0	10
CC	**Ettrick, Petersburg, VA**	**48**	**No**	**1**	**0**	**20**
DD	**Petersburg, VA**	**2**	**No**	**0**	**0**	**1**
A	Dinwiddie County, VA	0	No	0	0	1
B	Dinwiddie County, VA	3	No	1	0	3
C	Dinwiddie County, VA	4	No	8	0	3
D	**Brunswick County, VA**	**3**	**No**	**2**	**0**	**1**
E	**Brunswick County, Alberta, VA**	**2**	**No**	**7**	**0**	**0**
F	**Brunswick County, VA**	**0**	**No**	**0**	**0**	**0**
G	**Brunswick County, VA**	**2**	**No**	**0**	**0**	**0**
H	Brunswick County, VA	1	No	0	0	0
I	**La Crosse, VA**	**14**	**No**	**0**	**0**	**2**
J	Mecklenburg County, VA	5	No	0	0	1
K	Mecklenburg County, VA	0	No	5	0	0
L	**Warren County, NC**	**8**	**Yes**	**1**	**0**	**1**
M	**Warren County, Norlina, NC**	**18**	**Yes**	**4**	**0**	**0**
N	**Warren County, NC**	**2**	**Yes**	**0**	**0**	**1**
O	**Vance County, Middleburg, NC**	**3**	**No**	**0**	**0**	**1**
P	**Vance County, Henderson, NC**	**33**	**No**	**8**	**0**	**31**
Q	**Vance County, Kittrell, NC**	**10**	**Yes**	**0**	**0**	**4**
R	Franklin County, NC	1	No	0	0	0
S	**Franklinton, NC**	**4**	**No**	**0**	**0**	**7**
T	Franklin County, NC	5	No	0	0	4
U	Wake County, NC	8	No	12	0	20
V	Wake County, NC	0	No	59	0	79
	Project Totals	223	None	116	0	249
	Project Totals - EJ Communities Only	189	Yes	30	0	128
	% Impacts to EJ Communities Only	85%	Yes	26%	0%	51%

Note: Bolded text indicates an EJ community.

= Disproportionately High Impacts Relative to % Miles within Section having EJ communities

58% = Threshold value used to determine if impacts are disproportionate within Section having EJ communities

4.11.5.2.2 TRAFFIC CHANGES & PUBLIC ROAD AND PRIVATE DRIVE CLOSURES

Communities along the corridor have consistently provided supportive comments regarding the development of HSR. This community support is in light of the road closures and reroutes to accommodate rail crossing safety improvements. Road consolidations and grade separated (i.e., bridge and underpass) crossings are generally at a maximum distance of one mile apart, avoiding

lengthy or circuitous rerouting. In addition, the elimination of at-grade crossings will reduce train horn noise in communities through which the trains pass, including EJ communities. The temporary inconvenience of and disruption caused by construction activities will be shared by all, not just minority and/or low-income populations.

As shown in Table 4-30 above, EJ communities will be subject to a disproportionately high number of at-grade road and rail crossing closures. However, these closures are not considered significant given the maximum reroute distance of one mile. In addition, closures and reroutes were discussed with community representatives to develop the most beneficial and least impactful design (see Chapter 7 for details on community involvement).

As stated in Section 4.11.2.1.5, Traffic Changes & Public Road and Private Drive Closures, travelers in areas with active rail lines are accustomed to waiting at at-grade crossings for stopped or passing trains. While construction activities and the consolidated or realigned closings may be an initial inconvenience for these travelers, the short-term inconvenience will be offset by having a grade-separated rail crossing that allows for continuous, unimpeded access to and from both sides of the rail line. Owners of parcels with current, legal access to existing roads will have access to their parcels maintained (or will be compensated if it is not possible to maintain the access); driveway access to these parcels will be determined during final design when detailed survey level data is available.

While EJ communities will experience a disproportionately higher level of temporary community disruption from Project improvement activities, these EJ communities will also be the recipients of the permanent benefits associated with the improvements. The adverse effects associated with road and rail improvements are not anticipated to be appreciably more severe or greater in magnitude than those suffered by non-EJ communities.

4.11.5.2.3 RESIDENTIAL DISPLACEMENTS

Table 4-37 above, presents a summary of residential impacts relative to EJ communities. The greatest number of residential displacements in EJ communities will occur in Richmond, VA, Ettrick, VA, and Henderson, NC. These displacements will result from converting existing, at-grade crossings to grade-separated crossings, rerouting existing roads, and providing new access roads. Residences located along the existing rail corridor in a developed, urban area are difficult to avoid due to rail engineering standards and constraints that limit flexibility in the proposed designs. Last resort housing, as discussed in Section 4.11.6, will likely be necessary in Sections L (NC-portion), M, N, and Q in Warren and Vance Counties, NC, including Norlina, NC, and Kittrell, NC. The number of residential relocations within EJ communities is disproportionately high and adverse relative to non-EJ communities, as is the need for housing of last resort.

Where displacements are unavoidable, fair and equitable compensatory mitigation will be implemented in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646). As is the case with any relocation, the Uniform Relocation Act ensures that persons displaced as a result of a Federal action or by an undertaking involving Federal funds are treated fairly, consistently, and equitably. This helps to ensure persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. Persons who will be displaced will personally work with a Relocation Agent from either North Carolina or Virginia, as appropriate. Section 4.11.6 provides additional details on the relocation process.

While residential displacements are disproportionately high and adverse, the surrounding EJ communities would be served by and will directly benefit from the safety improvements afforded by the proposed improvements. A description of the residential displacements within EJ communities is provided in the text that follows.

Richmond, VA: As currently designed, three single-family residences, half of one multi-family residence, and one business would be displaced due to the construction of grade separations of the rail line at Ruffin Road and Bells Road. Given that these two roads serve as the primary points of access for residential, commercial, and industrial development in the area, and that the areas are fully built out, avoidance of these relocations is not practicable. In addition, given the high traffic volumes along these two roads, simply closing these at-grade crossings would not be a prudent option. Along Ruffin Road, one of the residential units at the Lafayette Gardens apartment community and several adjacent homes may be displaced as a result of ROW acquisition for the railroad bridge construction at this intersection. The footprint of the overpass was minimized to avoid the building that formerly housed the Shekinah Temple Church of Our Lord Jesus Christ on the eastern side of the railroad tracks. Project designs also include a Bells Road bridge over the existing rail line, andROW acquisition on the southern side of Bells Road, to the west of the rail line, may result in the displacement of up to three single-family residences. The Preferred Alternative maximizes the use of existing rail ROW in this area, minimizing displacements of any kind. Because these homes are located adjacent to the existing rail corridor, and because of design requirements, avoidance of all properties was not possible.

Ettrick, VA: Several single-family residences would be displaced for the bridging of Branders Bridge Road and Dupuy Road over the existing rail line. Both new road alignments would be located on the northern side of the roads to minimize property impacts and residential displacements. Given the high traffic volumes along these two roads, simply closing these at-grade crossings would not be a prudent option. Residential properties remaining on the south side of the original Dupuy Road (south of the proposed, relocated Dupuy Road) will face the new fill necessary to elevate relocated Dupuy Road over the railroad tracks. Landscaping of this fill will be evaluated during final design as mitigation for these remaining residents. God Mission of Faith Church on East River Road would be displaced by the Preferred Alternative railroad ROW requirements. Assistance with relocation will be provided as needed as part of Virginia right of way acquisition procedures. Public meetings were held in 2010 and 2013 to discuss these issues with local residents and develop acceptable solutions (see Section 4.11.1.10 and Chapter 7). Based on these meetings, residents and local officials attending the meetings appeared to understand the issues and the proposed design solutions.

Petersburg, VA: To accommodate construction of the new track east of the existing railroad, a new rail bridge would be constructed adjacent to the existing Dupuy Road/Farmer Street underpass, which would be retained. The Preferred Alternative does not impact the nearby Shining Light Pentecostal Church located on Dupuy Road. A new pedestrian-only bridge will be provided over Lincoln Street to maintain neighborhood access. Both of these improvements require the displacement of several single-family residences. Public meetings were held in 2010 and 2013 to discuss access issues with local residents and develop acceptable solutions (see Section 4.11.1.10 and Chapter 7). Road closures and consolidations would have a minimally disruptive effect in this area.

Brunswick County, VA: Rail along the CSX S-Line has not been active in Brunswick County, VA, since the 1980s. To accommodate rail and eliminate at-grade crossings, a small number of residential relocations will be necessary. Rawlings Road will be relocated to provide a grade-separated crossing. This new crossing was shifted to the west to avoid the displacement of several resources, including a residential displacement, Blick's Store and Wynnhurst (eligible for the National Register of Historic Places), and Lovely Zion Baptist Church. A new overpass will be constructed at Flat Rock Road, avoiding residential displacements and avoiding displacement of the Warfield Baptist Church. Rail will be on new alignment to the north of Alberta, VA, requiring an overpass of the new tracks at Chestnut Road. The design minimizes residential displacements along Chestnut Road.

Alberta, VA: Alberta, VA, is an old railroad village and the community's structure and identity historically relate directly to the existence of the former rail line. There has not been active rail in the town since the 1980s and the new, active rail will bisect the community, causing changes in travel patterns throughout the town. This effect will likely occur despite the three, relatively close new road overpasses for Main Street, 2nd Avenue, and Church Street. In addition, a new overpass for pedestrians, bicyclists, and horses will be provided where the Tobacco Heritage Trail crosses the railroad tracks, one block north of 2nd Avenue. Littlemont Road will be rerouted with the realigned Church Street and will include a new rail overpass for Church Street. While the alignment of the new Church Street goes through several residential parcels south of the railroad tracks, these parcels and the adjacent subdivision are vacant. The Preferred Alternative avoids the United Methodist Church and minimizes residential displacements, but several commercial displacements will be necessary. Meetings with residents and local officials have been ongoing to develop acceptable design plans (see Section 4.11.1.10 and Chapter 7).

La Crosse, VA: As with Brunswick County, VA, and the Town of Alberta, VA, there has not been active rail in La Crosse, VA, since the 1980s. Accommodating new, active rail and eliminating at-grade crossings will require multiple residential displacements. North of town, the relocation of Country Club Road and the shift of the existing rail corridor to the northwest will result in several displacements of residents at the Hillcrest Mobile Home Park. Based on discussions with the park administrator in May and August 2013, it is anticipated that the displaced properties can relocate to currently vacant lots within the park.

In addition to the residential displacements, water to residents of this mobile home park is provided via private wells. The relocated rail would require capping at least one well that serves remaining residents at the mobile home park. Communication with the Virginia Department of Health indicated that the Hillcrest Mobile Home Park was an inactive waterworks system as of June 2010. They stated that "[a] modification to their distribution system changed their status at that time and they are no longer required to follow Virginia Waterworks Regulations. It is unclear whether the Park has drilled additional wells, or if they are now connected to town water." Further coordination by the Project Team with the park administrator determined that the Park had, in fact, drilled an additional well. Due to the potential impacts to one of the Park's drinking water wells, the Project Team requested that the Mecklenburg County, VA, Health Department conduct a site visit of the Hillcrest Mobile Home Park property to assess the adequacy of the overall site to accommodate the relocation of the drinking water well. The Health Department determined there is sufficient land available within the Hillcrest 50-acre parcel to accommodate the relocation of the drinking water well. During final design, a suitable new water source will be identified to ensure a continuous, safe, and sanitary water source for these residents.

Immediately south of Hillcrest Mobile Home Park, there will be a new, grade-separated, rail over road access point connecting Country Club Road and Northington Road. An additional residential displacement is likely at this location.

The existing pedestrian rail crossing for the Tobacco Heritage Trail will be relocated to a new bicycle/pedestrian-only underpass connecting the trail to Main Street, just north of its current intersection with High Street. No displacements are associated with this feature. The rerouting of traffic, along with construction of a traffic circle for the intersection of Meredith Street and St. Tammany Road, may be confusing and disruptive at first. Changing traffic patterns may add traffic volumes to local streets due to reroutes. South of downtown La Crosse, VA, the existing Morris Town Circle at-grade crossing of the rail corridor will be closed. This closure may require an additional mile of travel for those wanting to get to the La Crosse Cemetery, Mecklenburg United Methodist Church, and Morning Star Apostolic Church, depending on which side of the railroad tracks they live.

The La Crosse, VA, Town Council requested consideration of an additional pedestrian crossing of the railroad tracks near the historic La Crosse Hotel. Following detailed discussions with the Mayor and local residents about the constraints to such a crossing, including the presence of historic resources (i.e., the La Crosse, VA, Commercial Historic District and the La Crosse Hotel), the community was satisfied that it was not prudent.

Residents remaining at the Hillcrest Mobile Home Park, as well as those within La Crosse, VA, will be subjected to the new sights, sounds, and vibrations of the new rail and the rerouted roads. Mitigation of noise and vibration impacts are addressed in detail in Section 4.11.1.8 and Section 4.7.

The community has been very involved in the development of and in support of the Project. Based on input received from residents and local officials via multiple meetings, the possibility of having a HSR station in their community is seen as a positive development and offers the community the possibility of multimodal transportation alternatives. The return of rail is seen as an opportunity for future tourism growth, particularly when coupled with the existing Tobacco Heritage Trail.

Warren County, NC, and Norlina, NC: From the Mecklenburg County, VA, line southward to the northern half of Norlina, NC, there is no active rail service. From the southern half of Norlina, NC, southward, freight rail is active along the CSX S-Line. North of Norlina, NC, Wise Five Forks/Carrie Dunn Road will be realigned to provide a new grade-separated crossing; this improvement may require a small amount of ROW from the front of the Wise Baptist Church property. There will be multiple displacements in Norlina, NC, as a result of roadway realignments, closures, and grade-separated crossings. Several mobile homes at Town and Country Mobile Home Park, between Kearney and Washington Streets, will be displaced due to the westward shift of Warren Plains Road adjacent to the rail line. The displacement of these mobile homes eliminates the need for circuitous routing of the entire mobile home park. New access will also be provided to the mobile home park from the north, through a new connection of Town and Country Road to Washington Street. It appears there is land available at the mobile home park to accommodate the relocation of these displaced mobile homes. Residential displacements are likely at the Main Street and US-158/401 intersection improvements associated with the replacement of the existing grade-separated crossing of US-158/401 and connection to US-1.

Just south of Norlina, NC, Ridgeway Drewry Road will be relocated to provide a new, grade-separated crossing of the railroad tracks. This change to the design presented in the Tier II DEIS was undertaken in response to comments on the Tier II DEIS and developed in coordination with Warren County, NC, and Kerr-Tar Cog (the Rural Planning Organization) to serve the needs of the local community and the County as a whole. The proposed grade separation will connect to a new frontage road connecting Ridgeway Warrenton Road with Axtell Ridgway Road. ROW acquisition for the new frontage road will displace one or two homes. However, final design will include efforts to minimize residential relocations in this area where possible.

Soul City Boulevard, located south of Ridgeway Drewry Road is also proposed to be grade separated.The designs have not changed from what was presented in the Tier II DEIS, and no residential relocations are anticipated. The designs shown in the Tier II DEIS for a bridge over the railroad at Kimball Road, the southernmost crossing in Warren County, NC, have been revised. The new designs minimize impacts and also allow traffic to be maintained during construction; no relocations are anticipated as part of the new designs.

Vance County, NC, and Middleburg, NC: Freight rail is active in Vance County, NC. Northeast of Middleburg, NC, residential relocations at a mobile home park may occur as a result of new railroad ROW. To the south of Middleburg, NC, the new rail alignment, the new, grade-

separated crossing for Brookston Road, and a new access road will require at least one residential displacement. ROW will be required along the front of the Young Memorial Church property, and from the rear of the Brookston Baptist Church and Cemetery. Final design will include efforts to minimize impacts, and will include coordination on possible mitigation for potential impacts to the cemetery. To the north of Henderson, NC, the relocation of Greystone Road, the new overpass of the railroad tracks, and the new intersection with Vulcan Lane are not anticipated to require residential displacements. However, the realignment of Vulcan Lane may displace one or two homes.

Henderson, NC: Henderson, NC, is one of the cities that the states of Virginia and North Carolina have recommended to have a HSR stop, the development of which will be evaluated in future environmental documentation. The economic and travel access benefits of a new station will be equally available to all residents and businesses within Henderson, NC. Disruption in travel patterns, the addition of HSR service through town, and the operation of a new rail station in town will likely affect all residents. Several meetings were held with Henderson, NC, officials and residents to develop a design that addresses existing traffic congestion problems and accommodates rerouted traffic from Project-related at-grade road closures. The end result of these discussions is that the Preferred Alternative is supported by both local officials and residents. The Henderson, NC, City Council passed Resolution 12-42 and Resolution 11-84 in support of a HSR Passenger Station in downtown Henderson, NC. The resolutions also state acceptance of both the adverse and beneficial impacts associated with construction of the necessary rail and road improvements of the Preferred Alternative (Appendix A).

There will be multiple displacements in Henderson, NC, as a result of roadway realignments, closures, and grade-separated crossings. Existing development, planned future development, and multiple historic resources were constraints to providing more grade-separated crossings than are proposed; thereby limiting the number of likely displacements.

At the north end of Henderson, there are several residences along Railroad Street that may potentially be impacted by the project in terms of property access. Railroad Street is a gravel road that runs parallel to the railroad, to the east (map 114, Appendix R). As it is shown on CSX mapping, the road is located within the existing railroad ROW. However, NCDOT identifies Railroad Street as SR 1251 within the state road system. In this location, the Project proposes to improve the single-track rail in its existing location (i.e., all within the existing rail ROW, with no construction impacts to the road or the residences that are accessed by the road). As no additional ROW is required by the Project, these residences were not identified as relocations. However, there is the possibility that the road bed is owned by CSX. If that is the case, at any time, the railroad could enforce its ROW and preclude access to the residences. If the Project results in future railroad ROW enforcement that would preclude access to the residences, there would be additional displacements associated with the Project. During final design and ROW acquisition, as survey data become available, NCDOT will coordinate with the neighborhood property owners and occupants, to ensure they are informed of any issues that may arise related to ROW and access.

Several residential displacements are likely at the proposed roundabout for N. Garnett Street, Main Street, N. Chestnut Street, and N. Beckford Drive. N. Main Street will be shifted slightly southward and a new, grade-separated crossing will be provided, connecting it to the new roundabout. ROW will be required from the front of the North Henderson Baptist Church property, and from the rear of St. John's Episcopal Church parking lot. In addition, improvements to Chestnut Street further south, may require a small amount of ROW from the front of the Cotton Memorial Presbyterian Church Property. A new pedestrian-only underpass will be constructed that connects N. Burwell Avenue/S. Garnett Street to Peachtree Street. No displacements are anticipated with this improvement.

The new, grade-separated crossing of Alexander Street will provide a new intersection with Raleigh Road and a new connection to Dabney Drive. While this improvement will result in several industrial property impacts, the industrial buildings impacted are currently vacant and in poor repair. Additionally, the proposed designs were developed at the request of the owner of a historic resource protected by Section 106 of the NHPA. Half of this roadway improvement is located within the South Henderson, NC, Industrial Historic District and includes Vance Flour Mill (Sanford Milling Company), which is still in operation. The current design configuration for this grade-separated crossing allows for Nicholas Street to remain open. Any other design configuration that avoided this historic district would have required the closure of Nicholas Street. Based on input from the owner of Vance Flour Mill, the closure of Nicholas Street will result in limited truck access to this mill and ultimately put the mill out of business. Upon hearing this, community representatives agreed that impacts associated with the proposed design were preferable to the closing of the mill. In addition, traffic flow on Nicholas Street will be improved and a new connection to J.P. Taylor Road will be provided. Several residential relocations may result from the improvements to Nicholas Street. In addition, a large, vacant industrial complex will be displaced as a result of the relocated connection between Nicholas Street and J.P. Taylor Road. This relocation accommodates a new, grade-separated crossing of J.P. Taylor Road to a new connection to Belmont Drive, which may require a small amount of ROW from the front of the Victory Baptist Church property. Local officials and residents requested that the vacant industrial complex be taken because it will provide access to this site planned for future commercial redevelopment.

Kittrell, NC: North of Kittrell, NC, Raleigh Road and the railroad tracks will be shifted slightly to the west to improve the curve radius of both. In so doing, several residential displacements will occur in a mobile home park adjacent to Vansandt Lane. The displacements are unavoidable, but it appears there may be suitable replacement land available within the mobile home park.

Several meetings were held with local officials and residents of Kittrell, NC, to determine acceptable road closures and grade-separated closures of the Preferred Alternative. Residential displacements have been minimized as a result of this coordination.

Franklinton, NC: Several meetings were held with local officials and residents of Franklinton, NC, to determine acceptable road closures and grade-separated closures of the Preferred Alternative. Residential displacements have been minimized as a result of this coordination. The replacement of the existing underpass at Green Street/NC 56, the new grade-separated crossing for Cedar Creek Road, and the new grade-separated crossing for a new road just north of the existing Pearce Street at-grade crossing, as well as the pedestrian-only, grade-separated crossings for College Street and E. Hawkins Street, will not require residential displacements.

4.11.5.2.4 NEIGHBORHOOD DISRUPTIONS

Whether the existing rail corridor is active or inactive, rail crossing consolidations and associated improvements to adjacent roadways could have an impact on community cohesion within neighborhoods and communities. The railroad corridor predates existing development and the railroad already acts as a boundary for many neighborhoods and businesses along the corridor, including EJ communities. Where rail service is active in this existing rail corridor, such adverse impacts are expected to be minor.

As stated in Section 4.11.2.1.2, Neighborhood Disruptions, neighborhood disruptions and relocations have been minimized to the greatest extent practicable because the Project maximizes the use of existing rail corridors. Along active rail lines, overall impacts to EJ neighborhoods and communities from the operation of SEHSR trains are expected to be minor because residents are used to the sights and sounds of trains through their communities.The introduction of high speed passenger rail would not substantially alter their current quality of life.

From the Burgess Connector in Dinwiddie County, VA, southward to Norlina in Warren County, NC, the rail corridor is inactive and, in some instances, the tracks have been removed and small portions of ROW sold for driveway access. EJ communities without active rail lines include the Virginia areas of Brunswick County, VA, Alberta, VA, and La Crosse, VA, and the North Carolina areas of Warren County, NC, and the northern half of Norlina, NC. In these communities and other areas adjacent to the inactive rail line, residents may view the reactivation of rail service as a negative impact on their quality of life. The sights and sounds of the rail would require a degree of adjustment for the families and businesses adjacent to it. However, given the number of trips planned (eight high speed trains and up to eight additional intermodal trains and two to four additional freight trains), and the speed at which the passenger trains will be traveling, exposure to rail activity will be of a limited duration and frequency for those EJ communities without a rail stop. In La Crosse, VA, and Henderson, NC, the duration of exposure to the HSR will be greater given that two stops daily are planned for each town.

Residents and businesses within EJ communities not currently living with an active rail line could also experience a sense of their community being split by the newly active rail line. What has in recent years been a situation of unencumbered access to and from either side of the tracks will now only be possible at designated bridges and underpasses. Given that the vast majority of consolidated crossings were designed to be no more than one mile apart, the change in community travel patterns will not be substantially altered. While EJ communities without existing rail will experience community disruption to some degree, the experience will not be disproportionately high and adverse relative to the experiences of non-EJ communities.

Communities and neighborhoods along the Study Area are concerned about the impacts of the proposed at-grade crossing changes, access consolidations, and road closures. Throughout the design process, the Project Team held meetings with local government representatives along the corridor to obtain input on local conditions that would affect design considerations. This information was used to refine proposed designs to better suit the needs of the local communities, including provision of pedestrian crossings in areas of high pedestrian activity. The decision to consolidate a crossing in a community considered accessibility and connectivity to the larger transportation network. Local and regional land use and transportation plans were taken into account and natural resource constraints, such as wetlands and cultural resources, were also considered.

Because of extensive outreach efforts with localities and communities within the Study Area, there is a high degree of public awareness of the proposed Project. As with any project where there are multiple opinions and stakeholders, support for one particular improvement over another is not always unanimous; however, localities and communities have continued to support the overall concept of HSR in their respective areas.

4.11.5.2.5 PUBLIC SERVICES AND FACILITIES

Overall, access to public services and facilities will not be substantially reduced. Because road consolidations and at-grade crossings are generally at a maximum distance of one mile apart, lengthy or circuitous rerouting is avoided. The temporary inconvenience of and disruption caused by construction activities will be shared by EJ communities and non-EJ communities. EJ communities share equally in the safety benefits afforded by the road closings, consolidations, and grade-separated crossings.

Stations: Two of the three existing rail stations are located within EJ communities: Richmond, VA, and Ettrick/Petersburg, VA. The new railroad stations proposed for La Crosse, VA, and Henderson, NC, would be located within EJ communities. The two new stations and improvements to the existing stations would bring with them local opportunities for economic development, employment, and more convenient access to rail services to these EJ communities.

Therefore, EJ communities currently and in the future will receive a disproportionately high level of benefits from rail stations located within their boundaries relative to non-EJ communities.

Schools and Places of Worship: As stated in Section 4.11, Community Resources, there will be an overall net benefit to schools from roadway safety improvements provided by grade-separated rail crossings (bridges and underpasses), the elimination of at-grade rail crossings, and the addition of pedestrian-only crossings. Inconveniences associated with construction activities will be temporary. The negative impacts of potentially longer driving distances to cross the rail line will be minimal and offset by the benefits gained in safety and unimpeded access. There will be no disproportionately high and adverse impacts to schools within EJ communities.

Section 4.11.3.2, Places of Worship and Cemeteries, states there are 98 places of worship and cemeteries within the Study Area. As with schools, there will be a net benefit to all places of worship from roadway safety improvements provided by grade-separated rail crossings, the elimination of at-grade rail crossings, and the addition of pedestrian-only crossings. The negative impacts of potentially longer driving distances to cross the rail line will be minimal (less than one mile) for most places of worship, and offset by the benefits gained in safety and unimpeded access. This will be the case for both EJ and non-EJ communities. Of the impacts to places of worship, there are 17 churches where the Preferred Alternative will or may require ROW, and where driveway access may be changed as part of the final design process. Of these, the Preferred Alternative will result in the relocation of two churches: God Mission of Faith Church in Ettrick, VA (an EJ community); and EMI New Covenant Global Ministries in Raleigh, NC. Based on these impacts, there would be no disproportionately high and adverse impacts to places of worship or cemeteries within EJ communities.

Police, Fire, and Emergency Response: Impacts to these facilities and services are addressed in detail in Section 4.11.3.3. Seven facilities were identified as being close to the corridor and will experience changes in access across the railroad. Of those seven, five are within or serve EJ communities. While impacts to these EJ facilities appear disproportionately high, mitigation measures have been incorporated for each facility, where warranted, to minimize adverse impacts such that they will not be severe. Impacts and details of minimization and mitigation measures are addressed in Section 4.11.3.3, but are summarized here.

- Alberta, VA, Volunteer Fire Department:
  There is almost no difference between the overall EMS service area for the Alberta, VA, Volunteer Fire Department under the Preferred Alternative compared to a No Build scenario.
- Ridgeway Volunteer Fire Department (Warren County, NC):
  In response to comments on the Tier II DEIS, revisions were made to road work designs in the Ridgeway area for the Preferred Alternative. The new road work was developed in coordination with Warren County, NC, Kerr-Tar Council of Governments (the Rural Planning Organization) and the NCDOT Transportation Planning Branch to serve the needs of the local community and Warren County, NC, as a whole.
- Vance County, NC, Ambulance and Fire Service (Henderson, NC):
  This facility provides fire response for Vance County, NC. The overall service area of the Preferred Alternative is largely the same compared to a No Build scenario. Although revisions to road work have been made in Henderson, NC, for the Preferred Alternative (as described in Section 2.2), the revisions do not affect which crossings are to be consolidated and will not substantially alter the response time service area of the Preferred Alternative.
- City of Henderson, NC, Fire Station 1 and City of Henderson, NC, Fire Station 2:
  The existing Charles Street underpass north of Chavasse Avenue, and the new Alexander Avenue bridge adequately compensate for the nearby crossing consolidations with regard to response time. There is very little change in the five-minute response area of the Preferred Alternative compared to a No Build scenario.

- Franklinton, NC, Fire Department:
  There is very little difference between the EMS service area for the Franklinton, NC, Fire Department under a No Build scenario or the Preferred Alternative. Although revisions to road work have been made in Franklinton, NC, for the Preferred Alternative, the revisions do not affect which crossings are to be consolidated and will not substantially alter the response time service area of the Preferred Alternative.

Once construction is complete, Project improvements are anticipated to have a net positive effect on access and response times for emergency vehicles serving all communities, including EJ communities. By eliminating at-grade crossings and by providing grade separations, the existing rail barriers will be eliminated for improved emergency vehicle access and response times. In areas with existing rail service, response time for emergency vehicles is expected to improve from decreased train delay times and improved roadway access as a result of improved roadway system linkage. Police, fire, and emergency response times may be temporarily affected during construction. Coordination with public response agencies serving the Study Area will continue during construction to avoid and minimize disruptions to emergency response.

4.11.5.2.6 ECONOMIC IMPACTS FROM CONSTRUCTION AND OPERATION

As stated in Section 4.11.1.1, Economic Impacts from Construction and Operation, construction would create new jobs for individuals to upgrade the railroad road bed, install signal and safety devices, build frontage/service roads, improve grade separated crossings, and build bridges to replace grade crossings. Additional jobs, possibly within the Study Area, could be created within the manufacturing sector to produce the equipment and materials needed to make these improvements. The additional jobs would increase income, thus affecting the economy of the region. These benefits are likely to be spread along the corridor, benefiting both EJ and non-EJ communities.

During construction, the economic impact would depend on the location of the firms supplying the labor and materials needed for the Project. It is estimated that a high percentage of the new employment during the construction phase would come from within the Study Area. Communities along the route, including EJ communities, will benefit as construction crews spend money in local hotels, restaurants, and shops.

The impact from operation expenditures would likely be more concentrated; the majority of new jobs would likely be created in communities served by the proposed service. Ticket agents and other railroad personnel would be located in these communities and the secondary impacts of their employment would be spread throughout the areas in which the stations are located, four out of five of which are EJ communities.

Freight-rail commerce would benefit by improving speed of service, enhancing safety of rail crossings, expanding rail connectivity, and relieving truck congestion on interstates. These improvements may provide opportunities for existing users to expand or new users to locate in communities with new or improved freight services, possibly equating to more jobs within these communities.

The specific economic impacts to the communities receiving HSR stops (Richmond, VA, Petersburg, VA, La Crosse, VA, Henderson, NC, and Raleigh, NC) are outside the scope of this document, but are anticipated to be positive. Therefore, the economic impacts from Project construction and operation will not be disproportionately high nor will they be adverse to EJ communities within the Study Area.

4.11.5.2.7 HAZARDOUS MATERIALS

As presented in Table 4-41, hazardous materials are present within the Study Area of the EJ communities. It is not expected that any of these sites would preclude the construction of the Project. The presence of these materials and the potential to impact them is not considered disproportionately high and adverse. If any potential hazardous waste sites cannot be avoided as the Preferred Alternative is designed and avoidance and minimization steps are undertaken, further assessments of the properties will be conducted.

4.11.5.2.8 AIR QUALITY

The results of the air quality analysis presented in Section 4.6 show that projected impacts from locomotive and automobile emissions will be below regulated thresholds for all monitored pollutants throughout the Study Area. Air quality improvements are anticipated as a result of the Project. In addition, while the consolidation of rail crossings throughout the Project corridor will necessitate that some automobiles travel an additional distance to reach a grade-separated crossing, the anticipated CO emissions associated with the additional distance are likely to be offset by the removal of the vehicle idling that currently occurs while trains pass at-grade crossings. Therefore, EJ communities will share in the benefits of air quality improvements and are not anticipated to experience disproportionately high and adverse air quality effects from the Project. No further action or mitigation is necessary relative to air quality impacts.

4.11.5.2.9 NOISE AND VIBRATION

As presented in Section 4.7, five categories of noise and vibration impacts were evaluated: Rail Operation Noise, Diverted Roadway Traffic Noise, Rail Operation Vibration, Construction Noise, and Construction Vibration. The EJ analyses of rail operation noise and rail operation vibration impacts are presented in Table 4-42 and Table 4-43, respectively.

Based on the disproportionate threshold of 58 percent, increased noise from new or additional rail operations would have a disproportionately high and adverse impact on Category 2 receptors (residences and buildings where people normally sleep) within EJ communities (Table 4-42). Forty-two of the 65 severe noise impacts would occur in EJ communities due in large part to the presence of properties adjacent to the existing railroad corridor. The towns of Alberta, VA, and La Crosse, VA, and Norlina, NC, Henderson, NC, Middleburg, NC, and Kittrell, NC, would receive the greatest number of predicted severe noise impacts. In addition, all four of the Category 3 receptors (institutional land uses with primary daytime uses) impacted are located within EJ communities (Alberta, VA, La Crosse, VA, Middleburg, NC, and Kittrell, NC). During the final design phase of the Project, NCDOT and VDOT will prepare a detailed noise assessment that identifies specific mitigation measures including the following: wheel treatments, rail treatments, vehicle treatments, building insulation, and noise barriers. NCDOT and VDOT will ensure that appropriate mitigation measures are in place where required.

With one exception, there would be no noise impacts as a result of diverted roadway traffic throughout the rail corridor. The exception to this is in the Town of Youngsville, NC, which is not an EJ community. Construction noise and vibration will be temporary and would equally affect EJ and non-EJ communities. Neither diverted roadway traffic noise, construction noise, nor construction vibration would have a disproportionately high and adverse effect on EJ communities within the Study Area. No further EJ analysis of these three areas is warranted.

With regard to rail operation vibration impacts, the vibration levels would be 5 to 10 vibration decibels (VdB) higher when there are crossovers, turnouts, jointed track, switches, or other special track work present. These conditions can cause annoying transients in the vibratory level characterized by a repetitive sounding, “thump-thump…thump-thump” that one would experience

during a train passby. Of the sensitive receptors identified along the corridor, single family, multi-family, and commercial receptors would experience disproportionately high and adverse effects within EJ communities (Table 4-43). NCDOT and VDOT will determine if vibration mitigation is required during the final design phase of the Project when more detailed data are available. The building damage criteria of 0.50 inch-per-second for rail operation vibrations would not be exceeded at any building along the corridor due to train passbys. Therefore, the Project is not expected to cause damage due to vibration to any buildings in the Study Area, regardless of EJ applicability.

Table 4-42
EJ Summary of Rail Operation Noise Impacts of Preferred Alternative

Section	EJ Community within Section	Preferred Alternative					
		Category 1*		Category 2*		Category 3*	
		Impact	Severe Impact	Impact	Severe Impact	Impact	Severe Impact
AA	**Richmond, VA**	**0**	**0**	**0**	**0**	**0**	**0**
BB	---	0	0	0	0	0	0
CC	**Ettrick, VA**	**0**	**0**	**11**	**0**	**0**	**0**
DD	**Petersburg, VA**	**0**	**0**	**0**	**0**	**0**	**0**
A	---	0	0	4	1	0	0
B	---	0	0	13	0	0	0
C	---	0	0	9	0	0	0
D	**Brunswick County, VA**	**0**	**0**	**4**	**2**	**0**	**0**
E	**Brunswick County, Alberta, VA**	**0**	**0**	**22**	**6**	**1**	**0**
F	**Brunswick County, VA**	**0**	**0**	**6**	**0**	**0**	**0**
G	**Brunswick County, VA**	**0**	**0**	**2**	**0**	**0**	**0**
H	---	0	0	18	2	0	0
I	**La Crosse, VA**	**0**	**0**	**49**	**5**	**1**	**0**
J	---	0	0	21	1	0	0
K	---	0	0	9	0	0	0
L	**Warren County, NC**	**0**	**0**	**20**	**1**	**0**	**0**
M	**Warren County, Norlina, NC**	**0**	**0**	**41**	**6**	**0**	**0**
N	**Warren County, NC**	**0**	**0**	**4**	**0**	**0**	**0**
O	**Vance County, Henderson, NC**	**0**	**0**	**10**	**5**	**0**	**0**
P	**Vance County, Middleburg, NC**	**0**	**0**	**77**	**11**	**1**	**0**
Q	**Vance County, Kittrell, NC**	**0**	**0**	**12**	**5**	**1**	**0**
R	---	0	0	1	0	0	0
S	**Franklinton, NC**	**0**	**0**	**22**	**1**	**0**	**0**
T	---	0	0	25	0	0	0
U	---	0	0	159	17	0	0
V	---	0	0	79	2	0	0
	Project Totals	0	0	618	65	4	0
	EJ Communities Only	0	0	280	42	4	0
	% EJ Communities Only	0%	0%	45%	65%	100%	0%

Note: Bolded text indicates an EJ community.

= Disproportionately high impacts relative to % miles within Section having EJ community

58% = Threshold value used to determine if impacts are disproportionate in Section having EJ community

*Where:

Category 1: Buildings where vibration would interfere with interior operations.

Category 2: Residences and buildings where people normally sleep.

Category 3: Institutional land uses with primarily daytime use.

**Where:

Impact = In this range, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost-effectiveness of mitigating noise to more acceptable levels.

Severe = Severe noise impacts are considered "significant" as this term is used in the National Environmental Policy Act (NEPA) and implementing regulations. Noise mitigation will normally be specified for severe impact areas unless there is no practical method of mitigating the noise.

Table 4-43
EJ Summary of Vibration Impacted Areas

Section	EJ Community within Section	Preferred Alternative		
		Single Family	Multi Family	Commercial
AA	**Richmond, VA**	**0**	**0**	**1**
BB	---	1	0	1
CC	**Ettrick, VA**	**7**	**7**	**1**
DD	**Petersburg, VA**	**0**	**0**	**0**
A	---	0	0	0
B	---	1	0	1
C	---	5	0	5
D	**Brunswick County, VA**	**2**	**0**	**0**
E	**Brunswick County, Alberta, VA**	**9**	**0**	**0**
F	**Brunswick County, VA**	**0**	**0**	**0**
G	**Brunswick County, VA**	**0**	**0**	**0**
H	---	4	0	1
I	**La Crosse, VA**	**15**	**0**	**9**
J	---	5	0	0
K	---	1	0	0
L	**Warren County, NC**	**6**	**0**	**1**
M	**Warren County, Norlina, NC**	**25**	**0**	**5**
N	**Warren County, NC**	**5**	**0**	**1**
O	**Vance County, Henderson, NC**	**3**	**0**	**0**
P	**Vance County, Middleburg, NC**	**30**	**0**	**44**
Q	**Vance County, Kittrell, NC**	**16**	**0**	**4**
R	---	2	0	1
S	**Franklinton, NC**	**17**	**0**	**5**
T	---	2	0	3
U	---	24	0	21
V	---	0	0	4
	Project Totals	180	7	108
	EJ Communities Only	135	7	71
	% EJ Communities Only	75%	100%	66%

Note: Bolded text indicates an EJ community.

= Disproportionately high impacts relative to % miles within Section having EJ community

58% = Threshold value used to determine if impacts are disproportionate within Section having EJ community

4.11.5.2.10 VISUAL ENVIRONMENT

The results of the visual analysis are provided in Section 4.9. Active passenger and/or freight rail service currently exists in the following EJ communities: Richmond, VA, Ettrick, VA, and Petersburg, VA, and the southern half of Warren County, NC, (including the southern half of Norlina, NC), Vance County, NC (including Middleburg, NC, Henderson, NC, and Kittrell, NC), and Franklinton, NC. In these EJ communities the visual and auditory introduction of HSR would not be inconsistent with the existing condition.

Rail service is currently inactive in the following environmental justice communities of concern: Brunswick County, VA, Alberta, VA, and La Crosse, VA and the northern half of Warren County, NC, and Norlina, NC. Disruption in travel patterns, the reactivation of rail service through town, and the operation of new rail stations in La Crosse, VA, and Henderson, NC, would likely affect all residents. Therefore, the reactivation of freight and passenger rail service is not anticipated to have a disproportionately high and adverse visual impact to EJ communities alone.

4.11.5.2.11 COMMUNITY INVOLVEMENT PROCESS AND RESULTING MITIGATION

The Project involved an extensive community involvement process that resulted in design modifications, shifts in roadway and rail alignments, new vehicular and pedestrian crossings, and bike lane accommodations. Details of the process, comments received, and responses provided are included in Chapter 7 and Chapter 8. The following is a summary of the public outreach effort to all communities. Communities identified as EJ populations or communities of concern are in *italics*.

Public Meetings and Workshops

At the initiation of the Tier II DEIS for the Project, a series of public meetings was held in 2003 to review rail alignments and to solicit concerns and feedback on the proposed Project. In Virginia, these meetings were held in *Petersburg, Alberta*, Dinwiddie, and *La Crosse*. In North Carolina, they were held in *Norlina, Henderson/Kittrell, Franklinton*, Wake Forest, and Raleigh.

In 2006, informational workshops were held in Petersburg, VA, and in Richmond, VA, to present the extension of the Project limits from Petersburg, VA, (S. Collier Yard) to Richmond, VA, (Main Street Station). This extension was done at the direction of the Federal Rail Administration and motivated by FRA's policy to connect city-center to city-center for the Project.

A series of public hearings was held in 2010 to present the 2010 Tier II DEIS and associated designs for public comment. In Virginia, these meetings were held in Chesterfield, *Richmond*, *Petersburg,* McKenney, and *Alberta*. In North Carolina, they were held in *Norlina, Henderson, Franklinton*, and Raleigh.

A series of public Project Update Meetings was also held in 2012 and 2013. These update meetings were held in communities in which design changes occurred in response to comments on the Tier II DEIS. These design changes included revisions to proposed bridges and underpasses, rail crossing closures and other road work throughout the corridor. In North Carolina, Project Update Meetings were held in Raleigh, north Raleigh (for downtown Wake Forest and north Raleigh), and Henderson. In Virginia, meetings were held in Chesterfield County and Alberta.

Local Official Coordination

Beginning in 2002, one-on-one meetings were held with local, county, and city planning staff throughout the entire Study Area to review proposed Project designs. Advisory Council meetings were held in 2004 and 2006 to update broader groups on the Project and answer questions. Advisory Council representatives typically included county commissioners, councils of government, and metropolitan planning organization staff. The combined outcome of these local meetings was considerable redesign in Virginia in Chesterfield County, McKenny, and *La Crosse* and in North Carolina in *Henderson, Kittrell, Franklinton*, Wake Forest, and Raleigh.

Resulting Mitigation for EJ Community Impacts

Extensive community outreach efforts resulted in the following mitigation for community impacts, including EJ communities:

- The decision that all new, grade-separated crossings will include room for sidewalks on at least one side of the bridge to accommodate pedestrians.
- The decision to provide, non-vehicular, grade-separated crossings at heavily used pedestrian/cyclist/scooter locations, including:
    - Lincoln Street in Petersburg, VA
    - Burwell Avenue/Peachtree Street in Henderson, NC
    - Mason Street in Franklinton, NC
    - College Street in Franklinton, NC
    - Hawkins Street (Franklinton Elementary School) in Franklinton, NC
- The two proposed high speed passenger rail stations will be located within the EJ communities of La Crosse, VA and Henderson, NC. (While this was recommended by the ridership revenue studies completed for the Project, the reason it was initially considered in the modeling was at the request of the local communities.)
- The Preferred Alternative essentially remains on existing alignment through the EJ communities, thereby minimizing relocation impacts and impacts to EJ community services and facilities as compared to impacts that would result if the Preferred Alternative were designed primarily on new location.
- All persons, business, and non-profit organizations displaced as a result of the Project would be compensated in a fair and equitable manner in accordance with the Uniform Relocation Assistance and Property Acquisition Policies Act of 1970, as amended, and the North Carolina Relocation Assistance Act (GS-133-5 through 133-18).

With the exception of Alberta, VA, and La Crosse, VA, and the northern portion of Norlina, NC, rail service is currently in operation through these EJ communities, thus the visual and auditory introduction of HSR would not be inconsistent with the existing condition.

4.11.6 RELOCATIONS AND ASSOCIATED RIGHT OF WAY COSTS

During the final design phase of the Project, which takes place after completion of the Tier II FEIS and ROD, the Project Team will begin to coordinate with affected families, businesses, and non-profit facilities. The states have established programs for assisting those affected with relocation to replacement facilities. Specific VDOT policies will be applied in Virginia and NCDOT policies will be applied in North Carolina, as outlined below.

Wherever possible, NCDOT and VDOT try to find an agreeable price for both the state and the property owner. When such a price cannot be reached, the legal system is used to ensure a fair market price for the property owner. Property owners are encouraged to obtain their own property appraisal for use in negotiating fair market value on their property with ROW agents. In all cases the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act)

will be applied as directed by Federal law. It is not the policy of VDOT or NCDOT to provide compensation for homes and businesses if no acquisition of property takes place.

