Final Environmental Impact Statement

US 340 Improvement

Jefferson County, West Virginia

April 2019

Martinsburg

Berkeley County

Jefferson County

Charles Town

Frederick County

Winchester

Loudoun County

WEST VIRGINIA

MARYLAND

VIRGINIA

Project Location

U.S. Department of Transportation
Federal Highway Administration

West Virginia
Department of Transportation

SECTION IV

Affected Environment & Environmental Consequences

IV. AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

This section provides a description of the existing social, economic, and natural environments of the project area. The social, economic, and natural environment impacts associated with each of the remaining build alternates 4, **4A (Preferred)**, and 4B are described in the following sections, along with measures proposed to mitigate those impacts.

A. SOCIAL ENVIRONMENT

1. Population and Growth Characteristics

a) Population Characteristics

For purposes of discussing socioeconomic conditions, the study area is comprised of the following Census Block Groups, based on the 2010 Census: Census Block Groups 972800-1 (east of US 340) and 972800-3 (west of US 340), which make up most of the project area, and 972800-4 in Jefferson County, West Virginia. Small areas of Census Block Groups 010100-2 and 010100-4 in Clarke County, Virginia are also in the project area. Table IV-1 provides information on the population and its racial and ethnic composition for the Census Block Groups in the project area, along with corresponding information for Jefferson County and West Virginia as a whole for comparison purposes.

All of the Census Block Groups in the project area have a lower proportion of minority residents than Jefferson County as a whole. Individual block group minority concentrations range from 6.1 percent to 10.3 percent, compared to a countywide average of 12.4 percent. All of the Block Groups in the project area also have a lower proportion of Hispanic residents than Jefferson County as a whole. Based on Census data and field observation, there are no concentrated areas of minority residents in the project area. Environmental justice concerns are discussed further in Section IV.A.6.

Table IV-1: Population Characteristics

JURISDICTION	TOTAL POPULATION	TOTAL POPULATION BY RACE						TOTAL POPULATION BY HISPANIC OR LATINO ETHNICITY		TOTAL MINORITY POPULATION *
		White	Black or African American	American Indian or Alaskan Native	Asian	Native Hawaiian or Pacific Islander	Other#	Hispanic or Latino (any race)	Not Hispanic or Latino	
West Virginia	1,852,994	1,739,988 (93.9%)	63,124 (3.4%)	3,606 (0.2%)	12,406 (0.7%)	428 (<0.1%)	33,261 (1.8%)	22,268 (1.2%)	1,830,726 (98.8%)	126,003 (6.8%)
Jefferson County	53,498	46,876 (87.6%)	3,524 (6.6%)	132 (0.2%)	618 (1.2%)	33 (0.1%)	2,315 (4.3%)	2,489 (4.6%)	51,009 (95.4%)	7,918 (14.8%)
Census Block Group 972800-1	1,565	1,465 (93.6%)	44 (2.8%)	1 (<0.1%)	18 (1.2%)	0 (0.0%)	37 (2.3%)	29 (1.9%)	1,536 (98.1%)	113 (7.2%)
Census Block Group 972800-3	1,477	1,330 (90.1%)	108 (7.3%)	3 (0.2%)	1 (<0.1%)	1 (<0.1%)	35 (2.4%)	25 (1.7%)	1,452 (98.3%)	158 (10.7%)
Census Block Group 972800-4	1,685	1,511 (89.7%)	74 (4.4%)	11 (0.7%)	7 (0.4%)	2 (0.1%)	80 (4.7%)	72 (4.3%)	1,613 (95.7%)	196 (11.6%)
Census Block Group 010100-2	1,151	1,079 (93.7%)	41 (3.6%)	0 (0.0%)	5 (0.4%)	0 (0.0%)	26 (2.2%)	35 (3.0%)	1,116 (97.0%)	79 (6.9%)
Census Block Group 010100-4	1,677	1,575 (93.9%)	55 (3.3%)	2 (0.1%)	10 (0.6%)	0 (0.0%)	35 (2.1%)	37 (2.2%)	1,640 (97.8%)	114 (6.8%)

#Includes individuals reporting "some other race" or "two or more races."

*Total minority population includes all individuals reporting a race other than white plus all individuals reporting both white race and Hispanic or Latino ethnicity (data not shown). This is calculated by subtracting the total non-Hispanic white population (data not shown) from the total population. All other races with Hispanic or Latino ethnicity are included in the race figures used to determine total minority population.