4.11.6.1 *VDOT RELOCATION POLICIES*

A comprehensive program of services and benefits has been established to ensure, to the maximum extent possible, the timely and successful relocation of displacees and reestablishment of businesses per the Virginia Administrative Code, 24VAC30-41. Property acquisition policies can be found under Right-of-Way at: http://www.virginiadot.org/business/resources/property_owners2006.pdf. The VDOT Right of Way and Utilities Division's relocation section is staffed with skilled personnel that oversee the Relocation Advisory Services Program. The services provided are intended to assist displacees in relocating to decent, safe and sanitary housing that meets their needs.

VDOT will ensure effective acquisition and relocation services, and will provide moving reimbursement, replacement housing payments and other cost reimbursements so that individuals displaced will not suffer disproportionate injuries as a result of state and/or Federally assisted projects. All housing will be fair housing and available to all persons, regardless of race, color, sex, religion, or national origin. The acquisition and relocation program will be conducted in accordance with the Uniform Act.

Early in the acquisition and relocation phase, experienced agents perform field inspections of each proposed segment and connection and secure tax boundary and sales records from local courthouses to determine the various costs of land, buildings, improvements, damages, and relocation costs. Realtors are also questioned regarding the availability of decent, safe, and sanitary replacement housing throughout the corridor alternatives. Each person will have sufficient time to negotiate for and obtain replacement housing or business space.

A displaced individual or family is entitled to receive a payment for moving personal property. The displacee has the option of a payment based upon the actual reasonable moving expenses (commercial move or self-move), a fixed payment that is based on VDOT's room count schedule, or, in unusual circumstances, any combination of the above. An example of such a circumstance would be to have a commercial mover that would move the household items, but would not move certain personal property stored in a shed. The displacee can remove the items from the shed as a self-move.

Individuals and families displaced from a dwelling are eligible for purchase or rental supplement payments. The purpose of the purchase or rental supplement is to enable the displaced household to relocate to decent, safe and sanitary replacement housing that is within financial means. The elements included in the replacement housing payment are: additional costs to purchase replacement housing (purchase supplement); compensation to the owner for the increased interest cost and other debt service costs which are incurred in connection with a mortgage(s) on the replacement dwelling; and reimbursement to the owner for expenses related to the purchase of replacement housing. A residential tenant who was in occupancy at the displacement dwelling for 90 days or more before the initiation of negotiations, is eligible to receive a rent supplement for relocation to comparable housing. An owner-displacee who was in occupancy from 90 to 179 days before the initiation of negotiations is also eligible for the same benefits.

No displaced persons will be required to move until a comparable replacement dwelling is made available within their financial means. Comparable replacement housing may not be available on the private market or does not meet specific requirements or special needs of a particular displaced family. Also, housing may be available on the market, but the cost exceeds the benefit limits for tenants and owners of $5,250 and $22,500, respectively. If housing is not available to a displacee and the transportation project would thereby be prevented from proceeding in a timely manner,

VDOT is authorized to take a broad range of measures to make housing available. These measures, which are outside normal relocation benefit limits, are called collectively, Last Resort Housing.

4.11.6.2 *NCDOT RELOCATION POLICIES*

It is the policy of NCDOT to ensure that comparable replacement housing is available for relocates prior to construction of state and/or Federally assisted projects. Furthermore, the NCDOT has three programs to minimize the inconvenience of relocation: relocation assistance, relocation moving payments, and relocation replacement housing payments or rent supplements. Property acquisition policies can be found under Right-of-Way at: http://www.ncdot.gov/projects/roadbuilt/.

With the Relocation Assistance Program, experienced NCDOT staff will be available to assist displacees with information such as: availability and prices of homes, apartments, or commercial property for sale or rent, and financing or other housing programs. The Relocation Moving Payment Program, in general, provides for payment of actual moving expenses encountered in relocation. Where displacement would force an owner or tenant to purchase or rent property at higher cost or to lose a favorable financing arrangement (in case of ownership), the Relocation Replacement Housing Payments or Rent Supplement Program would compensate up to $22,500 to owners who are eligible and qualify, and up to $5,250 to tenants who are eligible and qualify.

The relocation program for the proposed action will be conducted in accordance with the Uniform Act and the North Carolina Relocation Assistance Act (GS-133-5 through 133-18). This program is designed to provide assistance to displaced persons in relocating to a replacement site in which to live or do business. At least one relocation officer is assigned to each transportation project for this purpose.

The relocation officer will determine the needs of displaced families, individuals, businesses, non-profit organizations, and farm operations without regard to race, color, religion, sex, or national origin. NCDOT will schedule its work to allow ample time, prior to displacement, for negotiation and possession of replacement housing that meets decent, safe, and sanitary standards. The relocatees are given a 90-day written notice after the NCDOT purchases the property.

Relocation of displaced persons will be offered in areas not generally less desirable in regard to public utilities and commercial facilities. Rent and sale prices of replacement housing will be within the financial budget of the families and individuals displaced and will be reasonably accessible to their places of employment. The relocation officer also will assist owners of displaced businesses, non-profit organizations, and farm operations in searching for and moving to replacement property.

All tenant and owner residential occupants who may be displaced will receive an explanation regarding all available options, including: 1) purchases of replacement housing; 2) rental of replacement housing, either private or public; and 3) moving existing owner-occupied housing to another site (if practicable). The relocation officer also will supply information concerning other state or Federal programs offering assistance to displaced persons and will provide other advisory services as needed in order to minimize hardships to displaced persons in adjusting to a new location.

Last Resort Housing is a program used when comparable replacement housing is not available, or is unavailable within the displacee's financial means, and the replacement payment exceeds the Federal and state legal limitation. The purpose of the program is to allow broad latitudes in methods of implementation by the state so that decent, safe, and sanitary replacement housing can be provided. Since opportunities for replacement housing appear adequate within the Study Area, it is not likely that the Last Resort Housing Program will be necessary for the proposed Project. However, this program will still be considered, as mandated by State law.

4.11.6.3 *RELOCATION IMPACTS*

Historically, railroads played a major transportation role in the development of the east coast. Many large and small municipalities developed along and around the rail lines. This is true for the cities and towns throughout the Study Area.

To minimize impacts, alternatives were developed that took advantage of existing rail corridors. Throughout most of the urban and developed areas, the three alternatives share a common alignment. The proposed rail improvements and associated roadwork understandably require relocations to residences and business, due to their close proximity to the rail line.

Table 4-44 presents a summary of the potential residential and business relocation impacts for the Preferred Alternative by section. The highest number of residential relocations would occur in Section AA in Richmond, VA and Section CC, in Petersburg, VA, and Section P in Henderson, NC. The designs presented in this Tier II FEIS provide sufficient information to identify potential displacements. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

Table 4-44 Residential/Business Relocations by Section			
Section	**Preferred Alternative**	**Residential Relocation**	**Business Relocations**
AA	VA1	40	7
BB	VA1	7	1
CC	VA1	48	1
DD	VA3	2	0
A	VA2	0	0
B	VA1	3	1
C	VA1	4	8
D	VA4	3	2
E	VA1	2	7
F	VA1	0	0
G	VA3	2	0
H	VA1	1	0
I	VA1	14	0
J	VA2	5	0
K	VA1	0	5
L	VA1/NC1	8 (1 VA, 7 NC)	1 (NC)
M	NC1	18	4
N	NC1	2	0
O	NC3	3	0
P	NC1	33	8
Q	NC1	10	0
R	NC1	1	0
S	NC1	4	0
T	NC1	5	0
U	NC1	8	12
V	NC5	0	59
VA Total		132	32
NC Total		91	24

Source: VDOT, 2006, 2009; NCDOT, 2008, 2011, SEHSR project team 2013.

4.11.6.4 *RIGHT OF WAY COSTS*

Total ROW costs include land and damages, residential and business relocation costs, and acquisition costs. Table 4-45 presents a summary of the estimated ROW costs associated with Preferred Alternative by section. The costs for the Preferred Alternative are the same as those presented in the Tier II DEIS, except in Sections D and V. As described in Chapter 2, the Preferred Alternatives in these two sections were developed subsequent to the Tier II DEIS. For Sections D and V, the ROW costs are derived from the 2012 Project Recommendation Report (NCDOT, Virginia DRPT, 2012). The ROW costs for all sections will be updated during final design.

Table 4-45 Right of Way Costs by Section		
Section	**Preferred Alternative**	**Cost**
AA	VA1	$28,113,343
BB	VA1	$11,035,693
CC	VA1	$26,141,675
DD	VA3	$2,452,856
A	VA2	$505,900
B	VA1	$1,538,500
C	VA1	$4,335,300
D	VA4	$1,850,000
E	VA1	$1,533,800
F	VA1	$268,100
G	VA3	$531,200
H	VA1	$1,142,000
I	VA1	$1,929,100
J	VA2	$1,415,900
K	VA1	$1,573,000
L (VA)	VA1	$388,700
L (NC)	NC1	$5,032,500
M	NC1	$5,767,500
N	NC1	$2,080,188
O	NC3	$3,841,750
P	NC1	$6,976,313
Q	NC1	$7,943,532
R	NC1	$3,178,438
S	NC1	$6,801,188
T	NC1	$2,956,250
U	NC1	$26,245,625
V	NC5	$79,215,000
VA Total		$84,755,067
NC Total		$150,038,284

Source: DRPT, 2006, 2009; NCDOT, 2008; Recommendation Report, SEHSR Richmond, VA to Raleigh, NC Tier II EIS, April 2012.

4.12 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966 (Section 106), as amended (16 U.S.C. 306108), and implementing regulations (36 CFR Part 800) require Federal agencies to consider the effects of their actions on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment if the action would result in an adverse effect on the property listed on or eligible for the National Register of Historic Places (NRHP). Eligibility criteria for the NRHP are summarized in Section 3.12.

The potential effect of the Project on archaeological and historic architectural resources was evaluated in accordance with Section 106. According to the criteria for Effect and Adverse Effect developed by the ACHP (36 CFR Section 800.5), potential effect is determined based upon the following:

- No Effect - There would be no effect, neither adverse nor beneficial, on potential cultural resources.

- No Adverse Effect - There would be an effect, but it is determined that the effect would not compromise those characteristics that qualify the property for listing on the NRHP. Archeological sites may be "adversely affected" when they are threatened with unavoidable physical destruction or damage.
- Adverse Effect - There would be an effect that would compromise the physical and/or historic integrity of the resource.

Where the Project has been determined to have an adverse effect on historic resources, Section 106 requires that efforts be undertaken to avoid, minimize, or mitigate the adverse effects. As part of this process, consultation has taken place and is ongoing with the Virginia Department of Historic Resources (VDHR), North Carolina State Historic Preservation Office (NC-HPO), and other "consulting parties," such as the National Park Service, local historical societies, and property owners. FRA, the Virginia State Historic Preservation Officer, the North Carolina State Historic Preservation Officer, DRPT, NCDOT, and the Advisory Council on Historic Preservation have developed a draft Programmatic Agreement (Process PA) to ensure compliance with Section 106 of the Historic Preservation Act for the Proposed SEHSR project. This provides a consistent process for considering the effects of each portion of the SEHSR on historic properties and resolving adverse effects where appropriate. The draft agreement is included in Appendix K to allow for public comment.

As per the Process PA, "When the State Rail Transportation Agency proposes a finding of adverse effects to historic properties, it shall notify FRA. FRA shall initiate consultation with the appropriate SHPO and other consulting parties, interested Federal and state recognized Indian tribes, ACHP, FRA and the State Rail Transportation Agency shall develop a Memorandum of Agreement (MOA) to identify measures to avoid, minimize, and mitigate the adverse effects prior to beginning any work on that portion of the SEHSR Project. The State Rail Transportation Agency shall submit a draft of each MOA to the appropriate SHPO for review and comment. NCDOT and DRPT shall ensure that all comments received within thirty (30) days of SHPO's receipt of the draft MOA are addressed in the final MOA. One (1) copy of each final MOA shall be provided to the appropriate SHPO and other consulting parties and one (1) copy shall be provided to any consulting party or other group who may have a vested interest in a particular property."

Required MOAs for the Richmond to Raleigh Project will be included in the project Record of Decision (ROD).

4.12.1 ARCHAEOLOGICAL RESOURCES

The effects of the Project on archaeological resources were determined after the selection of the Preferred Alternative per 36 CFR 800.4(b)(2). This regulation permits a phased process to conduct identification and evaluation efforts on projects where alternatives under consideration consist of corridors or large land areas. Both VDHR and NC-HPO agreed with this approach for the Project.

Determinations of effect for archaeological resources in Virginia are listed in Table 4-46. Note that only the impact of the Preferred Alternative was evaluated as eligibility was only assessed within the APE for the Preferred Alternative. The resources are listed in the order they appear in the Study Area from north to south. There are no eligible or listed archaeological resources in North Carolina; therefore, it was not necessary to evaluate impacts in North Carolina.

If "No Effect" is listed for a Project alternative in Table 4-46, the Preferred Alternative does not have any property impacts on the resource; therefore, no further discussion is provided. For resources where the Project has been determined to have no adverse effect or adverse effects, details are provided below regarding the impact of the Preferred Alternative on the resource. In addition, resources that also have above-ground historic architecture components are discussed in Section 4.12.2 below.

Table 4-46 Effect Determinations for Eligible Archaeological Sites for Preferred Alternative – Virginia			
Resource Name	**Section**	**VDHR Site ID**	**Preferred Alternative Effect**
Williams Bridge Company	AA	44CF0724	Adverse Effect
Falling Creek Ironwork	AA	020-0063	No Effect
Sheffields	AA	020-0007	No Adverse Effect
USDOD Supply Center District	AA	020-5336	No Adverse Effect
Centralia Earthworks	BB	44CF0680	No Adverse Effect
Chester Hotel Site	BB	44CF0304	Adverse Effect
Swanee Site	BB	44CF0748	Adverse Effect
Site 44CF0707	BB, CC	44CF0707	Adverse Effect
Arrowfield Plantation	CC	44CF0708	Adverse Effect
Site 44CF0710	CC	44CF0710	Adverse Effect
Battersea	CC	123-0059	No Adverse Effect
Dimmock Line/Earthworks	CC	44DW0373	Adverse Effect
Fort Davis Earthworks	DD	44DW0314	No Adverse Effect
Orgain House	G	44BR0280	No Adverse Effect
Oak Shades House Site	G	44BR0179	No Adverse Effect
Davis Site	H	44BR0225	Adverse Effect
La Crosse Hotel	I	44MC0888	No Adverse Effect
Wright Farmstead	J	44MC0707	No Effect

4.12.1.1 *WILLIAMS BRIDGE COMPANY*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.2 *SHEFFIELDS*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.3 *USDOD SUPPLY CENTER*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.4 *CENTRALIA EARTHWORKS*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.5 *CHESTER HOTEL SITE*

The Chester Hotel site is located on the west side of the extant railroad tracks and north of Curtis Street. It is eligible for the NRHP under Criterion A for its association with the development of the Village of Chester and Criterion D for its archaeological potential. Although the rail alignment will not be notably modified in this area, a portion of Curtis Street will be realigned to remove the current at-grade crossing in this area. The new road alignment will physically impact the southern one-quarter of this site, resulting in disturbances to the subsurface matrix and data-bearing archaeological deposits. As a result, the Preferred Alternative will have an adverse effect on this resource.

4.12.1.6 *SWANEE SITE*

The Swanee site was identified during a Phase I archaeological survey of the road system adjacent to the rail corridor and found to be potentially eligible under Criterion D. The property owner did not allow access for a Phase II-level site evaluation. As such, this site is assumed to be eligible for the NRHP for coordination purposes. Modifications to the road system to the south of the site will result in physical impacts to intact soils with the potential to bear data on area history. As such, the Preferred Alternative will have an adverse effect on this resource.

4.12.1.7 *SITE 44CF0707*

Site 44CF0707 is a prehistoric campsite with subsurface integrity. It is eligible for the NRHP under Criterion D for its ability to contain notable information on the area's Woodland Period cultures. The designs for the Preferred Alternative include modifications to the rail corridor through the site. In addition, changes to the extant road pattern in this area will also result in subsurface impacts to the archaeological deposits. Since both the road and rail changes associated with the Preferred Alternative will impact intact data-bearing soils within the site, it will have an adverse effect on this resource.

4.12.1.8 *ARROWFIELD PLANTATION*

The Arrowfield Plantation site contains both intact subsurface deposits and above-ground features related to the historic occupation of this area. It is eligible for the NRHP under Criteria A and D. The designs for the Preferred Alternative include modifications to both the rail corridor and the road system, resulting in impacts to the physical fabric of this site and the extant surface features. Since both the road and rail changes associated with the Preferred Alternative will impact intact archaeological deposits and above-ground remains, it will have an adverse effect on this historic property.

4.12.1.9 *SITE 44CF0710*

Site 44CF0710 is a prehistoric campsite with subsurface integrity. It is eligible for the NRHP under Criterion D for its ability to contain notable information on the area's Archaic Period inhabitants. The Preferred Alternative includes modifications to the rail corridor through the site. In addition, changes to the extant road pattern in this area will also result in subsurface impacts to the intact archaeological deposits. As such, the Preferred Alternative will impact intact portions of the site with the ability to shed light on area prehistoric culture and will have an adverse effect on this historic property.

4.12.1.10 *BATTERSEA*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.11 *DIMMOCK LINE/EARTHWORKS*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.12 *FORT DAVIS EARTHWORKS*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.13 *ORGAIN HOUSE*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.14 *OAK SHADES HOUSE SITE*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.15 *DAVIS SITE*

The Davis Site is located south of the Meherrin River. It was found to be eligible for the NRHP under Criteria A and D for its association with post-bellum tenant farming and intact archaeological deposits. The road realignments in this area will result in the disturbances of soils throughout the site, thus altering intact subsurface deposits. As a result, the Preferred Alternative will have an adverse effect on this historic property.

4.12.1.16 *LA CROSSE HOTEL SITE*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.1.17 *WRIGHT FARMSTEAD*

This resource is also eligible for the NRHP as a historic architectural property and is discussed in Section 4.12.2 below.

4.12.2 HISTORICAL RESOURCES

FRA and DRPT made determinations of effect for historic resources in Virginia, which are listed in Table 4-47 and Table 4-48. The resources are listed in the order they appear in the Study Area from north to south. The VDHR concurred with these determinations in letters dated November 23, 2009 and July 29, 2014. In addition, coordination with the National Park Service (NPS) regarding impacts to historic battlefields is ongoing and will be completed prior to publication of the ROD.

FRA and NCDOT made determinations of effect for resources in North Carolina, which are listed in Table 4-49. The North Carolina State NC-HPO concurred with these determinations of effect in a form signed August 14, 2013. Copies of the correspondence related to Section 106 coordination are provided in Appendix K.

If "No Effect" is listed for a Project alternative in Tables 4-47 through 4-39, the alternative does not have any property impacts on the resource; therefore, no further discussion is provided. For resources where FRA, DRPT, and NCDOT determined that the Project would have no adverse effect or adverse effects, details are provided below regarding the impact of each alternative on the resource.

The Preferred Alternative is identified in **bold** in Tables 4-37 through 4-39.

Table 4-47
Effect Determinations for Historic Architecture Resources – Virginia
(Preferred Alternative Identified in Bold)

Resource Name	Sec-tion	VA1 Section 106 Effect	VA2 Section 106 Effect	VA3 Section 106 Effect	VA4 Section 106 Effect
Seaboard Air Line Railroad Corridor (resource spans sections)	AA	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
	BB	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
	CC	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
C. & O. & Seaboard Railroad Depot	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Shockoe Valley & Tobacco Row Historic District	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Shockoe Slip Historic District	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
James River and Kanawha Canal Historic District	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Atlantic Coast Line Railroad Corridor (resource spans sections)	AA	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
	BB	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
	CC	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Manchester Warehouse Historic District	AA	**No Effect**	No Effect	No Effect	N/A
Williams Bridge Company	AA	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Lucky Strike/RJ Reynolds Tobacco	AA	**No Effect**	No Effect	No Effect	N/A
Transmontaigne Product Services, Inc.	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Davee Gardens Historic District	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
DuPont Spruance	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Sheffields; Auburn Chase; Bellwood; Building 42 - DSCR Officer's Club; New Oxford	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
USDOD Supply Center Historic District; Bellwood-Richmond Quartermaster Depot Historic District	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Richmond & Petersburg Electric Railway (resource spans sections)	AA	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
	BB	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
	CC	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
House at 3619 Thurston Rd	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Centralia Post Office	BB	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Ragland House/4626 Centralia Road	BB	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Circle Oaks/4510 Centralia Road	BB	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Centralia Earthworks	BB	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Chester Historic District	BB	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A

Table 4-47 Effect Determinations for Historic Architecture Resources – Virginia (Preferred Alternative Identified in Bold)					
Resource Name	**Sec-tion**	**VA1 Section 106 Effect**	**VA2 Section 106 Effect**	**VA3 Section 106 Effect**	**VA4 Section 106 Effect**
Chester #94 Masonic Lodge	BB	**No Effect**	No Effect	No Effect	N/A
Pretlow House	BB	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Eichelberger House	BB	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Ellerslie	CC	**No Effect**	No Effect	No Effect	N/A
Appomattox River Railroad Bridge	CC	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Battersea	CC	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
North Battersea/Pride's Field Historic District	CC	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Defense Road	CC	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Dimmock Line/Earthworks	CC	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Bridge over Defense Road	CC	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Fort Davis Earthworks	DD	No Adverse Effect	No Adverse Effect	**No Adverse Effect**	N/A
Evergreen	A	No Effect	No Effect	No Effect	N/A
Courtworth	C	**No Effect**	No Effect	No Effect	N/A
Bowen House	C	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
W. Boisseau's Store, Warehouse, Dwelling	C	**No Effect**	No Effect	No Effect	N/A
Bank of McKenney (referred to as Bank Building in DEIS)	C	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Chesapeake and Potomac Telephone Company (C & P) Building	C	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Mayton House	C	**No Effect**	No Effect	No Effect	N/A
Zehmer Farm/Honeymoon Hill Farm	C	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Wynnhurst	D	Adverse Effect	No Effect	Adverse Effect	**N/A (Outside APE)**
Blick's Store	D	No Effect	No Adverse Effect	No Effect	**No Adverse Effect**
House/458 Second Avenue	E	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Orgain House	G	No Effect	No Effect	**No Adverse Effect**	Adverse Effect
Tourist Guest House	G	No Effect	No Effect	**Adverse Effect**	No Effect
Oak Shades	G	Adverse Effect	Adverse Effect	**No Effect**	No Effect
Evans House	H	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Smelley House	I	**No Effect**	No Effect	No Effect	N/A

Table 4-47
Effect Determinations for Historic Architecture Resources – Virginia
(Preferred Alternative Identified in Bold)

Resource Name	Section	VA1 Section 106 Effect	VA2 Section 106 Effect	VA3 Section 106 Effect	VA4 Section 106 Effect
La Crosse Commercial Historic District	I	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
La Crosse Hotel	I	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Wright Farmstead	J	Adverse Effect	**No Effect**	Adverse Effect	N/A
Sardis Methodist Church	J	No Adverse Effect	**No Adverse Effect**	No Adverse Effect	N/A
Bracey Historic District	K	**No Adverse Effect**	Adverse Effect	No Adverse Effect	N/A
Bracey Depot	K	**No Adverse Effect**	Adverse Effect	No Adverse Effect	N/A
Bracey & Company Store	K	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Granite Hall/Fitts House	L	**No Effect**	Adverse Effect	No Effect	N/A

Table 4-48
Effect Determinations for Battlefields – Virginia
(Preferred Alternative Identified in Bold)

Resource Name	Section	VA1 Section 106 Effect	VA2 Section 106 Effect	VA3 Section 106 Effect	VA4 Section 106 Effect
Proctor's Creek (resource spans sections)	AA	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
	BB	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Port Walthall Junction	BB	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Swift Creek/Arrowfield Church	CC	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Petersburg III/The Breakthrough (resource spans sections)	CC	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
	DD	No Adverse Effect	No Adverse Effect	**No Adverse Effect**	N/A
Weldon Railroad/Globe Tavern (resource spans sections)	CC	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
	DD	No Adverse Effect	No Adverse Effect	**No Adverse Effect**	N/A
Peebles Farm (resource spans sections)	CC	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
	DD	No Adverse Effect	No Adverse Effect	**No Adverse Effect**	N/A
Boydton Plank Road (resource spans sections)	DD	No Adverse Effect	No Adverse Effect	**No Adverse Effect**	N/A

Table 4-48
Effect Determinations for Battlefields – Virginia
(Preferred Alternative Identified in Bold)

Resource Name	Section	VA1 Section 106 Effect	VA2 Section 106 Effect	VA3 Section 106 Effect	VA4 Section 106 Effect
	A	No Adverse Effect	**No Adverse Effect**	No Adverse Effect	N/A
Hatcher's Run (resource spans sections)	DD	No Adverse Effect	No Adverse Effect	**No Adverse Effect**	N/A
	A	No Adverse Effect	**No Adverse Effect**	No Adverse Effect	N/A
Lewis Farm	A	No Adverse Effect	**No Adverse Effect**	No Adverse Effect	N/A
Dinwiddie Courthouse	B	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A

Table 4-49
Effect Determinations for Historic Architecture Resources – North Carolina
(Preferred Alternative Identified in Bold)

Resource Name	Section	NC1 Section 106 Effect	NC2 Section 106 Effect	NC3 Section 106 Effect	NC5 Section 106 Effect
Warren County Training School	L	**No Effect**	No Effect	No Effect	N/A
Wise School	L	**No Effect**	No Effect	No Effect	N/A
House (East side of US 1, Wise, NC)	M	**No Effect**	No Effect	No Effect	N/A
Holtzmann Farm	M	**No Effect**	No Effect	No Effect	N/A
Chapel of the Good Shepherd	M	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Dr. Thomas B. Williams House and Office	M	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Marshall House/Tavern (House No 245)	M	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
William J. Hawkins House	N	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Middleburg Community House (Middleburg Steakhouse)	O	No Effect	No Effect	**No Effect**	N/A
House (Allison Cooper Rd, Middleburg vicinity)	O	No Effect	No Effect	**No Effect**	N/A
Holloway Farm	O	Adverse Effect	Adverse Effect	**No Effect**	N/A
William Haywood Harris Farm	O	No Effect	No Effect	**No Effect**	N/A
Forrest Ellington Farm	O	No Adverse Effect	No Adverse Effect	**No Adverse Effect**	N/A
R. B. Carter House	P	**No Effect**	No Effect	No Effect	N/A
Henderson Historic District and Proposed Boundary Expansion	P	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Vance County Courthouse	P	**No Effect**	No Effect	No Effect	N/A
Zollicoffer's Law Office	P	**No Effect**	No Effect	No Effect	N/A
Henderson Fire Station and Municipal Building	P	**No Effect**	No Effect	No Effect	N/A

Table 4-49
Effect Determinations for Historic Architecture Resources – North Carolina
(Preferred Alternative Identified in Bold)

Resource Name	Section	NC1 Section 106 Effect	NC2 Section 106 Effect	NC3 Section 106 Effect	NC5 Section 106 Effect
Houses (2 bungalows on E Young Ave)	P	**No Effect**	No Effect	No Effect	N/A
Mistletoe Villa	P	**No Effect**	No Effect	No Effect	N/A
South Henderson Industrial Historic District	P	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Vance Flour Mill (Sanford Milling Co.)	P	**No Effect**	No Effect	No Effect	N/A
Houses (5 worker houses on 1400 block of Nicholas St)	P	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Houses (3 side gable houses on 1500 block of Nicholas St)	P	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Esso Gasoline Station	P	**No Effect**	No Effect	No Effect	N/A
Confederate Cemetery	Q	**No Effect**	No Effect	No Effect	N/A
Saint James Episcopal Church	Q	**No Effect**	No Effect	No Effect	N/A
Hedgepetch and Finch Store	Q	**No Effect**	No Effect	No Effect	N/A
Kittrell Residential Historic District	Q	**No Effect**	No Effect	No Effect	N/A
Josiah Crudup House	Q	**No Effect**	No Effect	No Effect	N/A
Person-McGhee Farm (resource spans sections)	Q	**No Effect**	No Effect	No Effect	N/A
	R	**No Effect**	No Effect	No Effect	N/A
Raleigh and Gaston Railroad Bridge Piers (Tar River) (resource spans sections)	Q	**No Effect**	No Effect	No Effect	N/A
	R	**No Effect**	No Effect	No Effect	N/A
Franklinton Historic District (Includes Sterling Mill Historic District)	S	**Adverse Effect**	Adverse Effect	Adverse Effect	N/A
Aldridge H. Vann House	S	**No Effect**	No Effect	No Effect	N/A
Franklinton Depot	S	**No Effect**	No Effect	No Effect	N/A
Church (within proposed Franklinton Historic District)	S	**No Effect**	No Effect	No Effect	N/A
Sterling Cotton Mill	S	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Cedar Creek Railroad Bridge Piers	S	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Youngsville Historic District	T	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
J. B. Perry House	T	**No Effect**	No Effect	No Effect	N/A
Glen Royall Mill Village Historic District	U	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Wake Forest Historic District	U	**No Adverse Effect**	No Adverse Effect	No Adverse Effect	N/A
Downtown Wake Forest Historic District	U	**No Effect**	No Effect	No Effect	N/A
Purefoy-Chappell House and Outbuildings	U	**No Effect**	No Effect	No Effect	N/A

Table 4-49
Effect Determinations for Historic Architecture Resources – North Carolina
(Preferred Alternative Identified in Bold)

Resource Name	Sec-tion	NC1 Section 106 Effect	NC2 Section 106 Effect	NC3 Section 106 Effect	NC5 Section 106 Effect
Oakforest	U	**No Effect**	No Effect	No Effect	N/A
Powell House	U	**No Effect**	No Effect	No Effect	N/A
Neuse Railroad Station	U	**No Effect**	No Effect	No Effect	N/A
Crabtree Creek Railroad Bridge Pier	V	No Adverse Effect	No Adverse Effect	No Adverse Effect	**No Adverse Effect**
Gulf Petroleum Products Warehouse	V	Adverse Effect	Adverse Effect	Adverse Effect	**Adverse Effect**
Raleigh Bonded Warehouse	V	No Effect	No Effect	No Effect	**No Effect**
Mordecai Place Historic District	V	No Effect	No Effect	No Effect	**No Effect**
Pilot Mill	V	No Effect	No Effect	No Effect	**No Effect**
Roanoke Park Historic District	V	No Effect	No Effect	Adverse Effect	**No Effect**
Noland Plumbing Company Building	V	No Effect	No Effect	No Adverse Effect	**No Effect**
John A. Edwards and Company Building	V	No Effect	No Effect	No Effect	**No Effect**
Glenwood-Brooklyn Historic District	V	No Effect	No Effect	No Adverse Effect	**No Effect**
Seaboard Railway Station	V	No Adverse Effect	No Adverse Effect	No Effect	**No Effect**
Seaboard Railway Warehouses	V	No Adverse Effect	No Adverse Effect	No Effect	**No Effect**
Raleigh Cotton Mills	V	No Adverse Effect	No Adverse Effect	No Effect	**No Effect**
Pine State Creamery	V	No Effect	No Effect	No Effect	**No Effect**
Seaboard Coast Line Railroad Company Office Building	V	No Effect	No Effect	No Effect	**No Effect**
Melrose Knitting Mill	V	No Effect	No Effect	No Effect	**No Effect**
Raleigh Electric Company Power House	V	Adverse Effect	Adverse Effect	No Adverse Effect	**No Adverse Effect**
Carolina Power and Light Company Car Barn and Automobile Garage	V	Adverse Effect	Adverse Effect	No Effect	**No Effect**
St. Paul A.M.E. Church	V	No Effect	No Effect	No Effect	**No Effect**
Depot Historic District	V	No Adverse Effect	No Adverse Effect	No Adverse Effect	**No Adverse Effect**
Depot Historic District Proposed Expansion Area	V	No Adverse Effect	No Adverse Effect	No Adverse Effect	**No Adverse Effect**
Montfort Hall	V	No Effect	No Effect	No Effect	**No Effect**
Boylan Heights Historic District	V	No Effect	No Effect	No Effect	**No Effect**
Joel Lane House	V	No Effect	No Effect	No Effect	**No Effect**
Boylan Apartments	V	No Effect	No Effect	No Effect	**No Effect**
Raleigh Hosiery Company Building	V	No Effect	No Effect	No Effect	**No Effect**

Table 4-49 Effect Determinations for Historic Architecture Resources – North Carolina (Preferred Alternative Identified in Bold)					
Resource Name	**Sec-tion**	**NC1 Section 106 Effect**	**NC2 Section 106 Effect**	**NC3 Section 106 Effect**	**NC5 Section 106 Effect**
North Carolina School Book Depository	V	No Effect	No Effect	No Effect	**No Effect**
Governor Morehead School Historic District	V	No Effect	No Effect	No Effect	**No Effect**
Raleigh and Gaston Railroad Corridor*	M-V	**Adverse Effect**	**Adverse Effect**	**Adverse Effect**	**Adverse Effect**

* Impacts to the Raleigh and Gaston Railroad Corridor are common among all project alternatives.

4.12.2.1 *HISTORICAL RESOURCES – VIRGINIA*

The following discussion provides details on the effect of the Project alternatives on historical resources in Virginia where FRA and DRPT concluded that the Project would have no adverse effect or adverse effects for at least one Project alternative. For all other resources, the Project has been determined to have no effect for all alternatives.

4.12.2.1.1 SEABOARD AIR LINE RAILROAD CORRIDOR

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The rail improvements will be located within the existing rail corridor in the vicinity of the Seaboard Air Line Railroad Corridor. Historically, the corridor contained two to three sets of parallel tracks. Over the years, the number of tracks has been reduced; therefore, the corridor now only contains one or two sets of tracks within the wider ROW. The addition of an additional set of tracks will return most of the corridor to its original historic appearance and configuration. In addition, the existing tracks have been replaced with in-kind materials numerous times over the past 150 years, including new rails, cross ties, spikes, and ballast. As such, the resource is only eligible for the NRHP under Criterion A (associated with events that have made a significant contribution to the broad patterns of our history) and not under Criterion C (embodying the distinctive characteristics of a type, period, or method of construction) due to compromised physical integrity.

Although most of the rail corridor will remain unchanged, the removal and replacement of the rail bridge over US-1 South near Alberta, VA, a contributing element to the historic resource, will alter the resource and diminish the resource's integrity of design, setting, materials, workmanship, feeling, and association. The location will not change, but a notable visual element will be removed from the resource. This element is representative of the modifications that occurred along the track in the second quarter of the twentieth century associated with transportation improvements and the establishment of a multi-state vehicular corridor. Because of the proposed demolition of a contributing element, the Preferred Alternative will have an adverse effect on theSeaboard Air Line Railroad Corridor .

(It should be noted that the Tier II DEIS identified the Project alternatives as having no adverse effect on the Seaboard Air Line Railroad Corridor. Subsequent to the publication of the Tier II DEIS, the US-1 South rail bridge was identified as a contributing element to the resource. This resulted in the change in effect.)

4.12.2.1.2 C. & O. & SEABOARD RAILROAD DEPOT

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The Project begins at the C. & O. & Seaboard Railroad Depot (Main Street Station) and runs

south. The Preferred Alternative will not require any modifications to the existing building or the surrounding tracks. Moreover, historically, numerous rail lines ran perpendicular to Main Street Station, thus this Project will return rail traffic to this notable historic building. Because the rail is elevated, no road changes are required in this area. Because the Project will not alter the property's location, design, setting, materials, workmanship, feeling, or association, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.3 SHOCKOE VALLEY & TOBACCO ROW HISTORIC DISTRICT

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. Currently, as trains exit to the south of Main Street Station and through this district, they run along a single-track, which is elevated on T-shaped supports built to accommodate two tracks, of which the second track has been removed. The Preferred Alternative will retain the existing track and reinstall the second track on top of the T-shaped support. All work will be between one and three stories above the historic district atop existing supports. Because the rail is elevated, no road changes are required in this area. As such, the addition of the second track will not alter the physical composition or viewshed of the district in any way. Therefore, the Preferred Alternative will have no adverse effect on this district.

4.12.2.1.4 SHOCKOE SLIP HISTORIC DISTRICT

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. As discussed with the Shockoe Valley & Tobacco Row Historic District above, the existing single-track that runs north-south through the Shockoe Slip Historic District is located on top of a T-shaped pier. The Preferred Alternative will add a second track to the same pier, thus limiting any potential impacts on surrounding historic properties. Because the rail is elevated, no road changes are required in this area. The Preferred Alternative will have no adverse effect on this district.

4.12.2.1.5 JAMES RIVER AND KANAWHA CANAL HISTORIC DISTRICT

This district is located south of Shockoe Slip Historic District and north of the James River. The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. As discussed with the nearby districts above, the existing single-track through the district is located on top of a T-shaped pier. The Preferred Alternative will add a second track to the same pier, thus limiting any potential impacts on surrounding historic properties. Because the rail is elevated, no road changes are required in this area. Modifications will not impact the integrity of any aspects of this district, and the addition of the second track on the existing pier will not alter the district's significance or character. The Preferred Alternative will have no adverse effect on this district.

4.12.2.1.6 ATLANTIC COAST LINE RAILROAD CORRIDOR

The Atlantic Coast Line Railroad Corridor spans Sections AA, BB, and CC. The Preferred Alternative for all three sections is VA1, the common alignment of VA1, VA2, and VA3. The rail improvements will be located within the existing rail corridor. Historically, the corridor contained two to three sets of parallel tracks. Over the years, the number of tracks has been reduced; therefore, the corridor now only contains one or two sets of tracks within the wider ROW. The addition of an additional set of tracks will return most of the corridor to its original historic appearance and configuration. In addition, the existing tracks have been replaced with in-kind materials numerous times over the past 150 years, including new rails, cross ties, spikes, and ballast. As such, the resource is only eligible for the NRHP under Criterion A and not under Criterion C due to compromised physical integrity.

Although most of the rail corridor will remain unchanged, the removal of a utility bridge for the crossing of the Richmond & Petersburg Electric Railway and abandoned abutments associated with the historic alignment of Highway 10, both of which are contributing elements to the historic resource, will alter the resource and diminish the resource's integrity of design, setting, materials, workmanship, feeling, and association. The location will not change, but notable visual elements will be removed from the resource. These elements are located along the Atlantic Coast Line Railroad Corridor and were constructed during its period of significance in response to the railroad tracks below. Because of the proposed demolition of contributing elements, the Preferred Alternative will have an adverse effect on this resource

It should be noted that the Tier II DEIS identified the Project alternatives as having no adverse effect on the Atlantic Coast Line Railroad Corridor. Subsequent to the publication of the Tier II DEIS, the utility bridge and Highway 10 bridge abutments were identified as contributing elements to the resource. This resulted in the change in effect.

4.12.2.1.7 MANCHESTER WAREHOUSE INDUSTRIAL HISTORIC DISTRICT

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will change relocated Maury Street within the Manchester Industrial Historic District to a new road and grade separation over the railway, located just north of the existing I-95 ramps and within the Citgo Petroleum above-ground storage tanks property. In addition to the new roadway, a roundabout will be constructed at the intersection of the relocated Maury Street/I-95 ramps/E. 4th Street, as proposed in the City of Richmond's Long Range Transportation Plan for this area. This new design for Maury Street will avoid property impacts to the expanded Manchester Industrial Historic District.

Although the Project will change the road configuration east of the historic district boundaries, it will not modify the historic road pattern or any above-ground contributing elements within the district itself. No buildings will be altered during this work. The construction of the new roundabout will be at-grade and thus not alter the viewshed of the district's contributing resources. The modifications in this area will not diminish the characteristics that make this property eligible for the NRHP. As such, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.8 WILLIAMS BRIDGE COMPANY

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will reroute the entry and roadways near the Williams Bridge Company complex to include changes to the road system. These changes may result in alterations to building remains and the subsurface deposits within the boundaries of the eligible archaeological component. Due to the Project's potential to diminish the property's integrity of location, design, setting, feeling, and association, and the impacts to the data-bearing layers within the associated archaeological site, the Preferred Alternative will have an adverse effect on this resource.

4.12.2.1.9 TRANSMONTAIGNE PRODUCT SERVICES, INC.

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. As mentioned above, the proposed rail work in this vicinity of Richmond, VA, is limited to adding a second track to the existing corridor. However, Goodes Street will be widened south of this resource. Widening on the eastern portion of Goodes Street near the railroad tracks requires creating an underpass to bring the roadway under the rail near the southeastern corner of the Transmontaigne property. A retaining wall will be constructed on the north side of Goodes Street to eliminate any modifications to this historic property. The viewshed will not be modified, and

no Transmontaigne-owned property will be used. As such, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.10 DAVEE GARDENS HISTORIC DISTRICT

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The proposed rail modifications near Davee Gardens are minimal and will include rebuilding a second track within the existing rail corridor. Road work in this area will involve widening a 2,300-foot long stretch of Ruffin Road, which is located along the northern perimeter of the district. The road widening in this area is minimal and will result in expanding the existing paved shoulder by approximately five feet. Thus, the front yard of one of the 165 homes in the district will be shortened by between one and five feet. This modification will not alter any of the characteristics that render this district eligible for the NRHP. As such, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.11 DUPONT SPRUANCE

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will reintroduce a second track to this area; there are no road modifications in the vicinity of the DuPont Spruce parcel. The rail corridor runs north-south along the western boundary of this resource. The complex was created in this particular location due to the close proximity of the active rail line and the company historically used the second rail track to help transport goods. Although the Project has the potential to slightly alter the setting of the resource, it will not diminish the characteristics that make this property eligible for the NRHP. As such, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.12 SHEFFIELDS; AUBURN CHASE; BELLWOOD; BUILDING 42 - DSCR OFFICER'S CLUB; NEW OXFORD

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The Sheffields home and surrounding archaeological site are located over 1,500 feet west of the rail alignment. The viewshed from the main house to the rail tracks is obscured by distance, topography and vegetation, thus rendering the rail area virtually invisible from the historic house. The Preferred Alternative involves reconstructing a second rail within the existing ROW, thus the current viewshed will not be modified during the Project. The rail and road work will also not physically impact the intact archaeological remains associate with this property. As such, the Preferred Alternative will have no adverse effect on this property. (It should be noted that the Tier II DEIS identified the Project alternatives as having no effect on the resource. The change was made as a result of additional coordination with VDHR.)

4.12.2.1.13 USDOD SUPPLY CENTER HISTORIC DISTRICT; BELLWOOD-RICHMOND QUARTERMASTER DEPOT HISTORIC DISTRICT

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The massive USDOD historic district is located west of the existing rail line. Only the southeastern 500 feet is adjacent to the current railway corridor boundaries, as the eastern boundary veers away from the rail track along the northeastern 3,000 feet. This southeastern area was once the location of a railroad spur providing rail access to the US Department of Defense complex off of the main rail tracks. Thus, the presence of the rail in this area is associated with the location and association of this resource. At the time the supply center was in operation, rail traffic along this line was higher and trains traveled on dual lines. The Preferred Alternative will add a second rail line in the ROW, thus restoring the rail configuration in this area to resemble the system in existence during the resource's Period of Significance. Because the changes will restore

the dual tracks in this area, the Preferred Alternative will have no adverse effect on this property. (It should be noted that the Tier II DEIS identified the Project alternatives as having no effect on the resource. The change was made as a result of additional coordination with VDHR.)

4.12.2.1.14 RICHMOND & PETERSBURG ELECTRIC RAILWAY

The Richmond & Petersburg Electric Railway spans Sections AA, BB, and CC. The Preferred Alternative for all three sections is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will rebuild a second rail line across the resource, which is located just east of Chimney Corner in Chesterfield County. The rail line had been in existence for almost 70 years when the electric rail line was established in the early-twentieth century. This resource has always crossed the rail line in this exact spot and the rail line contained two active tracks when the electric rail line was active. However, the Project designs will impact a utility bridge that historically carried the Richmond & Petersburg Electric Railway over the rail corridor immediately south of Hundred Road in Chester. This bridge is a contributing resource to the railway resource. Because of the removal of a contributing element to the historic property, the Preferred Alternative will have an adverse effect on this resource.

(It should be noted that the Tier II DEIS identified the Project alternatives as having no adverse effect on the Richmond & Petersburg Electric Railway. Subsequent to the publication of the Tier II DEIS, the utility bridge was identified as a contributing element to the resource. This resulted in the change in effect.)

4.12.2.1.15 HOUSE AT 3619 THURSTON RD

The Preferred Alternative in Section AA is VA1, the common alignment of VA1, VA2, and VA3. The House at 3619 Thurston Road is located west of the proposed railroad. Although the parcel is not within the APE of the rail modifications, a new roadway will be created west of the house, running from Thurston Road on the northwest, across the railroad tracks, and connecting to Chester Road on the southeast. The road will be located about 250 feet west of the dwelling. The house will be separated from the road ROW by a modern home and a vegetative buffer, and there will be no land takes from this resource. Because the road will not alter the resource's location, design, materials, workmanship, and feeling, the Preferred Alternative will have no adverse effect on this property.

4.12.2.1.16 CENTRALIA POST OFFICE

The Preferred Alternative in Section BB is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will construct an overpass on Centralia Road across the rail corridor to replace the existing at-grade crossing the railroad tracks. The fill slope from the bridge will be approximately 30 feet tall and located less than 30 feet south of the resource. The driveway for the property will be moved and the road itself will be shifted south. This will disconnect the resource from the local attributes that rendered its construction necessary. The Preferred Alternative will have an adverse effect on this resource.

4.12.2.1.17 RAGLAND HOUSE/4626 CENTRALIA RD

The Preferred Alternative in Section BB is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will construct an overpass on Centralia Road across the rail corridor to replace the existing at-grade crossing the railroad tracks. The fill slope from the bridge will be approximately 30 feet tall and located less than 30 feet south of the resource. A portion of Centralia Road will be rerouted just east of Ragland House. No roadwork will be completed on the Ragland property, and the viewshed from the main house will be only slightly modified as the new road meets the old road southeast of the house. Because the road change will not alter any of

the characteristics that make Ragland House eligible for the NRHP, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.18 CIRCLE OAKS/4510 CENTRALIA ROAD

The Preferred Alternative in Section BB is VA1, the common alignment of VA1, VA2, and VA3. Circle Oaks is located east of Ragland House, listed above. The Preferred Alternative will construct an overpass on Centralia Road across the rail corridor to replace the existing at-grade crossing the railroad tracks. The approach to the bridge will be visible from Circle Oaks and will require reconfiguring a section of driveway. The modifications have the potential to diminish the characteristics that make the property eligible for the NRHP. As such, the Preferred Alternative will have an adverse effect on this resource.

4.12.2.1.19 CENTRALIA EARTHWORKS

The Preferred Alternative in Section BB is VA1, the common alignment of VA1, VA2, and VA3. Although the rail improvements are not in the vicinity of the earthworks, the designs include associated road improvements along Hopkins Road and Centralia Road to accommodate traffic rerouted from the closure of nearby at-grade rail crossings. The Centralia Earthworks are located east of Hopkins Road and run north-south parallel to the roadway. Although the earthworks were once larger, previous changes to the road system in this area in the early- and mid-twentieth century have destroyed all physical remnants of the earthworks within and immediately adjacent to the road corridor. The proposed changes to the roadway will, therefore, not impact any intact above-ground features or below-ground deposits associated with this historic property. As such, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.20 CHESTER HISTORIC DISTRICT

The Preferred Alternative in Section BB is VA1, the common alignment of VA1, VA2, and VA3. Although the rail modifications in the vicinity of the Chester Historic District will require a slight widening to the existing rail corridor, the more notable changes will occur due to road improvements. Several original road alignments will be rerouted and rail crossing points will be closed. The Preferred Alternative will result in notable modifications to the district's original plan, thus the Preferred Alternative will have an adverse effect on this district.

4.12.2.1.21 PRETLOW HOUSE

The Preferred Alternative in Section BB is VA1, the common alignment of VA1, VA2, and VA3. The Pretlow House is located at the intersection of Curtis and Winfree Streets in Chester, VA. The property is one block away from the rail tracks, but the Project alternatives will lower Curtis Street under the rail tracks with an underpass, removing the existing at-grade crossing. This change will require modifications to the Curtis Street between the rail tracks and Winfree Street. At Pretlow House, the road changes have been minimized through the creation of curb and gutter designs, thus avoiding impacts to vegetation currently in existence at the corner of the property and avoiding any impacts to the existing store wall. As such, the only adjustments to the property may be the addition of a sliver of pavement and a new curb at the eastern corner of the property. The Preferred Alternative will have no adverse effect on this resource. As a condition of this effect determination, the VDHR requested that the all efforts be made during construction to avoid impacts to the existing stone wall and adjacent vegetation.

4.12.2.1.22 EICHELBERGER HOUSE

The Preferred Alternative in Section BB is VA1, the common alignment of VA1, VA2, and VA3. The Eichelberger House was once part of a large parcel of land that covered the entire block. It

was designed to accommodate both the home life and work pattern of its owner, Harry Eichelberger, a railroad executive who caught the train at the station in Chester, VA, every day to travel to his office in Richmond, VA. He reached the station by a trail that wound through his property, exiting onto Curtis Street from an ornate stone gate. The Preferred Alternative will widen Curtis Street as part of the new railroad underpass. This will require the removal of the original stone gate and part of the trail. Both of these resources are contributing elements to the larger Eichelberger House property. The Preferred Alternative will have an adverse effect on this property.

4.12.2.1.23 APPOMATTOX RIVER RAILROAD BRIDGE

The Preferred Alternative in Section CC is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will add a new, parallel bridge for high speed passenger trains just east of the existing bridge. The historic structural system will not be altered during this process. Although a new span will be built between the old structure and the viewshed between the bridge and the various downtown Petersburg, VA, historic districts, the distance between the bridge and the districts is over 1,500 feet and there is dense vegetation within the extant vista. Because the alteration will not diminish the physical characteristics of the historic structure or diminish the viewshed from downtown Petersburg, VA, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.24 BATTERSEA

The Preferred Alternative in Section CC is VA1, the common alignment of VA1, VA2, and VA3. Battersea is located just south of the Appomattox River in Petersburg, VA. There are no road changes proposed for this section of the Project. The main house of Battersea is not within the APE of the Project; however, the western boundary of the larger property abuts the rail line. Thus the larger parcel is within the general APE. The main house and all above-ground resources are shielded from the rail corridor by distance (the closest above-ground contributing element is over 750 feet from the rail track and the main house is 1,200 feet from the tracks), topography, and dense vegetation. The corridor is not at all visible from the primary occupation areas of the house, and this will not change with the reinstallation of a second rail within the existing corridor. Thus, the Preferred Alternative will have no adverse effect on this property.

4.12.2.1.25 NORTH BATTERSEA/PRIDE'S FIELD HISTORIC DISTRICT

The Preferred Alternative in Section CC is VA1, the common alignment of VA1, VA2, and VA3. The North Battersea district is located east of the rail corridor in Petersburg, VA. Most of the district itself is outside of the Project APE; however, Battersea mansion (a contributing element to the district) is located between the rail tracks and the remainder of the district. As such, the district is tangentially included within the Project APE. With the exception of Battersea itself, the closest contributing element to the rail corridor is over 2,000 feet east of the rail line, and no road changes are proposed in this area. The Preferred Alternative will not impact the physical or historic integrity of the resource. The Preferred Alternative will have no adverse effect on this district. As a condition of this effect determination, the VDHR requested that the Project Team coordinate with the City of Petersburg, VA, to identify measures to minimize impacts to this resource.

4.12.2.1.26 DEFENSE ROAD

The Preferred Alternative in Section CC is VA1, the common alignment of VA1, VA2, and VA3. Defense Road is perpendicular to the railroad corridor in this area. The Preferred Alternative will add a second railroad bridge over Defense Road (directly adjacent to the existing railroad bridge),

which will necessitate the removal of a small section of the original roadway and lowering the overall road grade near the bridge to allow for vehicular passage beneath the new span. This change will impact the road's location, design, setting, materials, workmanship, and feeling. Therefore, the Preferred Alternative will have an adverse effect on this resource.

4.12.2.1.27 DIMMOCK LINE/EARTHWORKS

The Preferred Alternative in Section CC is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will add a second railroad bridge over Defense Road (directly adjacent to the existing railroad bridge). Construction of the bridge and associated improvements to Defense Road will necessitate large disturbances to the segment of the earthworks within the Project APE. Therefore, the Preferred Alternative will have an adverse effect on the resource.

4.12.2.1.28 BRIDGE OVER DEFENSE ROAD

The Preferred Alternative in Section CC is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will construct a second bridge directly east of the existing span, thus introducing a new element adjacent to the current bridge. Due to the introduction of this large new element, the Preferred Alternative will have an adverse effect on the bridge.

4.12.2.1.29 FORT DAVIS EARTHWORKS

The Preferred Alternative in Section DD is VA3. The three Project alternatives vary slightly in this area based on their curvature; however, they are all located within the same general vicinity. Although the 4,000-foot long earthworks generally run perpendicular through the Study Area, the 300-foot long segment where the earthworks intersect the Study Area were completely destroyed in 1900 when the Seaboard Air Line Railroad cut through the resource to construct the original rail line in this area. As such, the portion of this historic property within the project APE does not contribute to the overall eligibility of this resource. Therefore, the Preferred Alternative, as well as VA1 and VA2, will have no adverse effect on this resource.

4.12.2.1.30 BOWEN HOUSE

The Preferred Alternative in Section C is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will add a set of tracks within the existing rail corridor on the west side of US-1. The rail corridor is approximately 75 feet west of the western boundary of this resource and over 150 feet from the main house. However, the road system in this area will also be modified by rerouting the corridor to the south of the Bowen House and bridging Glebe Road over the rail lines. This new bridge will be just southwest of the Bowen House boundaries. It is possible that the new structure will be visible from the main house. However, any modifications to the viewshed will be tempered by a vegetative screen, distance, and the US-1 corridor. The Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.31 BANK OF MCKENNEY

The Preferred Alternative in Section C is VA1, the common alignment of VA1, VA2, and VA3. The bank building is located on Rives Avenue in the community of McKenney, VA. The building is separated from the Project impact area by Rives Avenue itself, located between the bank and the rail corridor, a distance of 70 feet. Road modifications are restricted to the area south of the bank building, over 160 feet away. The Preferred Alternative will add a new visual element to the viewshed of this property, namely the rail itself, but the modification will actually restore the historic appearance of this area by putting the rail back where it was originally designed. Therefore, the Preferred Alternative will have no adverse effect on this historic property.

It should be noted that the Tier II DEIS identified the Project alternatives as having no effect on the Bank of McKenney. Subsequent to the publication of the Tier II DEIS, the building was reevaluated for eligibility. This resulted in the change in effect.

4.12.2.1.32 CHESAPEAKE AND POTOMAC TELEPHONE COMPANY (C & P) BUILDING

The Preferred Alternative in Section C is VA1, the common alignment of VA1, VA2, and VA3. The C & P Building is located north of a road modification area just outside of the Town of McKenney, VA. The Preferred Alternative will result in the widening of the roadway, but no alterations to the building or its associated landscape will occur. The Project will therefore not diminish any of the characteristics that render this property eligible for the NRHP, although the road footprint along the primary elevation will be slightly modified. Therefore, the Preferred Alternative will have no adverse effect on this historic property.

4.12.2.1.33 ZEHMER FARM/HONEYMOON HILL FARM

The Preferred Alternative in Section C is VA1, the common alignment of VA1, VA2, and VA3. The Preferred Alternative will shift the rail corridor slightly west of its existing location in order to straighten a curve. The new corridor will cross the Zehmer Farm along its easternmost boundary. The Project alternatives will also reroute Jack Zehmer Road, which currently crosses the railroad corridor at-grade from the east and provides access southward to the Town of McKenney, VA, wastewater treatment plant (which is located with the listed boundary of the Zehmer Farm). The existing at-grade crossing of the rail corridor will be closed and the rerouted road will tie into Community Street (along the eastern boundary of Sunnyside Elementary School), and then parallel the railroad south (on the west side of the tracks) to connect with the existing access road. The proposed changes are located more than 600 feet from the main buildings on the farm and will be blocked from view of the house by extensive vegetation. Therefore, the Preferred Alternative will have no adverse effect on this resource.

4.12.2.1.34 WYNNHURST

The Preferred Alternative in Section D is VA4, which is located to the northwest of Wynnhurst, running through the small community of Rawlings, VA. Given the distance from the resource, VDHR determined the Preferred Alternative is outside of the APE of Wynnhurst.

Designs for the VA2 Project alternative are located 300 feet west of the main house of Wynnhurst, and the rail corridor would be shielded from this resource by several modern dwellings and vegetation. Therefore, the VA2 Project alternative would have no effect on this resource.

The VA1 and VA3 Project alternatives are on common alignment in the vicinity of Wynnhurst, running in a straight line south of the Dinwiddie/Brunswick, VA, county line. This alignment runs through the southeastern half of the Wynnhurst property, located north of Route 629. The new rail corridor is 100 feet from the main house and entirely within the larger property boundaries. Due to alterations to the property's location, design, setting, feeling, and association, the VA1/VA3 Project alternative would have an adverse effect on this resource.

4.12.2.1.35 BLICK'S STORE

The Preferred Alternative in Section D is VA4, which will rebuild the railroad tracks through this area in the existing corridor. Along with the VA2 alternative, the Preferred Alternative will reroute Route 629 behind the Blick's Store property, about 300 feet south of the store building.

The road movement will not impact the physical characteristics of the resource. Therefore, the Preferred Alternative and the VA2 Project alternative will have no adverse effect on this resource.

The VA1 and VA3 Project alternatives are on common alignment in this area and include no roadwork in the vicinity of the Blick's Store. Therefore, the VA1/VA3 Project alternative would have no effect on this resource.

4.12.2.1.36 HOUSE/428 SECOND AVENUE

The Preferred Alternative in Section E is VA1, the common alignment of VA1 and VA3. However, all three of the Project alternatives are on common alignment near this resource. Although the road general road system in this area will be modified to remove at-grade crossings in the downtown area, the roadways adjacent to this resource will not be changed. Since the general approach to the home will be altered, but the change will not diminish any of the characteristics that render this property eligible for the NRHP, the Preferred Alternative and the VA2 Project alternative will have no adverse effect on this resource.

4.12.2.1.37 ORGAIN HOUSE

The Preferred Alternative in Section G is VA3. The Preferred Alternative will add a bridge on Old Indian Road over the relocated rail corridor approximately 500 feet south of the recommended boundary of the Orgain House historic resource. Given the distance of the designs from the main house, the Preferred Alternative will have no adverse effect on this resource.

The VA1 and VA2 Project alternatives are located across from both Old Indian Road and the existing rail corridor from the Orgain House and would have no effect on the resource.

The VA4 Project alternative was designed to serve as the avoidance alternative for impacts to the Oak Shades and Tourist Guest House resources described below. The designs for VA4 pass directly through the Orgain House property and, moreover, the main house itself. The main house, nearby 1840s foundation, and several outbuildings would be destroyed by this alternative. Therefore, the VA4 alternative would have an adverse effect on this resource.

4.12.2.1.38 TOURIST GUEST HOUSE

The Preferred Alternative in Section G is VA3. The Tourist Guest House was recorded during an investigation to locate an avoidance alternative to the Oak Shades property described below. The Preferred Alternative will locate the railroad tracks directly behind the main house of the Tourist Guest House. Construction of this new rail line will be within the viewshed of the home. Therefore, the Preferred Alternative will have an adverse effect on this property.

The VA1 and VA2 Project alternatives are located over 300 feet southeast of the property. Therefore, the VA1 and VA2 Project alternatives would have no effect on this resource.

The VA4 Project alternative would locate the railroad tracks approximately 350 feet from the eligible boundary of the Tourist Guest House. The new rail line would be visible from a portion of the property, but would not impact the physical characteristics of the resource. Therefore, the VA4 Project alternative would have no adverse effect on this resource.

4.12.2.1.39 OAK SHADES

The Preferred Alternative in Section G is VA3. Oak Shades is located south of the Tourist Guest House, to the east of Route 639 in Brunswick County, VA, and west of the abandoned Seaboard Coast Line railroad tracks. The VA3 alternative is located over 300 feet from the Oak Shades property and blocked from view by several homes and roadways. Therefore, the Preferred Alternative will have no effect on this resource.

The VA1 Project alternative would relocate the railroad corridor on new location just southeast of the main house at Oak Shades. The new rail corridor would be less than 50 feet from the home. Because of the impacts to the building's physical and historic integrity, the VA1 Project alternative would have an adverse effect on this resource.

The VA2 Project alternative would modify the inactive rail line southeast of the property. The rail tracks would be located down a steel escarpment and not visible from the main house. However, the rail alignment would be shifted away from the historic location of the railroad and would cut into the hill slope by about 30 feet. Because of these changes to its setting, the VA2 Project alternative would have an adverse effect on this resource. (It should be noted that the Tier II DEIS identified the VA2 Project alternative as having no adverse effect on Oak Shades. This determination was revised based on additional coordination with VDHR and review of the designs within Section G.)

The VA4 Project alternative is located over 800 feet from the Oak Shades property and blocked from view by several homes and roadways. Therefore, the VA4 Project alternative would have no effect on this resource.

4.12.2.1.40 EVANS HOUSE

The Preferred Alternative in Section H is VA1, the common alignment of VA1 and VA3. However, all three of the Project alternatives are on common alignment near this resource. The Preferred Alternative will add a set of tracks just east of the existing rail corridor that is located adjacent to the southeastern boundary of the Evans House. In addition, the road system in this area will also be modified by rerouting Wilson Road north of the Evans House to provide an overpass of the rail corridor. This new bridge will be northwest of the Evans House boundaries. It is possible that the new structure will be visible from the house. However, any modifications to the viewshed will be tempered by a vegetative screen and distance, and no character-defining features of this resource will be diminished by this change. Therefore, the Preferred Alternative will have no adverse effect on this resource. (It should be noted that the Tier II DEIS mistakenly listed the VA1 Project alternative as having no effect on the Evans House.)

4.12.2.1.41 LA CROSSE, VA, COMMERCIAL HISTORIC DISTRICT

The Preferred Alternative in Section I is VA1, the common alignment of VA1 and VA2. However, all three of the Project alternatives are on common alignment near this resource. The railroad tracks will run through town at the same grade as the surrounding roadways and above-ground resources. Changes include remodeling the road system through town and the demolition of at least two contributing resources. Because of these changes, the Preferred Alternative and the VA3 Project alternative will have an adverse effect on this district.

4.12.2.1.42 LA CROSSE HOTEL

The Preferred Alternative in Section I is VA1, the common alignment of VA1 and VA3. However, all three of the Project alternatives are on common alignment near this resource. The La Crosse Hotel is located immediately adjacent to the existing railroad ROW. The designs shown in the Tier II DEIS required a small amount of ROW from the hotel property (but not impacting the hotel itself) in order to accommodate the Town of La Crosse, VA, plans to use the property as a future HSR station. Subsequent to the Tier II DEIS, the designs were revised to no longer require any ROW from the resource. Moreover, although the Project will install a new set of rails within the viewshed of the primary elevation of this historic property, similar rails were in place when the hotel was constructed. The rail system was, in fact, the impetus for the development of this lot. Thus, the changes will not diminish the resource's integrity of location, design, setting, materials, workmanship, feeling or association. Based on these changes, the

Preferred Alternative, along with the VA2 and VA3 Project alternatives, will have no adverse effect on this property.

4.12.2.1.43 WRIGHT FARMSTEAD

The Preferred Alternative in Section J is VA2. In the vicinity of the Wright Farmstead, which is south of Belfield Road in Mecklenburg County, VA, the Preferred Alternative is located more than 500 feet away. The alternative will not be visible from the above-ground remains due to dense vegetation and distance. The Project will also not physically impact any portions of the associated archaeological site. Therefore, the Preferred Alternative will have no effect on this resource.

The VA1 and VA3 Project alternatives are on common alignment near the Wright Farmstead and run directly through the western two-thirds of the resource. Therefore, the VA1/VA3 Project alternative would have an adverse effect on this property.

4.12.2.1.44 SARDIS METHODIST CHURCH

The Preferred Alternative in Section J is VA2; however, all three Project alternatives are on common alignment near this resource, which is located east of the old railroad tracks. All alternatives will require rerouting of the current driveway for the Sardis Methodist Church. The existing access road is an at-grade crossing over the rail bed. Under the Project alternatives, the driveway will be rerouted slightly north to utilize an overpass. Visitors will approach the church from the north instead of from the west. Although this change alters the property's setting, it does not diminish any of the characteristics that render the resource eligible for the NRHP. Therefore, the Preferred Alternative, as well as the VA1 and VA3 Project alternatives, will have no adverse effect on this resource.

4.12.2.1.45 BRACEY HISTORIC DISTRICT

The Preferred Alternative in Section K is VA1, the common alignment of VA1 and VA3. The proposed Bracey Historic District is linear, running roughly east-west along Route 619. The town was founded due to the intersection of the road and railway to cater to rail traffic. The Preferred Alternative will construct the rail corridor west of the original Seaboard Air Line tracks. The work will be outside of the district, but will reintroduce an important element of the district's history that has been removed will result in an altered viewshed from contributing resources within the historic district. As such, the Preferred Alternatives will have no adverse effect on the district.

The VA2 Project alternative would reestablish rail on the abandoned Seaboard tracks. However, the existing rail corridor in this area is too narrow to accommodate the proposed line, thus the corridor would be widened to the east. This would result in construction directly adjacent to the existing Bracey Railroad Depot, which is a contributing element to the district. Although the depot would not be destroyed, the work has the potential to diminish the district's design, setting, feeling, and association by modifying the original rail corridor and risking impacts to contributing elements. As such, the VA2 Project alternative will have an adverse effect on this district.

4.12.2.1.46 BRACEY DEPOT

The Preferred Alternative in Section L is VA1/NC1, the common alignment of VA1/NC1 and VA3/NC3. The Bracey Depot is located adjacent to the rail tracks, but this building has been moved further away from the rail footprint and reoriented. Changes to the rail corridor in this area will result in an altered viewshed from the current orientation of the depot, but the alternative will

not diminish any of the characteristics that render this resource eligible for the NHRP. Therefore, the Preferred Alternative will have no adverse effect on this resource.

The VA2 Project alternative would reestablish rail on the abandoned Seaboard tracks. However, the existing rail corridor in this area is too narrow to accommodate the proposed line, thus the corridor would be widened to the east. This would result in construction directly adjacent to the Bracey Depot. As a result of these changes, the VA2 Project alternative would have an adverse effect on this resource.

4.12.2.1.47 BRACEY STORE

The Preferred Alternative in Section L is VA1/NC1, the common alignment of VA1/NC1 and VA3/NC3. The Bracey Store is located east of the rail corridor. The viewshed between the store and the rail tracks is partially blocked by the presence of the Bracey Store, although the rail crossing of Bracey Road is visible from the primary elevation of this resource. The Preferred Alternative would reintroduce rail tracks in this area, which will alter this resource's integrity of setting. However, it will not diminish the integrity of location, design, materials, workmanship, feeling or association. Therefore, the Preferred Alternative will have no adverse effect on this resource.

The VA2 Project alternative would reestablish rail on the abandoned Seaboard tracks. However, the existing rail corridor in this area is too narrow to accommodate the proposed line, thus the corridor would be widened to the east. Changes to the rail corridor in this area would result in an altered viewshed from the current orientation of the store, but the alternative would not diminish any of the characteristics that render this resource eligible for the NHRP. Therefore, the VA2 Project alternative would have no adverse effect on this resource.

4.12.2.1.48 GRANITE HALL/FITTS HOUSE

The Preferred Alternative in Section L is VA1/NC1, the common alignment of VA1/NC1 and VA3/NC3. Granite Hall is located at the northeastern quadrant of the intersection of Route 712 and the North Carolina/Virginia state line. The Preferred Alternative rail alignment is located 700 feet west of Granite Hall and several dwellings, vegetation, and roadways are between the home and the alignments. Therefore, the Preferred Alternative will have no effect on the resource.

The VA2/NC2 Project alternative runs along the abandoned Seaboard Air Line rail corridor. While the rail changes would occur within the existing alignment several hundred feet southwest of the main house, the alternative requires construction of a new bridge on Route 712 over the rail line. The fill slope for the new bridge would be located in front of the main house. This would alter both the driveway and the approach to the home and also introduce a new visual element outside of the primary elevation of the home. Because of impacts to the resource's design, setting, feeling, and association, the VA2/NC2 Project alternative will have an adverse effect on this resource.

4.12.2.2 *BATTLEFIELDS – VIRGINIA*

The follow sections describe the effect of the Project alternatives on battlefields in Virginia within the project APE. The impacts were determined in conjunction with the VDHR, the NPS Petersburg National Battlefield, and NPS Richmond National Battlefield.

As discussed in Section 3.12.2.2, the American Battlefield Protection Program (ABPP) proposed new National Register-eligible boundaries for the 10 Project battlefields in July 2009. The impacts described in the sections below are based on the boundaries determined by the state historic preservation office (VDHR). Although there are differences between the individual battlefield

boundaries, when considered in total, the VDHR boundaries within the Project APE encompass all of the ABPP boundaries with the following exceptions:

- Just south of Highway 288 in Chester, VA – all Project alternatives are on common alignment within existing railroad ROW
- Vicinity of Walthall Industrial Parkway just north of Colonial Heights, VA – all Project alternatives are on common alignment; rail alignments are within existing railroad ROW; new access road proposed to connect Walthall Industrial Parkway with Pine Forest Road
- Vaughn Road near the Burgess Connector – all Project alternatives are on common alignment; rail alignments are within existing railroad ROW; new bridge over the railroad on Vaughn Road
- Carson Road near the Dinwiddie, VA, Courthouse community – the Preferred Alternative (VA1, which is the common alignment of VA1 and VA3) shifts the rail slightly outside of existing railroad ROW and provides a new bridge over the railroad on Carson Road; the VA2 Project alternative is within existing railroad ROW
- Courthouse Road near the Dinwiddie, VA, Courthouse community – the Preferred Alternative (VA1, which is the common alignment of VA1 and VA3) and the VA2 Project alternative are separated by less than 150 feet in this area and extend just outside of the existing railroad ROW; no road improvements are proposed
- Gatewood Road south of the Dinwiddie, VA, Courthouse community – all Project alternatives are on common alignment; no rail work proposed in this location; Gatewood Road will be slightly realigned to accommodate a new bridge over the railroad
- Keelers Mill Road south of the Dinwiddie, VA, Courthouse community - all Project alternatives are on common alignment; rail alignments are within existing railroad ROW; Keelers Mill Road will be slightly realigned to connect with a new access road on the west side of the railroad (outside battlefield boundaries)

The seven segments listed above comprise an extremely small area. It is estimated that at least 95 percent of the area within the two sets of battlefield boundaries overlap. As such, none of the improvements proposed by the Project in these areas will result in a change to the recommended Section 106 effects described in the sections below.

4.12.2.2.1 PROCTOR'S CREEK

The Proctors Creek battlefield spans Sections AA and BB. The Preferred Alternative for both sections is VA1, the common alignment of VA1, VA2, and VA3. The resource straddles the existing rail corridor. Unfortunately, due to expansive commercial and residential development much of the battlefield itself has lost its physical integrity. Despite efforts to preserve parts of the battlefield, such as Fort Darling, large swaths have diminished setting, feeling, and association. As such, while the battlefield is eligible for the NRHP under Criterion A, it is not eligible under Criterion C. The Preferred Alternative will return a second rail line to the existing corridor, a condition that was present at the time of the battle. Because of the compromised integrity of the region as well as the reintroduction of the second rail line, the Preferred Alternative will have no adverse effect on this battlefield.

4.12.2.2.2 PORT WALTHALL JUNCTION

The Port Walthall Junction battlefield is located in Section BB. The Preferred Alternative for Section BB is VA1, the common alignment of VA1, VA2, and VA3. This battlefield encompasses 880 acres straddling the I-95 corridor. The Preferred Alternative will require road modifications to remove at-grade crossings in the very southwestern corner of the larger battlefield. The epicenter of the engagement is located north of the Study Area and remains untouched. The portion of the battlefield within the Study Area, however, has been completely

destroyed by development and the creation of an extensive system of roads. While portions of the battlefield retain their original setting and feeling, the Study Area does not retain its integrity of design, setting, materials, feeling, and association. The Preferred Alternative will have no adverse effect on this battlefield.

4.12.2.2.3 SWIFT CREEK/ARROWFIELD CHURCH

The Swift Creek/Arrowfield Church battlefield is located in Section CC. The Preferred Alternative for Section CC is VA1, the common alignment of VA1, VA2, and VA3. Oriented roughly east-west, this 3,800 acre resource is south of Port Walthall Battlefield and partially within the City of Colonial Heights, VA. Development within Colonial Heights, VA, has destroyed the primary engagement area as well as other segments of the larger battlefield, thus the resource is not eligible under Criterion C. The Project alternatives will minimally widen one existing roadway in the very northern portion of the battlefield. The overall impact area is thus very small compared to the size and scope of this large battlefield. Because of the minimal impacts to a resource that already has compromised physical integrity, the Preferred Alternative will have no adverse effect on this battlefield.

4.12.2.2.4 PETERSBURG III/THE BREAKTHROUGH

The Petersburg III/The Breakthrough battlefield spans Sections CC and DD, although the Project alternatives are on common alignment through the battlefield. The Preferred Alternative for Section CC is VA1, the common alignment of VA1, VA2, and VA3; the Preferred Alternative for Section DD is VA3. The rail line runs north-south through the center of the battlefield. The Preferred Alternative will return a second set of tracks within the existing rail corridor. In addition, three road modifications will occur within the battlefield boundaries: 1) the existing railroad bridge over I-85 in the very northern portion of the battlefield will be widened to accommodate the second set of tracks; 2) the bridge over Defense Road will be widened (see discussion of Defense Road above); and 3) a short segment of Halifax Road east of the rail tracks will be straightened to remove a curve that runs adjacent to the rail line. In all, the changes include a very small percentage of the overall battlefield area. Most of the core areas of engagement are protected within Pamplin Historical Park, but areas outside the park boundaries have been negatively impacted by development. The Preferred Alternative will have no adverse effect on this battlefield.

4.12.2.2.5 WELDON RAILROAD/GLOBE TAVERN

The Weldon Railroad/Globe Tavern battlefield spans Sections CC and DD. The Project alternatives are common through Section CC and vary slightly in the vicinity of the battlefield in Section DD. The Preferred Alternative for Section CC is VA1, the common alignment of VA1, VA2, and VA3; the Preferred Alternative for Section DD is VA3. All of the Project alternatives will add a second set of tracks, a bridge over the CSX A-line tracks, and road work along Halifax Road. The impacted areas comprise a very small segment of the larger 4,370 acre battlefield. The difference in the three alternatives is related to the way they bridge the active CSX A-line and a small access road in the vicinity of where Halifax Road crosses the CSX A-line within Section DD. Refer to Section 2.2.6.1 for more details.

The bridge in Section DD proposed for the Preferred Alternative (VA3) is significantly shorter than the bridge proposed under both the VA1 and VA2 Project alternatives, but will require the greatest amount of fill material through the battlefield.

The VA2 Project alternative maximizes the use of existing railroad ROW. However, the proposed bridge over the CSX A-line is the longest and would be most visible of the three Project alternatives.

The Preferred Alternative and the VA1 Project alternative would require more new ROW than VA2. The Preferred Alternative and the VA1 Project alternative primarily follow the same rail alignment, but the proposed bridges are different lengths. Both alternatives will have shorter bridges over the CSX A-line than the VA2 alternative.

The Preferred Alternative, as well as the VA1 and VA2 Project alternatives, will have no adverse effect on this battlefield. As a condition of this effect determination, the NPS Petersburg National Battlefield requested that the fill slopes for the proposed bridge have tree plantings to minimize the visual intrusion on the landscape. The VDHR also requested to view the engineering and vegetation plans before construction.

4.12.2.2.6 PEEBLES FARM

The Peebles Farm battlefield spans Sections CC and DD, although the Project alternatives are on common alignment through the battlefield. The Preferred Alternative for Section CC is VA1, the common alignment of VA1, VA2, and VA3; the Preferred Alternative for Section DD is VA3. This 2,800-acre resource includes two bounded areas. The rail corridor runs east-west between these two areas, thus the actual rail corridor is not within the boundaries of this resource. However, the Preferred Alternative will widen a small segment of Vaughn Road running north-south near the northeastern section of the southern battlefield section. This road modification area only clips the very northeastern corner of the southern battlefield area. The northern battlefield section will not be impacted, and the majority of the southern section will remain untouched. Due to the very minimal scope of the proposed change, the Preferred Alternative will have no adverse effect on this battlefield.

4.12.2.2.7 BOYDTON PLANK ROAD

The Boydton Plank Road battlefield spans Sections DD and A. The Project alternatives are common through Section DD and vary slightly through the battlefield in Section A in the vicinity of the Burgess Connector, an inactive railroad corridor between the CSX S-Line (currently inactive) and the CSX A-Line (currently active). The Preferred Alternative for Section DD is VA3; the Preferred Alternative for Section A is VA2. In Section A, the Preferred Alternative extends slightly outside of the existing ROW from Smith Grove Road to Dabney Mill Road, a distance of approximately two miles, in order to flatten out a severe curve in the existing rail alignment. The VA1/VA3 Project alternative stays within the existing railroad ROW in this area.

The existing rail corridor runs through the center of the resource from its northeastern corner diagonally to its southwestern edge. The Project alternatives will add a new set of rails on an abandoned rail track, which was in operation during the period of significance of this resource. In addition, a very small segment of Squirrel Level Road will be modified, located on the eastern edge of the larger resource. Re-establishing the rail line will restore a notable element of this resource that was removed in the twentieth century, and the changes to the road are quite minimal. These two alterations will not diminish the characteristics that rendered this property eligible for the NRHP under Criterion A. The Preferred Alternative, as well as the VA1 and VA2 alternatives in Section DD and the VA1 and VA3 alternatives in Section A, will have no adverse effect on this battlefield.

4.12.2.2.8 HATCHER'S RUN

The Hatcher's Run battlefield spans Sections DD and A and the Project alternatives vary slightly through the battlefield in the vicinity of the Burgess Connector in Section A, as described above for Boydton Plank Road battlefield. The Preferred Alternative for Section DD is VA3; the Preferred Alternative for Section A is VA2. As described above, Project changes in this general area will include reintroducing the second set of tracks within the rail corridor and road

modifications. Two small road changes are proposed: widening a small segment of Vaughn Road, which runs perpendicular to the tracks, and improving a small section of Squirrel Level Road near the east-west oriented rail tracks. Both road improvement areas are located in the very northeastern corner of the larger battlefield. The vast majority of the battlefield will not be impacted by this small amount of road work, and the Project will not alter the characteristics that render this property eligible for the NRHP. Therefore, the Preferred Alternative, as well as the VA1 and VA2 alternatives in Section DD and the VA1 and VA3 alternatives in Section A, will have no adverse effect on this battlefield.

4.12.2.2.9 LEWIS FARM

The Lewis Farm battlefield is located in Section A. The Preferred Alternative in Section A is VA2; however, all three of the Project alternatives are on common alignment through this battlefield. The Preferred Alternative will reintroduce a second line within the existing rail corridor. A segment of Quaker Road, located in the northwestern corner of the battlefield, will be rerouted for a distance of about 100 feet. The minimal changes to the road configuration will not alter the property's association with Civil War events, modify the viewshed within the battlefield boundaries, or diminish the property's integrity in any other way. As such, the Preferred Alternative will have no adverse effect on this battlefield.

4.12.2.2.10 DINWIDDIE, VA, COURTHOUSE

The Dinwiddie, VA, Courthouse battlefield is located in Section B. The Preferred Alternative in Section B is VA1, the common alignment of VA1 and VA3; however, all three of the Project alternatives are common through the battlefield. This large battlefield encompasses over 3,300 acres northwest of the community of Dinwiddie, VA. The eastern boundary of the battlefield is located adjacent to the western boundary of the rail corridor, thus the battlefield is within the visual APE of the rail work in this area. All modifications will be restricted to the existing rail corridor. The proposed rail alignments are not physically within the battlefield boundaries, and the viewshed of the larger battlefield is shielded from the rail corridor by excessive distance, vegetation, the presence of US-1, numerous modern developments within the community of Dinwiddie, VA, and topography. As such, the Preferred Alternative will have no adverse effect on this battlefield.

4.12.2.3 *HISTORICAL RESOURCES – NORTH CAROLINA*

The following discussion provides details on the effect of the Project alternatives on historical resources in North Carolina where FRA and NCDOT determined that the Project has no adverse effect or adverse effects for at least one alternative. For all other resources, the Project has been determined to have no effect for all alternatives. This includes the Holtzmann Farm, which was presented in the Tier II DEIS as having no adverse effect from all Project alternatives. A subsequent change to road designs in the Ridgeway, NC, area resulted in a shift away from this resource.

4.12.2.3.1 CHAPEL OF THE GOOD SHEPHERD

The Preferred Alternative in Section M is NC1, the common alignment of NC1 and NC3. All three of the Project alternatives are on common alignment through Ridgeway and in the vicinity of the Chapel of the Good Shepherd. The designs presented in the Tier II DEIS will reroute Ridgeway Warrenton Road from its current location in front of the church to a new location immediately behind the church in order to access a proposed grade separation over the railroad corridor. Due to the changes in access and the visual environment, FRA and NCDOT determined that the NC1, NC2, and NC3 Project alternatives have an adverse effect on the Chapel of the

Good Shepherd. In response to comments on the Tier II DEIS and in coordination with Warren County, NC, the Kerr-Tar Council of Governments (the Rural Planning Organization) and the NCDOT Transportation Planning Branch, several modifications were made to the proposed roadwork for the Ridgeway area. The revised designs will put the grade separation over the railroad corridor on Ridgeway Drewry Road rather than on Ridgeway Warrenton Road. Ridgeway Drewry Road will be shifted approximately 650 feet to the northeast to cross over US-1 and the railroad on a bridge, and connect to a new alignment for Axtell Ridgway Road on the south side of the railroad. Additional traffic will pass in front of Chapel of the Good Shepherd to use the new grade separation. Therefore, the Preferred Alternative, as well as the NC2 Project alternative, will have no adverse effect on the resource.

4.12.2.3.2 DR. THOMAS B. WILLIAMS HOUSE AND OFFICE

The Preferred Alternative in Section M is NC1, the common alignment of NC1 and NC3. As discussed above for the Chapel of the Good Shepherd, all three of the Project alternatives are on common alignment through Ridgeway and changes to the designs presented in the Tier II DEIS will put the grade separation over the railroad corridor on Ridgeway Drewry Road rather than on Ridgeway Warrenton Road. Ridgeway Drewry Road will be shifted approximately 650 feet to the northeast to cross over US-1 and the railroad on a bridge, and connect to a new alignment for Axtell Ridgway Road on the south side of the railroad. The grade separation will be located approximately 500 feet to the west of the Dr. Thomas B. Williams House and Office. Therefore, the Preferred Alternative, as well as the NC2 Project alternative, will have no adverse effect on the resource.

4.12.2.3.3 MARSHALL HOUSE/TAVERN

The Preferred Alternative in Section M is NC1, the common alignment of NC1 and NC3. As discussed above for the Chapel of the Good Shepherd, all three of the Project alternatives are on common alignment through Ridgeway and changes to the designs presented in the Tier II DEIS will put the grade separation over the railroad corridor on Ridgeway Drewry Road rather than on Ridgeway Warrenton Road. Ridgeway Drewry Road will be shifted approximately 650 feet to the northeast to cross over US-1 and the railroad on a bridge, and connect to a new alignment for Axtell Ridgway Road on the south side of the railroad. The grade separation will be located approximately 700 feet to the east of the Marshall House/Tavern, and a short section of the old Ridgeway Drewry Road in front of the Marshall House/Tavern will be used to provide a connection between US-1 and the new road and bridge. The designs will require a minor amount of road frontage ROW from the resource for the new connection, but the change will not alter the viewshed from the resource's primary elevation. Therefore, the Preferred Alternative, as well as the NC2 Project alternative, will have no adverse effect on the resource.

4.12.2.3.4 WILLIAM J. HAWKINS HOUSE

The Preferred Alternative in Section N is NC1, the common alignment of NC1 and NC3. All three of the Project alternatives are on common alignment in the vicinity of the William J. Hawkins House, and will require a small amount of additional railroad ROW be taken from the resource. In addition, the current driveway access for the property will be relocated to a proposed service road that will provide access to Axtell Ridgeway Road, north of the property. Because of these impacts to the resource, the Preferred Alternative, as well as the NC2 Project alternative, will have no adverse effect on this resource. NC-HPO's concurrence with this determination is conditional; the Project Team must coordinate with the property owner about the access issue, i.e., a temporary construction easement will be required to maintain access.

4.12.2.3.5 HOLLOWAY FARM

The Preferred Alternative in Section O is NC3. The Project alternatives vary in the vicinity of the Holloway Farm. No property impacts to the historic resource are anticipated from the Preferred Alternative; therefore, the Preferred Alternative will have no effect on this resource.

The proposed NC1 and NC2 rail alignments alternatives would bisect this resource; therefore, the NC1 and NC2 alternatives would have an adverse effect on this resource.

4.12.2.3.6 FORREST ELLINGTON FARM

The Preferred Alternative in Section O is NC3. All three of the Project alternatives are on common alignment in the vicinity of the Forrest Ellington Farm and will require a minor amount of road frontage ROW from the northwest corner of the property at the intersection of Brookston Road and Carver School Road. Therefore, the Preferred Alternative, as well as the NC1 and NC2 Project alternatives, will have no adverse effect on this resource.

4.12.2.3.7 HENDERSON, NC, HISTORIC DISTRICT AND PROPOSED BOUNDARY EXPANSION

The Preferred Alternative in Section P is NC1, the common alignment of NC1, NC2, and NC3. All three of the proposed Project alternatives are on common alignment through Henderson, NC, and will grade-separate Andrews Avenue (NC Hwy 39) within the Henderson, NC, Historic District. A retaining wall is included in the design to minimize impacts to the district from the grade separation. However, the retaining wall will require a small amount of ROW be taken from a house along Andrews Avenue and necessitate re-grading a driveway. It will also impact landscaping along Andrews Avenue, potentially removing several trees. Due to these impacts, the Preferred Alternative will have an adverse effect on the district.

4.12.2.3.8 SOUTH HENDERSON, NC, INDUSTRIAL HISTORIC DISTRICT

The Preferred Alternative in Section P is NC1, the common alignment of NC1, NC2, and NC3. All three of the Project alternatives are on common alignment through Henderson, NC, and will grade-separate Alexander Avenue on new alignment through the South Henderson, NC, Industrial Historic District. Currently, Alexander Avenue tees into Nicholas Street; the proposed alternatives will carry it over the railroad tracks to connect to the Dabney Drive Extension. In order to accommodate the new bridge on Alexander Avenue, the SEHSR alternatives will require the closing of the Nicholas Street intersection with Alexander Avenue. Due to these impacts, the Preferred Alternative will have an adverse effect on the district.

4.12.2.3.9 HOUSES (5 WORKER HOUSES ON 1400 BLOCK OF NICHOLAS ST)

The Preferred Alternative in Section P is NC1, the common alignment of NC1, NC2, and NC3. These houses are located within the South Henderson, NC, Industrial Historic District. All three of the Project alternatives are on common alignment through Henderson, NC, and will require minor ROW from the resources directly adjacent to the railroad corridor (at the rear end of the properties). Therefore, the Preferred Alternative will have no adverse effect on these resources provided that there is no taking of the structures.

4.12.2.3.10 HOUSES (3 SIDE GABLE HOUSES ON 1500 BLOCK OF NICHOLAS ST)

The Preferred Alternative in Section P is NC1, the common alignment of NC1, NC2, and NC3. These houses are located within the South Henderson, NC, Industrial Historic District. All three of the Project alternatives are on common alignment through Henderson, NC, and will require

minor ROW from the resources directly adjacent to the railroad corridor (at the rear end of the properties). Therefore, the Preferred Alternative will have no adverse effect on these resources provided that there is no taking of the structures.

4.12.2.3.11 FRANKLINTON, NC, HISTORIC DISTRICT (INCLUDES STERLING MILL HISTORIC DISTRICT)

The Preferred Alternative in Section S is NC1, the common alignment of NC1 and NC3. All three of the Project alternatives are on common alignment through Franklinton, NC, and will eliminate the railroad crossing at Mason Street and also replace the railroad bridge at Green Street, which is a contributing element to the historic district. Due to these impacts, the Preferred Alternative, as well as the NC2 Project alternative, will have an adverse effect on the district.

4.12.2.3.12 STERLING COTTON MILL

The Preferred Alternative in Section S is NC1, the common alignment of NC1 and NC3. Sterling Mill is located within the Franklinton, NC, Historic District. All three of the Project alternatives are on common alignment through Franklinton, NC, and will require minor ROW for the Green Street underpass improvements (including sidewalks). Therefore, the Preferred Alternative, as well as the NC2 Project alternative, will have no adverse effect on this resource.

4.12.2.3.13 CEDAR CREEK RAILROAD BRIDGE PIERS

The Preferred Alternative in Section S is NC1, the common alignment of NC1 and NC3. Currently, active railroad traffic in the proposed Project corridor crosses Cedar Creek on a bridge that spans the historic Cedar Creek Railroad Bridge Piers. All three of the Project alternatives will be on new location in this location. The Preferred Alternative and the NC3 Project alternative will cross Cedar Creek on a new bridge just to the east of the piers; the NC2 Project alternative would cross on a new bridge just to the west of the existing piers. With implementation of any of the three Project alternatives, the existing railroad bridge will no longer be used for rail traffic. Therefore, the Preferred Alternative, as well as the NC2 Project alternative, will have no adverse effect on this resource. NC-HPO's concurrence with this determination is conditional; the Project must commit to ensuring the piers are not taken down during the construction or life of the Project.