Source: US Census Bureau (2010) Summary File 1 Total Population (100-Percent Data), Table P8. – RACE and Table P9. – HISPANIC OR LATINO, AND NOT HISPANIC OR LATINO BY RACE

b) Age of Population

Table IV-2 shows information about the relative age of the project area's population. The median age of all of the Census Block Groups in the project area is relatively high, reflecting West Virginia's high median age overall. Median age of the U.S. population is 36.8 years, while West Virginia's median age is 41.3 years. Most of the Block Groups in the project area have a slightly higher percentage of residents aged 65 years or older than in Jefferson County as a whole, but all have a lower percentage than for West Virginia as a whole. Based on Census data and field observation, there are no defined communities or areas composed primarily of older residents in the project area. Most of the Block Groups in the project area also have a slightly higher percentage of residents aged 19 years or younger than for the county or state as a whole.

Table IV-2: Population by Age Group and Median Age (2010)

Area	Total Population	Percent ≤ 19 Years	Percent ≥ 65 Years	Median Age
West Virginia	1,852,994	23.7	16.0	41.3
Jefferson County	53,498	27.0	11.8	41.1
Census Block Group 972800-1	1,565	25.6	13.2	43.8
Census Block Group 972800-3	1,477	29.0	11.9	40.8
Census Block Group 972800-4	1,685	30.3	8.9	40.5
Census Block Group 010100-2	1,151	27.5	14.6	44.4
Census Block Group 010100-4	1,677	27.5	14.6	44.4

c) Growth Trends

As shown in Table IV-3, the population of Jefferson County has grown steadily in recent decades, growing notably faster than West Virginia's population as a whole. Several new residential subdivisions have developed in and near the project area in recent decades. Jefferson County's location at the fringes of the Washington DC metropolitan area, within

commuting distances from employment centers in the Washington area, has contributed to its population growth. This factor will continue to influence growth in Jefferson County and the surrounding area, with the West Virginia Bureau of Business and Economic Research predicting continued, but more moderate growth in Jefferson County through 2030. The state's overall population, however, is anticipated to begin to decline after 2020.

Table IV-3: Population Projections

Area	Year	Population	Period	Percent Change
West Virginia	1990	1,793,477	--	--
	2000	1,808,344	1990-2000	+8.3
	2010	1,852,994	2000-2010	+2.5
	2020*	1,857,795	2010-2020	+0.3
	2030*	1,833,536	2020-2030	-1.3
Jefferson County	1990	35,926	--	--
	2000	42,571	1990-2000	+18.5
	2010	53,498	2000-2010	+25.7
	2020*	59,552	2010-2020	+11.3
	2030*	65,144	2020-2030	+9.4

* Projected population
Source: US Census Bureau (2010) Summary File 1 Total Population (100-Percent Data); West Virginia University Bureau of Business and Economic Research (2014), Population Trends in West Virginia Through 2030

2. Economic Development

Data herein is taken from the 2012 Economic Census and 2014 American Community Survey, collected by the US Census Bureau.

As shown in Table IV-4, a much higher proportion of Jefferson County working-age residents are in the labor force than in West Virginia as a whole. Jefferson County's labor force participation is also slightly higher than the national rate. Jefferson County's unemployment rates are also relatively low compared with West Virginia and the nation as a whole. Recent unemployment rates are slightly higher than they were a decade ago, but the nationwide economic recession in the intervening years has strongly influenced these trends.

Table IV-4: Employment Status and Unemployment Rates

Area	Population 16 Years and Older in Labor Force	Unemployment - 2004 Annual Average	Unemployment - 2014 Annual Average	Unemployment - March 2015
United States	63.5%	5.5%	6.2%	5.5%
West Virginia	54.2%	5.3%	6.5%	7.7%
Jefferson Co.	67.4%	3.4%	4.5%	4.8%

Source: US Census Bureau 2010-2014 American Community Survey Table B23001. – EMPLOYMENT STATUS FOR THE POPULATION 16 YEARS AND OVER; U.S. Bureau of Labor Statistics, 2015.

a) Income and Housing Characteristics

As shown in Table IV-5, the median household incomes in the project area Block Groups are generally higher than for Jefferson County as a whole and are much higher than the state's median household income. The highest median household income in the project area is in Block Group 972800-1 ($93,750), which corresponds to the area east of US 340. Median household income in Block Group 972800-3 ($53,250) is lower than the county as a whole, but is still 28 percent higher than the state's overall median household income.