4.12.2.3.14 YOUNGSVILLE, NC, HISTORIC DISTRICT

The Preferred Alternative in Section T is NC1, the common alignment of NC1 and NC3. All three of the Project alternatives are on common alignment through Youngsville, NC, and will grade-separate Main Street in the vicinity of the Youngsville, NC, Historic District. In order to accommodate the new bridge, the alternatives will require the removal of several on-street parking spots in front of the Youngsville, NC, Community Center at 115 East Main Street. Therefore, the Preferred Alternative, as well as the NC2 Project alternative, will have no adverse effect on this resource. NC-HPO's concurrence with this determination is conditional; the Project must provide tree protection along Cross Street during construction of the Project.

It should be noted that the eligible historic district boundary shown on the Project mapping varies slightly from the district boundary shown on the North Carolina state "Study List." The Study List is a list of properties that appear to be "potentially eligible" for listing in the NRHP. It is used as a preliminary step in the review of potential nominations to the NRHP and is codified in the state administrative code (Subchapter 4R, Section .0304). The boundary for the Youngsville, NC, Historic District shown on the Study List was identified prior to the surveys completed for the Project to determine eligibility for the NRHP.

4.12.2.3.15 GLEN ROYALL MILL VILLAGE HISTORIC DISTRICT

The Preferred Alternative in Section U is NC1. All three of the Project alternatives are on common alignment in the vicinity of the Glen Royall Mill Village Historic District. No property impacts within the historic district are anticipated from any of the three proposed alternatives; however, a pedestrian crossing of the railroad tracks is proposed directly adjacent to the district. As a result, the Preferred Alternative, as well as the NC2 and NC3 Project alternatives, will have no adverse effect on this resource. NC-HPO's concurrence with this determination is conditional; the Project Team must design the pedestrian crossing in a manner that minimizes its opaqueness and that fits in with the character of its surroundings.

4.12.2.3.16 WAKE FOREST, NC, HISTORIC DISTRICT

The Preferred Alternative in Section U is NC1. All three of the Project alternatives are on common alignment through Wake Forest, NC,. The designs presented in the Tier II DEIS would have closed the existing at-grade crossing at Elm Avenue and were determined to have no effect on the Wake Forest, NC, Historic District. Comments on the Tier II DEIS from the public and the Town of Wake Forest, NC, indicated a strong desire to maintain access across the railroad at Elm Avenue, if not vehicular, at least pedestrian. This led to the design of a pedestrian underpass, developed in coordination with the Town and the NC-HPO. The new design also included development of alternative access for properties on the northwest side (contributing elements to the district) that will lose the existing illegal access off of Elm Avenue along Railroad Street, which lies within the railroad right of way. The new designs were presented at a May 15, 2012, Public Update Meeting. Strong opposition to the property impacts associated with the designs led to their elimination.

Following the Public Update Meeting, additional coordination with the Town and the NC-HPO led to the development of a design for a pedestrian bridge with stairs. As part of the consultation with the NC-HPO, it was determined that although the Project will not necessarily prevent access with the pedestrian bridge nor require enforcement of the rail right of way, loss of access to Railroad Street is a foreseeable consequence of the Project; therefore, the Project will need to address access to Railroad Street. The pedestrian bridge and associated new access to the properties on Railroad Street are included in the Project designs presented in this Tier II FEIS. Based on these changes to the designs, the Preferred Alternative, as well as the NC2 and NC3 Project alternatives, will have no adverse effect on the Wake Forest, NC, Historic District. NC-HPO's concurrence with this determination is conditional; the Section 106 Memorandum of Agreement for the Project must specifically address coordination with owners of the four residences for temporary construction easements. In addition, standardized and aesthetic closures of at-grade crossings within the district must be employed (e.g., no guard rails or "T" closures).

4.12.2.3.17 CRABTREE CREEK RAILROAD BRIDGE PIER

The Preferred Alternative in Section V is NC5; however, all four of the Project alternatives are on common alignment in the vicinity of the Crabtree Creek Railroad Bridge Pier. The pier is located immediately adjacent to the existing rail bridge that spans both Crabtree Creek and Hodges Street. The Project alternatives will construct a new bridge adjacent to the existing single-track bridge. The new bridge will span the pier and require a small amount of ROW under the span to allow for access and maintenance. This ROW includes the land where the pier is situated. The pier will not be otherwise impacted. Therefore, the Preferred Alternative, as well as the NC1, NC2, and NC3 Project alternatives, will have no adverse effect on this resource. NC-HPO's concurrence with this determination is conditional; the Project must ensure that the pier is not impacted during construction of the new bridge.

4.12.2.3.18 GULF PETROLEUM PRODUCTS WAREHOUSE

The Preferred Alternative in Section V is NC5. The Project alternatives vary slightly in the vicinity of the Gulf Petroleum Products Warehouse. However, all four of the Project alternatives add an additional railroad track within the existing active rail corridor adjacent to the resource. The Preferred Alternative, as well as the NC1, NC2, and NC3, Project alternatives all require ROW from the side of the warehouse closest to the existing CSX railroad corridor. Final designs may require the warehouse building to be demolished and also impact the masonry foundation at the northeast corner of the parcel, which historically held a series of above-ground tanks and is a contributing element to the resource. Therefore, the Preferred Alternative, as well as the NC1, NC2, and NC3 Project alternatives, will have an adverse effect on the resource.

4.12.2.3.19 ROANOKE PARK HISTORIC DISTRICT

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Roanoke Park Historic District. The Preferred Alternative, NC1, and NC2 rail alignments are located across Capital Boulevard from the district; therefore, the Preferred Alternative, as well as the NC1 and NC2 Project alternatives, will have no effect on this resource.

The NC3 Project alternative would require additional ROW directly adjacent to the railroad corridor behind four properties on Bickett Boulevard within the historic district. The ROW is necessary to maintain the operation of the nearby Norfolk Southern railroad yard. The necessary ROW would impact the backyards of these properties; in particular, one property would lose approximately 0.15 acres, including a garage. Due to these impacts, the NC3 Project alternative would have an adverse effect on this resource.

4.12.2.3.20 NOLAND PLUMBING COMPANY BUILDING

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Noland Plumbing Company Building. The Preferred alternative, as well as the NC1 and NC2 rail alignments, are located across Capital Boulevard from the Noland Plumbing Company Building source. Therefore, the Preferred Alternative, as well as the NC1 and NC2 Project alternatives, will have no effect on this resource.

The NC3 Project alternative would require a minor amount of ROW directly adjacent to the railroad corridor along the rear of the Noland Plumbing Company Building property. The ROW is necessary to maintain the operation of the nearby Norfolk Southern railroad yard. Two modern storage buildings would potentially be impacted by the additional ROW; neither is a contributing element to the resource. Due to these impacts, the NC3 Project alternative would have no adverse effect on this resource.

4.12.2.3.21 GLENWOOD-BROOKLYN HISTORIC DISTRICT

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Glenwood-Brooklyn Historic District. The NC5 Project alternative is located on the east side of the Norfolk Southern railroad tracks adjacent to the Glenwood-Brooklyn Historic District. Therefore, the Preferred Alternative will have no effect on this resource.

The proposed NC1 and NC2 rail alignments are located across Capital Boulevard from the district; therefore, the NC1 and NC2 Project alternatives would have no effect on this resource.

The NC3 Project alternative would require a minor amount of ROW and easements directly adjacent to the railroad corridor along the Glenwood-Brooklyn Historic District in order to maintain the operation of the nearby Norfolk Southern railroad yard. A minor amount of ROW would be required from one residence on Adams Street and one residence on Washington Street

(at the rear end of the properties). In addition, an easement would be required within the parking lots for several commercial properties along Dale Street and Jefferson Street. These easements are necessary to construct and maintain a retaining wall along the railroad corridor. Due to these impacts, the NC3 Project alternative would have no adverse effect on this resource.

4.12.2.3.22 SEABOARD RAILWAY STATION

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Seaboard Railway Station, which is located adjacent to the Mordecai Historic District. The Preferred Alternative and the NC3 rail alignments are located across Capital Boulevard from the district; therefore, the Preferred Alternative, as well as the NC3 alternative, will have no effect on this resource.

The NC1 and NC2 rail alignment alternatives may require temporary construction easements from this resource, but no additional ROW. Therefore, the NC1 and NC2 Project alternatives would have no adverse effect on this resource.

4.12.2.3.23 SEABOARD RAILWAY WAREHOUSES

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Seaboard Railway Warehouses, which are located adjacent to the Mordecai Historic District. The Preferred Alternative and the NC3 Project alternative are located across Capital Boulevard from the district; therefore, the Preferred Alternative, as well as the NC3 alternative, will have no effect on this resource.

The NC1 and NC2 rail alignment alternatives may require temporary construction easements from this resource, but no additional ROW. Therefore, the NC1 and NC2 alternatives would have no adverse effect on this resource.

4.12.2.3.24 RALEIGH COTTON MILLS

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Raleigh Cotton Mills. The Preferred Alternative and the NC3 Project alternative are located across Capital Boulevard from the resource; therefore, the Preferred Alternative, as well as the NC3 alternative, will have no effect on this resource.

The NC1 and NC2 rail alignment alternatives would require minor ROW from the resource; however, no buildings would be taken. Therefore, the NC1 and NC2 Project alternatives would have no adverse effect on this resource.

4.12.2.3.25 RALEIGH ELECTRIC COMPANY POWER HOUSE

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Raleigh Electric Company Power House. The Preferred Alternative and the NC3 Project alternative will close the existing at-grade railroad crossing at West Jones Street and provide a pedestrian crossing across the tracks. The ROW required for the closing will not have a property impact on the Raleigh Electric Company Power House; however, the pedestrian bridge will be visible directly in front of the building. Therefore, the Preferred Alternative, as well as the NC3 alternative, will have no adverse effect on this resource. The NC-HPO's concurrence with this determination is conditional; the Project must provide aesthetic treatments for the bridge be outlined in the Memorandum of Agreement (MOA) for the Project in coordination with the consulting parties and property owners in this location.

The NC1 Project alternative would grade-separate West Jones Street. The bridge would be visible directly in front of the Raleigh Electric Company Power House and a minor amount of

ROW would be required from the property (with no impacts to the building itself). Therefore, the NC1 Project alternative would have an adverse effect on this resource.

The NC2 Project alternative would be almost identical to the NC1 Project alternative in the vicinity of the Raleigh Electric Company Power House, with a minor shift in rail alignment. The NC2 Project alternative would also grade-separate West Jones Street and will have the same visual and property impacts as the NC1 Project alternative. Therefore, the NC2 Project alternative would have an adverse effect on this resource.

4.12.2.3.26 CAROLINA POWER AND LIGHT COMPANY CAR BARN AND AUTOMOBILE GARAGE

The Preferred Alternative in Section V is NC5. The Project alternatives vary in the vicinity of the Carolina Power and Light Company Car Barn and Automobile Garage. The Preferred Alternative and the NC3 Project alternative will close the existing at-grade railroad crossing at West Jones Street. The ROW required for the closing will not impact the Carolina Power and Light Company Car Barn and Automobile Garage. Therefore, the Preferred Alternative, as well as the NC3 alternative, will have no effect on this resource.

The NC1 Project alternative would grade-separate West Jones Street. The bridge would be visible directly in front of the Carolina Power and Light Company Car Barn and Automobile Garage and a minor amount of ROW would be required from the property (with no impacts to the building itself). Therefore, the NC1 Project alternative would have an adverse effect on this resource.

The NC2 Project alternative would be almost identical to the NC1 Project alternative in the vicinity of the Carolina Power and Light Company Car Barn and Automobile Garage, with a minor shift in rail alignment. The NC2 Project alternative would also grade-separate West Jones Street and will have the same visual and property impacts as the NC1 Project alternative. Therefore, the NC2 Project alternative would have an adverse effect on this resource.

4.12.2.3.27 DEPOT HISTORIC DISTRICT AND PROPOSED EXPANSION AREA

The Preferred Alternative in Section V is NC5. The Project alternatives vary slightly in the vicinity of the Depot Historic District and Proposed Expansion Area. All four of the Project alternatives add an additional railroad track within the existing active rail corridor adjacent to the district, but do not require ROW from resource. However, they all close the existing at-grade railroad crossing on W. Hargett Street within the proposed expansion area for the district. Therefore, the Preferred Alternative, as well as the NC1, NC2, and NC3 Project alternatives, will have no adverse effect on these resources.

On March 12, 2014, FRA, in partnership with NCDOT, completed an Environmental Assessment for Phase I of the proposed Raleigh Union Station to be constructed at the Boylan Wye to support the expansion of intercity passenger rail service in Raleigh, NC; for which FRA subsequently issued a Finding of no Significant Impact (FONSI) on June 24, 2014. In support of the FONSI, FRA, NCDOT and the NC-HPO executed a Memorandum of Agreement (MOA) for Phase I of the proposed Raleigh Union Station on May 22, 2014.

The MOA determined that Phase I of the Raleigh Union Station project will have an Adverse Effect upon the Depot Historic District and the Proposed Boundary Amendment to the Depot Historic District. Specific areas of effect include the Capital Feed and Grocery and Southern Railway Passenger Station, which may be subject to demolition for Phase I of the Raleigh Union Station project. Although Phase I of the Raleigh Union Station project will provide the primary station building and access facility, it is considered independent from the Richmond to Raleigh Project Tier II EIS. A future phase of the Raleigh Union Station will include the expansion of

facilities to construct a platform and passenger access to the CSX S-Line on the SEHSR corridor. This future phase will require a separate environmental determination from the Phase I activity as well as this Richmond to Raleigh Project Tier II FEIS.

4.12.2.3.28 RALEIGH, NC, AND GASTON, NC, RAILROAD CORRIDOR

The Preferred Alternative in Sections M through V is a combination of the various Project alternatives (NC1 in Sections M, N, P, Q, R, S, T, and U; NC3 in Section O; and NC 5 in Section V). All of the Project alternatives are located within the Raleigh, NC, and Gaston, NC, Railroad Corridor for the majority of their lengths (approximately 74% for NC1, 72% for NC3, and 67% for NC3). The NC5 alternative in Raleigh, NC, is also almost entirely within the corridor. The Project alternatives do not impact the vast majority of contributing elements to the corridor. However, all Project alternatives will replace at least one of the reinforced concrete bridges and potentially impact at least one of the stone-lined culverts. In addition, the NC2 Project alternative would require the relocation of the repeater tower in Norlina, NC. Due to these impacts, all alternatives will have an adverse effect on the Raleigh, NC, and Gaston, NC, Railroad Corridor.

4.12.3 SUMMARY AND POTENTIAL MITIGATION MEASURES

In summary, there are 149 unique historic resources within the Project corridor that are protected under Section 106 of the NHPA. (Several properties are considered both historic architecture and archaeology resources.) Of these, 36 resources would be adversely affected by one or more of the Project alternatives. The Preferred Alternative will have an adverse effect on 26 resources.

Efforts were made to identify Project alternatives that avoid adverse effects to Section 106 resources. Where avoidance was not possible, measures will be undertaken to minimize and mitigate for impacts. Section 5.11 outlines measures to minimize harm to historic resources. Section 5.12 describes the coordination that has taken place between the Project Team and state historic preservation offices, resource owners, historic societies, and other consulting parties.

4.13 PARKLANDS, RECREATIONAL AREAS AND REFUGES

The following section describes the Federal parklands, city/county parks, and local greenways that have potential impacts from the Project alternatives, and the extent of the potential impacts. There are no state parks, natural area preserves, forests or recreation areas located within the Study Area.

4.13.1 FEDERAL PARKLANDS

The National Park Service (NPS) manages the Fort Wadsworth Unit of Petersburg National Battlefield, which is located directly adjacent to the rail corridor near Collier rail yard. The Preferred Alternative in Section DD is VA3; however, the three Project alternatives were on common alignment in the vicinity of the Fort Wadsworth Unit and would require obtaining between 30 feet and 50 feet of ROW along the western portion of the Fort Wadsworth Unit. This ROW is needed for the additional track necessary to accommodate the high speed trains associated with the Project.

The Project Team met with the NPS regarding this issue on February 26, 2009. In a letter dated March 4, 2009, the Petersburg National Battlefield superintendent stated that the Project could mitigate potential adverse effects to the Fort Wadsworth Unit under Section 106 with a land exchange (see Tier II DEIS, Appendix M). This land exchange would be worked out as the Project is implemented.

4.13.2 COUNTY/CITY PARKLANDS

4.13.2.1 *VIRGINIA*

4.13.2.1.1 CANAL WALK (RICHMOND, VA)

The City of Richmond, VA, Canal Walk is located between 5th and 17th Streets along the James River and the Kanawha and Haxall Canals. Alternative VA1 is the Preferred Alternative in Section AA. All three of the proposed Project alternatives (VA1, VA2, and VA3) are on common alignment in this area and would not require any ROW from the Canal Walk. The existing rail line has daily freight and passenger rail traffic that can be heard and seen from the walkway. Therefore, the addition of SEHSR will not negatively impact the Canal Walk.

4.13.2.1.2 JAMES RIVER PARK SYSTEM – SLAVE TRAIL (RICHMOND, VA)

The Slave Trail is located within the City of Richmond, VA, James River Park System. Alternative VA1 is the Preferred Alternative in Section AA. The VA1, VA2, and VA3 Project alternatives are on common alignment through Richmond, VA, and would require the construction of a new rail bridge over the James River, immediately adjacent to the existing rail bridge located between the South 14th Street and I-95 roadway bridges. A small amount of ROW under the span of the bridge is required to allow for access and maintenance. Included in this ROW is approximately 0.03 acre of the Slave Trail within the James River Park System. The existing rail bridge has daily freight rail traffic that can be heard and seen from the trail; therefore, the new, parallel bridge will not alter the character, setting, or use of the trail. The Project would not negatively impact this resource.

4.13.2.1.3 GREAT SHIPLOCK PARK (RICHMOND, VA)

This park is located outside the Study Area on the north bank of the James River, east of the Project alternatives and I-95 crossing of the James River. There are no impacts to this resource from the Project.

4.13.2.1.4 JEFFERSON PARK (RICHMOND, VA)

This park is east of the Study Area. There are no impacts to this resource from the Project.

4.13.2.1.5 THOMAS B. SMITH COMMUNITY CENTER (RICHMOND, VA)

The City of Richmond, VA - Department of Parks, Recreation, and Community Facilities operates the Thomas B. Smith Community Center at 2015 Ruffin Road. Alternative VA1 is the Preferred Alternative in Section AA. The VA1, VA2, and VA3 Project alternatives are on common alignment, and would provide a railroad bridge over Ruffin Road just west of the community center and park. This bridge would ensure the safety of automobiles crossing the Project corridor. Due to the need to lower Ruffin Road to accommodate the bridge, a small amount of ROW is needed in the southwest corner of the Thomas B. Smith Community Center and Park. The ROW is approximately 0.07 acres along Ruffin Road adjacent to the community center. Automobile access to the community center would be maintained. In addition, the grade-separated rail-over-road crossing would greatly improve safety for pedestrians and bicyclists accessing the community center from west of the rail line. The Project will not have a negative impact on this resource.

4.13.2.1.6 FALLING CREEK PARK EXPANSION (PLANNED) (CHESTERFIELD COUNTY, VA)

Chesterfield County is planning to acquire property just north of Falling Creek and east of Jefferson Davis Highway to use for a public park, expanding on the Falling Creek Ironworks Park directly south of the creek. Alternative VA1 is the Preferred Alternative in Section AA. All three of the proposed Project alternatives (VA1, VA2, and VA3) are on common alignment in the vicinity of the planned Falling Creek Park Expansion. Although the Project rail designs are located within the existing CSX railroad corridor and would not impact the park, the proposed grade separation of Station Road would relocate Station Road onto the parcel where the park is planned. Although ROW is needed from the parcel, the designs do not impact the proposed "Resource Protection Area" for the park as shown on the rendered site plan provided by Chesterfield County to the Project Team in June 2012. The existing rail lines in this area have daily freight and passenger rail traffic that can be heard and seen from the proposed location of the trail. In addition, there is vehicular traffic along Jefferson Davis Highway immediately adjacent to the proposed park. Therefore, the Project would not negatively impact this resource.

4.13.2.1.7 FALLING CREEK IRONWORKS PARK (UNDER DEVELOPMENT) (CHESTERFIELD COUNTY, VA)

Chesterfield County is developing a park at the site of the Falling Creek Ironworks, the first ironworks in English North America. Alternative VA1 is the Preferred Alternative in Section AA. All three of the proposed Project alternatives (VA1, VA2, and VA3) are located within the existing CSX railroad corridor where it crosses through Falling Creek Ironworks Park. The Project alternatives would cross Falling Creek on the existing structure and would not require any new ROW. The existing rail lines in this area have daily freight and passenger rail traffic that can be heard and seen from the Falling Creek Ironworks Park. Therefore, the addition of the Project should not negatively impact the park.

4.13.2.1.8 CHESTER LINEAR PARK EXPANSION (PLANNED) (CHESTERFIELD COUNTY, VA)

Chesterfield County operates Chester Linear Park, a strip of land situated in the Chester Village area. Alternative VA1 is the Preferred Alternative in Section BB. All three of the proposed Project alternatives (VA1, VA2, and VA3) would add an additional railroad track within the existing CSX railroad corridor in the location where the planned expansion of Chester Linear Park would cross. Chesterfield County does not currently have an agreement from CSX to cross the active railroad corridor in this area. Therefore, the proposed changes associated with the Project would not create a barrier to the expansion of Chester Linear Park (because that barrier already exists). The existing rail lines in this area have daily freight and passenger rail traffic that can be heard and seen from the proposed location of the expanded Chester Linear Park. Therefore, the addition of the SEHSR track should not negatively impact the trail.

4.13.2.1.9 CHESTER KIWANIS HISTORICAL PARK (PLANNED) (CHESTER, VA)

In 2008, the Chesterfield County Board of Supervisors accepted the Kiwanis Club of Chester's donation of their 5.3 acre property at 4001 Gill Street in Chester, VA, for development as the Chester Kiwanis Historical Park. The property is planned to be used as a public park for passive recreation and historical interpretation. Alternative VA1 is the Preferred Alternative in Section BB. All The VA1, VA2, and VA3 Project alternatives are on common alignment through this area and would require ROW from the parcel along Curtis Street and Richmond Street planned for the Chester Kiwanis Historical Park. However, Chesterfield County made the acceptance of the donated land conditional upon reserving the necessary ROW for the Project (100 feet from the

centerlines of both Curtis Street and Richmond Street) for non-park uses. In addition, a grade-separated rail-over-road crossing would improve safety for pedestrians and bicyclists accessing the park from east of the rail line. The Project would not negatively impact this planned resource.

4.13.2.1.10 ETTRICK RIVERSIDE PARK (CHESTERFIELD, VA)

This park is east of the Study Area. The Project would not physically impact the park nor the visual or recreational value of the park.

4.13.2.1.11 ETTRICK PARK & MAYES-COLBERT ETTRICK COMMUNITY BUILDING (ETTRICK, VA)

This park and community building are located in the Chesterfield County community of Ettrick, VA. The existing and active rail line bounds the southeastern portion of the park with the Ettrick Rail Station (Petersburg, VA, Amtrak Station) adjacent to the southern limits of the park. Alternative VA1 is the Preferred Alternative in Section CC. The VA1, VA2, and VA3 Project alternatives are on common alignment along the park boundary and would not require any ROW from the park. The existing rail line has daily freight and passenger rail traffic that can be heard and seen from the park and community center. Therefore, the addition of SEHSR should not negatively impact the park. The construction of a Dupuy Road bridge over the rail line would improve the safety of those accessing the park from east of the rail line.

4.13.2.1.12 WEST END PARK FAIRGROUNDS (PETERSBURG, VA)

This park is located approximately one quarter mile east of the Study Area. There are no direct impacts from the Project. Alternative VA1 is the Preferred Alternative in Section CC. The VA1, VA2, and VA3 Project alternatives are on common alignment through Petersburg, VA, and would pass near the West End Park Fairgrounds. In this area, the existing rail bridge is being widened. This would result in temporary delays accessing the property from east of the rail line during construction, but these delays would end once construction is completed. There may be some increase in noise associated with the Project; however, it is not anticipated that any increase would limit use of this resource.

4.13.2.1.13 PAMPLIN HISTORICAL PARK (DINWIDDIE COUNTY, VA)

This park is located more than two miles from the Study Area. There are no impacts to this resource from the Project alternatives.

4.13.2.1.14 CENTENNIAL PARK (LA CROSSE, VA)

This park is located in downtown La Crosse, VA, at the intersection of Main Street and the abandoned Norfolk Southern railroad line (which is intended for use by the planned Tobacco Heritage Trail, discussed in Section 4.13.2). The primary focus of the park is a train caboose, which recognizes the town as a place where railroads once crossed. Alternative VA1 is the Preferred Alternative in Section I. The VA1, VA2, and VA3 Project alternatives are on common alignment through this area and would close the existing pedestrian crossing just east of Centennial Park and require a small amount of ROW (approximately 0.06 acres) to accommodate the railroad improvements. Although the new rail traffic would be heard from the park, it is in character with its rail theme; therefore, the required ROW should not negatively impact the park.

4.13.2.2 *NORTH CAROLINA*

4.13.2.2.1 VULCAN GREYSTONE MINING OPERATIONS PARK (HENDERSON, NC)

There are no impacts to this private park from the Project alternatives.

4.13.2.2.2 FRANKLINTON ELEMENTARY SCHOOL (FRANKLINTON, NC)

The Franklinton Elementary School, located at 431 South Hillsborough Street in Franklinton, NC, has playgrounds, a practice field, a baseball field, a football field, and a soccer field that are available for public use. Alternative NC1 is the Preferred Alternative in Section S. The NC1, NC2, and NC3 Project alternatives are on common alignment through this area and would require ROW in the vicinity of the Franklinton Elementary School to provide pedestrian access from Hawkins Street, under the railroad tracks, to South Main Street. However, no land would be required from the school. The existing rail line has daily freight rail traffic that can be heard and seen from the school's playground. Therefore, the addition of SEHSR should not negatively impact the playground. The new, pedestrian-only rail overpass would improve the safety of those accessing the school facilities and playground from east of the rail line.

4.13.2.2.3 J.B. FLAHERTY PARK (WAKE FOREST, NC)

This park is located just outside the Study Area. There are no impacts to this resource from the Project alternatives.

4.13.3 GREENWAYS

4.13.3.1 *JAMES RIVER GREENWAY (KINGSLAND CREEK) (CHESTERFIELD COUNTY, VA)*

Chesterfield County plans to develop a greenway on the north side of Kingsland Creek in the vicinity of the Defense Supply Center Richmond (DSCR) in Bellwood. Alternative VA1 is the Preferred Alternative in Section AA. All three of the proposed Project alternatives (VA1, VA2, and VA3) would add an additional railroad track within the existing CSX railroad corridor in the location where the greenway would cross. Chesterfield County has not yet obtained a legal crossing of the active railroad corridor in this area. Therefore, the proposed changes associated with the Project would not create a barrier to the development of the trail (because that barrier already exists). The existing rail lines in this area have daily freight and passenger rail traffic that can be heard and seen from the proposed location of the trail. The addition of the SEHSR track is not expected to negatively impact the trail.

4.13.3.2 *APPOMATTOX RIVERFRONT TRAIL (ETTRICK, VA)*

Alternative VA1 is the Preferred Alternative in Section CC. The VA1, VA2, and VA3 Project alternatives are on common alignment through this area and would construct a new rail bridge over the Appomattox River, immediately adjacent to the existing rail bridge near Virginia State University. The bridge would be located just to the east of the existing bridge and would require a small amount of ROW under the span of the bridge to allow for access and maintenance. Included in the ROW needed for the Project is approximately 0.8 acres of the easement for the planned Appomattox Riverfront Trail. The existing rail bridge has daily freight and passenger rail traffic that can be heard from the surrounding area; therefore, the new bridge should not negatively impact the planned trail.

4.13.3.3 *UPPER APPOMATTOX CANAL TRAIL (PETERSBURG, VA)*

The Upper Appomattox Canal Trail in the City of Petersburg, VA, is a 3.6 mile trail following the towpath of the Upper Appomattox canal. Alternative VA1 is the Preferred Alternative in Section CC. The VA1, VA2, and VA3 Project alternatives are on common alignment through this area and would require a new rail bridge over the Appomattox River, immediately adjacent to the existing rail bridge near Virginia State University. A small amount of ROW under the span of the bridge is required to allow for access and maintenance. Included in this ROW is approximately 0.1 acre of the Upper Appomattox Canal Trail. The existing rail bridge has daily freight and passenger rail traffic that can be heard and seen from the trail; therefore, the new bridge and SEHSR activity should not alter the character, setting, or use of the trail. The Project would not negatively impact this resource.

4.13.3.4 *TOBACCO HERITAGE TRAIL (VA)*

The Tobacco Heritage Trail is a partially constructed rails-to-trails corridor that will connect Southern Virginia counties via over 160 miles of abandoned railroad ROW, 110 miles of on-road trail, new trail, and active rail ROW. Within the Study Area, the Tobacco Heritage Trail intersects the Study Area in Alberta, VA, and La Crosse, VA (Appendix R, map sheets 66 and 83). In La Crosse, VA, the Tobacco Heritage Trail makes use of the old Norfolk Southern rail line that intersects the Project corridor in the downtown area; a location intended to provide a central access point for residents and tourists. The East Coast Greenway (discussed below) plans to use 55 miles of the Tobacco Heritage Trail, including the section that connects Alberta, VA, to La Crosse, VA,. Completed sections of the Tobacco Heritage Trail include an unimproved, 4-mile section of trail along the abandoned rail line from Brodnax, VA, to La Crosse, VA. The Master Plan for the Tobacco Heritage Trail states that:

"The Southeast High Speed Rail line is slated to run through La Crosse, VA, on the former north-south rail alignment at some point in the future. Trail crossings and pedestrian links to a potential rail station should be anticipated. In addition, the East Coast Greenway plans to use this portion of the Tobacco Heritage Trail to complete their Maine-to-Florida trail. The greatest cost factors for trail improvements within Region 1 are the replacement cost for the missing bridges and constructing an I-85 crossing. Additional costs may include improving trail crossings over the high speed rail line and constructing extra trail footage to link the trail with potential high speed rail stations." (p. 34)

Within Alberta, VA, the Tobacco Heritage Trail follows the abandoned Norfolk Southern line and crosses the Project corridor and the inactive CSX S-Line in the vicinity of Second Avenue. The VA1, VA2, and VA3 Project alternatives are on common alignment through this area. To maintain continuity of the existing trail and to provide a safe crossing by Tobacco Heritage Trail users, the Project will provide a pedestrian/non-motorized overpass of the proposed rail alignment. In addition, the realignment of Second Avenue, which is necessary to provide a vehicle bridge over the proposed rail alignment, will require a small amount of ROW from the trail.

Within La Crosse, VA, the trail follows the abandoned Norfolk Southern line and crosses the Study Area in the vicinity of Central Avenue. Alternative VA1 is the Preferred Alternative in Section E and Section I. VA1, VA2, and VA3 are on common alignment through this area. The proposed Project will re-route the Tobacco Heritage Trail north along Main Street approximately 300 feet, where it will then cross under the proposed rail alignment and rejoin the existing rails-to-trails corridor.

The Project Team worked with representatives from Alberta, VA, La Crosse, VA, and the Roanoke River Rails-to-Trails, Inc. (RRRT) in the development of Project designs to ensure that the Project

will not impede the development or planned use of the trail. The Project will not negatively impact this recreation resource.

4.13.3.5 *NEUSE RIVER GREENWAY (NC) (RALEIGH, NC)*

Alternative NC1 is the Preferred Alternative in Section U. All three of the Project alternatives (NC1, NC2, and NC3) would cross over the Neuse River Greenway. No ROW from the greenway would be required. The existing rail line in this area has daily freight traffic that can be heard and seen from the greenway. The addition of SEHSR should not alter the character, setting, or use of the greenway. In addition, the SEHSR bridge at this location would have a covered deck, which would meet the requirements from the City requesting a protected cover to protect patrons from falling debris. Therefore, the Project would not negatively impact the resource.

4.13.3.6 *SIMMS BRANCH GREENWAY (PROPOSED) (RALEIGH, NC)*

Alternative NC1 is the Preferred Alternative in Section U. All three of the proposed Project alternatives (NC1, NC2, and NC3) would cross the proposed location of the Simms Branch Greenway within the existing, active railroad corridor. The City of Raleigh, NC, does not currently have an agreement with CSX to cross the active railroad corridor in this area. Therefore, the proposed changes associated with the Project would not create a barrier to the development of the Simms Branch Greenway (because that barrier already exists). The City could route the greenway south to Gresham Lake Road or north to Durant Road to cross the rail corridor. Gresham Lake Road and Durant Road would both be grade-separated (road over rail) with the Project, and the bridges would accommodate bikes and pedestrians. The existing rail lines in this area have daily freight and passenger rail traffic that can be heard and seen from the proposed location of the proposed location of the greenway. The addition of the SEHSR track should not alter the character, setting, or use of the trail. Therefore, the Project would not negatively impact the resource.

4.13.3.7 *MARSH CREEK GREENWAY (PROPOSED) (RALEIGH, NC)*

Alternative NC5 is the Preferred Alternative in Section V. All four of the proposed Project alternatives (NC1, NC2, NC3, and NC5) would cross the proposed location of the Marsh Creek Greenway within the existing, active railroad corridor. The City of Raleigh, NC, has not yet obtained a legal crossing of the corridor at this location. Therefore, the proposed changes associated with the Project would not create a barrier to the development of the Marsh Creek Greenway (because that barrier already exists). The City could route the greenway south to Millbrook Road to cross the rail corridor. Millbrook Road would be grade-separated (road under rail) with the Project, and the underpass would accommodate bikes and pedestrians. The existing rail lines in this area have daily freight and passenger rail traffic that can be heard and seen from the proposed location of the proposed location of the greenway. The addition of the SEHSR track should not alter the character, setting, or use of the trail. Therefore, the Project would not negatively impact on the resource.

4.13.3.8 *MIDDLE CRABTREE CREEK GREENWAY (RALEIGH, NC)*

Alternative NC5 is the Preferred Alternative in Section V. Middle Crabtree Creek Greenway is part of the City of Raleigh, NC, Capital Area Greenway system. Near Hodges Street, the greenway parallels the north bank of Crabtree Creek, and passes under the existing single-track railroad bridge. All four of the proposed Project alternatives (NC1, NC2, NC3, and NC5) are on common alignment in this location, and would construct a new bridge adjacent to the existing single-track bridge. The new bridge would cross both the greenway and the creek. The existing rail bridge has daily freight rail traffic that can be heard from the trail; therefore, the new bridge will not negatively impact the trail.

4.13.3.9 *EAST COAST GREENWAY (VA & NC)*

The East Coast Greenway (ECG) has identified possible trail routes for the corridor between Richmond, VA, and Raleigh, NC (East Coast Greenway website, 2013). The Project is coordinating with ECG so that the proposed rail and roadway improvements do not impede the development of the ECG. At locations where the SEHSR and/or the associated roadway improvements and grade-separations impact the interim ECG on-road routing, it will be necessary to update the routes to ensure the safety of ECG users. Possible impacts to ECG users include temporary delays and reroutes due to construction activities.

4.13.3.10 *MULTIUSE GREENWAY CONCEPT (VA & NC)*

The concept of a greenway located parallel to the Project corridor from Dinwiddie, VA, to the Neuse River (just north of Raleigh, NC) was introduced in the Richmond to Raleigh Project Tier II DEIS. The rationale for its inclusion was to allow the necessary environmental documentation for the greenway to be prepared so that local municipalities could more quickly pursue the construction of the greenway in their jurisdictions. The construction of the greenway was never intended to be funded as part of the Project because FRA (the source of Federal funding for HSR projects) does not have a mechanism to provide funding for greenways. Although the parallel greenway is still being studied along with the Project, the process of developing the environmental documentation for the greenway has changed since publication of the Tier II DEIS. FRA, FHWA, and the states of Virginia and North Carolina have jointly determined that the greenway project is more suitable for a pre-NEPA Greenway Corridor Plan, rather than being included in the Richmond to Raleigh Project Tier II FEIS, as previously considered. This is primarily to give the local jurisdictions who will ultimately construct the greenway greater flexibility to pursue various funding types over time, rather than limiting them to a particular funding agency's NEPA requirements. The details for the greenway will, therefore, not be contained within this Tier II FEIS, but rather in a separate Greenway Corridor Plan. This Corridor Plan is currently under development, with completion anticipated at the time of the ROD for Project. The SEHSR Corridor website www.sehsr.org will provide additional details on this separate plan and opportunities for its public review and comment.

The location recommended by DRPT and NCDOT for the greenway will be based on the Preferred Alternative for the Project. Therefore, the Project will not have a negative impact on the greenway.

4.14 TRANSPORTATION

When built, the Project will become part of the larger transportation network that includes roads, transit, aviation, and other rail. This section provides an assessment of potential impacts from the Project to that transportation network. The Richmond to Raleigh Project is designed to be completely grade separated by bridges or underpasses, yet maintain connectivity across the railroad. Impacts to connectivity across the railroad are evaluated below in Section 4.14.2, while impacts to traffic conditions in the communities throughout the corridor are evaluated in Section 4.14.3. (Note that the impacts from proposed changes to roadwork on the human environment were discussed previously in Section 4.11.) The impacts to existing freight and passenger rail operations are also evaluated, followed by a general discussion about impacts related to potential station locations, local public transit, and aviation facilities.

4.14.1 **ROADS**

The existing road network within the Study Area was described in Section 3.14. Major roads crossing the existing rail ROW with Annual Average Daily Traffic (AADT) counts greater than 1,000 vehicles per day were highlighted. Because the SEHSR is designed to be completely grade separated

through bridges or underpasses, it is important to assess the impact from the Preferred Alternative on connectivity, i.e., the ability to move across the corridor. Potential impacts to the major east-west travel corridors throughout the Study Area are discussed below. In addition to the discussion regarding these major corridors, designs for all crossings and associated roadwork are included in Appendix F. Maps displaying the proposed roadwork are included in Appendix R.

4.14.1.1 *CITY OF RICHMOND, VA*

Section AA of the Project is located within the City of Richmond, VA; the Preferred Alternative for Section AA is Alternative VA1.

The most heavily traveled roads carrying east-west traffic across the railroad in Richmond, VA, have existing bridges or underpasses over or under the rail corridor. The Preferred Alternative utilizes these existing structures. In addition, the Preferred Alternative provides grade separated crossings at:

- Maury Street
- East Commerce Road
- West Bells Road
- Ruffin Road.

All the major public road facilities in the City of Richmond, VA, identified in Section 3.14 will be grade separated; therefore, the Preferred Alternative will not significantly impact east-west connectivity within the City of Richmond, VA.

4.14.1.2 *CHESTERFIELD COUNTY, VA*

A portion of Project Section AA, as well as Section BB, and a portion of Section CC are located within Chesterfield County, VA; the Preferred Alternative in each of these sections is Alternative VA1.

Within Chesterfield County the major east/west corridors are Chippenham Parkway, Highway 288, and West Hundred Road; all three roads cross the railroad on existing bridges. The Preferred Alternative utilizes the existing bridges and also provides grade separated crossings at:

- Station Road
- Kingsland Road
- Centralia Road
- Woods Edge Road
- Pine Forest Drive
- Branders Bridge Road
- Dupuy Road
- Curtis Street

Therefore, the Preferred Alternative will not significantly impact east-west connectivity in Chesterfield County.

4.14.1.3 *CITY OF COLONIAL HEIGHTS, VA*

A small portion of Project Section CC is located within the City of Colonial Heights, VA; the Preferred Alternative in Section CC is Alternative VA1.

The Preferred Alternative maintains grade-separated crossings at the two roads that cross the railroad in Colonial Heights, VA; therefore, the Preferred Alternative will not impact east-west connectivity.

4.14.1.4 *CITY OF PETERSBURG, VA*

A portion of Section CC is located within the City of Petersburg, VA; the Preferred Alternative in Section CC is Alternative VA1.

The greatest east/west traffic volume in Petersburg, VA, is carried by Boydton Plank Road, which feeds into Washington Street. I-85 provides some east/west connectivity across the railroad in addition to serving as a north/south traffic corridor. The Preferred Alternative maintains the grade-separated crossings at each of the major public road facilities that cross the Preferred Alternative:

- Washington Street
- Farmer Street
- Halifax Street
- I-85
- Defense Road
- Halifax Road.

All the major public road facilities in the City of Petersburg, VA, that cross the Preferred Alternative will be grade separated; therefore, the Preferred Alternative will not significantly impact east-west connectivity in this area.

4.14.1.5 *DINWIDDIE COUNTY, VA*

The Preferred Alternative within Dinwiddie County, VA, varies by Project section. In Section DD, the Preferred Alternative is Alternative VA3; in Section A, the Preferred Alternative is Alternative VA2; and in Sections B and C, the Preferred Alternative is Alternative VA1.

The largest volume of north/south traffic in Dinwiddie County, VA, is carried by I-85 and US-1/Boydton Plank Road; both roads cross the CSX S-Line ROW on existing bridges. The Preferred Alternative maintains grade separated crossings at these locations and retains the existing bridge at Courthouse Road in the community of Dinwiddie, VA. VA 703/Carson Road carries the greatest east/west traffic volume across the Study Area in the northern part of the county, while VA 40/Doyle Boulevard, which passes through the Town of McKenney, VA, serves as the major east/west corridor in southern Dinwiddie County, VA. The Preferred Alternative provides new grade separated crossings for these two roads.

All the major public road facilities in Dinwiddie County, VA, that cross the Preferred Alternative will be grade separated; therefore, the Preferred Alternative will not significantly impact east-west connectivity within Dinwiddie County, VA.

4.14.1.6 *BRUNSWICK COUNTY, VA*

The Preferred Alternative within Brunswick County, VA, varies by Project section. In Section D, the Preferred Alternative is Alternative VA4; in Sections E, F, and H, the Preferred Alternative is Alternative VA1; and in Section G, the preferred Alternative is Alternative VA3.

Within Brunswick County, VA, the largest volume of north/south traffic is carried by I-85 and US-1/Boydton Plank Road; both roads closely parallel as well as cross the CSX S-Line ROW and the Study Area. In the Town of Alberta, VA, Main Street runs north/south and carries the largest volume of traffic through the town; however, Second Avenue provides the east-west connectivity. The Preferred Alternative provides a realignment of Second Avenue and a new bridge over the railroad, thereby maintaining the cross-town connection. Throughout the remainder of Brunswick County, VA, grade separated crossings for all major public road facilities that cross the Preferred Alternative are maintained; therefore, the Preferred Alternative will not significantly impact connectivity.

4.14.1.7 *MECKLENBURG COUNTY, VA*

The Preferred Alternative within Mecklenburg County, VA, varies by Project section. In Sections H, I, K and L, the Preferred Alternative is Alternative VA1; in Section, J the Preferred Alternative is Alternative VA2.

US 58 carries the largest east/west traffic load through the county, crossing the Study Area in La Crosse, VA, on a bridge that is retained by the Preferred Alternative. Main Street in La Crosse, VA, carries the bulk of local traffic across the railroad on an existing at-grade crossing. The Preferred Alternative closes the existing Main Street crossing, but provides a new grade separated crossing approximately 600 feet south to replace the function currently served by Main Street and provide the same level of connectivity across the railroad. The Preferred Alternative provides a grade separated crossing of the railroad for the major east-west travel corridors in Mecklenburg County, therefore, the Preferred Alternative will not significantly impact connectivity.

4.14.1.8 *WARREN COUNTY, NC*

A portion of Project Section L, as well as Sections M and N, are located within Warren County, NC. The Preferred Alternative in each of these sections is Alternative NC1.

US-158 serves as the primary east/west connector in Warren County, NC, and crosses the CSX S-Line by way of an underpass in Norlina, NC, where the CSX S-Line becomes an active freight railroad. The Preferred Alternative maintains a grade-separated crossing at US-158 through an expansion of the existing underpass. In addition, five new bridged crossings are proposed throughout the rest of the county; therefore, the Preferred Alternative will not significantly impact connectivity.

4.14.1.9 *VANCE COUNTY, NC*

The Preferred Alternative within Vance County, NC, varies by Project section. In Section O, the Preferred Alternative is Alternative NC3; in Sections P and Q, the Preferred Alternative is Alternative NC1.

US1 Bypass crosses the active CSX S-Line on a bridge north of Henderson, NC. US-158 provides east/west access through the Henderson, NC, area, but does not cross the railroad, while Andrews Avenue/NC 39 provides a connection from US-1 to the east. There are many public roads that cross the active CSX S-Line at grade as it moves through the central areas of Middleburg, NC, Henderson, NC, and Kittrell, NC.

In Middleburg, NC, at the north end of the county, there is no major road that provides continuous connectivity across the proposed rail corridor. However, Carol Street/Allison Cooper Road (SR 1151) provides a connection from US-1 to the east. Because the Preferred Alternative provides a grade separated crossing at Carol Street, connectivity in this area will not be significantly impacted.

In the Henderson, NC, area the Preferred Alternative includes several revisions to the DEIS road designs. The revisions were made in response to comments from the City of Henderson, and several of the changes were made to improve both east-west and north-south connectivity; refer to Section 2.2.22.4 for more information. The Preferred Alternative retains the existing US-1 Bypass bridge over the railroad north of the city. In addition, Andrews Avenue/NC 39, which provides a connection from US-1 to the east, and currently crosses the railroad at-grade, is designed to be grade separated under the Preferred Alternative. A new roundabout west of the railroad provides east-west connectivity via Main Street and N. Beckford Drive, and north-south connectivity via N. Chestnut Street and N. Garnett Street. The Preferred Alternative maintains the existing underpass at Charles Street. The designs for a new bridge over the railroad at Alexander Avenue were revised for the FEIS to allow Nicholas Street to connect on the east side of the railroad, thereby retaining

existing north-south connectivity. Just south of town, the Preferred Alternative provides bridges over the railroad for JP Taylor Road and Bear Pond Road, and retains the US-1 Bypass bridges over the railroad. Because the Preferred Alternative provides grade separated crossings for the major east-west travel corridors in Henderson, NC, the Project is not expected to significantly impact connectivity in this area.

There is no continuous roadway that provides for east-west travel through the town of Kittrell, NC. Main Street, however, does provide a connection to the east, with Kittrell College Road (SR 1105) connecting to the west. Main Street will be closed under the Preferred Alternative, with traffic relocated to a new bridged crossing approximately 650 feet south. While this would have some effect on traffic flow, it accommodates the traffic volume and provides approximately the same level of connectivity as currently exists.

4.14.1.10 *FRANKLIN COUNTY, NC*

Sections R, S and T of the Project are located within Franklin County, NC; the Preferred Alternative in these sections is Alternative NC1.

Highway NC 56 provides the main east/west connection through the county, crossing the railroad in Franklinton, NC, by way of an underpass. The Preferred Alternative maintains a grade-separated crossing at NC 56 (Green Street) through an expansion of the existing underpass.

Bert Winston Road crosses the railroad at grade in a location midway between Franklinton, NC, and Youngsville, NC. Under the Preferred Alternative, the road would be grade-separated through construction of a bridge, maintaining connectivity across the railroad in this part of the county. Highway NC 96 also provides east/west connectivity through the county, and currently crosses the railroad with an at-grade crossing in Youngsville, NC. The Preferred Alternative provides an extension/realignment of NC 96; crossing the railroad on a bridge north of town, then connecting with an extension of Cross Street on the east side of town. This design will enhance the connectivity for east/west through traffic. The east/west connectivity for local traffic will be maintained by the provision of a bridge over the railroad at Main Street.

4.14.1.11 *WAKE COUNTY, NC*

The Preferred Alternative within Wake County, NC, varies by Project section. In Section U, the Preferred Alternative is Alternative NC1; in Section V, the Preferred Alternative is Alternative NC5.

A network of roads provides east/west access across the railroad in Wake County. As listed in Section 3.14, there are 30 major public road facilities in Wake County that cross the Preferred Alternative. Some of these major road facilities cross the railroad on existing bridges or underpasses, some cross at grade. The Preferred Alternative maintains connectivity by utilizing existing or constructing new bridges or underpasses for all but two of the major public road facilities in Wake County. Therefore, the Preferred Alternative will not significantly impact connectivity.

4.14.2 TRAFFIC CONDITIONS

Detailed traffic analyses were performed at locations throughout the Project corridor to determine the effects of rail crossing closures and consolidations on local traffic conditions. Section 3.14 identified these locations and outlined the existing traffic conditions for each location. For select intersections anticipated to experience an increase in traffic volume due to changes associated with the Project, Synchro (for signalized and unsignalized intersections) and HCS (for unsignalized intersections) were used to determine the change in level of service (LOS) and delay. Also, several intersections were analyzed to determine the expected queue for a particular movement (e.g., turning, through) to

determine if "spillback" (queuing from one intersection affecting traffic flow through an adjacent intersection) would affect nearby intersections.

It should be noted that the purpose of these analyses was to help ensure that traffic operations with the Project were comparable to operations without the Project. While additional enhancements would be preferable in certain locations, improvements presented here are to provide similar or improved level of service and delay (as constraints allow) with the Project, not to mitigate all traffic operational issues in the Study Area. The removal of all at-grade rail crossings within the Study Area would improve traffic safely along the corridor considerably. The analysis is described in greater detail in the SEHSR Traffic Review (Hatch Mott MacDonald, 2014), which is available on CD from NCDOT by request.

Appendix P includes figures displaying future traffic configurations (e.g., crossing closures, new bridges/underpasses, new/extended turn lanes) and predicted 2030 traffic volumes with and without the Project.

4.14.2.1 *OVERVIEW*

The following sections describe the effects on traffic from the proposed Project at each of the evaluated locations. The anticipated LOS for the Project alternatives in the year 2030 is compared to the LOS in the same location were the Project not constructed (i.e., a No Build scenario) for both the morning (AM) and evening (PM) peak traffic conditions. The LOS system stratifies travelers' perceptions of the quality of service provided by the transportation facilities on a scale from A to F with A representing the best level of service. Level of service is not reported where a movement does not experience delay, such as a through movement with no stop condition or a free flowing right turn. In addition, LOS is not reported for future No Build conditions at intersections that would not exist without the Project (e.g., completely new roadway alignments).

It should be noted that the Build and No Build conditions might have movements or approaches that have the same LOS rating at a given intersection, but still result in varying travel delay times per vehicle. In other words, even if an intersection, approach, or movement has the same level of service in the No Build or Build conditions, more than likely one will experience more travel time delay than the other will. For details on the estimated delay at evaluated intersections, refer to the SEHSR Traffic Review (Hatch Mott MacDonald, 2014).

Of the intersections evaluated for potential traffic impacts, the following have the greatest predicted change in 2030 LOS with and without the Project, or are notable for other traffic-related changes due to the Project:

Virginia

Improvements

- **Chester Road and Perrymont Road** (unsignalized), Chesterfield County – In the No Build conditions the eastbound approach is anticipated to operate at LOS F in the AM and PM peak periods. In the Build conditions the delay improves by 78.5 seconds per vehicle and 72 seconds per vehicle in the AM and PM peaks respectively and the LOS improves to LOS E in the PM peak period (see Section 4.14.2.2.1).
- **Chester Road and Park Road** (unsignalized No Build / signalized Build), Chesterfield County – As a signalized intersection, the level of service experiences noticeable improvement on the side streets (southeast bound and northwest bound approaches), improving from LOS F to LOS E (see Section 4.14.2.2.1)

- **Centralia Road and Chester Road** (signalized), Chesterfield County – With the conversion of this intersection to two three-leg intersections, the approach movement levels of service improve from three operating at LOS F and two at LOS E (AM and PM combined) in the No Build conditions to one operating at LOS E in the Build conditions (see Section 4.14.2.3.1).

Degradation

- **Old Lane and Chester Road** (signalized No Build / unsignalized Build), Chesterfield County – While the level of service and or/delay does degrade considerably for Old Lane in the Build conditions, it should be noted that the volumes are noticeably lighter than in the No Build conditions and based on modelling the maximum queue length would be approximately 50 feet (see Section 4.14.2.3.1).

North Carolina

Improvements

- **Chestnut Street and Andrews Avenue** (signalized), Henderson, NC – With the Project, multiple movements improve from LOS E and F between the No Build and Build conditions (see Section 4.14.2.7.2).
- **Garnett Street and Andrews Avenue** (signalized), Henderson, NC – In the No Build conditions, this intersection has one approach operating at LOS E in AM Peak and two approaches operating at LOS F in the PM Peak. The Project will remove this intersection. Modelling results indicate that the analyzed intersections will operate similarly between the No Build and Build conditions (see Section 4.14.2.7.2).
- **Williams Street and Andrews Avenue** (unsignalized), Henderson, NC – In the No Build conditions, this intersection has one approach operating at LOS F in AM Peak and one approach operating at LOS E and one at LOS F in the PM Peak. The Project will remove this intersection. Modelling results indicate that the analyzed intersections will operate similarly between the No Build and Build conditions (see Section 4.14.2.7.2).
- **US-1 Business and Welcome Avenue/Belmont Avenue** (signalized), Henderson, NC – In the No Build conditions, all intersection approaches except for the northbound approach operate at LOS F in both the AM and PM peaks. The westbound leg is removed as part of the Project which results in no movement operating below LOS C. Modelling results indicate that the intersections in the surrounding network impacted by the work at this intersection will operate al LOS C or better (see Section 4.14.2.7.4).
- **US-1 Business and JP Taylor Road** (signalized), Henderson, NC – In the No Build conditions, this intersection has an approach operating at LOS F in the AM Peak and LOS E in the PM peak. This intersection is removed as part of the Project. Modelling results indicate that the replacement intersection of JP Taylor Road Extension and Belmont Drive will not have any movements operating worse than LOS C (see Section 4.14.2.7.4).
- **US-1 Business and Bear Pond Road** (signalized), Henderson, NC – In the No Build conditions, this intersection has several approaches operating at LOS E or LOS F. This intersection is removed as part of the Project. Based on modelling results, the replacement intersections of US-1 Business and New Connector south of Bear Pond Road and Bear Pond Road and New Connector west of US-1 Business would not have any movements operating worse than LOS C (see Section 4.14.2.7.5).

- **US-1 Business and Peter Gill Road** (signalized No Build / unsignalized Build), Henderson, NC – In the No Build conditions, this intersection has several approaches operating at LOS E or LOS F. This eastern leg of this intersection is removed as part of the Project. The remaining movements are expected to operate at LOS C or better in the Build conditions. Also, the proposed intersection of US-1 Business and Wildlife Lane, which would serve traffic from both the intersections of Peter Gill Road and Eastern Minerals Road with US-1 Business, is expected to operate at LOS D or better with no approach operating below LOS D (see Section 4.14.2.7.5).
- **Wolfpack Lane/Highwoods Boulevard and Atlantic Avenue** (signalized), Raleigh, NC – this intersection has several approaches operate at LOS F in the No Build conditions. In the PM peak, the overall operations are anticipated to operate at LOS F in the No Build conditions. With the provision of a grade separation in the Build conditions, no approach is expected to operate worse than LOS C. However, the replacement intersection of Wolfpack Lane and Beechleaf Court is expected to have an approach operate at LOS E in the PM peak, and rerouted traffic will result in one approach of the Highwoods Boulevard and Beechleaf Court intersection to degrade to LOS F (see Section 4.14.2.10.1).

Degradation

- **Alexander Avenue and Nicholas Street** (unsignalized), Henderson, NC – With the Project, three movements degrade to LOS E or LOS F. If the City of Henderson determines that a signal is warranted and it is installed by the design year, all movements are anticipated to operate at LOS D or better. A simulation of the intersection did not indicate considerable queuing under two-way stop control with a maximum queue of 221 feet eastbound and 75 feet westbound. The appropriate intersection control will be investigated near the time of construction and be based on volume, geometric conditions, and constraints among other factors (see Section 4.14.2.7.3).
- **Montgomery Street and Garnett Street** (signalized No Build / unsignalized Build), Henderson, NC – With the Project, this intersection is essentially converted to a "T" intersection and was analyzed under stop control. In this instance, the eastbound approaches drop in level of service from LOS B to LOS E in the PM peak. It should be noted that operating unsignalized allows Garnett Street to operate with considerably less delay than in the No Build conditions. Also, the anticipated queue is only expected to be approximately 100 feet and, if it warrants signalization by 2030, the intersection is anticipated to operate as well as if not better than No Build conditions (see Section 4.14.2.7.2).
- **Highwoods Boulevard and Beechleaf Court** (signalized), Raleigh, NC – With the rerouted traffic associated with the Project, the southwest bound approach is expected to degrade from LOS D to LOS F with 146.8 seconds per vehicle increase in delay in PM peak period. Given the southwest bound leg serves a parking lot with alternative access, no improvements were provided to this leg as part of the Project (see Section 4.14.2.10.1).

As evidenced by the bullets above, only a few of the numerous locations analyzed vary considerably between the No Build and Build conditions with most resulting in improvements in the Build conditions. This is because effort was taken to provide a concept that would allow traffic to operate at similarly or at better levels of service than it would without the Project. When traffic operations degraded in comparison to conditions under the No Build, it generally was the result of either the fact that low traffic volumes were affected or there were human or environmental constraints in the intersection area.

It should be noted that the above bullets are based on level of service and when operations reach capacity, other measures such as delay or simulations can provide a better comparison of operations. However, a majority of the intersections along the Project corridor that are affected by the Project are not expected to operate at or above capacity.

4.14.2.2 *CHESTERFIELD COUNTY, VA*

4.14.2.2.1 KINGSLAND ROAD/NORCLIFF ROAD AND PERRYMONT ROAD - BELLWOOD AREA

The Preferred Alternative in this area is the common alignment of the VA1, VA2, and VA3 Project alternatives. Refer to map sheet 8 in Appendix R for a map of the proposed designs in this location. To facilitate east-west traffic movements in this area, which are affected by the proposed closure of the Kingsland Road at-grade rail crossing near Chester Road, a realignment of Kingsland Road, including a new grade separated crossing over the proposed Project railroad alignment and Chester Road, is proposed. This facility will connect Kingsland Road from its intersection with Dorsey Road to Perrymont Road, replacing the church driveway as the western leg of the intersection of Perrymont Road and Norcliff Road. Traffic utilizing the existing at-grade rail crossing of Kingsland Road located just west of Chester Road would utilize the new alignment and associated grade separated crossing in the proposed design. Some of that traffic is anticipated to use the intersection of Norcliff Road and US-1 to perform their desired maneuvers. The anticipated operations for Chester Road and Perrymont Road, Norcliff Road and Perrymont Road, Norcliff Road and US-1, and Kingsland Road and Dorsey Road intersections are provided below.

Chester Road/Bellwood Road and US-1: The traffic volumes for this intersection are similar between the No Build and Proposed conditions; therefore, no modifications are proposed as part of the Project. Appendix P Figures 3 and 4 provide the 2030 proposed laneage and peak hour traffic volumes for the Chester Road/Bellwood Road and US-1 intersection. Table 4-50 provides the intersection approach level of service for the Chester Road/Bellwood Road and US-1intersection in the 2030 No Build and proposed conditions. As shown in Table 4-50, each approach maintains the same or improves the level of service in the proposed conditions. The overall intersection level of service improves one letter grade for both the AM and PM peak periods with the proposed conditions.

Table 4-50
Chester Road/Bellwood Road and US-1 – Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	F	F	F	D
No Build (PM)	E	E	C	C
Proposed (AM)	F	F	E	D
Proposed (PM)	E	E	C	C

Source: Hatch Mott MacDonald, 2014.

Perrymont Road and Chester Road/Driveway: At this intersection, aside from increasing the radius of the southbound right-turn, the proposed laneage is identical to the existing laneage. Appendix P Figures 3 and 4 provide the 2030 proposed laneage and peak hour traffic volumes for the Chester Road and Perrymont Road intersection, respectively. Table 4-51 provides the intersection approach level of service for the Chester Road and Perrymont Road intersection in the 2030 No Build and proposed conditions. With the provision of the Kingsland Road extension, the volumes at this intersection decrease. As expected, and shown in Table 4-51, the

operations are very similar for most movements in the proposed and No Build conditions; however, the eastbound movement is noticeably improved in the 2030 proposed conditions.

Table 4-51
Chester Road and Perrymont Road/Driveway – Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	F	B	A	A
No Build (PM)	F	B	A	A
Proposed (AM)	F	B	A	A
Proposed (PM)	E	B	A	A

Source: Hatch Mott MacDonald, 2014.

Kingsland Road and Chester Road: The Chester Road and Kingsland Road intersection is removed as part of the Project; therefore, no analysis was performed for the 2030 proposed conditions. Traffic from this intersection will be rerouted to the extension of Kingsland Road to Norcliff Road.

Norcliff Road and Perrymont Road/Church Parking Lot: With the proposed Kingsland Road realignment, the existing church parking lot on the west side of the Perrymont Road and Norcliff Road intersection is replaced by the realigned Kingsland Road. The only proposed change in laneage is to restripe the westbound approach to provide a westbound left-turn lane. Appendix P Figures 3 and 4 provide the 2030 proposed laneage and peak hour traffic volumes for the Norcliff Road and Perrymont Road intersection, respectively. Table 4-52 provides the level of service for the 2030 No-Build and proposed scenarios. As shown in Table 4-52, even with the additional traffic associated with the Kingsland Road extension, the No Build and proposed scenarios operate similarly. Also, all movements are anticipated to operate at LOS B or better in the design year with the proposed design.

Table 4-52 Norcliff Road and Perrymont Road/Church Parking Lot – Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	A	A	A
No Build (PM)	B	B	A	A
Proposed (AM)	B	B	A	A
Proposed (PM)	C	B	A	A

Source: Hatch Mott MacDonald, 2014.

Norcliff Road and US-1: With the connection of the realignment of Kingsland Road to the existing driveway on the west side of the Perrymont Road and Norcliff Road intersection, turning movements from/to the western leg of the Norcliff Road and US-1 intersection are anticipated to increase. The only proposed laneage modification for the Norcliff Road and US-1 intersection is to restripe the eastbound approach to provide an exclusive eastbound left-turn lane. Appendix P Figures 3 and 4 provide the 2030 proposed laneage and peak hour traffic volumes for the Norcliff Road and US-1 intersection, respectively. This intersection was analyzed as a four-leg intersection operating under stop control with Norcliff Road experiencing the stop condition. Table 4-53 provides the level of service for the Norcliff Road and US-1 intersection in the future No- Build and proposed conditions. As shown in Table 4-53, even with the eastbound left-turn lane, operation of the eastbound approach degrades in the 2030 proposed scenario, while the remaining approaches operate similarly in the proposed scenario as compared to the No Build. It should be noted that providing an exclusive left-turn lane removes the effect the through and right-turn movements have on the operations, which would improve the overall reported operations, but worsen the through and right-turn movement reported operations. Based on a request from Chesterfield County, this intersection was analyzed under signal control. While the need for a signal will be determined at/near the time of construction, under signal control, this intersection is expected to operate at LOS C or better in the design year.

Table 4-53 Norcliff Road and US-1 – Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	E	F	A	A
No Build (PM)	F	F	A	A
Proposed (AM)	F	F	A	A
Proposed (PM)	F	F	A	A

Source: Hatch Mott MacDonald, 2014.

Kingsland Road and Dorsey Road: The Project proposes to extend Kingsland Road from Dorsey Road to Norcliff Road and remove the at-grade rail crossing of Kingsland Road. These modifications will considerably alter traffic flow at the Kingsland Road and Dorsey Road intersection. The Kingsland Road and Dorsey Road intersection will be converted from a three-leg intersection to a four-leg intersection and the predominant traffic flow is anticipated to be east-west instead of north-south. During final design, the Project Team will coordinate with VDOT and Chesterfield County to consider making the intersection northbound and southbound approaches stop controlled, and the eastbound and westbound approaches free flowing movements. The intersection was analyzed with that configuration for the 2030 proposed conditions.

Appendix P Figures 3 and 4 provide the 2030 proposed laneage and peak hour traffic volumes for the Kingsland Road and Dorsey Road intersection, respectively. Table 4-54 provides the level of service for the Kingsland Road and Dorsey Road intersection in the 2030 No Build and proposed

conditions. As shown in Table 4-54, this intersection is anticipated to have all movements operate at LOS B or better in both the 2030 No Build and proposed conditions.

Table 4-54
Kingsland Road and Dorsey Road – Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	--	A	--
No Build (PM)	B	--	A	--
Proposed (AM)	A	A	B	A
Proposed (PM)	A	A	B	B

Source: Hatch Mott MacDonald, 2014.

4.14.2.2.1 CHESTER ROAD AND BRINKLEY ROAD - BELLWOOD AREA

The Preferred Alternative in this area is the common alignment of the VA1, VA2, and VA3 Project alternatives. Refer to map sheet 9 in Appendix R for a map of the proposed designs in this location. Under the proposed design conditions, the existing at-grade rail crossing of Brinkley Road located just west of Chester Road will be closed. To service the Brinkley Road traffic and other local area traffic currently using that at-grade rail crossing, a new grade separated crossing including a new connection from Thurston Road to Park Road is proposed as part of the Project. The traffic currently using the Brinkley Road crossing will be able to utilize the new grade separated crossing and access Chester Road as the west leg of the intersection of Chester Road and Park Road. Traffic can also use the connection to bypass part of Hopkins Road or Chester Road depending on their origin and destination. The intersections in this area were analyzed to determine the impacts of this option.

Chester Road and Brinkley Road: With the proposed Project, the existing at-grade rail crossing adjacent to the Brinkley Road and Chester Road intersection will be closed. This will remove the current access of Brinkley Road to Chester Road. This traffic will reroute to other surrounding intersections.

Hopkins Road and Thurston Road: With the proposed Project, which includes the at-grade crossing closure at Old Lane Road, additional traffic will be rerouted to the intersection of Hopkins Road and Thurston Road. Traffic will be rerouted to use the new connector to access Chester Road. Some traffic currently using the Brinkley Road at-grade rail crossing may also reroute to this intersection. No laneage modifications were proposed to the Hopkins Road and Thurston Road intersection. Appendix P Figures 7 and 8 provide the 2030 proposed laneage and traffic volumes for the Hopkins Road and Thurston Road intersection, respectively. Table 4-55 below provides the level of service for the Hopkins Road and Thurston Road intersection 2030 No Build and proposed conditions. As shown in Table 4-55, all movements for the Hopkins Road and Thurston Road intersection are anticipated to operate at LOS C or better in 2030 with and without the proposed Project.

Table 4-55
Hopkins Road and Thurston Road - Level of Service in 2030

	Southbound	Northwest bound
No Build (AM)	A	C
No Build (PM)	A	B
Proposed (AM)	A	C
Proposed (PM)	A	C

Source: Hatch Mott MacDonald, 2014.

Kingsdale Road and Chester Road: With the proposed new connection between Thurston Road and Park Road and associated grade separation, the overall traffic at the Kingsdale Road and Chester Road intersection is anticipated to decrease slightly. Even though traffic volumes decreased slightly, an improvement is proposed to the northbound approach to extend the right-turn lane south to the upstream intersection of Chester Road and Park Road/Thurston Road Connection. While this improvement is more closely tied to the Chester Road and Park Road/Thurston Road Connector intersection, it will improve northbound operations on Chester Road. The 2030 proposed laneage and peak hour volumes for the Kingsdale Road and Chester Road intersection are shown by Appendix P Figures 7 and 8, respectively. Table 4-56 provides the level of service for the 2030 No Build and proposed conditions. As shown in Table 4-56, the proposed design provides overall better level of service for the Kingsdale Road and Chester Road intersection in the PM peak period of the 2030 design year and the same level of service and reduced delay in the AM peak period. One approach, westbound, degrades from LOS D to LOS E in the AM peak period but the overall delay improves slightly in the proposed conditions and that same movement improves from LOS F to LOS E in the PM peak period with the proposed design. As previously mentioned, it should be noted that the overall volumes with the proposed design are anticipated to be less at this intersection as compared to the No Build conditions.

Table 4-56
Kingsdale Road and Chester Road – Level of Service in 2030

	Westbound	Northbound	Southbound
No Build (AM)	D	B	A
No Build (PM)	F	B	D
Proposed (AM)	E	A	B
Proposed (PM)	E	A	D

Source: Hatch Mott MacDonald, 2014.

Thurston Road and Thurston Connector: This intersection is created with the proposed Project design, which includes the new connection from Thurston Road to Chester Road. This new connection, which provides a grade separation over the proposed Project railroad alignment, will provide access to/from Chester Road to help mitigate the closure of the Brinkley Road and Old Lane Road at-grade crossings. This intersection was analyzed under stop control. Appendix P Figures 7 and 8 provide the 2030 proposed laneage and peak hour volumes, while Table 4-57 provides the level of service for the 2030 proposed conditions. Based on the level of service analysis, all movements are anticipated to operate at LOS B or better in the 2030 proposed conditions

Table 4-57
Thurston Road and Thurston Connector - Level of Service in 2030

	Westbound	Northbound
No Build (AM)	--	--
No Build (PM)	--	--
Proposed (AM)	A	B
Proposed (PM)	A	B

Source: Hatch Mott MacDonald, 2014.

Park Road/Thurston Connector and Chester Road: The function of this intersection changes with the proposed design, which includes the new connection from Thurston Road to Chester Road. This new connection, which provides a grade separation over the proposed P alignment, will add considerably more traffic to the west leg of this intersection and to the turning movements from Chester Road to the new connector. To help mitigate the effect of the increased volume, turn lane

improvements were provided for this intersection. Also, a proposed improvement to the Kingsdale Road and Chester Road intersection is expected to considerably improve operations of this intersection. Appendix P Figures 7 and 8 provide the 2030 proposed laneage and peak hour volumes, while Table 4-58 provides the level of service for the 2030 No Build and proposed conditions. Based on the level of service analysis, the side street approaches for the intersection of Chester Road and Park Road will experience LOS F conditions by 2030 without the proposed Project and LOS E with the Project. The Chester Road approaches are anticipated to operate at LOS D or better with or without the Project.

Table 4-58
Chester Road and Park Road/Thurston Connector- Level of Service in 2030

	Northbound	Southbound	Southeast bound	Northwest bound
No Build (AM)	A	B	D	F
No Build (PM)	B	A	F	F
Proposed (AM)	B	B	D	E
Proposed (PM)	C	D	E	E

Source: Hatch Mott MacDonald, 2014.

It should be noted that the No Build conditions were analyzed as an unsignalized two-way stop controlled intersection with the driveway and Park Road movements operating under stop control while the proposed conditions were analyzed under signal control based on the proposed laneage and estimated 2030 volumes. It should also be noted that while not included in this analysis, there is a northbound lane addition from the VA 288 interchange with Chester Road that results in weaving operations between the interchange and the Park Road and Chester Road intersection. The provision of a signal at this location will extend the northbound queues, and therefore considerably reduce the allowable weaving distance for these maneuvers. Therefore, it is recommended to tie in the existing northwest bound right-turn lane from VA 288 and remove the weave that exists today if the intersection of Chester Road and Park Road/Thurston Connector is signalized. This enhancement may be needed by the design year with or without the Project.

4.14.2.3 *CHESTER, VA*

4.14.2.3.1 OLD LANE, CENTRALIA ROAD AND CHESTER ROAD

The Preferred Alternative in this area is the common alignment of the VA1, VA2, and VA3 Project alternatives. Refer to map sheet 10 in Appendix R for a map of the proposed designs in this location. As a result of the crossing consolidation, Virginia DRPT assumed that traffic currently utilizing the Old Lane and Centralia Road at-grade rail crossings would use the proposed grade separations on the revised Centralia Road connection or the proposed Thurston Road Connector to Park Road. Traffic volumes were estimated for these intersections and analyses performed to determine the effect the proposed Project would have on traffic.

Old Lane and Hopkins Road: Current designs for the Project include removal of the Old Lane at-grade rail crossing , which will decrease the amount of traffic on the eastern leg of the Old Lane and Hopkins Road intersection, but will increase traffic on the western leg and alter the traffic patterns. It is anticipated that this traffic will reroute either to the new grade separated crossing at Centralia Road or at the Thurston Road Connector. Based on anticipated traffic volumes, this intersection was analyzed as a stop condition for the southbound leg only in the 2030 proposed conditions. Appendix P Figures 11 and 12 provide the proposed laneage and associated 2030 peak hour volumes, respectively. Table 4-59 provides the level of service for the 2030 No Build and proposed conditions. As shown in Table 4-59, the intersection of Old Lane and Hopkins

Road is expected to operate similarly in the 2030 No Build and proposed conditions with no movement operating worse than LOS D.

Table 4-59
Old Lane and Hopkins Road - Level of Service in 2030

	Eastbound	Southbound
No Build (AM)	A	B
No Build (PM)	A	D
Proposed (AM)	A	B
Proposed (PM)	A	B

Source: Hatch Mott MacDonald, 2014.

Old Lane and Chester Road: The Old Lane at-grade rail crossing is proposed to be closed as part of the Project, considerably reducing the traffic volume at the intersection of Old Lane and Chester Road. It is anticipated that this traffic will reroute either to the new grade separated crossing at Centralia Road or at the Thurston Road Connector. Based on anticipated traffic volumes, this intersection was analyzed under signal control for the 2030 No Build conditions, but a signal must be deemed to be warranted before it is provided. The intersection was analyzed under stop control for the No Build conditions due to the minor volume on that section of Old Lane. Appendix P Figures 11 and 12 provide the 2030 proposed laneage and peak hour volumes, respectively. Table 4-60 provides the level of service for the 2030 No Build and proposed conditions for the Old Lane and Chester Road intersection. As shown in Table 4-60, while both the eastbound left-turn and right-turn movements are expected to operate at LOS F in the 2030 proposed conditions, it should be noted that these volumes are light (considerably less than the No Build condition) and the maximum queue is anticipated to be approximately 50 feet.

Table 4-60
Old Lane and Chester Road – Level of Service in 2030

	Eastbound	Northbound	Southbound
No Build (AM)	D	A	C
No Build (PM)	F	C	C
Proposed (AM)	F	A	--
Proposed (PM)	F	C	--

Source: Hatch Mott MacDonald, 2014.

Centralia Road and Chester Road: As previously mentioned, the existing at-grade rail crossing of Centralia Road at Chester Road is proposed to be removed as part of the Project. The traffic using this crossing is anticipated to relocate to the new grade separated crossing of Centralia Road and the proposed Project railroad alignment. With the proposed design, the existing Centralia Road and Chester Road intersection will remain, but convert to a "T" intersection as the western leg is removed. The grade separation will relocate the western leg to the eastern side of Chester Road approximately 950 feet south of the existing intersection. Based upon the proposed laneage and anticipated volumes, this intersection was analyzed under signal control for each condition and location. Appendix P Figures 11 and 12 provide the 2030 proposed laneage and peak hour volumes for both intersections of Centralia Road and Chester Road, respectively. Table 4-61 and Table 4-62 provide the level of service for both Centralia Road and Chester Road intersections for the 2030 No Build and proposed conditions.

Table 4-61 Centralia Road and Chester Road - Level of Service in 2030				
	Eastbound	**Westbound**	**Northbound**	**Southbound**
No Build (AM)	E	F	E	C
No Build (PM)	F	F	F	D
Proposed (AM)	--	E	B	B
Proposed (PM)	--	D	B	B

Source: Hatch Mott MacDonald, 2014.

As shown by Table 4-61, while the westbound movement is anticipated to operate at LOS E in the AM peak period, the overall intersection operations are improved over the No Build Conditions due to the removal of the eastbound leg of the intersection and its associated traffic.

Table 4-62 New Connection of Centralia Road and Chester Road - Level of Service in 2030			
	Westbound	**Northbound**	**Southbound**
No Build (AM)	--	--	--
No Build (PM)	--	--	--
Proposed (AM)	B	D	D
Proposed (PM)	C	C	C

Source: Hatch Mott MacDonald, 2014.

Based on the level of service analysis results shown in Table 4-62, the intersection of the new connection of Centralia Road and Chester Road will operate at an improved level of service over the 2030 No Build operations of the Chester Road and Centralia Road intersection. It is important to note that based on the anticipated design year volumes, Chester Road will warrant multi-lanes by the design year. With only one northbound through lane, the available "green" time for the competing movements is limited and considerable queuing is anticipated in the northbound direction. Chester Road will need to be widened to provide additional lanes in this area by the 2030 design year with or without the Project as indicated in the No Build analysis.

Centralia Road and Hopkins Road: With the closure of the existing Old Lane at-grade crossing and the provision of the Thurston Road Connector proposed as part of the Project, traffic at the intersection of Centralia Road and Hopkins Road will change from the No Build conditions. Turn lane enhancements were provided at this intersection to help mitigate the additional traffic flow due to the Project. Based on the projected volumes in 2030, this intersection was analyzed under signal control for each condition; however, this assumes that a signal study would take place prior to the design year to determine if a signal was warranted. Appendix P Figures 11 and 12 provide the 2030 proposed laneage and peak hour volumes for the intersection of Centralia Road and Hopkins Road, respectively. Table 4-63 provides the level of service for the 2030 No Build and proposed conditions. As shown in Table 4-63, with the SEHSR and proposed intersection improvements and traffic pattern modifications associated with the modifications, the Centralia Road and Hopkins Road intersection is anticipated to improve the level of service in the PM peak period as compared to the No Build conditions.

Table 4-63 Centralia Road and Hopkins Road - Level of Service in 2030				
	Eastbound	**Westbound**	**Northbound**	**Southbound**
No Build (AM)	D	C	D	D
No Build (PM)	E	F	F	F
Proposed (AM)	C	C	D	D
Proposed (PM)	D	F	F	F

Source: Hatch Mott MacDonald, 2014.

4.14.2.4 *LA CROSSE, VA*

4.14.2.4.1 PINE STREET AND MAIN STREET

The Preferred Alternative in this area is the common alignment of the VA1, VA2, and VA3 Project alternatives. Refer to map sheet 83 in Appendix R for a map of the proposed design in this location. The proposed design will disallow east-west travel along Pine Street at the old rail corridor between Main Street and Montgomery Street. The analysis for this section assumed all rerouted traffic would utilize US 58 as the east-west facility. As part of that analysis, traffic was rerouted to the intersections of US 58 and Main Street, Pine Street and Main Street, and Carter Street and Pine Street to evaluate the traffic operations related to the effects of this scenario. Also of note, the current design calls for Carter Street to be extended to the north. This extension is to provide access to a small number of parcels and connect to Northington Road to the north. This extension was assumed to not generate significant traffic volumes at the intersection of Carter Street and US 58.

A roundabout is proposed at the relocated intersection of Main Street, Jones Street, and Meredith Street. This intersection, along with the proposed grade separation over the proposed Project railroad alignment, will serve to replace the connection that is currently provided by Main Street and would be severed under the Project.

US 58 and Main Street/Country Club Road: With the proposed closure of the Pine Street at-grade crossing, east-west traffic on Pine Street is rerouted to US 58 with some of that traffic using Main Street to access US 58. Appendix P Figures 15 and 16 provide the Proposed 2030 laneage and peak hour volumes, respectively. Table 4-64 provides the level of service for the 2030 No Build and proposed conditions. As shown by Table 4-64, in the No Build and proposed conditions, all approaches are anticipated to operate at LOS D or better in the design year with the Project in place. Based on these operations, no modifications were proposed to the intersection geometry as part of the Project.

Table 4-64 US 58 and Main Street/Country Club Road - Level of Service in 2030				
	Eastbound	**Westbound**	**Northbound**	**Southbound**
No Build (AM)	B	C	C	B
No Build (PM)	B	B	C	C
Proposed (AM)	C	C	C	B
Proposed (PM)	C	B	D	C

Source: Hatch Mott MacDonald, 2014.

Pine Street and Main Street: The proposed Project will sever Pine Street between Main Street and Montgomery Street. East-west traffic along Pine Street will have to reroute to perform their desired maneuver. Some traffic is anticipated to use Main Street to access US 58 and perform an

east-west maneuver. Appendix P Figures 15 and 16 provide the 2030 proposed laneage and peak hour volumes, respectively. Table 4-65 provides the level of service for the 2030 No Build and proposed conditions. As shown by Table 4-65, with the rerouted traffic all movements are anticipated to operate at LOS B or better in the 2030 design year No Build and proposed conditions. Based on these operations, no modifications were proposed to the intersection as part of the Project.

Table 4-65
Pine Street and Main Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	B	A	A
No Build (PM)	B	B	A	A
Proposed (AM)	B	A	A	A
Proposed (PM)	B	B	A	A

Source: Hatch Mott MacDonald, 2014.

Carter Street and Pine Street: As with Main Street, with the closure of the Pine Street crossing at the proposed Project railroad alignment, some traffic will reroute to use Carter Street to access US 58 or travel south to reach the provided grade separation at Main Street to travel east-west. Appendix P Figures 15 and 16 provide the 2030 proposed laneage and peak hour volumes, respectively. Table 4-66 provides the level of service for the 2030 No Build and proposed conditions. As shown by Table 4-66, with the rerouted traffic all movements are anticipated to operate at LOS A in the 2030 design year proposed conditions. Based on this information, no modifications were proposed as part of the Project.

Table 4-66
Carter Street and Pine Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	A	A	A
No Build (PM)	A	A	A	A
Proposed (AM)	A	A	A	A
Proposed (PM)	A	A	A	A

Source: Hatch Mott MacDonald, 2014.

US 58 and Pine Street: With the closure of Pine Street to through traffic at the proposed Project railroad alignment, traffic may also take Pine Street to Main Street or Carter Street to access US 58 to perform an east-west maneuver. Appendix P Figures 15 and 16 provide the 2030 proposed laneage and peak hour volumes, respectively. Table 4-67 provides the level of service for the 2030 No Build and proposed conditions. As shown by Table 4-67, with the rerouted traffic, all movements are anticipated to operate as well as or better in the proposed conditions than in the No Build conditions. Also, all movements operate at LOS B or better in the 2030 proposed conditions. Based on this information, no modifications were proposed as part of the Project.

Table 4-67 US 58 and Pine Street - Level of Service in 2030			
	Eastbound	Westbound	Northbound
No Build (AM)	A	A	B
No Build (PM)	B	A	C
Proposed (AM)	A	A	B
Proposed (PM)	A	A	B

Source: Hatch Mott MacDonald, 2014.

4.14.2.5 *NORLINA, NC*

4.14.2.5.1 WARREN PLAINS ROAD AND YANCEY ROAD

The Preferred Alternative in Norlina, NC, (Section M) is Alternative NC1. Refer to map sheets 98 and 99 in Appendix R for maps of the proposed designs in Norlina, NC. The proposed Project railroad alignment will split Warren Plains Road just west of its intersection with Yancey Road. To the east of the split, Warren Plains Road is proposed to be extended northwest to intersect US-1/US 401. This relocation will provide a grade separated crossing of the proposed Project railroad alignment. The SEHSR design also proposes to provide a connection to the existing section of Warren Plains Road between the Project railroad alignment and the relocated Warren Plains Road. This connection is accomplished by relocating existing Warren Plains Road to access the new section of Warren Plains Road. This access provides a connection from Yancey Road to the extended Warren Plains Road and would be facilitated by a new alignment and "T" connection between the existing and the relocated Warren Plains Road. This connection will provide access to/from Yancey Road to/from Warren Plains and US-1/US 401. Also, the connection of existing Warren Plains Road from Yancey Road to Hyco Street (west of the Yancey Road intersection) would be removed. To access downtown Norlina, NC, from existing Yancey Road, drivers would use US-158/US 401 on the south end of Yancey Road, or use the new connector to access US-1/US 401 north of Norlina, NC. The Project will also sever the connection of Weldon Road with US-1/US 401. This traffic will now need to use the new connection of Warren Plains Road and US-1/US 401.

US-1/US 401 and New Warren Plains-Norlina Road Connection/Norlina Pines Drive: The proposed Project railroad alignment would split Warren Plains-Norlina Road west of Yancey Road; therefore, the projected volumes at the intersection of Yancey Road and Warren Plains-Norlina Road wishing to access US-1 or downtown Norlina, NC, would be relocated to the new connection of US-1 and Warren Pines Road. This new connection will form the fourth leg of the existing intersection of Norlina Pines Drive and US-1. It is important to note this intersection is approximately 450 feet from the intersection of US-1 and Elementary Avenue, which provides access to an elementary school. The intersection is proposed as an unsignalized intersection with the new Warren Plains-Norlina Road connection and Norlina Pines Drive experiencing the stop condition. The 2030 proposed laneage and volumes are shown by Appendix P Figures 19 and 20, respectively. Table 4-68 provides the level of service for the 2030 No Build and the proposed conditions. As shown in Table 4-68, with the rerouted traffic associated with the proposed Project and proposed laneage, all movements are anticipated to operate at LOS B or better in the 2030 proposed conditions, except for the southeast approach, which is anticipated to operate at LOS C in the AM peak period.

Table 4-68 Warren Plains–Norlina Road Extension/Norlina Pines Drive and US-1/US 401 - Level of Service in 2030				
	Southeast bound	Northeast bound	Southwest bound	Northwest bound
No Build (AM)	B	A	--	--
No Build (PM)	B	A	--	--
Proposed (AM)	C	B	A	A
Proposed (PM)	B	B	A	A

Source: Hatch Mott MacDonald, 2014.

Warren Plains-Norlina Road and Yancey Road: The existing intersection of Warren Plains-Norlina Road and Yancey Road will be removed as part of the Project.

Warren Plains-Norlina Road and Warren Plains-Norlina Road Connector: The Warren Plains-Norlina Road and Warren Plains Road-Norlina Connector intersection is a new intersection proposed as part of the Project. The Project railroad alignment as proposed will split Warren Plains-Norlina Road west of Yancey Road. At this point east of the alignment, Warren Plains-Norlina Road will begin at its intersection with Yancey Road. The projected volumes at the intersection of Yancey Road and Warren Plains-Norlina Road wishing to access US-1 or downtown Norlina, NC, would be relocated to the new connection of US-1 and Warren Plains-Norlina Road via the Warren Plains-Norlina Road and Warren Plains Road Connector. This intersection was analyzed as an unsignalized intersection with the Warren Plains Connector approach experiencing the stop condition. Appendix P Figures 19 and 20 provide the 2030 proposed laneage and peak hour volumes, respectively. Table 4-69 provides level of service for the 2030 proposed conditions. As shown by Table 4-69, in the 2030 proposed conditions, all approaches are expected to operate at LOS A.

Table 4-69 Warren Plains–Norlina Road and Warren Plains–Norlina Road Connector - Level of Service in 2030		
	Westbound	Northbound
No Build (AM)	--	--
No Build (PM)	--	--
Proposed (AM)	A	A
Proposed (PM)	A	A

Source: Hatch Mott MacDonald, 2014.

Weldon Road and Warren Plains-Norlina Road: The Project railroad alignment will sever the Weldon Road connection to US-1/US 401; therefore, this traffic will be rerouted to the new Warren Plains-Norlina Road and US-1/US 401 intersection. The Warren Plains-Norlina Road and Weldon Road intersection was analyzed under the same traffic control conditions as existing, an unsignalized "T" intersection with Weldon Road experiencing the stop condition. Appendix P Figures 19 and 20 provide the 2030 proposed laneage and peak hour volumes, respectively. Table 4-70 provides the delay and level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-70, all approaches are expected to operate at LOS A in both the 2030 design year No Build and proposed conditions. Based on this analysis, no modifications were proposed to the Warren Plains-Norlina Road and Weldon Road intersection as part of the Project.

Table 4-70 Weldon Road and Warren Plains–Norlina Road - Level of Service in 2030		
	Eastbound	**Southbound**
No Build (AM)	A	A
No Build (PM)	A	A
Proposed (AM)	A	A
Proposed (PM)	A	A

Source: Hatch Mott MacDonald, 2014.

4.14.2.5.2 WARREN PLAINS ROAD AND HYCO STREET

The Preferred Alternative in Norlina, NC, (Section M) is Alternative NC1. Refer to map sheet 100 in Appendix R for a map of the proposed designs. With the proposed Project, the connection between Division Street and Warren Plains Road will be removed, Warren Plains Road will be severed between Yancey Road and Washington Street, and the intersections of Liberty Street and Hyco Street with US-158/US 401 will be removed. Traffic from these closures would be rerouted to US 401/US-158 via other surrounding roadways such as Main Street and US-1/US 401.

Warren Plains Road and Hyco Street: With the removal of the Division Street and Warren Plains Road intersection, the removal of the Hyco Street and US-1/US-158 intersection, and the splitting of Warren Plains Road east of Hyco Street due to the Project, most traffic at the Hyco Road and Warren Plains Road intersection would have to reroute. This traffic is anticipated to use US-1/US 401, Main Street, and US-1/US-158. Appendix P Figures 19 and 20 provide the 2030 proposed laneage and peak hour volumes for the Warren Plains Road and Hyco Street intersection. Table 4-71 provides the level of service for the 2030 No Build and proposed conditions. As shown by Table 4-71, with the new traffic patterns associated with the Project, which reduces traffic at this intersection, and the proposed design, all approaches are anticipated to operate at LOS A or better in the 2030 design year for both the No Build and proposed conditions. Therefore, no modifications are proposed for this intersection as part of the Project

Table 4-71 Warren Plains Road and Hyco Street - Level of Service in 2030		
	Westbound	**Southbound**
No Build (AM)	A	A
No Build (PM)	A	A
Proposed (AM)	A	A
Proposed (PM)	A	A

Source: Hatch Mott MacDonald, 2014.

US-1/US 401 and Hyco Street/North Street: No modifications are proposed to the US-1/US 401 and Hyco Street/North Street intersection as part of the Project. While the rerouting of traffic due to the Project reduces turning movements at this intersection, it increases the through traffic on US-1/US 401 as traffic diverts to US-1/US-158 or Warren Plains Road to reach their destination. Appendix P Figures 19 and 20 provide the 2030 proposed laneage and peak hour volumes for the US-1/US 401 and Hyco Street/North Street intersection. Table 4-72 provides a comparison of the 2030 No Build and Proposed operations for the US-1/US 401 and Hyco Street/North Street intersection. As shown by Table 4-72, with the rerouted traffic and the proposed design, all approaches are anticipated to operate at LOS C or better in the 2030 design year proposed conditions, which is comparable to the No Build conditions. Therefore, no modifications are proposed to this intersection as part of the Project.