The U.S. Department of Health and Human Services (HHS) establishes annual poverty guidelines, defining household income thresholds for determining a household's poverty status. These income thresholds are reported by household size. According to the 2014 American Community Survey, there is an average of 2.63 persons per household in Jefferson County. The HHS 2014 household income threshold for poverty status was $15,730 for a two-person household and $19,790 for a three-person household. At the block group level, the American Community Survey reports the number of households with incomes at a range of levels—it reports the number of households with incomes under $10,000, the number with incomes between $10,000 and $14,999, the number with incomes between $15,000 and $19,999, etc. For this analysis, all households with incomes in these three lowest categories (i.e., households with incomes under $20,000) were counted as falling below the poverty threshold. Table IV-5 shows the percent of households in each block group with incomes falling below this level.

The pattern of households with incomes below the poverty level is similar to the pattern of median household incomes in the project area. Block Group 972800-3 has the highest concentration of households with incomes below the poverty level (21.0 percent below poverty

level) in the project area, but this is lower than the statewide percentage of 24.4 of households below the poverty level. Based on the current Census data and on field reviews, low-income residents are generally not concentrated in specific locations in the project area.

Table IV-5: Income and Housing Characteristics

Area	Median Household Income	Percent of Families with Income Below Poverty Level	Renter-occupied Housing Units	Vacant Housing Units	Median Value of Owner-occupied units	Median Year Housing Structures Built
West Virginia	$ 41,576	24.4%	30.9%	13.4%	$ 100,200	1973
Jefferson County	$ 66,205	13.2%	21.0%	9.6%	$ 204,900	1986
Census Block Group 972800-1	$ 93,750	10.2%	12.6%	10.1%	$ 244,100	1989
Census Block Group 972800-3	$ 53,250	21.0%	17.6%	6.9%	$ 193,900	1992
Census Block Group 972800-4	$ 83,011	0.0%	10.8%	4.8%	$ 306,000	1992
Census Block Group 010100-2	$ 93,173	20.0%	12.1%	9.9%	$ 370,800	1992
Census Block Group 010100-4	$ 68,914	6.1%	20.1%	10.1%	$ 369,000	1978

Source: US Census Bureau 2010-2014 American Community Survey Table B19001. – HOUSEHOLD INCOME IN THE PAST 12 MONTHS; Table B25077 – MEDIAN VALUE OF OWNER-OCCUPIED HOUSING UNITS; Table B25035 – MEDIAN YEAR STRUCTURE BUILT; US Census Bureau (2010) Summary File 1 Total Population (100-Percent Data), Table H1 & H3 – OCCUPIED STATUS

Most of the housing in the project area is owner-occupied, with smaller proportions of renter-occupied housing units than Jefferson County or West Virginia as a whole. The proportion of vacant housing units is generally similar to or lower than the county as a whole, and lower than

the state as a whole. The median values of owner-occupied housing units in the project area are all much higher than for West Virginia as a whole. Most of the project area has higher median house values than Jefferson County as a whole, which has a median house value of $204,900. The exception is Census Block Group 972800-3, which has a slightly lower median house value ($193,900). This is consistent with the somewhat lower median household income and higher proportion of households below the poverty level in this block group. Housing units in the project area are typically newer than for Jefferson County as a whole (median year built 1986) and much newer than for West Virginia as a whole (median year built 1973).

b) Project Effects on the Local Economy

According to *Envision Jefferson County*, lack of road improvements has been a restraint on the economic growth of Jefferson County. Better access via interstate highways and other four-lane roadway facilities would make Jefferson County more attractive to prospective businesses and industries. These improvements could help support planned industrial and commercial growth, particularly in the large area located at the south end of the project area, west of the existing US 340, which is zoned for these types of land uses. Because of its geographic location, Jefferson County has the potential to become a point of distribution for several metropolitan areas located within a 300-mile radius. US 340 improvements would be consistent with the *Envision Jefferson 2035 Comprehensive Plan*.

Improved access through Jefferson County is likely to help promote local tourist attractions such as Charles Town Races, Harpers Ferry National Historical Park, the Jefferson County Mountain Heritage Arts and Crafts Festival, the National Fisheries Center, and Summit Point Raceway. As a result of improving US 340 and providing better access to these attractions, tourism may become more important to the local economy.