Table 4-72 US-1/US 401 and Hyco Street/North Street - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	A	B	B
No Build (PM)	A	A	B	B
Proposed (AM)	A	A	C	B
Proposed (PM)	A	A	B	B

Source: Hatch Mott MacDonald, 2014.

Warren Plains Road and Division Street: The Warren Plains Road and Division Street intersection is proposed to be removed as part of the Project and the traffic will be rerouted.

Liberty Street and US 401/US-158: The existing intersection of Liberty Street and US-158/US 401 will be removed as part of the Project. It is less than 100 feet from the existing grade separation of the rail line and US-1/US-158; the proposed new grade separation constructed for this Project will be at the same location as the existing grade separation. This new structure has the potential to cause sight distance issues for drivers wishing to turn from Liberty Street to US-158/US 401, but this concern is removed with the elimination of the intersection.

Liberty Street and Division Street: The existing intersection of Liberty Street and Division Street is less than 100 feet from the proposed Project railroad alignment and will be removed as part of the Project.

Main Street and US 401/US-158: With the proposed closure of Division Street between Liberty Street and Hyco Street, the traffic using the existing at-grade crossing was rerouted to Main Street. Traffic currently using this section of Division Street has multiple facilities in the grid network to access US 401/US-158 and reach their intended destination. For the purposes of this analysis, the majority of this traffic was rerouted to the intersection of Main Street and US 401/158. The closure of the east leg of the intersection of Liberty Street and US 401/158 will route traffic to Elm Street or Division Street and back to Main Street. The closure of the east and west legs of the intersection of Hyco Street and US 401/US-158 is anticipated to route traffic back to US-1/US 401 and US-1/US-158 to reach their desired destination.

With the closure of the crossing at Division Street and the additional changes to the above intersections, the intersection of Main Street and US 401/US-158 was analyzed to estimate operations with the proposed SEHSR in place in the 2030 design year. The Project proposes to provide a northbound and southbound left-turn lane along US-1/US-158 at the Main Street intersection. Appendix P Figures 19 and 20 provide the 2030 proposed laneage and peak hour volumes for the Main Street and US-158/US 401 intersection. Table 4-73 provides a comparison of the 2030 No Build and proposed operations for the Main Street and US-158/US 401 intersection. As shown by Table 4-73, with the anticipated volumes and proposed laneage, all approaches are anticipated to operate at the same level of service between the 2030 No build and Proposed conditions.

Table 4-73 Main Street and US 401/US-158 - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	C	C	A	A
No Build (PM)	C	C	A	A
Proposed (AM)	C	C	A	A
Proposed (PM)	C	C	A	A

Source: Hatch Mott MacDonald, 2014.

4.14.2.5.3 US-1 AND AXTELL-RIDGEWAY ROAD AND RIDGEWAY-DREWRY ROAD

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. It should be noted that the road designs for this area were revised from what was presented in the Tier II DEIS based on comments from local officials and the public. (See Section 2.2.19 for more information on this change.) Refer to map sheets 101 and 102 in Appendix R for maps of the proposed designs. With the proposed closures of the at-grade rail crossings at Axtell Ridgeway Road and Ridgeway-Warrenton Road, traffic from these locations will be rerouted across the proposed Ridgeway-Drewry Road grade separated crossing of the Project railroad alignment. The grade separated crossing on the proposed extension of Ridgeway-Drewry Road will allow vehicles to travel to/from US-1/US-158.

US-1/US-158 and Axtell Ridgeway Road/Driveway: The Axtell Ridgway Road leg of the US-1/US-158 and Axtell Ridgeway Road intersection will be removed under the Project; the driveway which serves as the northern leg of the intersection will remain. Appendix P Figures 23 and 24 provide the 2030 laneage and Proposed peak hour volumes for the US-1/US-158 and Driveway intersection (Axtell Ridgeway Road is removed from the intersection) while Table 4-74 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-74, all movements are anticipated to operate at LOS C better in the 2030 No Build and Proposed conditions. Therefore, no additional enhancements are proposed as part of the Project.

Table 4-74
US-1/US-158 and Axtell Ridgeway Road/Driveway - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	A	B	C
No Build (PM)	A	A	C	C
Proposed (AM)	A	--	--	C
Proposed (PM)	A	--	--	B

Source: Hatch Mott MacDonald, 2014.

US-1/US-158 and Ridgeway-Drewry Road: The Project will provide an extension of Ridgeway-Drewry Road, which includes a grade separated crossing of the proposed Project railroad alignment. This new connection will extend northward from US-1 for approximately one half mile to connect back to existing Ridgeway-Drewry Road. This extension and associated grade separation will provide access for vehicles on Axtell Ridgeway Road and Ridgeway-Warrenton Road to access US-1/US-158 and vice versa, replacing the removed at-grade rail crossings on each of these facilities. Appendix P Figures 23 and 24 provide the 2030 laneage and proposed peak hour volumes for the US-1/US-158 and Ridgeway-Drewry Road intersection, while Table 4-75 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-75, all movements are anticipated to operate at LOS C better in the 2030 No Build and Proposed conditions; therefore, no additional enhancements are proposed as part of the Project.

Table 4-75
US-1/US-158 and Ridgeway-Drewry Road - Level of Service in 2030

	Eastbound	Southbound
No Build (AM)	A	C
No Build (PM)	A	C
Proposed (AM)	A	C
Proposed (PM)	A	C

Source: Hatch Mott MacDonald, 2014.

US-1/US-158 and Ridgeway-Warrenton Road/Grant Lane: The Ridgeway-Warrenton Road leg of the US-1/US-158 and Ridgeway-Warrenton Road/Grant Lane intersection is removed in the proposed SEHSR designs. Appendix P Figures 23 and 24 provide the 2030 proposed laneage and peak hour volumes for the US-1/US-158 and Grant Lane intersection (Ridgeway-Warrenton Road is removed), while Table 4-76 provides the level of service the 2030 No-Build and proposed conditions. As shown by Table 4-76, all movements are anticipated to operate at LOS D or better in the 2030 No Build conditions and LOS B or better in the 2030 proposed conditions; therefore, no additional enhancements are proposed by the Project.

Table 4-76
US-1 and Ridgeway-Warrenton Road/Grant Lane - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	A	C	C
No Build (PM)	A	A	C	C
Proposed (AM)	A	--	--	B
Proposed (PM)	A	--	--	B

Source: Hatch Mott MacDonald, 2014.

US-1/US-158 and Saint Tammany Road: In the design presented in the Tier II DEIS, the intersection configuration and volumes of the US-1/US-158 and Saint Tammany intersection changed due to the Project. With the current design, the existing configuration of the US-1/US-158 and St. Tammany Road intersection will not change with the Project. Also, the volumes are not anticipated to change between the Build and proposed conditions. Therefore, a traffic analysis was not performed.

Ridgeway-Warrenton Road and Ridgeway-Drewry Road Connector: The Ridgeway-Warrenton Road and Ridgeway-Drewry Road Connector intersection is a new intersection that would be created as part of the Project. This intersection provides access from Ridgeway-Warrenton Road and Axtell Ridgeway Road to US-1/US-158 and Ridgeway-Drewry Road and vice versa. The traffic volumes at this intersection were estimated using the counts at US-1/US-158 with Axtell Ridgeway Road, Ridgeway-Warrenton Road, and Ridgeway-Drewry Road. Appendix P Figures 23 and 24 provide the 2030 proposed laneage and peak hour volumes for the Ridgeway-Warrenton Road and Ridgeway-Drewry Road Connector intersection, while Table 4-77 provides the level of service for the 2030 proposed conditions. As shown by Table 4-77 all movements are anticipated to operate at LOS B better in the 2030 proposed conditions.

Table 4-77
Ridgeway-Warrenton Road and Ridgeway-Drewry Road Connector - Level of Service in 2030

	Eastbound	Southbound
No Build (AM)	--	--
No Build (PM)	--	--
Proposed (AM)	A	A
Proposed (PM)	A	B

Source: Hatch Mott MacDonald, 2014.

Ridgeway-Drewry Road and Ridgeway-Drewry Road Connector: The Ridgeway-Drewry Road and Ridgeway-Drewry Road Connector intersection is a new intersection that would be created as part of the Project. This intersection provides access from Ridgeway-Warrenton Road and Axtell Ridgeway Road to US-1/US-158 and Ridgeway-Drewry Road and vice versa. The traffic volumes at this intersection were estimated using the counts at US-1/US-158 with Axtell Ridgeway Road, Ridgeway-Warrenton Road, and Ridgeway-Drewry Road. Appendix P Figures

23 and 24 provide the 2030 proposed laneage and peak hour volumes for the Ridgeway-Drewry Road and Ridgeway-Drewry Road Connector intersection, while Table 4-78 provides the level of service for the 2030 proposed conditions. As shown by Table 4-78 all movements are anticipated to operate at LOS B better in the 2030 proposed conditions.

Table 4-78
Ridgeway-Warrenton Road and Ridgeway-Drewry Road Connector - Level of Service in 2030

	Eastbound	Southbound
No Build (AM)	--	--
No Build (PM)	--	--
Proposed (AM)	A	A
Proposed (PM)	A	B

Source: Hatch Mott MacDonald, 2014.

4.14.2.5.4 COLLINS ROAD AND SOUL CITY BOULEVARD – SOUL CITY AREA

The Preferred Alternative in this area (Section N) is Alternative NC1. Refer to map sheet 104 in Appendix P for a map of the proposed designs. The designs would relocate the intersection of Collins Road and Soul City Boulevard and realign Soul City Boulevard to allow a grade separated crossing over the proposed Project railroad alignment north of the intersection. Soul City Boulevard will maintain the same intersection location with US-1; however, the intersection of Soul City Boulevard and Collins Road will be shifted slightly. The proposed Project railroad alignment crossing of Collins Road west of Manson-Axtell Road will result in a continuous movement from Manson-Axtell Road to Collins Road and remove access from Manson-Axtell Road and Collins Road east of Manson-Axtell Road, to US-1/US-158 (as the existing crossing will be closed). Traffic using the intersection of Collins Road and US-1/US-158 to access Collins Road US-1 or US-1 was rerouted to the intersection of Soul City Boulevard and US-1.

Soul City Boulevard and US-1/US-158: The analysis for the intersection of Soul City Boulevard and US-1/US-158 is based on a diversion of traffic from Manson-Axtell Road currently traveling westbound on Collins Road to US-1/US-158. This traffic is diverted to the intersection of Soul City Boulevard and US-1/US-158, via the proposed grade separation. Appendix P Figures 27 and 28 provide the 2030 proposed laneage and peak hour volumes for intersection of Soul City Boulevard and US-1/US-158, respectively. Table 4-79 provides the level of service for the 2030 No-Build and proposed conditions. As shown in Table 4-79, no movement is anticipated to operate below LOS B in the No Build conditions or LOS C in the proposed conditions. While the at-grade rail crossing closures at Collins Road, Kimball Road, and Soul City Boulevard will result in rerouting of traffic, it is not expected to have considerable effects on the operations of the Soul City Boulevard and US-1/US-158 intersection. Therefore, no geometric modifications were proposed as part of the Project.

Table 4-79
Soul City Boulevard and US-1/US-158 - Level of Service in 2030

	Westbound	Northbound
No Build (AM)	A	B
No Build (PM)	A	B
Proposed (AM)	A	C
Proposed (PM)	A	C

Source: Hatch Mott MacDonald, 2014.

Collins Road and Manson-Axtell Road: This intersection is converted to a free-flow movement with the SEHSR designs. Therefore, an analysis was not performed for the proposed conditions.

Collins Road and Soul City Boulevard: Given the low volumes in the design year along Soul City Boulevard at US-1/US-158 (north of this intersection) and on Collins Road at Manson-Axtell Road (west of this intersection), the Project Team anticipates that the impacts on traffic operations at this intersection will be minimal. Based on this information, the intersection of Collins Road and Soul City Boulevard was not analyzed.

4.14.2.6 *MIDDLEBURG, NC*

4.14.2.6.1 SOUTH CAROL STREET AND US-1/US-158

The Preferred Alternative in this area (Section O) is Alternative NC3. Refer to map sheet 108 and 109 in Appendix R for maps of the proposed designs. The Tier II DEIS included alternatives that would affect traffic movements in the Middleburg, NC, area. However, the Preferred Alternative includes a grade separated crossing for South Carol Street, and the Project Team does not expect changes to existing traffic patterns. Therefore, as a result of the Project railroad alignment, no additional traffic will operate through the intersection and traffic volumes will not increase.

4.14.2.7 *HENDERSON, NC*

In the City of Henderson, NC, the Preferred Alternative is the common alignment of the NC1, NC2, and NC3 Project alternatives, which is located along existing rail ROW with active freight service. The Project designs were developed in an attempt to balance the need for an adequate number of safe grade-separated crossings, with the desire to minimize impacts to surrounding development. Within city limits, the Project alternatives call for eight existing public crossings to be closed, with traffic re-routed to three new and one existing bridged crossings. Of note, there is also a pedestrian-only underpass proposed.

4.14.2.7.1 MAIN STREET/BECKFORD DRIVE AND OLD NORLINA ROAD

The Preferred Alternative is the common alignment of the NC1, NC2, and NC3 Project alternatives in this area. Refer to map sheet 114 in Appendix R for a map of the proposed designs in this location. Based on coordination with the Henderson, NC, City Council and City staff, Main Street will be extended from its current terminus at David Street east to provide better east-west connectivity. To further improve this connectivity, several alternatives were studied under the Project to enhance the connection to US-1 Business/US-158. Options included removing the US-1 Business/US-158 (North Garnett Street) leg of the intersection of US-1 Business/US-158 (North Garnett Street) with North Beckford Drive and North Chestnut Street, and removing the Chestnut Street leg of the same intersection. The Tier II FEIS designs would provide a roundabout at this location in order to accommodate the existing intersection movements and provide the direct connection to Main Street as a fifth leg of the intersection.

As a result of constructing a grade separated crossing of Main Street and the Project railroad alignment, the intersection of Old Norlina Road and Main Street will be removed. Traffic from Old Norlina Road will not be able to travel past Main Street. The existing at-grade rail crossing of Harris Street will also be removed. Traffic on the east side of the existing crossing will likely use David Street to reach the Beckford Drive/Main Street, Chestnut Street, and Garnett Street intersection while traffic on the west side of the crossing will use one of the several available roadways to access Garnet Street to reach the Beckford Drive/Main Street, Chestnut Street, and Garnett Street intersection.

Beckford Drive/Main Street, Chestnut Street, and US-1 Business/US-158 (Garnett Street): By creating a revised five-leg intersection, the traffic on Main Street will have a direct connection to Garnett Street, Chestnut Street, and Beckford Drive. Traffic from the proposed at-grade rail closures at Harris Street and Old Norlina Road will be rerouted to the Beckford Drive/Main Street and Garnett Street intersection.

The intersection is proposed as a dual-lane roundabout. One benefit to a roundabout configuration is to simplify traffic operations when Main Street is connected to the intersection. To help introduce roundabout operations to the area, a single lane roundabout may adequately service the traffic volumes in intermediate years; however, a dual-lane roundabout is needed by the design year. Therefore, while this intersection may initially operate as a single lane roundabout, it was analyzed as a dual lane roundabout in order to determine 2030 design year operations.

Appendix P Figures 31 and 32a, 32b provide the 2030 proposed laneage and AM and PM peak hour volumes for the Beckford Drive/Main Street, Chestnut Street, and Main Street intersection, respectively. Table 4-80 provides the level of service for the 2030 No-Build and proposed conditions. As shown in Table 4-80, the proposed conditions are expected to operate at the same or better LOS than the No Build conditions. It should also be noted that this configuration is in keeping with the long range plan to extend Main Street and provides more direct movements from Main Street to major facilities in downtown Henderson, NC.

Table 4-80
Beckford Drive/Main Street, Chestnut Street and US-1 Business/US 158 (Garnett Street) - Level of Service in 2030

	Eastbound	Northbound	Southbound	Northeast bound	Westbound
No Build (AM)	B	C	A	B	--
No Build (PM)	C	C	B	C	--
Proposed (AM)	A	A	A	A	A
Proposed (PM)	B	A	A	B	B

Source: Hatch Mott MacDonald, 2014.

Main Street and Old Norlina Road: With the Project, the existing at-grade crossing on Main Street east of this intersection is proposed to be grade separated. Due to the structure that would be constructed, Main Street would not intersect with Old Norlina Road, and vehicles on Old Norlina Road would not be able to cross Main Street. As such, this intersection will no longer exist. Therefore, a 2030 design year proposed analysis was not performed

4.14.2.7.2 US-1 BUSINESS (GARNETT STREET) AND NC 39 (ANDREWS AVENUE)

The Preferred Alternative is the common alignment of the NC1, NC2, and NC3 Project alternatives in this area. Refer to map sheets 114 and 115 in in Appendix R for a map of the proposed designs in this location. The Project designs would close the existing at-grade rail crossings on Rock Spring Street, Montgomery Street, and other more minor at-grade rail crossings in the vicinity, and construct a grade separated crossing on NC 39 (Andrews Avenue) over Williams Street, the proposed Project railroad alignment, and US-1 Business (Garnett Street). The proposed closures and grade separated crossings will alter traffic along Williams Street, Chestnut Street, Andrews Avenue, and Garnett Street among others in this area.

Rock Spring Street and Chestnut Street: With the Project, traffic patterns at the Rock Spring Street and Chestnut Street intersection will change due to the closure of the at-grade rail crossing of Rock Spring Street between Garnett Street and Williams Street. Some of the traffic currently using the at-grade crossing on Rock Spring Street is expected to reroute at this intersection in order to access either the proposed grade separation on Andrews Avenue or the exiting grade

separation on Charles Street. Also, vehicles currently using Andrews Avenue from the east to access Garnett Street will no longer be able to do so due to the proposed grade separation. Therefore, some of those vehicles will also use this intersection to access Garnett Street. With the change in traffic patterns and increase in traffic volume, this intersection was analyzed under signal control in the proposed conditions; however, a signal must be warranted before being installed. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Rock Spring Street and Chestnut Street intersection. Table 4-81 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-81, all movements are anticipated to operate at LOS C or better in the 2030 No Build conditions. Under signal control, each approach is anticipated to operate at LOS D or better in the 2030 proposed conditions.

Table 4-81
Rock Spring Street and Chestnut Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	B	A	A
No Build (PM)	B	C	A	A
Proposed (AM)*	A	B	C	B
Proposed (PM)*	B	C	D	B

* Signalized
Source: Hatch Mott MacDonald, 2014.

Rock Spring Street and Garnett Street: With the Project, traffic patterns at the Rock Spring Street and Garnett Street intersection will change due to the closure of the at-grade rail crossing of Rock Spring Street between Garnett Street and Williams Street. The removal of the at-grade rail crossing would convert this intersection to a "T" configuration with Rock Spring Street still experiencing the stop condition. As vehicles on the east side of the proposed SEHSR alignment wish to access the west side and vice-versa, some will use this intersection as they travel to/from the intersection of Chestnut Street and Andrews Avenue, which provides access to the proposed grade separated crossing on Andrews Avenue. While the removal of the east leg of the Rock Spring Street and Garnett Street intersection will reduce some volumes, the rerouting associated with the Project is expected to result in an increase of some turning movements (southbound right-turns and eastbound left-turns) at this intersection. Appendix P Figures 33 and 34 provide the 2030 proposed laneage peak hour volumes for the Rock Spring Street and Garnett Street intersection. Table 4-82 provides the level of service for the 2030 No-Build and proposed Build scenarios. As shown by Table 4-82, the eastbound and westbound movements are anticipated to operate under failing conditions in the PM peak period of the 2030 No Build conditions. Under the proposed conditions, the westbound approach is removed, but the eastbound approach still operates at LOS F in the PM peak period. There is also an increase in delay over the No Build conditions, which is attributed to the change in traffic patterns in the proposed conditions. Traffic from the proposed grade separation on Andrews Avenue destined for Garnett Street and Garnett Street traffic destined for the grade separation on Andrews Avenue would use this intersection. Even though the eastbound approach operates at LOS F with an increase in delay in the PM peak period, no improvements were recommended due to the ROW constraints at this location. This intersection was also evaluated under signal control to determine operations if a signal were warranted in the design year. Under signal control, the intersection is expected to operate better than LOS D in the proposed conditions.

Table 4-82 Rock Spring Street and Garnett Street - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	B	A	A
No Build (PM)	F	F	A	A
Proposed (AM)	C	--	A	--
Proposed (PM)	F	--	A	--

Source: Hatch Mott MacDonald, 2014.

Rock Spring Street and Williams Street: With the Project, traffic patterns at the Rock Spring Street and Williams Street intersection will change due to the removal of the at-grade rail crossing of Rock Spring Street between Garnett Street and Williams Street and the fact that traffic currently turning onto Andrews Avenue from Williams Street and vice-versa may relocate to this intersection. The removal of the at-grade rail crossing would convert this intersection to a "T" configuration with Williams Street still experiencing the stop condition. The modifications associated with the Project result in some volumes increasing and some decreasing in the proposed conditions. Appendix P Figures 33 and 34 provide the 2030 proposed laneage peak hour volumes for the Rock Spring Street and Williams Street intersection. Table 4-83 provides the level of service for the 2030 No-Build and Proposed conditions. As shown by Table 4-83, all approaches are expected to operate at LOS B or better in the No Build and proposed conditions.

Table 4-83 Rock Spring Street and Williams Street - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	A	B	B
No Build (PM)	A	A	B	B
Proposed (AM)	--	A	A	B
Proposed (PM)	--	A	A	B

Source: Hatch Mott MacDonald, 2014.

Chestnut Street and Andrews Avenue (NC 39): The intersection of Chestnut Street and Andrews Avenue remains a four-leg signalized intersection under the proposed conditions. However, with the grade separation of Andrews Street with Garnett Street and Williams Street, considerably more turning traffic would move through this intersection. Vehicles currently using the at-grade rail crossings in the area that are proposed for removal will likley either use this intersection to access the proposed grade separation on Andrews Avenue or use Charles Street to make their desired maneuver. Additional turn lanes were provided at this intersection to help facilitate the additional traffic volume anticipated to use this intersection with the Project. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Chestnut Street and Andrews Avenue intersection. Table 4-84 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-84, the south and east approaches both operate at LOS F in the 2030 No Build PM peak period. NCDOT projects that Chestnut Street willcarry considerably more traffic during the PM peak period than the AM peak period, resuting in more delay and congestion in the PM peak period. While two approaches, north and south, operate at LOS E during the PM peak period in the 2030 proposed conditions, both approaches experience less delay than in the No Build conditions. It should also be noted that in the 2030 PM peak period the overall intersection level of service improves from LOS E in the No Build conditions to LOS D in the proposed conditions.

Table 4-84 Rock Spring Street and Williams Street - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	C	B	C	C
No Build (PM)	F	C	E	E
Proposed (AM)	C	C	D	C
Proposed (PM)	D	C	E	D

Source: Hatch Mott MacDonald, 2014.

Garnett Street and Andrews Avenue (NC 39): This intersection would be removed by the Project and traffic would be rerouted along the surrounding network.

Williams Street and Andrews Avenue (NC 39): The intersection of Williams Street and Andrews Avenue would be removed by the Project and traffic currently using this intersection would be rerouted into the surrounding network with most vehicles likely using either the new grade separated crossing on Andrews Avenue or the existing grade separated crossing at Charles Street.

Montgomery Street and Chestnut Street: The intersection of Montgomery Street and Chestnut Street remains a four-leg signalized intersection in the proposed conditions; however, traffic patterns change and traffic would be rerouted to this intersection as a result to the Project. The proposed removal of the at-grade rail crossing on Montgomery Street and the grade separation of Andrews Avenue with Garnett Street and Williams Street would affect the traffic patterns and volumes at this intersection. Therefore, turn lane enhancements are provided as part of the Project to help mitigate the traffic pattern changes. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Chestnut Street and Montgomery Street intersection. Table 4-85 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-85, the intersection of Montgomery Street and Chestnut Street is expected to operate similarly in the 2030 No Build and proposed conditions.

Table 4-85 Montgomery Street and Chestnut Street - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	B	C	C
No Build (PM)	B	B	B	B
Proposed (AM)	B	B	B	B
Proposed (PM)	B	C	C	C

Source: Hatch Mott MacDonald, 2014.

Montgomery Street and Garnett Street: With the closure of the at-grade rail crossing on Montgomery Street southwest of this intersection, it essentially becomes a "T" intersection with the southwest leg currently serving a business parking lot. Since there would be little to no traffic on the southwest leg, this intersection was analyzed under stop control for the proposed conditions, but remained under signal control for the No Build conditions. The Montgomery Street traffic that currently uses the at-grade crossing will be forced to reroute, and the most likely route will be either to Charles Street or the proposed grade separated crossing on Andrews Avenue. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Montgomery Street and Garnett Street intersection. Table 4-86 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-86, the intersection of Montgomery Street and Garnett Street is expected to operate at LOS D or better in the 2030 No Build conditions. With the Project and under stop control, the eastbound movements are anticipated to operate at LOS E in the 2030 proposed conditions in the PM peak period with an anticipated queue of 100 feet. While this is not unusual for an unsignalized movement, if the City of Henderson determines that it is appropriate to maintain the signal after the Project is

constructed, the overall level of service is expected to be as good as or better than the No Build conditions.

Table 4-86
Montgomery Street and Garnett Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	A	D	D
No Build (PM)	B	C	D	C
Proposed (AM)	E	--	A	--
Proposed (PM)	E	--	A	--

Source: Hatch Mott MacDonald, 2014.

Montgomery Street and Williams Street: With the Project and the associated removal of the at-grade rail crossing on Montgomery Street northwest of this intersection, the Montgomery Street and Williams Street intersection would essentially function as a "T" intersection. Traffic currently using this intersection to travel across the at-grade intersection would have to reroute, with the most likely options being the existing grade separation at Charles Street or the proposed grade separation of Andrews Avenue over the Project railroad alignment, Garnett Street, and Williams Street. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Williams Street and Montgomery Street intersection. Table 4-87 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-87, all movements for the intersection of Montgomery Street and Williams Street are expected to operate at LOS D or better in the 2030 No Build conditions and LOS B or better in the 2030 proposed conditions.

Table 4-87
Williams Street and Montgomery Street - Level of Service in 2030

	Eastbound	Westbound	Northbound		Southbound	
			Left	Thru-Right	Left	Thru-Right
No Build (AM)	A	A	B	B	C	B
No Build (PM)	A	A	D	C	C	C
Proposed (AM)	--	B	--		A	
Proposed (PM)	--	B	--		A	

Source: Hatch Mott MacDonald, 2014.

Charles Street/Church Street and Garnett Street (Southwest): The western intersection of Charles Street/Church Street and Garnett Street would not change configuration with the Project. Even though the geometry is not affected by the Project, the traffic flow through the intersection is affected. More vehicles are anticipated to use Charles Street to take advantage of the existing grade separation on Charles Street and fewer vehicles are anticipated to use Garnett Street at this location with the closure of the at-grade rail crossings in the area. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Charles Street/Church Street and Garnett Street intersection (southwest). Table 4-88 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-88, even though traffic patterns change, the intersection of Charles Street/Church Street and Garnett Street (southwest) is expected to operate well in the 2030 Proposed conditions. While the traffic on Charles Street increases as more vehicles take advantage of the existing grade separation, the through traffic volumes on Garnett Street decrease due to the removal of nearby at-grade rail crossings. As shown in Table 4-88, all approaches are anticipated to operate at LOS B or better with the Project.

Table 4-88 Charles Street/Church Street and Garnett Street (Southwest) - Level of Service in 2030				
	Eastbound	**Westbound**	**Northbound**	**Southbound**
No Build (AM)	D	D	A	A
No Build (PM)	D	E	A	A
Proposed (AM)	A	B	B	B
Proposed (PM)	B	B	B	A

Source: Hatch Mott MacDonald, 2014.

Charles Street and Garnett Street (Northeast): The configuration of the northeastern intersection of Charles Street and Garnett Street would not change with the Project. As with the southwest intersection, even though the geometry is not affected by the Project, the traffic flow through the intersection is affected. More vehicles are anticipated to use Charles Street to take advantage of the existing grade separation on Charles Street and fewer vehicles are anticipated to use Garnett Street in the area due to the closure of nearby at-grade rail crossings. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Charles Street and Garnett Street intersection (northeast). Table 4-89 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-89, even though traffic patterns change, the intersection of Charles Street and Garnett Street (northeast) is expected to operate very similarly in the No Build and the proposed conditions. This is due, in part, to the fact that while traffic on Charles Street increases as more vehicles use the existing grade separation on Charles Street, less traffic is anticipated on Garnett Street in this area due to the removal of nearby at-grade rail crossings.

Table 4-89 Charles Street and Garnett Street (Northeast) - Level of Service in 2030		
	Westbound	**Southbound**
No Build (AM)	B	A
No Build (PM)	B	A
Proposed (AM)	A	A
Proposed (PM)	B	A

Source: Hatch Mott MacDonald, 2014.

Williams Street and Charles Street: While the configuration of the intersection of Williams Street and Charles Street does not change with the Project, the traffic volumes and patterns would change. More traffic is anticipated to use Charles Street to take advantage of the existing grade separation, while flow on Williams Street varies with some volumes increasing and some decreasing due to the closing of nearby at-grade crossings and the provision of a grade separation at Andrews Avenue. Appendix P Figures 33 and 34 provide the 2030 proposed laneage and peak hour volumes for the Williams Street and Charles Street intersection. Table 4-90 provides the level of service for the 2030 No Build and proposed conditions. As shown by Table 4-90, even though traffic patterns change, the intersection of Charles Street and Williams Street is expected to operate similarly in the 2030 No Build and proposed conditions.

Table 4-90 Williams Street and Charles Street - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	C	A	A
No Build (PM)	A	A	A	A
Proposed (AM)	A	B	B	A
Proposed (PM)	B	A	B	A

Source: Hatch Mott MacDonald, 2014.

4.14.2.7.3 CHAVASSE AVENUE/DABNEY DRIVE/ALEXANDER AVENUE

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. Refer to map sheet 115 in Appendix R for a map of the proposed designs in this location. As part of the proposed Project, Dabney Drive would be relocated approximately 550 feet south of its current intersection with US-1 Business (Raleigh Road). Alexander Avenue would be extended to tie into the relocated intersection of Dabney Drive and US-1 Business with a grade separated crossing over the proposed Project railroad alignment. The proposed closure of the existing at-grade rail crossing on Chavasse Avenue, approximately 50 feet west of Williams Street, would result in traffic being rerouted to the new intersection of Dabney Drive and US-1 Business.

Chavasse Avenue and Williams Street: The proposed at-grade rail crossing closure on Chavasse Avenue near Williams Street would result in traffic rerouting to the new intersection of Dabney Drive and US-1 Business. With the closing of the rail crossing, the intersection of Chavasse Avenue and Williams Street would convert to a "T" intersection and traffic on Chavasse Avenue would reduce due to the removal of the western leg. As such, the intersection was analyzed under stop control in the 2030 proposed conditions with Chavasse Avenue experiencing the stop condition. Appendix P Figures 37 and 38 provide the 2030 proposed laneage and peak hour volumes for the Chavasse Avenue and Williams Street intersection. Table 4-91 provides the level of service for the 2030 No-Build and Proposed conditions. As shown by Table 4-91, with the rerouted traffic and the proposed design, all approaches are anticipated to operate at LOS B or better in the design year, which is an improvement over the No Build conditions.

Table 4-91 Chavasse Avenue and Williams Street - Level of Service in 2030					
	Eastbound	Westbound		Northbound	Southbound
No Build (AM)	B	C		D	C
No Build (PM)	B	C		D	B
Proposed (AM)	--	Left: B	Right: A	--	A
Proposed (PM)	--	Left: B	Right: A	--	A

Source: Hatch Mott MacDonald, 2014.

Chavasse Avenue/Oxford Street and Dorsey Avenue and US-1 Business: With the proposed rail crossing closure on Chavasse Avenue near Williams Street, traffic patterns at the Chavasse Avenue/Oxford Street and Dorsey Avenue and US-1 Business intersection are anticipated to change. Less traffic is expected to approach from and leave to the east, while other turning movements may increase as vehicles are rerouted. Appendix P Figures 37 and 38 provide the 2030 proposed laneage and peak hour volumes for the Chavasse Avenue/Oxford Street and Dorsey Avenue and US-1 Business intersection. Table 4-92 provides the level of service for the 2030 No-Build and proposed conditions. As shown in Table 4-92, with the change in traffic

patterns associated with the closure of the at-grade crossing of Chavasse Avenue at Williams Street, both the AM and PM peak periods operate at LOS C in the 2030 No Build conditions, while the AM and PM peak periods operate at LOS B in the 2030 proposed conditions. One movement, the stop-controlled southwest bound right-turn improves to LOS D from LOS E in the proposed conditions as compared to the No Build conditions. Overall, operations are improved for the intersection in the 2030 proposed conditions as compared to the No Build conditions. Based on this information, no improvements are proposed for this intersection as part of the Project.

Table 4-92
Chavasse Avenue/Oxford Street and Dorsey Avenue and US-1 Business - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound	Southwest bound
No Build (AM)	D	D	B	B	D
No Build (PM)	D	D	B	C	E
Proposed (AM)	D	C	A	A	D
Proposed (PM)	D	C	A	B	D

Source: Hatch Mott MacDonald, 2014.

Dabney Drive and Oxford Road: The extension of Alexander Avenue, the realignment of Dabney Drive, and the closure of the Chavasse Avenue at-grade crossing would all have an effect on the traffic patterns at the Dabney Drive and Oxford Road intersection. Vehicles currently using the at-grade rail crossing on Chavasse Avenue would reroute to use the proposed grade separation on Alexander Avenue. This is expected to increase the intersection volumes to/from the south and reduce the volumes to/from the east. The intersection would remain a four-leg signalized intersection; however, an additional northbound left-turn lane is proposed to help mitigate the anticipated change in traffic patterns associated with the Project. There are already dual westbound through lanes to receive the dual northbound left-turn lanes. Appendix P Figures 37 and 38 provide the 2030 proposed laneage and peak hour volumes for the Dabney Drive and Oxford Road intersection. Table 4-93 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-93, with the rerouted traffic and the proposed design, conditions are expected to be similar with the Project as compared to the No Build conditions.

Table 4-93
Dabney Drive and Oxford Road - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	D	C	B	D
No Build (PM)	E	F	D	E
Proposed (AM)	D	E	C	C
Proposed (PM)	E	E	E	E

Source: Hatch Mott MacDonald, 2014.

Dabney Drive and Garnett Street/Deer Court: Neither the traffic volumes nor the configuration of the intersection of Dabney Drive and Garnett Street/Deer Court will alter due to the Project; however, operations are expected to change due to the different traffic patterns at the closely spaced signalized intersection of Dabney Drive and Oxford Road. Appendix P Figures 37 and 38 provide the 2030 proposed laneage and peak hour volumes for the Dabney Drive and Garnett Street/Deer Court intersection. Tables 4-94 and 4-95 provide the level of service for the future No-Build and proposed scenarios for both the southeast and northwest intersections. As shown by Table 4-94, with the rerouted traffic and the proposed design, the southeast intersection level

of service is anticipated to be very similar in the AM and PM peak periods. It should be noted that in the 2030 proposed conditions, one approach (northeast bound) improves to LOS E from LOS F in the PM peak period and one (southwest bound) improves from LOS E to LOS D in the AM peak period. Based on this information, no mitigation is proposed as part of the Project.

Table 4-94
Dabney Drive and Garnett Street/Deer Court (Southeast Intersection) - Level of Service in 2030

	Southeast bound	Northwest bound	Northeast bound	Southwest bound
No Build (AM)	E	B	E	E
No Build (PM)	D	E	F	E
Proposed (AM)	E	B	E	D
Proposed (PM)	D	E	E	E

Source: Hatch Mott MacDonald, 2014.

The Project does not affect the projected volumes or the existing configuration for the northwest intersection in the design year. As shown by Table 4-95, the rerouted traffic associated with the design is expected to have minimal effect on the operations of the Dabney Drive and Garnett Street/Deer Court northwest intersection; therefore, no modifications are proposed as part of the Project.

Table 4-95
Charles Street and Garnett Street (Northeast) - Level of Service in 2030

	Southeast bound	Northwest bound
No Build (AM)	B	A
No Build (PM)	B	A
Proposed (AM)	B	A
Proposed (PM)	B	A

Source: Hatch Mott MacDonald, 2014.

Dabney Drive/Shopping Center and US-1 Business: This intersection would be converted to two separate intersections as part of the Project. Dabney Drive would be relocated approximately 500 feet south of its existing intersection with US-1 Business and will then continue east, travel over the proposed Project railroad alignment via a grade separation and form the fourth leg of the Alexander Avenue and Nicolas Street intersection. The existing intersection of Dabney Drive/Shopping Center and US-1 Business would remain; however, the existing western leg (Dabney Drive) would be converted to a short "No Outlet" access facility.

The Dabney Drive Extension is proposed as a three-lane facility. Appendix P Figures 37 and 38 provide the proposed laneage and 2030 Build peak hour volumes for both the new Dabney Drive Extension and US-1 Business intersection and the modified Dabney Drive/Shopping Center and US-1 Business intersection. Tables 4-96 and 4-97 provide the level of service for the 2030 No-Build and proposed conditions for the Dabney Drive Extension and US-1 Business and Dabney Drive/Shopping Center and US-1 Business intersections, respectively. In order to help mitigate the traffic at the new (southern) intersection, turn lane enhancements were recommended by the Project Team. As shown by Table 4-96, with the proposed extension and relocation of Dabney Drive, the rerouted traffic due to the proposed Project railroad alignment, and the proposed design, all approaches to the southern intersection are anticipated to operate at LOS D or better in the AM and PM peak periods.

Table 4-96 Dabney Drive/Shopping Center and US-1 Business (Southern) - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	--	--	--	--
No Build (PM)	--	--	--	--
Proposed (AM)	C	D	C	B
Proposed (PM)	C	D	C	C

Source: Hatch Mott MacDonald, 2014.

As shown by Table 4-97, with the proposed relocation of Dabney Drive and associated improvements, the Dabney Drive/Shopping Center and US-1 Business intersection (northern intersection) level of service is anticipated to improve. While the westbound approach (the shopping center access) is anticipated to operate at LOS E in the PM peak period of the No Build condition, it improves to LOS D in the proposed conditions.

Table 4-97 Dabney Drive/Shopping Center and US-1 Business (Northern) - Level of Service in 2030				
	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	C	D	C	B
No Build (PM)	B	E	C	B
Proposed (AM)	C	D	A	A
Proposed (PM)	C	D	A	A

Source: Hatch Mott MacDonald, 2014.

Alexander Avenue and Nicholas Street: With the Project, the western leg of this intersection would be extended with a grade separation of the proposed SEHSR alignment to intersect with the relocated Dabney Drive/US-1 Business intersection. The extension is proposed as a three-lane section. Appendix P Figures 37 and 38 provide the 2030 proposed laneage and peak hour volumes for the Alexander Avenue and Nicholas Street intersection. Table 4-98 provides the level of service for the 2030 No-Build and proposed conditions for the Alexander Avenue and Nicolas Street intersection. As shown by Table 4-98, with the proposed extension and relocation of Dabney Drive, delay will increase at the Alexander Avenue and Nicholas Street intersection due to the increase in volume. In the AM peak period, all approaches are anticipated to operate at LOS D or better; however, in the PM peak, two movements are anticipated to operate at LOS F and one at LOS E.

Table 4-98 Alexander Avenue and Nicholas Street- Level of Service in 2030					
	Eastbound		Westbound	Northbound	Southbound
No Build (AM)	B		B	A	A
No Build (PM)	C		B	A	A
Proposed (AM)	Left: D	Thru/ Right: B	C	A	A
Proposed (PM)	Left: F	Thru/ Right: E	F	A	A

Source: Hatch Mott MacDonald, 2014.

During final design, the Project Team will coordinate with NCDOT Highway Division 5 and the City of Henderson, NC, regarding consideration of converting Nicolas Street to the stopped condition and Alexander Avenue to the free-flow movement. This is expected to improve the eastbound and westbound approaches to LOS A, but the northbound approach is expected to degrade to LOS F with this configuration. If a signal is warranted and installed by the design year, all movements are anticipated to operate at LOS D or better.

4.14.2.7.4 BELMONT DRIVE AND WELCOME AVENUE

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. Refer to map sheet 116 in Appendix R for a map of the proposed designs in this location. Under the Project designs, the Welcome Avenue at-grade rail crossing would be closed and JP Taylor Road would be grade separated and extended to connect with Belmont Drive, resulting in the rerouting of traffic in this area of Henderson, NC. Traffic currently using the at-grade crossing on Welcome Avenue will likely divert to the new connection of JP Taylor Road and Belmont Drive. Nicolas Street is proposed to extend to Warehouse Road at its intersection with JP Taylor Road creating a four-leg intersection and providing access from Welcome Avenue to the proposed grade separated crossing on JP Taylor Road. Based on the low anticipated volumes at the new JP Taylor Road and Nicolas Street/Warehouse Road intersection, an analysis was not performed for that intersection. However, traffic was estimated for the new connection of Nicolas Street and JP Taylor Road and an analysis was performed for that intersection.

US-1 Business (Raleigh Road) and Welcome Avenue/Belmont Drive: The closure of the Welcome Avenue at-grade rail crossing would result in this intersection functioning as a "T" intersection. The crossing closure, along with the extension of JP Taylor Road to connect with Belmont Drive and the associated grade separated crossing of the Project railroad alignment and US-1 Business, would result in rerouting of traffic at this intersection. Traffic using the at-grade crossing is anticipated to reroute to the proposed grade separation at JP Taylor Road. Turn lane enhancements are proposed as part of the Project to help mitigate the changes in traffic patterns anticipated with the Project. Appendix P Figures 41 and 42 provide the 2030 proposed laneage and peak hour volumes for the US-1 Business and Welcome Road/Belmont Drive intersection, while Table 4-99 provides the level of service for the future No-Build and proposed conditions. As shown by Table 4-99, with the proposed laneage and anticipated volumes in 2030, the intersection of US-1 Business and Welcome Avenue/Belmont Drive operates considerably better than in the No Build conditions. This is due in large part to the removal of the eastern leg (Welcome Avenue) and its traffic volume, as well as the intersection enhancements proposed as part of the Project.

Table 4-99
US-1 Business (Raleigh Road) and Welcome Avenue/Belmont Drive - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	F	F	C	F
No Build (PM)	F	F	E	F
Proposed (AM)	B	--	C	C
Proposed (PM)	C	--	C	C

Source: Hatch Mott MacDonald, 2014.

Welcome Avenue and Nicolas Street: With the closure of the at-grade rail crossing on Welcome Avenue just west of this intersection, the intersection will function as a "T" intersection with the Project. This conversion, along with the proposed extension of Nicholas Street to JP Taylor Road and Warehouse Road, is expected to result in revised traffic patterns. The extension will allow

traffic on the east side of the Project railroad alignment to access the proposed grade separated crossing on the JP Taylor Road extension. This extension is expected to increase traffic volume on the southern leg of Nicholas Street. Appendix P Figures 41 and 42 provide the 2030 proposed laneage and peak hour volumes for the Welcome Avenue and Nicholas Street intersection, while Table 4-100 provides the level of service for the future No-Build and proposed conditions. As shown by Table 4-100, the intersection of Welcome Avenue and Nicolas Street is expected to operate with minimal congestion in both the 2030 No Build and proposed conditions. Based on this information, no additional mitigation is proposed as part of the Project.

Table 4-100
Welcome Avenue and Nicolas Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	A	A	A	A
No Build (PM)	A	A	A	A
Proposed (AM)	--	A	--	A
Proposed (PM)	--	A	--	A

Source: Hatch Mott MacDonald, 2014.

US-1 Business (Raleigh Road) and JP Taylor Road: The intersection of US-1 Business and JP Taylor Road would be removed under the Project. The Project proposes to shift JP Taylor Road and provide a grade separation over the Project railroad alignment and US-1 Business. The Project would then extend JP Taylor Road to tie into Belmont Road west of its intersection with US-1 Business. The intersection of US-1 Business and JP Taylor Road would be replaced by the new intersection of JP Taylor Road and Belmont Drive along with the existing Belmont Drive and US-1 Business intersection.

JP Taylor Road Extension and Belmont Drive: The intersection of JP Taylor Road Extension and Belmont Drive is a new intersection created as part of the Project. This intersection, along with the grade separation of JP Taylor over the proposed Project railroad alignment and US-1 Business and the intersection of US-1 Business and Belmont Drive, will replace the intersection of JP Taylor Road and US-1 Business, which is proposed to be removed as part of the Project. This intersection was analyzed under signal control for the 2030 design year traffic. Appendix P Figures 41 and 42 provide the 2030 proposed laneage and peak hour volumes for the JP Taylor Road Extension and Belmont Drive intersection, while Table 4-101 provides the level of service for the 2030 proposed conditions. As shown by Table 4-101, each approach to the intersection of JP Taylor Road Extension and Belmont Drive is expected to operate at LOS C or better in 2030 with the proposed laneage and projected traffic volumes.

Table 4-101
JP Taylor Road Extension and Belmont Drive - Level of Service in 2030

	Westbound	Northbound	Southbound
No Build (AM)	--	--	--
No Build (PM)	--	--	--
Proposed (AM)	C	B	A
Proposed (PM)	C	C	B

Source: Hatch Mott MacDonald, 2014.

4.14.2.7.5 US-1 BUSINESS (RALEIGH ROAD) AND BEAR POND ROAD AND PETER GILL ROAD

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. Refer to map sheet 117 in Appendix R for a map of the proposed designs in this location. Under the Project designs, the existing Bear Pond Road at-grade rail crossing would be closed and a new grade separated crossing would be constructed over the proposed Project railroad alignment and US-1 Business (Raleigh Road) approximately 200 feet south of the existing intersection. Traffic using the existing intersection would be rerouted to the new jug-handle type connection that provides connectivity between US-1 Business and Lynnbank Road/Bear Pond Road. Also in this area, the existing at-grade crossing of Peter Gill Road is also proposed for closure as part of the Project. Traffic wishing to use this intersection is expected to reroute to either Bear Pond Road or the proposed grade separation of Wildlife Lane, which will be extended to intersect with US-1 Business.

US-1 Business (Raleigh Road) and Bear Pond/Lynnbank Road: The intersection of US-1 Business (Raleigh Road) and Bear Pond Road/Lynnbank Road is proposed for removal as part of the Project. Bear Pond Road would be relocated and have a grade separation over US-1 Business and the proposed Project railroad alignment. This would require the construction of two "T" intersections. A new connector would be constructed between US-1 Business and the relocated Bear Pond Road as an extension of JP Taylor Road. Both the new intersection with Bear Pond Road and with US-1 Business were analyzed under signal control for the 2030 proposed conditions to determine operations if a signal was warranted by the design year. Appendix P Figures 45 and 46 provide the 2030 proposed laneage and peak hour volumes for the US-1 Business and Bear Pond Road/Lynnbank Road, Bear Pond Road and New Connector, and US-1 Business and New Connector intersections, while Tables 4-102, 4-103, and 4-104 provide the level of service for the future No-Build and proposed conditions. As shown in Tables 4-102, 4-103, and 4-104, while the existing intersection of US-1 Business and Bear Pond Road has approaches that operate at LOS E in the PM peak period of the 2030 No Build conditions, both new intersections have no approach operate below LOS D.

Table 4-102
US-1 Business and Bear Pond Road/Lynnbank Road - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	E	F	E	D
No Build (PM)	E	E	D	C

Source: Hatch Mott MacDonald, 2014.

Table 4-103
US-1 Business (Raleigh Road) and New Connector South of Bear Pond Road - Level of Service in 2030

	Eastbound	Northbound	Southbound
Proposed (AM)	C	B	C
Proposed (PM)	D	B	B

Source: Hatch Mott MacDonald, 2014.

Table 4-104 Bear Pond Road and New Connector West of US-1 Business - Level of Service in 2030			
	Eastbound	**Westbound**	**Northbound**
Proposed (AM)	A	B	C
Proposed (PM)	A	B	C

Source: Hatch Mott MacDonald, 2014.

US-1 Business (Raleigh Road) and US-1 NB Ramp/Eastern Minerals Road: The at-grade rail crossing on the eastern leg of this intersection (Eastern Minerals Road) is proposed for removal under the Project. Traffic currently using this crossing would need to reroute. Vehicles could use Commerce Drive to access Bear Pond Road and US-1 Business via Bear Pond Road to the north or use Commerce Drive to access Peter Gill Road, than access Bobbitt Road to access the proposed grade separated crossing at Wildlife Lane. As part of the proposed grade separation of Wildlife Lane, Wildlife Lane would be extended to intersect US-1 Business by traversing under the proposed Project railroad alignment. The reverse movements can be made to travel from US-1 Business to the eastern side of the proposed Project railroad alignment. Given the anticipated traffic volumes, both the US-1 Business and US-1 NB Ramps/Eastern Minerals Road and the Wildlife Lane and US-1 Business intersections were analyzed under signal control in 2030 to determine operations if a signal were to be warranted by the design year. It should be noted that a signal should be warranted before one is installed.

Appendix P Figures 45 and 46 provide the 2030 proposed laneage and peak hour volumes for the US-1 Business and US-1 NB Ramps/Eastern Minerals Road and US-1 Business and Wildlife Lane intersections. Table 4-105 provides the level of service for the 2030 No-Build and proposed conditions for the US-1 Business and US-1 NB Ramp/Eastern Minerals Road intersection. Table 4-106 provides the level of service for the 2030 proposed conditions for the US-1 Business and Wildlife Lane intersection.

Table 4-105 US-1 Business and US-1 NB Ramps/Eastern Minerals Road - Level of Service in 2030				
	Eastbound	**Westbound**	**Northbound**	**Southbound**
No Build (AM)	D	C	A	B
No Build (PM)	E	D	A	A
Proposed (AM)	D	--	A	A
Proposed (PM)	D	--	A	A

Source: Hatch Mott MacDonald, 2014.

Table 4-106 US-1 Business (Raleigh Road) and Wildlife Lane - Level of Service in 2030			
	Westbound	**Northbound**	**Southbound**
Proposed (AM)	D	D	C
Proposed (PM)	D	D	C

Source: Hatch Mott MacDonald, 2014.

As shown in Table 4-105, the eastbound approach of US-1 Business and US-1 NB Ramps/Eastern Minerals Road intersection is expected to operate at LOS E in the PM peak period, but no other approach is expected to operate below LOS D in the 2030 No Build conditions. With the proposed Project railroad alignment, the eastern leg would be removed and the intersection would function as a "T" intersection. In the 2030 proposed conditions, no

approach to the US-1 Business and US-1 NB Ramps intersection is anticipated to operate below LOS D. As shown in Table 4-106, no approach to the new US-1 Business and Wildlife Lane intersection in the 2030 proposed conditions will operate below LOS D.

US-1 Business (Raleigh Road) and Peter Gill Road: The at-grade rail crossing on Peter Gill Road just east of its intersection with US-1 Business is proposed for removal under the Project. Traffic currently using this crossing would need to reroute their trips. Vehicles could use Commerce Drive to access Bear Pond Road and US-1 Business via Bear Pond Road to the north or use Commerce Drive to access Bobbitt Road via Peter Gill Road to access the proposed grade separated crossing at Wildlife Lane. As part of the proposed grade separation of Wildlife Lane, Wildlife Lane would be extended to intersect US-1 Business by traversing under the proposed Project railroad alignment. The reverse movements could be made to travel from US-1 Business to the eastern side of the proposed Project railroad alignment. Due to the projected traffic volumes at the US-1 Business and Peter Gill Road intersection, it was analyzed under signal control in the 2030 No Build conditions to determine operations if a signal were to be warranted by the design year. It is worth noting that a signal should be warranted before one is installed.

Appendix P Figures 45 and 46 provide the 2030 proposed laneage and peak hour volumes for the US-1 Business and Wildlife Lane intersection and the US-1 Business and Peter Gill Road/Driveway intersection, while Table 4-107 and Table 4-106 (above) provide the level of service for the 2030 No-Build and proposed conditions for the US-1 Business and Peter Gill Road/Driveway intersection and the 2030 proposed conditions for the US-1 Business and Wildlife Lane intersection, respectively. As shown in Table 4-107, the, eastbound, westbound, and northbound approaches to the intersection of US-1 Business and Peter Gill Road/Driveway are expected to operate at LOS E or LOS F in the AM peak period, while the eastbound and westbound approaches operate at LOS E in the PM peak period. This intersection was analyzed under stop control in the 2030 proposed conditions due to the removal of the eastern leg with the Project railroad alignment. Under this configuration, all movements are anticipated to operate at LOS C or better in the 2030 proposed conditions. Also as shown by Table 4-106 (above), the proposed intersection of US-1 Business and Wildlife Lane, which would serve traffic from both the intersections of Peter Gill Road and Eastern Minerals Road with US-1 Business, is expected to operate with no approach below LOS D in the 2030 proposed conditions, which is an improvement over the 2030 No Build conditions of the US-1 Business and Peter Gill Road intersection.

Table 4-107
US-1 Business and Peter Gill Road/Driveway - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	F	F	E	D
No Build (PM)	E	E	D	C
Proposed (AM)*	C	--	A	--
Proposed (PM)*	B	--	A	--

* Unsignalized
Source: Hatch Mott MacDonald, 2014.

4.14.2.7.6 US-1 BUSINESS (RALEIGH ROAD) AND CHAVIS ROAD

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. Refer to map sheets 119 and 120 in Appendix R for a map of the proposed designs in this location. Under the Project designs, an extension of Edwards Road over the proposed Project railroad alignment to Chavis Road would provide a new connection to US-1 Business (Raleigh Road). This extension would tie into the westbound leg of the intersection of

US-1 Business and Edwards Road. This new connector would serve to replace multiple low volume at-grade rail crossings in this area that are proposed to be closed under the Project.

US-1 Business and Chavis Road: As mentioned previously, this intersection will be removed with the Project and the traffic using this intersection is expected to use the new connection at the intersection of US-1 Business and Edwards Road. The new connection is proposed to have a grade separated crossing with the proposed Project railroad alignment.

US-1 Business and Edwards Road: Based on the closure of the Chavis Road intersection with US-1 Business, all traffic was rerouted from that intersection to the new connector planned at Edwards Road and US-1 Business for the purposes of this analysis. This new connector is proposed to have a grade separated crossing with the Project railroad alignment. Traffic on other minor at-grade rail crossings in the area is expected to use this intersection as well; however, the volumes on these crossings are anticipated to be minor and not have a considerable effect on the intersection operations. Appendix P Figures 49 and 50 provide the 2030 proposed laneage and peak hour volumes for the US-1 Business and Edwards Road intersection, while Table 4-108 provides the level of service for the 2030 No-Build and proposed conditions. As shown in Table 4-108, based on the two-way stop controlled analysis, the intersection is expected to have no movement operate below LOS B in the proposed or No Build conditions. This is expected due to the low existing volumes at this intersection and the low volumes on the surrounding roadways in the immediate area. While traffic from all the surrounding crossings was not included in this analysis, the intersection is still anticipated to operate within the desired LOS D criteria due to the fact these crossings appear to be minor and are not expected to add considerable volume to the intersection.

Table 4-108
US-1 Business (Raleigh Road) and Edwards Road/New Connector - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	--	A	--
No Build (PM)	A	--	A	--
Proposed (AM)	B	B	A	A
Proposed (PM)	B	B	A	A

Source: Hatch Mott MacDonald, 2014.

4.14.2.8 *KITTRELL, NC*

4.14.2.8.1 US-1 (CAPITAL BOULEVARD) AND KITTRELL COLLEGE ROAD/NEW CONNECTOR

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. Refer to map sheet 121 in Appendix R for a map of the proposed designs in this location. Under the Project designs, the existing at-grade rail crossings of Main Street and McClanahan Street are proposed to be removed. These crossings will be replaced by a proposed grade separated crossing on McClanahan Street, which will tie into the existing intersection of US-1 Business and Kittrell Vance Avenue forming the fourth (eastern leg) of the intersection.

US-1 and Kittrell College Road/College Street: The existing at-grade rail crossings of Main Street and McClanahan Street are proposed to be closed as part of the Project. McClanahan Street would be realigned with a grade separation over the Project railroad alignment. It would also be extended to the north and south to connect Main Street to the north and Kittrell Vance Avenue to the south. The extension to Kittrell Vance Avenue would form the fourth leg of the US-1 and Kittrell Vance Road intersection. Traffic east of the existing rail line that currently uses Main

Street or McClanahan Street to access US-1, along with US-1 traffic that currently uses Main Street to cross the rail line eastbound, would be routed along the new facility. With the new configuration, this traffic would use the intersection of Kittrell Vance Avenue and US-1. Appendix P Figures 53 and 54 provide the proposed laneage and 2030 peak hour volumes for the US-1 and Kittrell College Road/College Street intersection while Table 4-109 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-109, all approaches of this intersection are anticipated to operate very similarly and at LOS D or better in both the No Build and proposed conditions.

Table 4-109
US-1 Business (Raleigh Road) and Kittrell College Road/College Street - Level of Service in 2030

	Eastbound		Westbound	Northbound	Southbound
	Left	Thru-Right			
No Build (AM)	C	B	C	A	B
No Build (PM)	D	C	D	B	B
Proposed (AM)	C	B	D	A	B
Proposed (PM)	D	B	C	B	A

Source: Hatch Mott MacDonald, 2014.

US-1 and Kittrell Vance Road/New Connector: The intersection traffic patterns and configuration of US-1 and Kittrell Vance Road would be modified as part of the Project. Traffic from the closure of the Main Street and McClanahan Street at-grade rail crossings was rerouted to the grade separation proposed on the realigned McClanahan Street for this analysis. This realignment ties into the US-1 and Kittrell Vance Road intersection. This intersection was analyzed under stop control for both the No Build and proposed conditions. Turn lane enhancements are provided at this intersection by the Project to help mitigate the rerouted traffic. Appendix P Figures 53 and 54 provide the proposed laneage and 2030 Build peak hour volumes for the US-1 and Kittrell Vance Road intersection, while Table 4-110 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-110, all approaches to this intersection are anticipated to operate at LOS C or better in the No Build conditions. Also, as shown in Table 4-110, with the addition of the fourth (eastern) leg, the rerouted traffic volumes associated with the Project and the laneage proposed as part of the Project design, no approach is expected operate worse than LOS C.

Table 4-110
US-1 and Kittrell Vance Road/New Connector - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	--	A	--
No Build (PM)	C	--	B	
Proposed (AM)	C	C	A	B
Proposed (PM)	C	C	B	B

Source: Hatch Mott MacDonald, 2014.

Main Street and Railroad Street: With the closure of the Main Street at-grade crossing just east of this intersection, movements at this intersection would become free flowing with the Project. Due to design constraints, they will be low speed movements and, if needed, one or both could become stop controlled, but there should be no conflicting movements. Based on this information, no analysis was performed for the proposed conditions.

4.14.2.9 *FRANKLINTON, NC*

4.14.2.9.1 MAIN STREET AND NC 56 (GREEN STREET)

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. Refer to map sheet 127 in Appendix R for a map of the proposed designs in this location. Under the Project designs, the at-grade rail crossings on Mason Street and College Street would be closed. The existing grade separation of the rail line and NC 56 would be maintained with the Project; however, the intersection of Elm Street and NC 56 would be removed due to the close spacing of the proposed rail structure over NC 56. Tanyard Street and a new connection proposed to link College Street and NC 56 would allow traffic on Mason Street and College Street to access NC 56 and its grade separated crossing of the Project railroad alignment.

Mason Street and Main Street: As mentioned above, the at-grade rail crossing on Mason Street east of Main Street would close under the Project. This will affect the amount of traffic using this intersection, essentially turning it into a three-leg intersection. Traffic using the Mason Street crossing was routed to the NC 56 and Main Street intersection, using the grade separated crossing on NC 56. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the Mason Street and Main Street intersection, while Table 4-111 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-111, all approaches are anticipated to operate at LOS C or better in both the No Build conditions and with the proposed Project.

Table 4-111
Mason Street and Main Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	C	A	A
No Build (PM)	C	C	A	A
Proposed (AM)	C	C	A	A
Proposed (PM)	C	B	A	A

Source: Hatch Mott MacDonald, 2014.

NC 56 (Green Street) and Main Street: As mentioned above, with the proposed closure of the at-grade rail crossings on Mason Street and College Street as part of the Project, traffic from those crossings would have the option to divert to the NC 56 grade separated crossing of the Project railroad alignment. This rerouting would affect traffic patterns and volumes at the NC 56 and Main Street intersection. Appendix P Figures 57 and 58 provide the proposed laneage and 2030 peak hour volumes for the NC 56 and Main Street intersection, while Table 4-112 provides the level of service for the 2030 No-Build and Proposed conditions. As shown by Table 4-112, all approaches are anticipated to operate at LOS C or better in both the 2030 No Build conditions and with the proposed Project.

Table 4-112
NC 56 (Green Street) and Main Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	B	B	A
No Build (PM)	B	C	B	B
Proposed (AM)	B	C	B	B
Proposed (PM)	B	B	B	B

Source: Hatch Mott MacDonald, 2014.

College Street and Main Street: As mentioned above, the existing at-grade rail crossing on College Street is proposed for closure under the Project. Traffic from this crossing would have the option to use a proposed connector linking College Street and NC 56 to access the grade separation on NC 56 or use the proposed extension of Hawkins Street to access the proposed grade separation at Cedar Creek Road. Appendix P Figures 57 and 58 provide the proposed 2030 laneage and peak hour volumes for the College Street and Main Street intersection, while Table 4-113 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-113, all approaches are anticipated to operate at LOS B or better in both the 2030 No Build conditions and with the proposed Project.

Table 4-113
College Street and Main Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	B	B	A	A
No Build (PM)	B	B	A	A
Proposed (AM)	B	B	A	A
Proposed (PM)	B	B	A	A

Source: Hatch Mott MacDonald, 2014.

College Street and Hawkins Street: With the proposed closure of the existing at-grade rail crossing on College Street west of this intersection, traffic currently using the at-grade rail crossing would have to reroute with the Project. Traffic from this crossing would have the option to use a proposed connector linking College Street and NC 56 to access the grade separation on NC 56 or use the proposed extension of Hawkins Street to access the proposed grade separation at Cedar Creek Road. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the College Street and Hawkins Street intersection, while Table 4-114 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-114, with the low anticipated volumes in this area, the College Street and Hawkins Street intersection is anticipated to operate well with or without the Project in 2030. All approaches are anticipated to operate at LOS A both in the No Build condition and with the proposed Project.

Table 4-114
College Street and Hawkins Street - Level of Service in 2030

	Westbound	Northbound
No Build (AM)	A	A
No Build (PM)	A	A
Proposed (AM)	A	A
Proposed (PM)	A	A

Source: Hatch Mott MacDonald, 2014.

NC 56 (Green Street) and New Connector: A new connection is proposed between College Street and NC 56 to allow traffic currently using the at-grade rail crossing on College Street to access the proposed grade separated crossing of the Project railroad alignment on NC 56. Volumes at this intersection were estimated using counts at the intersections of College Street and Hawkins Street, NC 56 and Main Street, and Hawkins Street/Hillsborough Street and Main Street. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the NC 56 and New Connector intersection, while Table 4-115 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-115, the proposed New Connector intersection with NC 56 is anticipated to have all movements operate at LOS D or better in the design year with the Project.

Table 4-115 NC 56 (Green Street) and New Connector - Level of Service in 2030		
	Westbound	**Northbound**
No Build (AM)	--	--
No Build (PM)	--	--
Proposed (AM)	A	D
Proposed (PM)	A	D

Source: Hatch Mott MacDonald, 2014.

College Street and New Connector: A new connection is proposed between College Street and NC 56 to allow traffic currently using the at-grade rail crossing on College Street to access the proposed grade separated crossing on NC 56. This new connection will create a new intersection with College Street. Volumes at this intersection were estimated using counts at the intersections of College Street and Hawkins Street, NC 56 and Main Street, and Hawkins Street/Hillsborough Street and Main Street. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the College Street and New Connector intersection while Table 4-116 provides the level of service for the 2030 proposed conditions. As shown by Table 4-116 the proposed New Connector intersection with College Street is anticipated to have all movements operate at LOS A in the design year with the Project.

Table 4-116 College Street and New Connector - Level of Service in 2030		
	Eastbound	**Southbound**
No Build (AM)	--	--
No Build (PM)	--	--
Proposed (AM)	A	A
Proposed (PM)	A	A

Source: Hatch Mott MacDonald, 2014.

4.14.2.9.2 CEDAR CREEK ROAD AND MAIN STREET

The Preferred Alternative in this area is the common alignment of the NC1, NC2, and NC3 Project alternatives. Refer to map sheet 128 in Appendix R for a map of the proposed designs in this location. Under the Project designs, the Cedar Creek Road intersection of Main Street is relocated approximately 500 feet south of the existing location. Additionally, Hawkins Street is proposed to be extended to intersect with Cedar Creek Road as a "T" intersection approximately 1,000 feet east of the Main Street and Cedar Creek Road intersection. Due to the proposed at-grade rail crossing closures, additional traffic from College Street and Hawkins Street will be rerouted to Main Street and Cedar Creek Road and the proposed grade separation on Cedar Creek Road. Some traffic from the College Street at-grade rail crossing is expected to also use proposed new connector to NC 56 to access the grade separated crossing on NC 56. The traffic patterns and volumes at the intersection of Person Street and Main Street, which services school traffic, also have the potential to change due to the Project.

Person Street and Main Street: The configuration of the Person Street and Main Street intersection will not change due to the Project; however, traffic patterns and volumes may change. Given its proximity to the Project and school, an analysis was performed for this intersection to determine the effects of the Project on its operations. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the College Street and Main Street intersection, while Table 4-117 provides the level of service for the 2030 No-Build and proposed conditions. After performing traffic rerouting in the area, it was estimated that the

volumes at this intersection would not change with the Project. As shown by Table 4-117, even with volumes altering at adjacent intersections, the operations of the Person Street and Main Street intersection are anticipated to be the same with and without the proposed Project with no movement operating below LOS B.

Table 4-117
Person Street and Main Street - Level of Service in 2030

	Eastbound	
	Left	Right
No Build (AM)	B	B
No Build (PM)	B	A
Proposed (AM)	B	B
Proposed (PM)	B	A

Source: Hatch Mott MacDonald, 2014.

Hillsborough Street/Hawkins Street and Main Street: As mentioned above, the existing at-grade rail crossing on Hawkins Street would be closed under the Project. Traffic from this crossing would have the option to use a proposed connector linking College Street and NC 56 to access the proposed grade separation on NC 56 or use the proposed extension of Hawkins Street to access the proposed grade separation at Cedar Creek Road. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the Hillsborough Street/Hawkins Street and Main Street intersection, while Table 4-118 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-118, the operations of the Hillsborough Street/Hawkins Street and Main Street intersection will improve with the Project. This improvement is due to the anticipated traffic reductions to and from the west, which are based on the removal of the existing at-grade rail crossing associated with the Project.

Table 4-118
Hillsborough Street/Hawkins Street and Main Street - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	C	C	A	A
No Build (PM)	B	B	A	A
Proposed (AM)	B	B	A	A
Proposed (PM)	A	B	A	A

Source: Hatch Mott MacDonald, 2014.

Cedar Creek Road and Main Street: As part of the Project, Cedar Creek Road is proposed to be relocated approximately 500 feet south of its current intersection with Main Street and have a grade separated crossing over the Project railroad alignment. Traffic from existing at-grade rail crossings on College Street and Hawkins Street that are proposed for removal would have the option to use the proposed grade separation on Cedar Creek Road. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the Cedar Creek Road and Main Street intersection, while Table 4-119 provides the level of service for the 2030 No-Build and Proposed conditions. As shown by Table 4-119, with the proposed design, the Cedar Creek Road and Main Street intersection operates very similarly in the design year with and without the Project. All movements are anticipated to operate at LOS B or better in both the No Build and proposed conditions.

Table 4-119 Cedar Creek Road and Main Street - Level of Service in 2030		
	Westbound	**Southbound**
No Build (AM)	B	A
No Build (PM)	A	A
Proposed (AM)	B	A
Proposed (PM)	B	A

Source: Hatch Mott MacDonald, 2014.

Cedar Creek Road and New Connector: An extension of Hawkins Street is proposed to provide a new connection to Cedar Creek Road east of the proposed grade separated crossing. This new connection would create a new intersection on Cedar Creek Road and allow traffic currently using the at-grade rail crossings on College Street and Hawkins Street to access the proposed grade separated crossing on Cedar Creek Road. Volumes at this intersection were estimated using counts at the intersections of College Street and Hawkins Street, Hawkins Street/Hillsborough Street and Main Street, Cedar Creek Road and Main Street, and projected school trip assignments. Appendix P Figures 57 and 58 provide the 2030 proposed laneage and peak hour volumes for the Cedar Creek Road and New Connector intersection, while Table 4-120 provides the level of service for the 2030 proposed conditions. As shown by Table 4-120, the proposed New Connector intersection with Cedar Creek Road is anticipated to have all movements operate at LOS A in 2030 with the Project.

Table 4-120 Cedar Creek Road and New Connector - Level of Service in 2030		
	Southbound	**Southwest bound**
No Build (AM)	--	--
No Build (PM)	--	--
Proposed (AM)	A	A
Proposed (PM)	A	A

Source: Hatch Mott MacDonald, 2014.

4.14.2.10 *RALEIGH, NC*

4.14.2.10.1 ATLANTIC AVENUE AND WOLFPACK LANE/HIGHWOODS BOULEVARD

The Preferred Alternative in this area is the common alignment of the NC1, NC2, NC3, and NC5 Project alternatives. Refer to map sheets 146 and 147 in Appendix R for a map of the proposed designs in this location. Under the Project designs, a bridge would be provided at Wolfpack Lane and the proposed Project railroad alignment, located just west of the intersection of Wolfpack Lane/Highwoods Boulevard and Atlantic Avenue in Raleigh, NC. In order to maintain all movements across Atlantic Avenue, Tarheel Drive, and Wolfpack Lane and provide the grade separated crossing, Tarheel Drive will be realigned and three closely spaced intersections created. The analysis discussed in this section was performed to determine the effects of the proposed grade separation over the Project railroad alignment to the surrounding intersections and how operations will compare to future operations if the Project was not implemented. The three closely spaced intersections that would be created by the Project: Highwoods Boulevard and Atlantic Avenue, Highwoods Boulevard and Beechleaf Court, and Wolfpack Lane and Beechleaf Court were all analyzed under signal control.

While the concept of maintaining all movements at these intersections may not be ideal, both the public and the City of Raleigh, NC, supported them, and they result in adequate intersection level of service, minimize overall impacts, and, based on the analysis, result in relatively efficient traffic flow.

Wolfpack Lane and Tarheel Drive: Neither the existing configuration nor the design year traffic volumes for the Wolfpack Lane and Tarheel Drive intersection are expected to change with the Project. The only considerable effect on operations could be the proposed signal at the intersection of Wolfpack Lane and Beechleaf Court. Appendix P Figures 61 and 62 provide the 2030 proposed laneage and peak hour volumes for the Wolfpack Lane and Tarheel Drive intersection, while Table 4-121 provides the level of service for the future No-Build and proposed conditions. As shown by Table 4-121, the intersection of Wolfpack Lane and Tarheel Drive is expected to operate very similarly in the design year with and without the proposed Project, and no movements are anticipated to operate below LOS B.

Table 4-121
Wolfpack Lane and Tarheel Drive - Level of Service in 2030

	Southbound	Southeast bound
No Build (AM)	B	A
No Build (PM)	B	A
Proposed (AM)	B	A
Proposed (PM)	B	A

Source: Hatch Mott MacDonald, 2014.

Wolfpack Lane/Highwoods Boulevard and Atlantic Avenue: With the proposed removal of the at-grade rail crossing on Wolfpack Lane, this intersection would become a "T" type intersection. The removal of the fourth leg is anticipated to improve operations; however, with the new proposed closely spaced signalized intersections, coordination will be a key factor in future operations. It should be noted that in the analysis, this intersection was coordinated with these three intersections and not intersections along Atlantic Avenue which could affect operations of Atlantic Avenue in the future. Appendix P Figures 61 and 62 provide the 2030 proposed laneage and peak hour volumes for the Wolfpack Lane/Highwoods Boulevard and Atlantic Avenue intersection, while Table 4-122 provides the level of service for the 2030 No-Build and proposed conditions. As shown by Table 4-122, the intersection of Wolfpack Lane/Highwoods Boulevard and Atlantic Avenue operates with less congestion in the design year with the proposed Project and its associated design. No approaches are anticipated to operate below LOS C in the proposed conditions, while several movements are expected to operate at LOS F in the No Build PM peak period.

Table 4-122
Wolfpack Lane/Highwoods Boulevard and Atlantic Avenue - Level of Service in 2030

	Eastbound	Westbound	Northbound	Southbound
No Build (AM)	F	D	D	D
No Build (PM)	F	F	F	D
Proposed (AM)	--	C	C	B
Proposed (PM)	--	C	C	C

Source: Hatch Mott MacDonald, 2014.

Beechleaf Court and Wolfpack Lane: In order to help facilitate all movements, Wolfpack Lane is proposed to extend to Beechleaf Court, which will create a new "T" intersection. This new

connection will allow traffic from Wolfpack Lane to access Highwoods Boulevard and Atlantic Avenue. Conversely, it will also allow traffic from Highwoods Boulevard and Atlantic Avenue to access Wolfpack Lane. Based on laneage and for coordination purposes, this intersection was analyzed under signal control. Appendix P Figures 61 and 62 provide the 2030 proposed laneage and peak hour volumes for the Wolfpack Lane and Beechleaf Court intersection, while Table 4-123 provides the level of service for the 2030 proposed conditions. As shown by Table 4-123, while one approach (northeast bound) in the PM peak is expected to operate at LOS E in the 2030 design year, the remaining movements are expected to operate at an overall LOS D or better in the proposed conditions.

Table 4-123
Wolfpack Lane and Beechleaf Court - Level of Service in 2030

	Southbound	Northeast bound	Southwest bound
Proposed (AM)	D	D	B
Proposed (PM)	D	E	A

Source: Hatch Mott MacDonald, 2014.

Highwoods Boulevard and Beechleaf Court: With the proposed Project design, traffic patterns and geometrics at this intersection will change considerably. Due to projected volumes, proposed laneage, and for coordination purposes, this intersection was analyzed under signal control in the design year for both the proposed and No Build conditions. Appendix P Figures 61 and 62 provide the 2030 proposed laneage and peak hour volumes for the Highwoods Boulevard and Beechleaf Court intersection, while Table 4-124 provides the level of service for the 2030 proposed conditions. As shown by Table 4-124, while one approach (southwest bound) in the PM peak is expected to operate at LOS F in the 2030 design year, the remaining movements are expected to operate LOS D or better in the proposed conditions.

Table 4-124
Highwoods Boulevard and Beechleaf Court - Level of Service in 2030

	Southeast bound	Northwest bound	Northeast bound	Southwest bound
No Build (AM)	A	A	D	D
No Build (PM)	A	B	D	C
Proposed (AM)	C	C	A	C
Proposed (PM)	D	D	A	F

Source: Hatch Mott MacDonald, 2014.

Highwoods Boulevard and Smoketree Court: The Highwoods Boulevard and Smoketree Court intersection traffic volumes, traffic patterns, and intersection geometry are not expected to alter with the Project; therefore, no analysis was performed for this intersection. Appendix P Figures 61 and 62 provide the 2030 proposed laneage and peak hour volumes for the Highwoods Boulevard and Smoketree Court intersection.

4.14.2.11 *DOWNTOWN RALEIGH, NC, AREA*

In downtown Raleigh, NC, the Preferred Alternative is NC5. Refer to map sheets 148-150 in Appendix R for maps of the proposed designs in this area. The Project designs in downtown Raleigh, NC, locate proposed grade separated crossings adjacent to existing grade separated crossings; however, two existing at-grade crossings, Jones Street and Hargett Street, will be closed

to vehicular traffic. Given the expansive grid system in downtown Raleigh, NC, the system is expected to be able to adequately service the rerouted traffic. The analysis discussed in this section was performed to determine the effects of the proposed at-grade crossing closures on multiple nearby downtown intersections. Aside from Jones Street and Hargett Street, no intersection geometry is anticipated to alter due to the Project. Appendix P Figures 65 and 66 provide the 2030 proposed laneage and peak hour volumes for the downtown intersections while Table 4-125 provides the level of service for the 2030 No Build and proposed conditions.

Table 4-125
Downtown Raleigh, NC - Level of Service in 2030

Intersection	Movement	Period	2030 No Build	2030 Proposed
Glenwood Avenue/North Street (signalized)	all	AM	A	B
		PM	B	B
North Street/West Street (unsignalized)	Eastbound	AM	B	B
		PM	B	B
	Westbound	AM	B	B
		PM	B	C
	Northbound	AM	A	A
		PM	A	A
	Southbound	AM	A	A
		PM	A	A
North Street/Harrington Street (unsignalized)	Eastbound	AM	A	A
		PM	A	A
	Northbound	AM	A	A
		PM	A	A
Harrington Street/Lane Street (unsignalized)	Eastbound	AM	A	A
		PM	A	A
	Westbound Left	AM	A	A
		PM	B	B
	Westbound Thru/Right	AM	A	A
		PM	A	A
	Northbound	AM	A	A
		PM	A	A
Glenwood Avenue/Jones Street (signalized)	all	AM	A	A
		PM	B	A
West Street/Jones Street (unsignalized)	Eastbound	AM	A	A
		PM	A	A
	Westbound	AM	A	A
		PM	A	A
	Northbound	AM	A	A
		PM	A	A
	Southbound	AM	A	A
		PM	A	A
Harrington Street/Jones Street (unsignalized)	Eastbound	AM	A	A
		PM	A	A

Table 4-125 Downtown Raleigh, NC - Level of Service in 2030				
Intersection	**Movement**	**Period**	**2030 No Build**	**2030 Proposed**
	Northbound	AM	B	B
		PM	B	B
	Southbound	AM	B	B
		PM	B	B
Glenwood Avenue/Hillsborough Street (signalized)	all	AM	B	C
		PM	B	C
Edenton Street/West Street (signalized)	all	AM	C	B
		PM	B	B
Boylan Street/Morgan Street (signalized)	all	AM	C	C
		PM	B	B
Glenwood Avenue/Morgan Street (signalized)	all	AM	B	A
		PM	C	B
Boylan Street/Hargett Street (signalized)	all	AM	B	B
		PM	B	B
Hargett Street/West Street (unsignalized)	Eastbound	AM	A	--
		PM	A	--
	Westbound	AM	A	A
		PM	A	A
	Northbound	AM	B	A
		PM	B	B
	Southbound	AM	B	B
		PM	B	B
Hargett Street/Harrington Street (unsignalized)	Eastbound	AM	A	A
		PM	A	A
	Westbound	AM	A	A
		PM	A	A
	Northbound	AM	B	B
		PM	B	B
	Southbound	AM	B	B
		PM	B	B

Source: Hatch Mott MacDonald, 2014.

As shown by Table 4-125, all analyzed signalized intersections in the Raleigh, NC, downtown area are expected to operate LOS C or better in the 2030 design year No Build and proposed conditions. Each unsignalized movement is also expected to operate LOS C or better in the 2030 design year No Build and proposed conditions. Based on this information, the downtown grid network, which provides the ability for trips to divert in numerous ways, is expected to have adequate capacity to service the rerouted traffic associated with the proposed Project.

The downtown grid network is anticipated to be able to service the design year traffic with the proposed Project railroad alignment. However, during final design the Project Team will coordinate with the City of Raleigh, NC, regarding the following:

- Accommodations for cyclists (such as identification of an alternate route) for the proposed closure of Hargett Street at-grade crossing. Hargett Street currently services the signed bicycle route Cross Town Route 8.
- Accommodations for cyclists (such as identification of an alternate route) for Jones Street, which currently serves as a signed bicycle route, Cross Town Route 9. The Preferred Alternative includes closing the existing at-grade crossing to vehicular traffic, and building a pedestrian bridge with towers.
- The City of Raleigh, NC, is currently in the process of upgrading their City Signal System. The Project Team will continue to coordinate with the City related to the signals in the areas of the rail crossing closures and grade separations to service the final reconfigured traffic as well as traffic shifts during construction. Updates may include signal timings as well as signal and signal system equipment including interconnections.
- The Project Team will coordinate with the school system on potential school bus rerouting due to the crossing closures, grade separations, and associated. While it should be noted the Underwood Gifted and Talented Magnet, Project Enlightenment, and Wiley Elementary schools are in the vicinity of this alignment, a concern with school bus routing is not anticipated. This is based on the fact that the current US DOT Crossing Inventory Sheets as of March 26, 2009 for the crossings of Jones Street (Crossing Number 630-629N), West Street (Crossing Number 630-628G), Harrington Street (Crossing Number 630-627A), and Hargett Street (Crossing Numbers 735-364G and 630-632W), indicate the average number of school busses per day over those crossings is zero.

4.14.3 RAIL

As described in Section 3.14, the two main Class I railroads operating in Virginia and North Carolina are CSX and NS. A large portion of the existing rail network is single-track, which creates bottlenecks in high traffic areas. The Preferred Alternative provides improvements to the rail network through provision of additional tracks, which increases capacity; through designs for straighter track, which allows increased speeds; and through use of grade-separated crossings, which improve safety. In addition, this Project could provide relief to the congested CSX A-line over much of the corridor and also provide a detour route should the A-line be closed due to damage or derailments. Refer to Section 1.4 for a full description of rail improvements throughout the corridor. For a description of the designs for river and major creek bridges, and description of the track configuration by Project section, refer to Chapter 2. The track charts provided in the Tier II DEIS have been updated and can be found in Appendix E.

4.14.4 STATIONS

Section 4.14.4 of the Tier II DEIS contained a discussion regarding station locations. However, as noted in Chapter 3 of this Tier II FEIS, this study does not evaluate environmental impacts related to specific station locations, but rather provides a general discussion of potential station locations in relationship to the larger transportation network. Therefore, the discussion regarding stations was determined to be more appropriately placed within the Project description in Section 1.4.

4.14.5 TRANSIT

The Project is being planned to allow connectivity with other rail transit in the major metropolitan areas along the Project corridor as well as to other forms of transit. In addition, Virginia and North Carolina have both evaluated the feasibility of adding conventional passenger train service to eastern and western portions of the states. The Project, as part of the SEHSR Corridor, would serve as the spine to these added routes, allowing conventional rail service passengers to connect to the proposed SEHSR service and other points in the Northeast, Southeast, and beyond. The Project enhances the

connectivity through greatly enhanced speed, reliability, and reductions in travel time, as discussed in Section 1.5.

Section 3.11.3 discussed the associated local and regional transit services planned to connect to the Project, as well as which agencies are responsible for planning the transportation needs in the two-state Study Area. For example, rail transit plans for the Richmond, VA, region include several commuter rail and light rail lines providing service to Main Street Station. In addition, TT's regional rail plans for the Raleigh, NC, region involve a light rail line that could potentially share the same general corridor as the Project railroad alignment from north Raleigh, NC, to downtown Raleigh, NC, and then continue west along existing rail lines to Orange and Durham Counties. As noted in Chapter 3, planning between the TT Regional Transit project and the Project (especially in those areas where the proposed ROW's for the two systems are immediately adjacent to each other) is on-going and has included extensive coordination with the NCDOT Rail Division and the Project Team.

As discussed in Section 3.11.3.1, there is currently at least one public transit service agency that provides bus or van services for SEHSR riders at each of the planned SEHSR station locations within the Study Area. This includes the following bus transit agencies/systems listed by proposed SEHSR station location:

- Richmond, VA - Greater Richmond Transit Company (GRTC)
- Petersburg, VA - Petersburg Area Transit (PAT)
- La Crosse, VA - Lake Area Bus (LAB)
- Henderson, NC - Kerr Area Rural Transportation System (KARTS)
- Raleigh, NC - Capital Area Transit (CAT) & Triangle Transit (TT)

These existing systems are likely to be expanded and/or supplemented with additional systems once the Project is constructed and anticipated ridership on the SEHSR Corridor becomes a reality. As noted in Section 3.11.3.1, each of the regional transportation agencies in the Study Area is committed to provide enhanced transit opportunities surrounding the proposed SEHSR Corridor stops.

4.14.6 AVIATION

This section is new to the Tier II FEIS and was added to address agency comments on the Tier II DEIS.

As noted in Section 3.14.6, according to Federal Aviation Administration (FAA) Advisory Circular 150/5300, a Notice of Proposed Construction or Alteration (FAA Form 7460-1) is required for projects that exceed specific standards listed in 14 CFR 77.9. The three airports located near the Preferred Alternative do not meet the need for this Notice, as detailed in Table 4-126.

Table 4-126 Airports Located Near Preferred Alternative					
Name	**Location**	**Runway Length (ft)**	**Distance Between Runway and SEHSR (ft)**	**SEHSR Largest Height Above Ground (ft)**	**Is FAA Notice Required? If Not, Why? (see Notes Below)**
Chesterfield County	Richmond, VA	5,500	18,900	~40	No – Exempt (§ 77.9 (e)(1)); also SEHR height will not exceed 189 ft (§ 77.9(b)(1))
Dinwiddie County	Petersburg, VA	5,000	10,000	~40	No – Exempt (§ 77.9 (e)(1)); also SEHR height will not exceed 100 ft (§ 77.9(b)(1))
Mecklenburg-Brunswick Regional Airport	South Hill, VA	5,000	10,300	~40	No – SEHR height will not exceed 103 ft (§ 77.9(b)(1))

NOTES:
§ 77.9 Construction or alteration requiring notice. If requested by the FAA, or if you propose any of the following types of construction or alteration, you must file notice with the FAA of:
(a) Any construction or alteration that is more than 200 ft. Above Ground Level (AGL) at its site.
(b) Any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes:
(1) 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway more than 3,200 ft. in actual length, excluding heliports.
(2) 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway no more than 3,200 ft. in actual length, excluding heliports.
(c) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) or (b) of this section.
(d) Any construction or alteration on any of the following airports and heliports: (1) A public use airport listed in the Airport/Facility Directory, Alaska Supplement, or Pacific Chart Supplement of the U.S. Government Flight Information Publications;
(e) You do not need to file notice for construction or alteration of:
(1) Any object that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation.

4.15 UTILITIES

Utility impacts for the Preferred Alternative vary widely throughout the length of the Project. Table 4-147 displays a summary of the projected costs associated with impacts to utility infrastructure, by section for the Preferred Alternative.

Utility cost estimated were developed initially for the Tier II DEIS. Appendix N of the Tier II DEIS provided a breakdown of utility impacts by type (power, telephone, cable television, water, gas, and sewer) for each alternative, by section. These costs were evaluated during selection of the Preferred Alternative, as described in Chapter 2. The costs for the Preferred Alternative shown in Table 4-127 are from the Tier II DEIS, with the exception of Section V where a new alternative (NC5) was developed based on stakeholder input. NCDOT developed utility costs for the new portion of this alignment in 2011. Based on this information and the existing utility costs north of Whitaker Mill Road for Section V, the utility impacts for NC5 were estimated. For the other sections, the minor adjustments

made to the designs were not deemed to be sufficient to substantially change the costs estimated in the Tier II DEIS.

Table 4-127
Utility Cost Impacts by Section (in dollars)

Section	Preferred Alternative	Utility Costs
AA	VA1	$20,469,250
BB	VA1	$3,874,350
CC	VA1	$4,486,800
DD	VA3	$2,421,500
A	VA2	$415,675
B	VA1	$264,000
C	VA1	$1,874,650
D	VA4	$1,283,500
E	VA1	$765,900
F	VA1	$409,925
G	VA3	$191,700
H	VA1	$727,900
I	VA1	$990,950
J	VA2	$996,550
K	VA1	$397,900
L (VA)	VA1	$459,200
L (NC)	NC1	$543,597
M	NC1	$1,343,111
N	NC1	$505,185
O	NC3	$189,972
P	NC1	$2,683,653
Q	NC1	$681,550
R	NC1	$21,882
S	NC1	$1,054,977
T	NC1	$906,535
U	NC1	$2,114,507
V	NC5	$2,279,020

Source: NCDOT, 2008, 2009. 2011; DRPT, 2006, 2009.

4.15.1 GROUNDWATER WELLS AND SURFACE WATER SUPPLY INTAKES

4.15.1.1 *SURFACE WATER SUPPLY INTAKES*

The Preferred Alternative will not directly impact any surface water supply intakes.

The Project will employ best management practices in both Virginia and North Carolina to control erosion and sedimentation, and to prevent spills. Section 4.1 lists all mitigation and minimization techniques that will be followed to minimize water quality impacts from the Project.

Potential impacts to public water distribution systems will be verified during final design and local utilities will be contacted during the right of way phase of the Project, if necessary.

4.15.1.2 *GROUNDWATER WELLS*

Subsequent to the publication of the Tier II DEIS, it was determined that the Project would impact two private wells. The Preferred Alternative will impact a private well serving Hillcrest Mobile Home Park, located north of La Crosse, VA in Section I. The Mecklenburg County, VA, Health Department has indicated that there is sufficient land available within the Hillcrest property to accommodate relocation of the drinking water well. During final design, a suitable new water source will be identified to ensure a continuous, safe, and sanitary water source for the residents.

The Preferred Alternative will also impact the Aqua North Carolina well on Ligon Mill Road in Wake Forest, NC, in Section U. It is anticipated that the impact to the Agua North Carolina well can be mitigated with a connection to a public water supply or the well can be relocated. This issue will be addressed during the final design stage of the Project, at which time coordination with the owner of the well will take place.

4.16 SAFETY AND SECURITY

This section has been revised in response to public comments on the Tier II DEIS.