Small businesses located within the community of Rippon may be affected by the reduction in through-traffic due to the relocation of US 340 to outside of the community. The majority of these businesses are likely to primarily serve the local residents with only a small percentage of their business generated by through-traffic. The slight effect of the relocation of US 340 is balanced by the improved traffic conditions within Rippon. Decreased traffic makes the businesses in the community of Rippon more easily accessible.

Any effect on the businesses in the community of Rippon that may occur may be more than compensated for by the economic benefits of increased tourism and expected residential growth and its attendant taxes. The economic benefits provided by the proposed improvements are not expected to substantially differ between build alternates.

3. Land Use Planning

For a county government to implement land use regulations, the West Virginia Code requires that the county enact and maintain a comprehensive plan. The *Envision Jefferson 2035 Comprehensive Plan* is Jefferson County's comprehensive plan. It states that the county is in transition—while, for most of its history, Jefferson County has been an agricultural community, it is becoming increasingly developed. The 50 miles separating Jefferson County from the Washington DC metropolitan area allowed the rural traditions and agricultural landscape to remain intact until the late 1980s. Since that time, the willingness of workers to commute further, the expansion of the boundaries of the DC metro areas, the addition of more commuter trains and the attractiveness of Jefferson County as a place to live have resulted in substantial population growth. The population is anticipated to continue its steady growth over the next two decades. In light of this continued growth, Jefferson County seeks to shape future growth in a manner that preserves the most important features of Jefferson County: the rural landscape, the natural beauty of the rivers, the rolling terrain and the strong sense of community.

Jefferson County's zoning ordinance identifies five zones in the county. Along the east side of US 340, the project area is classified in the Rural zoning category. Along the west side of US 340, the project area includes Industrial-Commercial and Rural zoning designations, with the area around Rippon designated in the Village zoning category. Reflecting this zoning pattern, current land use in the project area encompasses agriculture, residential, and sparse commercial and industrial development. Exhibit II-7 shows the existing and future land use designations in the project area.

The comprehensive plan's future land use guide designates planned future land uses throughout the county. The area east of US 340 in the project area is designated for Rural/Agriculture uses and Large Lot Residential uses. The future land use guide designates much of the area along and to the west of US 340 and east of the Norfolk Southern Railroad as a Preferred Growth Area (PGA), including a mix of Industrial or Commercial uses, Mixed Use

Residential/Commercial uses, and Low Density Residential uses. This area is called the US 340 South PGA and the plan acknowledges that the improvements to US 340 have the potential to create some growth pressures along this corridor. PGAs are areas that are outside current urban growth boundaries where water and sewer are either currently available or could be made available within the next two decades. Public water and sewer are not currently available in the US 340 South PGA, but the plan indicates that localized water and sewer services could be developed to support growth in this area. The plan indicates that a small area plan for this area may need to be developed, depending on the alignment of this project's Preferred Alternative.

a) Impacts to Land Use

All three of the build alternates considered are on new alignment for a portion of their length. All three follow a roughly similar alignment and, from a land use planning perspective, are likely to affect the area similarly. As indicated in the *Envision Jefferson 2035 Comprehensive Plan*, the project has the potential to encourage additional growth along the US 340 corridor. Because the alignments of the three build alternates are similar, each is likely to stimulate a similar pattern of growth along the corridor. The No-Build Alternative will not result in any land use changes.

The comprehensive plan's future land use guide designates much of the area along and to the west of US 340 in the project area as a PGA, using a representative alignment for the US 340 improvements as the eastern boundary for the PGA. The intention is to establish this area as an area that could support growth in a mix of industrial, commercial and residential land uses over the next two decades, even though public water and sewer are not currently available. The plan indicates that localized water and sewer services could be developed to support growth in this area. The plan also indicates that a small area plan for this area may need to be developed, depending on the alignment of this project's Preferred Alternative. Any of the three build alternates under consideration would support the plan's vision for this area.

4. Relocation Impacts

The potential residential and business relocations vary by alternate. Table IV-6 displays by alternate the number of relocations by type and the total right of way required. The number of relocations is based on alternate alignments and conceptual design over planimetric basemaps provided.

Table IV-6: Relocations by Alternate

Alternate	Relationship to Rippon Village District	Right of way (Acres)	Number of Relocations			
			Site-Built Residences	Mobile Homes	Business	Minority Owned
4	bypasses to the **East**	112	10	0	4	0
4A (Preferred)	**bypasses to the East**	**116**	**3**	**0**	**4**	**0**
4B	bypasses to the **East**	120	5	0	4	0

As shown in Table IV-6, Alternate 4A (Preferred) requires the fewest number of relocations. Alternate 4 has a total of 14 relocations, which includes 10 residences and four businesses. Alternate 4A has a total of seven relocations, including three residences and four businesses. Alternate 4B has a total of nine relocations, including five residences and four businesses.