As discussed in Section 1.8.6, passenger rail has consistently been one of the safest ways to travel nationally. Since 1970, over 94% of all transportation fatalities have been motor vehicle related, while less than 4% have been related to rail operations (and the majority of those are due to highway-rail collisions or trespassers, as opposed to train accidents). Following this national trend, passenger rail has consistently been one of the safest ways to travel in Virginia and North Carolina, with railroad related fatalities representing only 0.1% of total transportation related fatalities for both states in 2010. The safety improvements discussed in Section 1.8.6, along with the full grade separations proposed with this Project, will result in improved overall rail passenger safety within the Project corridor when compared to existing rail service and will create an even safer mode of transportation than currently available in the Study Area. Increasing the safety of the transportation system within the travel corridor is one of the primary purposes for the Project.

4.16.1 HIGH SPEED RAIL (HSR) SAFETY

The Code of Federal Regulations (CFR) Title 49 (Transportation) requires high speed trains and track to be designed and maintained at a very high standard for safety and ride quality. The proposed Project improvements will be designed to meet American Railway Engineering and Maintenance-of-way Association (AREMA) standards for high speed track and will exceed the requirements of CFR Title 49. The design will include such items as modern track components and geometry and advanced signal systems that separate trains. In addition, risk of derailment is significantly reduced by the elimination of at-grade crossings, where the potential of a collision is highest. Maintenance requirements of CFR Title 49 include frequent inspection of vehicles and track, and independent testing by FRA.

In addition, FRA currently administers a comprehensive set of safety standards and program guidance for conventional and high-speed operations. These standards include requirements for track, equipment, operating rules and practices, signals and train control, communications, emergency preparedness, and certification of locomotive engineers, among others. In 2009, FRA began amending those existing safety standards through a High-Speed Passenger Rail Safety Strategy that will support a very high level of safety for new passenger rail services, including final design and operations of the SEHSR Corridor (USDOT FRA, 2009). This Strategy will update and augment existing FRA design and operation standards based on lessons learned from high speed systems around the world. New factors being evaluated include: volume and nature of freight operations sharing the system, construction of shared equipment on the system, ability to respond to emergencies, and degree of isolation of the system from hazards (vehicles, unauthorized access,

vandalism, and natural hazards). Under this FRA Strategy, operators of HSR along the SEHSR Corridor will be required to prepare and follow the following safety elements: Right-of-Way Safety Plan, Maintenance-of-Way Safety Management Plan, On-Board Emergency Systems and System Safety Programs.

4.16.2 GRADE SEPARATION

As discussed in Chapter 2, the existing rail corridors contain 200-plus rail-road crossings, many of which are at-grade, which pose inherent hazards to existing train operations, motor vehicles, non-motorized vehicles, and pedestrians. Since 1994, USDOT policy has supported consolidation or elimination of at-grade roadway crossings on all active rail lines (freight and/or passenger) because roadway-rail crossings are the most difficult to control and therefore present the areas with the highest risk, given the involvement of two independent modes of transportation (USDOT, 1994).

According to recent FRA guidelines for highway-rail crossings for high-speed passenger rail special care must be observed where rail lines carry high-speed passenger trains to ensure that road traffic does not present an obstruction that could result in a collision and subsequent derailment (USDOT FRA, 2009). The presence of both high-speed passenger trains and slower-moving freight trains (as proposed within the Project corridor) creates another dimension of risk, warranting additional attention to governance of all traffic over the roadway-rail intersection. Under these circumstances, exclusive reliance on sight distance or audible warnings to judge the arrival of trains is not practical. Particularly where there are two or more tracks (as proposed with some portions the Project), the potential for an event involving more than the single train initially impacting a road user adds to the potential for even greater additional risk.

For these reasons, as well as the other safety and operability purposes detailed in Section 2.2.1.2, the Project is proposing the safest design possible by consolidating and grade separating all railroad-roadway crossings. Included in the Project are over 80 new bridges/overpasses/underpasses that, when combined with existing bridges/overpasses and proposed roadway realignments and closures, will create a fully grade-separated system to ensure absolute automobile/truck – train collision avoidance (which is the primary cause for derailments), thereby assuring the highest level of safety to both passengers and the surrounding communities. Detailed information about proposed treatments for existing at-grade crossings (both public and private), can be found in Appendix F and are shown on the designs in Appendix R.

4.16.3 PEDESTRIAN SAFETY

The ability of pedestrians to move safely across the HSR corridor is another important safety consideration. In Virginia, one existing public pedestrian-only underpass will be retained with the Preferred Alternative (there are no existing public pedestrian-only bridges or underpasses in North Carolina). The Preferred Alternative also proposes twelve new pedestrian-only bridges/underpasses to provide increased pedestrian access in certain downtown areas. All of the proposed new bridge and underpass designs will have sufficient width so as not to create a hazard for pedestrian movement. In locations where existing pedestrian accommodations (e.g., sidewalks) currently exist, these accommodations will be provided on the bridges/underpasses. At other locations, pedestrian accommodations on the bridges/underpasses will be evaluated during final design based on the current NCDOT and VDOT pedestrian policies. In general, these policies consider the provision of pedestrian accommodations in more populous locations where pedestrian activity currently exists.

4.16.4 FENCING

Fencing that would direct pedestrians to bridges/underpasses may be proposed for some locations in urbanized areas. The location and type of fencing will be determined during final design, based on coordination between the owner of the rail corridor, the operator of the railroad, and adjacent

communities. Such fencing, along with the proposed crossing closures may prevent unauthorized access onto the rail corridor in some areas, as well as help direct pedestrians to safe crossings (bridges/underpasses), thereby improving safety along the corridor.

4.16.5 OTHER SECURITY CONCERNS

Section 3.19 provided a discussion about railroad security in the current security climate. Just as it exists currently, the future developed Project corridor will remain accessible from many miles of arterial and secondary roadways where no security measures are practicable. It should be noted that any crossing of the railroad (either existing or proposed with the Project) where no legal crossings currently exist is not only unsafe, it is considered trespassing.

4.17 INDIRECT AND CUMULATIVE EFFECTS

This section is completely revised from the Tier II DEIS to address public and agency comments on the Tier II DEIS.

The purpose of this section is to examine the indirect and cumulative effects (ICEs) of the Project. NEPA, as amended, requires the assessment of direct, indirect, and cumulative impacts as part of the Project decision-making process. The CEQ guidelines define direct, indirect, and cumulative impacts as follows:

- Direct effects are caused by the action and occur at the same time and place.
- Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.
- Cumulative effects are the impact on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Descriptions of the Study Area's history and how past actions shaped the present are provided in the Phase I and Phase II architectural and archaeological reports prepared for this Project and are summarized in Chapter 3.12 of the 2010 Tier II DEIS and this Tier II FEIS. Present conditions of the Study Area, including land use, transportation planning, communities, protected species and habitats, and other human and natural resources, are documented in Chapter 3 of this Tier II FEIS. The direct effects of the Project on human and natural resources are documented throughout Chapters 4 and 5 of this Tier II FEIS. Potential indirect and cumulative effects are based on the information provided in Chapters 3, 4, and 5 of this Tier II FEIS.

The implementation of the Project would have varying degrees of indirect and cumulative effects at national, regional, and local levels. Contributing factors to indirect and cumulative effects are other major planned actions and the Project's compatibility with future land use and transportation plans. Mitigating factors that could offset any impacts would include locally adopted ordinances and land use controls. Summaries of concerns relative to the potential for indirect and cumulative effects, as further discussed in this section, are provided in Table 4-128 and Table 4-129, respectively.

Table 4-128
Issues/Concerns and Potential Indirect Effects (Dependent on Location)

Area of Concern	Potential Indirect Effects	Potential Mitigation Actions
Water Resources: Streams, Wetlands, Riparian Areas, Floodplains, Water Quality	• Potential negative impacts to wetlands, streams, riparian areas, floodplains, water quality from potential secondary development surrounding the proposed stations in more rural areas. • Potential water quality effects associated with construction, operation, and maintenance of the rail system.	• Stormwater controls and locally administered monitoring • Local and use controls limiting development and runoff • Local low impact development guidelines • Stormwater facility maintenance • Following sediment and erosion control guidance during construction
Farmlands	• Potential loss of prime farmland soils as a result of secondary development surrounding the proposed stations in more rural areas.	• Local land use controls that concentrate development around station
Air Quality	• Localized air quality impacts from increased traffic due to potential secondary development surrounding the proposed stations in more rural areas. • Regional air quality improvements from switch to auto-related trips to rail-related trips.	• Travel demand management strategies that reduce trip making as applied locally
Noise & Vibration	• Noise and vibration impacts from increased traffic due to potential secondary development surrounding the proposed stations in more rural areas.	• Local zoning and land use controls that require buffering around stations
Biological Resources: Terrestrial & Aquatic Communities	• Potential terrestrial and aquatic wildlife and habitat impacts from secondary development surrounding the proposed stations in more rural areas. • Potential water quality effects associated with construction, operation, and maintenance of the rail system.	• Local land use controls that concentrate development around stations • Local monitoring programs of habitats • Stormwater facility maintenance • Following sediment and erosion control guidance during construction
Rare & Protected Species	• Potential for secondary development to put pressures on existing protected species and habitats surrounding the proposed stations in more rural areas. • Potential water quality effects associated with construction, operation, and maintenance of the rail system.	• Local land use controls that concentrate development around stations • Local monitoring programs of habitats • Stormwater facility maintenance • Following sediment and erosion control guidance during construction
Community Resources:	• Potential secondary development could place additional demands on community resources such as schools, emergency response, and infrastructure surrounding the proposed stations.	• Local land use planning (use of proffers or development requirements to meet new demand for services)
Socioeconomics	• Economic development around rail stations, with increased employment opportunities and induced development.	• None required, beneficial impact potential

Table 4-128 Issues/Concerns and Potential Indirect Effects (Dependent on Location)		
Area of Concern	**Potential Indirect Effects**	**Potential Mitigation Actions**
	• Potential for additional employment opportunities around secondary development areas.	
Neighborhood & Community Impacts	• Effects on communities due to change in development patterns, densities and property values, and associated traffic impacts due to induced development surrounding the proposed stations.	• Local land use controls to limit impacts including traffic mitigation measures
Land Use	• Change in development, including increased redevelopment to higher densities and increased property values, around stations • Local economic effects from change in development and property values around stations • Potential for secondary development around station areas is greatest in the La Crosse area, given the amount of undeveloped land currently available; however, all station areas will see secondary development pressures.	• None required – land use would be determined by local authorities in terms of any changes that occur
Archaeological & Historical Resources	• Potential for secondary development surrounding the proposed stations to put pressures on archaeological resources and to alter historic quality of towns and communities.	• Local land use controls – historic preservation codes and local enforcement
Transportation: Roads, Traffic, Rail, Stations	• Increased traffic from potential induced development surrounding the proposed stations. • Increased multi-modal system linkage	• Local land use controls including traffic analyses and local investments would mitigate any impacts

Table 4-129 Concerns and Potential Cumulative Effects (Dependent on Location)		
Area of Concern	**Potential Cumulative Effects**	**Potential Mitigation Actions**
Water Resources	• Possible cumulative effects due to increased impervious ground surfaces related to road work, resulting in stormwater run-off and reduction in water quality. • Possible cumulative effects of development pressures on water resources of wetlands, streams, rivers, riparian areas.	• Stormwater contols and locally administered monitoring • Local and use controls limiting development and runoff • Local low impact development guidelines • Local land use controls that limit growth in undeveloped areas along corridor and concentrate growth and infill development in areas best suited to accommodate it.
Air Quality	• Regionally, automobile emissions may decrease as drivers switch to passenger rail as their mode of transportation.	• None required
Noise & Vibration	• Increased freight rail in addition to passenger rail could cumulatively impact those in the vicinity of the rail line.	• Locally administered mitigation programs including buffering, noise insulation.

Table 4-129 Concerns and Potential Cumulative Effects (Dependent on Location)		
Area of Concern	**Potential Cumulative Effects**	**Potential Mitigation Actions**
	• Impact would be worse in areas where rail service is not currently provided.	
Biological Resources	• Possible cumulative effects of development pressures on biological resources of terrestrial and aquatic wildlife and habitat.	• Local land use controls that limit growth in undeveloped areas along corridor and concentrate growth and infill development in areas best suited to accommodate it.
Communities and Community Resources	• Potential for increased population and employment in areas around rail stations, leading to an increase in community resource demands in city centers. • Benefit from improved mobility option offered by passenger rail. • The combination of increased noise and vibration and changes to circulation patterns from crossing closures and consolidations could reduce the feeling of community. However, to some, the addition of HSR and a station could improve a community's sense of identity and offer employment and development opportunities that might not otherwise be possible.	• Local land use planning and provision of services to meet demand.
Land Use	• A possible increase in new development and redevelopment to higher density uses near proposed stations may shift some urban growth away from suburban and greenfield areas and into city centers, increasing the demand for urban services in downtowns but reducing the impact of growth on sensitive natural environmental resources.	• None required, land use would be controlled locally to define what patterns of development would occur over time.
Archaeological & Historical Resources	• The combination of secondary development near the proposed stations with the direct effects of the project could potentially threaten the integrity of archaeological and historical resources. • Although the increase in redevelopment pressures nearest the proposed HSR stations may threaten some historic resources, other areas of downtown may see additional interest in the restoration of historic structures for homes and small businesses.	• Locally administered preservation programs to reduce potential impacts to these resources.
Traffic	• The combination of removing at-grade rail crossings and replacing with grade-separated crossings, along with roadway trips switching to passenger rail trips, would have a cumulative benefit on the roadway network in terms of improving overall safety and reducing traffic volumes on the interstate. • Localized station area traffic increase due to induced demand and provision of stations over time.	• No mitigation required for beneficial impacts • Traffic mitigation measures implemented by local land use controls as development occurs near stations and as stations are developed by localities involved.
Freight Rail Operations	• The potential for increased freight rail shipping from separate but ongoing road and rail projects could result in overall truck traffic reduction on interstate facilities and an economic benefit to the freight rail industry and supporting services	• No mitigation required.

4.17.1 NATIONAL EFFECTS

The Project, as part of the SEHSR Corridor (one of the ten Federally-designated HSR corridors), will play an important role in modernizing America's transportation system. A national HSR network will help fulfill the strategic transportation goals identified in the American Recovery and Reinvestment Act of 2009 and the Passenger Rail Investment and Improvement Act of 2008. Cumulatively, the Project, when combined with other HSR projects, would help achieve the following national transportation goals:

Safe and Efficient Transportation Choices

Provide safe and efficient transportation choices by promoting the safest possible movement of goods and people and optimizing the use of existing and new transportation infrastructure.

Foundation for Economic Competitiveness

Build a foundation for economic competitiveness by laying the groundwork for near-term and ongoing economic growth by facilitating efficient movement of people and goods, while renewing critical domestic manufacturing and supply industries. America's transportation system is the lifeblood of the economy. Providing a robust rail network can help serve the needs of national and regional commerce in a cost-effective, resource-efficient manner, by offering travelers and freight convenient access to economic centers.

Energy Efficiency and Environmental Quality

Promote energy efficiency and environmental quality by reinforcing efforts to foster energy independence and renewable energy, and reduce pollutants and greenhouse gas emissions. Rail is already among the cleanest and most energy-efficient of the passenger transportation modes.

Findings from the National Surface Transportation Policy and Revenue Study Commission indicate that the expansion of intercity passenger rail would improve the nation's transportation system by reducing congestion on other modes and offering mobility options to travelers. As noted above, it would also address important national goals related to climate change and energy use. The following summarizes the benefits associated with an expanded intercity passenger rail service.

- Relieve highway and airway congestion;
- Improve public safety and air quality;
- Reduce fuel consumption per passenger mile, potentially reducing the nation's dependence on imported oil;
- Help mitigate the negative impacts of short or prolonged energy supply disruptions and energy price increases;
- Provide land use and travel pattern changes that could improve air and water quality, as well as aesthetic appeal;
- Provide mobility and economic development opportunities to smaller communities with little or no other access to public transport;
- Assure a redundant transportation mode for use in emergency situations; and
- Provide a mobility option for individuals who do not drive or fly.

4.17.2 REGIONAL EFFECTS

As stated in the Tier I EIS for the SEHSR Corridor between Washington, DC and Raleigh, NC, implementation of HSR in the SEHSR Corridor would enhance the existing transportation network along the SEHSR Corridor, providing many indirect benefits. It would link cities and major metropolitan areas where highway and airline travel volumes are the greatest, thereby providing a travel alternative that will help ease congestion on the existing highway and airway systems. The

proposed Project would offer an alternative mode of transportation between Virginia and North Carolina.

The increased speeds and frequencies proposed for the Project will allow people to make trips that they otherwise would not make, increasing capacity to the overall transportation network and the ability for people to travel. The auto trip diversions to the new HSR service would aid in improving air quality throughout the Study Area. The extension of HSR service into states to the south would allow both Virginia and North Carolina to be more accessible by rail to residents, tourists, and business travelers arriving from the north and south.

Implementation of HSR in the SEHSR Corridor, including the Project corridor would provide access to rural areas and communities through links with additional intercity passenger rail service.

Virginia and North Carolina have both evaluated the feasibility of adding passenger train service and routes to eastern and western portions of their respective states. The proposed SEHSR program would serve as the spine to these added routes, allowing passengers to link conventional service to HSR service and connect to points in the Northeast, Southeast, and beyond. These new passenger train services and routes in Virginia and North Carolina would provide linkages to the SEHSR service from parts of Virginia and North Carolina not currently served by rail. Passenger rail linkages would be provided to existing and planned commuter rail services at multimodal stations, allowing for connections to suburbs and airports in Washington, DC, Richmond, VA, Raleigh-Durham-Chapel Hill (the Triangle), NC, and Charlotte, NC.

4.17.3 LOCAL EFFECTS

As reported in the Tier I EIS for the SEHSR Corridor between Washington, DC and Charlotte, NC, and the Project Tier II DEIS (see Chapter 4.11.4), implementation of HSR within the SEHSR Corridor is not expected to alter development patterns in the Study Area except in the vicinity of the rail stations in Richmond, VA, (Main Street Station), Raleigh, NC, (the new Union Station to be completed by 2017), and the yet-to-be-determined station locations in Petersburg, VA, and La Crosse, VA, and Henderson, NC. The Tier I ROD for the SEHSR Corridor between Washington, DC and Charlotte, NC, states that future development will occur primarily around these stations, with commensurate levels of noise and traffic associated with the increased use of the stations, as well as with secondary commercial and residential development that may be drawn to the station areas. The chief potential negative impact would be noise and vibration caused by the reintroduction of service along the CSX S-Line in Virginia where there is presently no rail service.

The implementation of SEHSR service could result in undeveloped land in the vicinity of these stations developing at a faster pace than would happen without the Project. This would most likely be the case at the more rural rail station in La Crosse, VA where there is an abundance of undeveloped land. The remaining station locations are in moderately urbanized areas to highly urbanized areas with limited available vacant land. In these urban areas, nearest the stations, the potential for additional, large-scale new development and redevelopment of previously developed lands would be the greatest. New or retrofitted passenger stations in Richmond, VA; Petersburg, VA; Henderson, NC; and Raleigh, NC, could assist in urban redevelopment efforts of these localities and several of the localities have been doing local land use planning in anticipation of new services at these stations.[2] This local land use planning and control over the local land development process could help focus development around the existing infrastructure and minimize the use of undeveloped lands, and thus could help to limit suburban sprawl and therefore the impact on natural resources. In areas where no current rail service exists (e.g., the CSX S-Line from Petersburg, VA, to Norlina, NC),

[2] As discussed previously in this document, NCDOT has secured funding to construct a new Raleigh Union Station, the City of Richmond is rehabilitating Main Street Station, and the Tri-Cities Municipal Planning Organization has recently initiated an Environmental Assessment for a new multimodal passenger station in the Tri-Cities area.

there may be secondary industrial development because of the new availability of freight access. This could also include the need for local governments to expand infrastructure and supporting services required by industrial development (e.g., roads, water/sewer, food service, residential development). Again, any such growth would be controlled locally through the local land development process.

The secondary impacts of increased traffic from the new and retrofitted stations and the traffic diverted as a result of grade-crossing consolidations are expected to be minimal because traffic volumes on surrounding streets are low and can absorb added traffic without reducing the existing level of service.

As previously noted, construction-related employment from the Project would be relatively short-term. Long-term development, economic activity, and job creation would likely occur within a three to five mile radius of the potential station areas with the highest ridership and the greatest market conditions. This would likely occur in Richmond, VA, Petersburg, VA, and Raleigh, NC, given their existing urban development, multimodal transportation network, and diversified economies. This potential is contingent upon many factors such as current financial and real estate market conditions, and local land use and zoning regulations. Section 4.11.1 identifies potential changes in economic activity that might precipitate secondary development. Additional detail on the potential for secondary development will be more specifically assessed when as yet determined station locations are identified and subjected to their own NEPA process (if Federally funded) and as directed by the information provided by the localities that would determine the form and pattern of any secondary development. This activity could take place during each state and locality's evaluation of the individual stations, a step that will come after the Record of Decision for this Tier II EIS.

Secondary development could adversely impact natural resources such as streams, wetlands, riparian areas, floodplains, protected species, wildlife, habitats, watersheds, and water quality if not mitigated or controlled locally. As discussed in Section 4.1, Water Resources, and Section 4.10, Biological Resources, activities associated with secondary development can include conversion of farmland to impermeable development, clearing and grubbing of forests and stream banks, riparian canopy removal, loss of wildlife and aquatic habitats, increased sedimentation and nutrient loading, and increased demands on water resources. As previously noted, the most likely secondary development pressures would be within a three to five mile radius of the stations and controlled locally. Because developable land in the La Crosse, VA, area is more plentiful than at other station areas, the potential for secondary impacts to natural resources will likely be the greatest in this community. While the La Crosse, VA, area is rich in undeveloped land, sensitive resources such as wetlands, streams, floodplains, protected species or habitat are not in abundance, so prudent local land use planning should consider how to balance development patterns with sensitive resources. The other stations are proposed in highly urbanized areas where secondary development would not likely adversely impact most natural resources.

From a watershed perspective, in Virginia, both the Richmond, VA, and Petersburg, VA, station areas are within the James River Basin, the La Crosse, VA, station would be within the Roanoke River Basin. In North Carolina, the Henderson, NC, station would be within the Roanoke and the Tar-Pamlico River Basins, and the Raleigh, NC, station is in the Neuse River Basin. Any secondary development within these watersheds would be subject to local, state, and Federal water quality regulations, erosion and sediment controls, and permit requirements. Being subject to these regulations and requirements is a line of defense protecting sensitive natural resources.

FRA has developed a "Station Area Planning" guide that can assist localities in managing the consequences and leveraging the opportunities offered by potential HSR stations USDOT FRA, 2011). The document provides concepts, topics, and ideas to assist local jurisdictions and others to accomplish successful station area planning and achieve an optimal integration of the station in its context – to ensure ridership growth and capture livability, sustainability and economic benefits. In addition, many other guides are available to localities to draw upon transit-oriented development

(TOD) and low impact development concepts, such as encouraging compact development and enhancing transit, pedestrian, and bike transportation options. In addition, the recent results of a study on the California HSR can assist localities with better assessing how the proposed Project could bring positive urban transformations by considering complementarities with other station cities and how to integrate their station into the regional context (Mineta Transportation Institute, 2011).

The overall air quality effect is beneficial based on the number of trips diverted from automobiles (see Section 4.6). This benefit would increase proportionally if the cumulative effect of improvements results in the railroad mode capturing more of the corridor trips than currently modeled. The net energy use per passenger mile is substantially less for rail than either air or auto, giving a net positive energy benefit. There is a net positive safety benefit because of the safety advantages of train versus auto travel in the corridor, along with the net positive effect of increased mobility choices for all populations, including minority and low income. These net positive impacts would grow if the cumulative effect of the improvements results in higher use of the rail transportation system.

4.17.3.1 *LOCAL INDIRECT EFFECTS TO NATURAL RESOURCES*

Waters, wetlands, aquatic and terrestrial communities, and threatened and endangered species and their habitats have some potential to be indirectly affected by the project. Indirect effects associated with habitat fragmentation (See Section 4.10.1.1 for discussion of direct impacts) may result in creation of more edge habitat, barriers to wildlife movement, reduction in patch size, loss of interior or area-sensitive species, disruption of wildlife foraging patterns, increased opportunity for invasive species establishment, and generally reduced biological diversity. Indirect effects to major riparian corridors may be realized through restriction of movements by wildlife into and out of them as a result of fragmentation of the wildlife corridors, as well as more localized movements of wildlife into and out of these areas.

The primary indirect effect associated with the introduction of pollutants from railroad construction, use, and maintenance is the degradation of nearby terrestrial and aquatic habitats. That degradation can take place in the form of increased deposition of sediments or contamination from chemical pollutants in the form of heavy metals and petroleum products and their byproducts. When this runoff enters waters that are already impaired, the impacts can accumulate and result in accelerated changes in the macrobenthic community structure and composition, which in turn can affect the fish and amphibian populations that rely on them as a food source, as well as the birds and aquatic mammals that prey on the fish and amphibians. The effects can result in changes in community structure at a local level, but may also extend further to include changes in ecosystem structure and function in the absence of proper mitigation.

The disruption or alteration of natural processes leads to the indirect effect of changing the flow of energy through the local natural communities and sometimes altering the energy flow at the ecosystem level such that it changes the ability of the system to maintain itself. A major pathway for energy flows in the study area may be through the riparian corridors. Some of the potential effects that may occur as a result of the disruption of hydrology in these systems and wetlands of the study area include changes to floodwater storage capacity and retention times, vegetative community composition and structure, nutrient cycling, and aquatic life movement. However, these riparian corridors are dynamic systems both hydrologically and vegetatively; with changes in stream channel morphology, flow characteristics, floodwater storage capacity and retention time, vegetative community composition, and nutrient cycling occurring regularly throughout the systems due to natural causes. Hydrologic modifications due to beaver activity are commonplace, and these low gradient stream systems are adapted to these constantly changing hydrologic modifications. The changes that occur to the parameters identified above tend to be localized around the disturbance sites, and because the systems are adapted to regular changes in hydrologic

flow, the changes have little to no effect on the system's ability to maintain itself. These systems are already highly segmented due to current and historic utility, roadway, (and beaver) activity. While railroad crossings represent a more permanent impact to the system than natural beaver modifications, measures can be implemented to minimize and mitigate impacts to the systems.

4.17.4 OTHER PLANNED ACTIONS

The Project takes into account other planned actions by local, state, and Federal authorities within the Study Area, as discussed in Sections 3.11 and 4.11. Long-range planning data was incorporated into the Project. The effects of other planned roadway improvements were evaluated and documented in the SEHSR Draft Traffic Review (Hatch Mott MacDonald, June 2013). The Richmond to Raleigh Project would not adversely impact the ability of these other planned projects to be constructed. Overall, the Project would have a beneficial impact on these planned roadway improvements by way of redirecting a portion of roadway users to SEHSR trains, thereby reducing roadway congestion and improving air quality. Other planned actions in the Study Area are identified below, as well as in Sections 3.11.3 and 3.11.4 and Section 4.11.3. As with planned roadway improvements, these separate, planned projects would have a positive, synergistic effect with the Project.

4.17.4.1 *SEHSR: I-95 CORRIDOR*

The Commonwealth of Virginia Statewide Rail Plan established the I-95 Corridor as a part of the SEHSR Corridor. The I-95 Corridor runs from Washington, DC, to Richmond, VA, and includes an extension to Hampton Roads, VA. The I-95 corridor was identified as a top priority corridor for passenger rail improvements in Virginia, in the state's request for $1.57 billion in Federal funding under the American Recovery and Reinvestment Act of 2009 (ARRA). Key projects within the corridor include:

- Washington, DC/Richmond, VA, Rail Improvement - Virginia DRPT has recommended a ten-year $370 million rail improvement program along this corridor that includes a proposal for a parallel, third main line track over most of the corridor and identifies other track and signal improvements to increase railroad capacity and maximum speeds for both freight and passenger rail operations.
- Richmond, VA, to Hampton Roads, VA, SEHSR Corridor – Virginia DRPT is investigating improved passenger rail service between Richmond, VA, and Hampton Roads, VA, to ultimately connect to the Southeast, Northeast, and Mid-Atlantic regions as an extension of the SEHSR Corridor between Washington, DC and Charlotte, NC. The Study Area includes two routes, the existing Amtrak route from Richmond, VA, to Williamsburg, VA, to Newport News, VA, via the CSX route and another route south of the James River along the Norfolk Southern route between Petersburg, VA, and Norfolk, VA. Additional information on this project is provided in Section 3.14.3.
- Virginia Railway Express Cherry Hill, VA, Station and Third Track – Virginia Railway Express (VRE) provides commuter rail service from the Northern Virginia suburbs to Alexandria, VA, Crystal City, VA, and downtown Washington, DC. Virginia DRPT is partnering with VRE to fund the evaluation of potential enhancements to improve VRE service. Studies are currently underway to evaluate potential improvements to the Fredericksburg VRE line, including construction of a third track in the CSX ROW, design and construction of a new VRE station and slope stabilization at Cherry Hill, VA, a public commuter parking structure to serve the new Cherry Hill, VA, station, and a new highway grade separation over the CSX line.

4.17.4.2 *SEHSR: RALEIGH, NC TO CHARLOTTE, NC*

The NCDOT's Statewide Multimodal Transportation Plan identifies the Raleigh, NC, to Charlotte, NC, corridor as one of its top passenger rail priorities. NCDOT has completed extensive planning and financial analyses for the incremental development of this important section of the SEHSR Corridor, including expanding existing capacity through additional trackage, straightening curves to improve travel times, and grade-separations to improve safety. NCDOT has applied for more than $5 billion in Federal funding through the ARRA program to complete many of these planned projects. To date, approximately $550 million has been awarded.

4.17.4.3 *FORT LEE MILITARY RESERVATION: BRAC EXPANSION*

As a part of the US Department of Defense's Base Realignment and Closure (BRAC) activities, Fort Lee is on the receiving end of many base consolidations and expansion. Fort Lee serves as the focal point for Army Logistics and is approximately four to six miles east of Petersburg, VA. The expansion included establishing a Sustainment Center of Excellence, a Joint Center for Consolidated Transportation Management Training, and a Joint Center of Excellence for Culinary Training, as well as relocating all Defense Commissary Agency and relocating Mobilization Processing Functions to Fort Lee. At the conclusion of the BRAC process, more than seven million square feet of buildings were constructed on Fort Lee. It is estimated that approximately 64 percent of the population growth in the areas surrounding Fort Lee are or will be the result of the Fort Lee expansion. Fort Lee is the Crater District's economic engine. BRAC expansion resulted in growth of its average daily student population from 6,000 to 10,000. Over 8,000 new military, civilian, and contract employees, along with their families, have moved or will be moving to the Fort Lee area. Out of town travelers would benefit from the ease of access to Fort Lee via HSR, regardless of which Petersburg, VA, area station is selected.

4.17.4.4 *HEARTLAND CORRIDOR RAIL PROJECT & NATIONAL GATEWAY PROJECT*

Two major freight rail improvement projects are underway in the Crater Planning District region. Norfolk Southern's Heartland Corridor Rail Project was completed in 2010. It extends from Columbus, OH, through Petersburg, VA, and terminates in Norfolk, VA. It substantially enhances the Crater Planning District area's transportation and distribution capabilities by shortening rail shipments from Norfolk, VA, to the Midwest.

The CSX's National Gateway Project is a multi-state project extending from North Carolina to Ohio and includes a spur that connects to the Ports of Hampton Roads. The Heartland Corridor and the National Gateway Projects intersect at Collier Yard in the City of Petersburg, VA, making the Crater Planning District region well suited to serve as an East Coast hub for freight distribution.

4.17.4.5 *CITY OF RICHMOND, VA: MAIN STREET STATION IMPROVEMENTS*

The restoration and construction of Richmond, VA, Main Street Station into a multimodal transportation center is one of the Richmond, VA, Area MPO's Priority Projects. As a multimodal center, Main Street Station will serve not only SEHSR trains, but Amtrak trains, GRTC local buses, airport shuttles, taxis, and tour buses, along with bicycle and pedestrian access, at one centralized location in downtown Richmond, VA. Additional information on this project is provided in Section 3.11.3 of this document.

4.17.4.6 *CITY OF HENDERSON, NC: DOWNTOWN REVITALIZATION*

One of the primary goals of the City of Henderson, NC, is to promote downtown revitalization projects, the major three of which include the restoration of the Historic downtown District, the Embassy Center and Embassy Cultural Center, and the Recreation, Economic Development,

Education, and Family (REEF) Project. As noted in the City of Henderson, NC, website, revitalizing the "Historic downtown" is an ongoing process with many storefront shops restoring their original construction. The Henderson-Vance, NC, downtown Development Commission provided grants for improving facades. The city, local property owners, and the Henderson-Vance, NC, downtown Development Commission received two $1,000,000 grants from the U.S. Department of Housing and Urban Development to add 30 apartments above store front buildings on Garnett Street, the main street in downtown.

The Embassy Center is a ten-acre, two city block site in historic downtown Henderson, NC. Within it are the Embassy Center, a 25,000 square foot Police Headquarters, and a large garden area and green spaces available for community festivals and outdoor events. The Embassy Cultural Center will host a 35,000 square foot Performing Arts Theater. A 40,000 square foot Public Library was completed in 2006. Adjoining the two is a 5,000 square foot open gallery space used for a variety of public functions.

The REEF project is a combined effort by the Gateway Corporate Development Commission, the Henderson-Vance, NC, downtown Development Commission, and the North Carolina Community Development Initiative. The project involves renovating an 86,000 square foot tobacco warehouse. The new facility will house a new Community & Business Center, including a Boys & Girls Club center, an off-campus facility for Vance-Granville Community College, 5 Star child care, an urgent care/medical clinic, various retail spaces, cultural arts and farmer's market spaces, and other spaces to be decided on in the future.

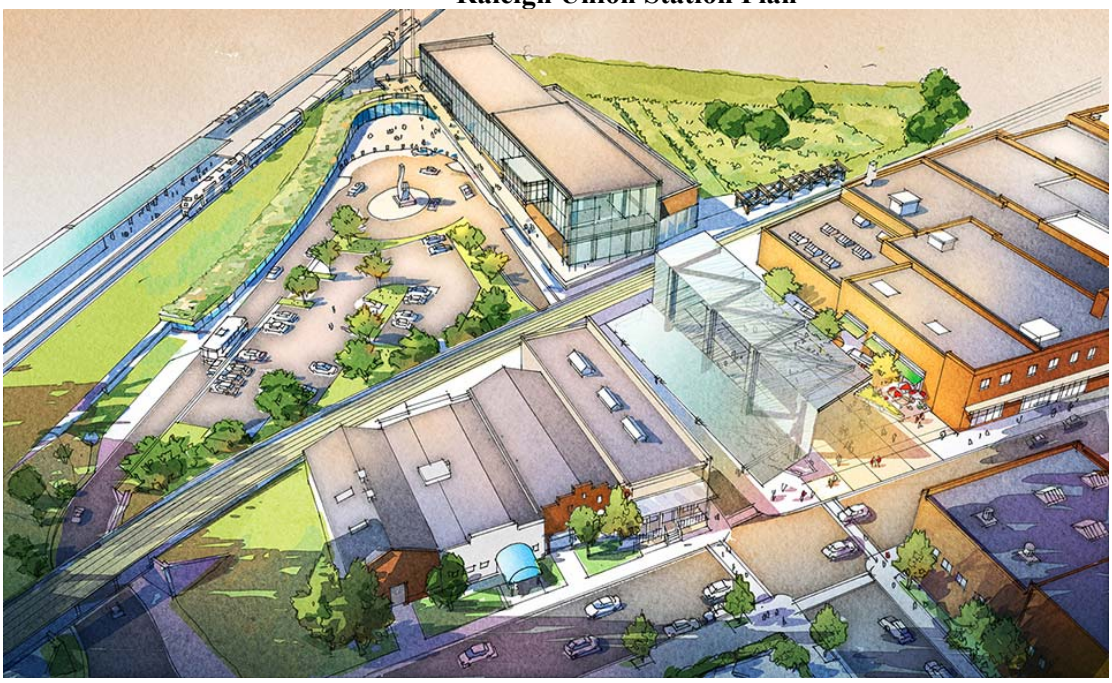
4.17.4.7 *TRIANGLE COMMUTER RAIL SERVICE*

Triangle Transit (TT), the Capital Area MPO, and the Durham-Chapel Hill-Carrboro MPO adopted the Regional Rail Plan in the mid-1990s. The plan includes regional rail service, expanded bus service, shuttles, park-and-ride facilities, and enhanced transit access for pedestrians and bicycles. As discussed in Section 3.11, plans for this project have continued to evolve since a 2003 Federal Transit Administration ROD on the Phase I Regional Rail System FEIS. TT's current focus for regional light rail is on Orange and Durham Counties, which are outside corridor for this Project. However, planning for the TT corridor in Wake County is on-going, and includes five stations and ROW adjacent and parallel to the proposed Project railroad ROW.

4.17.4.8 *CITY OF RALEIGH, NC, NEW RALEIGH UNION STATION*

The City of Raleigh, NC, TT, and NCDOT are currently moving forward with plans to construct the Raleigh Union Station, a new passenger train station, at 510 West Martin Street in downtown Raleigh, NC (see Figure 4-3). It will accommodate current and future demand for intercity passenger rail, including SEHSR service, TT's planned commuter rail, light rail, city bus, regional bus, taxis, bicycles, and other modes of transportation. The new station is among the improvements to North Carolina's railroads between Raleigh, NC, and Charlotte, NC, intended to increase railroad capacity, efficiency, and safety. The new station will replace the existing Amtrak Station on Cabarrus Street. The new station is almost fully funded, and FRA has completed the NEPA review. Construction is expected to begin in 2015 and operations are expected to begin in 2017. Subsequent phases of the station are currently under way as well, including plans to build a new parking deck near the station and move the existing Moore Square Bus Transit Facility to be closer to the new station. Refer to Section 1.4 for additional information.

Figure 4-3
Raleigh Union Station Plan



4.17.4.9 *CITY OF RALEIGH, NC, LONG-RANGE PLAN*

The City of Raleigh, NC, 2030 Comprehensive Plan (adopted October 2009) was last amended October 2013. The amendments included the city's vision to be a "sustainable city", including implementation of SEHSR Corridor service and related "growth framework elements". The Raleigh Comprehensive Plan Growth Framework Map designates several "future rail stations" along the TT light rail system proposed between Chapel Hill, NC, and Raleigh, NC, as well as along the proposed Wake Forest, NC, commuter rail line. These stations are located in downtown Raleigh, NC, (Raleigh Union Station discussed above), west Raleigh, NC, as well as north and south of downtown. The land around these stations is planned for a normal amount of Transit Oriented Development, except for the proposed new Raleigh Union Station, which has a much larger growth center called "downtown Regional Center". The downtown Regional Center is planned as the City's urban core with the area's most intense growth and highest levels of transit, bicycle, and pedestrian access" and "a true hub for a rapidly growing region, served by highways, rail transit, high-speed intercity rail, and local and express bus." The proposed new Raleigh Union Station is identified as the heart of this Center. The city's future land use was developed based on a vision to redirect a full 60 percent of anticipated future growth (120,000 new households and 170,000 additional jobs projected by 2030) into "downtown, a series of seven city growth centers, 12 transit-oriented centers, and over 40 mixed-use community centers, connected via a network of parkways, multimodal corridors, and urban streets", based on the availability of SEHSR service, as well as TT's regional rail, other transit services, and major thoroughfares and interstate highways.

4.18 RELATIONSHIP BETWEEN SHORT-TERM IMPACTS AND LONG-TERM BENEFITS

This section addresses in general terms the proposed Project's relationship between local short-term impacts/use of resources and the maintenance and enhancement of long-term productivity. The Preferred Alternative was selected based upon sound planning for local, regional, and statewide transportation needs within the context of present and possible future traffic requirements and land use

patterns. Coupled with the environmentally sensitive design of the proposed Project and BMPs, this helps to ensure that the short-term use of resources related to construction will be out-weighed by the long-term impacts of implementing the proposed Project.

The most disruptive local short-term impacts associated with the Preferred Alternative would occur during land acquisition and Project construction. The short-term use of the environment and of human, socioeconomic, cultural, and natural resources contributes to the long-term productivity of the Study Area. Most short-term, construction-related impacts would occur within or in close proximity to the proposed ROW.

Existing homes, farms, and businesses within the selected alternative's ROW would be displaced. However, adequate replacement housing, land, and space are available for homeowners, tenants, and business owners within the Study Area. Improved access within the Study Area would contribute to long-term residential and business growth.

Construction activities would create short-term air quality impacts, such as dust due to earthwork, road and rail improvements, and exhaust from construction vehicles. Short-term noise impacts would be unavoidable due to use of heavy equipment. Air and noise abatement measures, discussed in Section 4.6 and Section 4.7, would be used to minimize these short-term impacts during construction.

Short-term visual impacts would occur in the vicinity of the construction corridor. Mitigation measures, such as reducing slope cuts outside necessary road widths, reducing vegetation removal, leaving native vegetation screens in place, and minimizing the alteration of scenic viewsheds, would be used to reduce long-term visual resource impacts.

Implementation of the BMPs for the protection of surface waters would minimize potential water quality impacts.

A short-term impact from construction would be the removal of biotic communities and wildlife within the proposed ROW and construction staging areas. However, recovery rates of local wildlife populations are expected to be relatively fast, and no effect on long-term productivity is expected.

Overall, the Preferred Alternative would have minimal short-term impacts relative to the long-term benefits of HSR between Richmond, VA, and Raleigh, NC, and the ultimate extension of the SEHSR Corridor along the East Coast. In addition, the elimination of at-grade rail crossings and construction of grade-separated crossings would greatly improve the safety of rail crossings throughout the Project corridor. Construction-related activities would be localized and temporary. Short-term gains to the local economy should be recognized as a result of hiring local firms and labor, as well as purchasing local services and supplies to construct the proposed Project. Once completed, the benefits of long-term productivity in terms of improved mobility and safety would be realized. The implementation of the Project would enhance the existing transportation network between Richmond, VA, and Raleigh, NC, and provide a viable travel alternative for residents and users. This is consistent with the purpose of the proposed Project. Based upon the significant contribution to the long-term objectives of regional and local plans for development, the proposed Project is consistent with the maintenance and enhancement of the long-term productivity at the local, regional, state, and national levels.

4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction of the Preferred Alternative would require certain irreversible and irretrievable commitments of natural resources, manpower, materials, and fiscal resources. Because most of the Project will be constructed within existing railroad ROW, land acquisition for construction of the proposed Project will be minimized. However, there will be an irreversible conversion of land to a transportation use in areas of new alignment and in areas where the existing road network will be modified to accommodate rail crossing closures and consolidations, and to avoid historic resources. If a

greater need for the use of the land was to arise or if the transportation facility were no longer needed, it could be converted to another use. At present there is no reason to believe such a conversion would be necessary or desirable.

The acquisition of new ROW and new construction within the existing ROW may result in both short-term and long-term losses and alterations to the natural resources in the area. Upland and aquatic biotic communities, as well as agricultural land may be committed to rail service where new ROW is required. The most apparent impact may be the loss of aquatic or terrestrial habitat productivity and connectivity; therefore, wildlife abundance may decline in the area as a result of habitat destruction. Increased noise associated with the Project may be intolerable to some wildlife species. Forested areas may be cleared in some locations, and wetlands and other surface waters may be filled to accommodate new bridges and underpasses. Riprap may be placed along stream banks at bridge crossings, reducing habitat within riparian zone. After construction, some habitat types may be restored within the construction limits, although their value to wildlife is unlikely to equate to that which was lost. If wetlands are filled for new construction, mitigation of impacts will likely involve restoration of degraded wetlands within the same watershed. In the long-term, this will offset the loss of wetland habitats within the Project construction limits. The commitment of natural resources within existing and new ROW is a permanent loss of productive wildlife habitat.

In addition, the construction of the Project would increase habitat fragmentation within the Project corridor. As described in Section 4.10.1.1, habitat fragmentation can increase the risk of predation or displacement of native species by invasive, exotic species. Loss of habitat, mortality due to collisions, barrier effect, and reduction in habitat quality are the main impacts of habitat fragmentation by railroads. On a local scale, trains may affect wildlife habitats through the introduction of exotic plant species (e.g. seeds), emission of toxic contaminants like heavy metals, or ROW management (e.g. herbicide application). Section-specific habitat fragmentation effects are discussed in Section 4.10.1.1,

Fossil fuels, labor, and construction materials would be expended in the fabrication and preparation of construction materials, as well as during the construction of the Preferred Alternative. While these materials are generally not retrievable, they are not in short supply and their use would not have an adverse effect on the continued availability of these resources. It should be noted that the steel rails required for the Project could be recycled should an alternate use of the property be selected in the future. Any construction would also require a substantial, one-time expenditure of both state and Federal funds, which are not retrievable and could be used instead on other projects within the local community or in other parts of the country.

Specific natural resource impacts for the Preferred Alternative have been previously detailed in this chapter. When reviewed in the overall context of the Project and taken in total, they are proportionately small compared to the benefits of the Project.