It is the policy of the WVDOH to ensure that comparable replacement housing is available prior to construction of state- and federal-assisted projects. The acquisition and relocation program is undertaken in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended. Replacement assistance and compensation are offered regardless of race, sex, color, or national origin. Right of way agents were available to address specific questions and details of the state's relocation assistance program at public meetings for the project.

A review of data from the Multiple Listing Service during June 2015 showed that there are over 150 residential properties on the market in the two zip codes in the project vicinity (25414 and 25446). The average list prices in these two zip codes are over $300,000, somewhat higher than Jefferson County's median house value of $223,700, but there are numerous properties available with list prices at or below the county's median house value. There appeared to be an adequate number of properties on the market with a variety of features in all price ranges. Although there is not a large number of rental properties available in the area, there are typically five to ten available rental properties in the area, with monthly rents ranging from just under $1,000 to just over $2,000.

There is adequate land available for the relocation of the impacted businesses. There are areas at the south and north ends of the project that are zoned for commercial land uses. For several

of the potentially impacted businesses, it may be possible for the business to relocate to a different location on the remaining property. For all cases, there should be adequate locations available nearby to re-establish the business.

If necessary, the WVDOH will implement a Last Resort Housing Program. This program ensures that decent, safe, and sanitary housing is made available to all relocatees.

5. Community Facilities and Services

a) Neighborhoods and Community Cohesion

The project area is generally rural in nature with several large farms scattered throughout. The two communities in the project area are Rippon and Wheatland. Rippon is generally centered around the intersections of US 340 and CR 19 and 21. Wheatland is located in the vicinity of the intersection of US 340 with CR 340/2.

A small subdivision, Ryan's Glen, consists of 14 single-family, residential units situated on the east side of US 340 about midway between CR 38 (Smith Road) and CR 21 (Meyerstown Road). Rippon Commons is another small subdivision located on the east side of US 340 just north of CR 19 (Withers Larue Road). There are no homes constructed in this subdivision.

None of the build alternates under consideration will have a notable effect on community cohesion. By relocating the existing US 340 out of the Village of Rippon Historic District to a new alignment outside of the district, community cohesion could be positively affected. Through-traffic will no longer have to pass through the center of the Village of Rippon; all of the alternates relocate US 340 outside of the central village district.

The remaining alternates do impact Ryan's Glen and Rippon Commons with Alternate 4 having the most severe impact. Alternates 4A (Preferred) and 4B have similar impacts and will displace two homes on the edge of Ryan's Glen. The access to Ryan's Glen will be relocated and provide safer ingress/egress.

The small portion of each alternate in Clarke County, Virginia will not have any effect on community cohesion. The improvements proposed for the section of the project within Clarke County will not require new right of way. All widening will be constructed within the existing right of way for each build alternate.

Within the Wheatland area, the majority of the development is west of the existing US 340. In this area, all of the build alternates are located near the existing US 340; for this reason, none will greatly affect community cohesion in this area. The No-Build Alternative will have no effect on community cohesion.

b) Utilities

The communities and rural development within the project area are not serviced by public water supplies or sanitary sewer. It can generally be assumed that each residence has a water supply from a well or cistern and an on-site sewage disposal system. FirstEnergy provides electrical power in the project area, Frontier Communications provides landline telephone service, and Comcast provides cable service.

Several single-family residences or businesses in close proximity, such as mobile home parks and some areas within Rippon, rely on a single water supply and/or sewage disposal system. The Rainbow Road Club has a non-community water supply that serves both the food establishment and a single-family residence. John's Family Restaurant also has a non-community water supply that serves the food service establishment and several single-family homes. Rippon Mobile Home Park has a well that serves the entire park. The location of the sewage disposal service for the park is unknown. Dave's Auto Sales and Service has a well and sewage disposal system which serves the auto service and an apartment located above. The Rainbow Diner Truck Stop/Rainbow Mobile Home Park has a non-community water supply that serves the food service establishment, the mobile home park, and two single-family residences.

Impacts to existing utilities in the project area are considered low to moderate. Over a third of the project length will be on new alignment where no impacts to existing utilities is expected. Where the project follows the existing US 340 alignment closely, impacts on existing overhead utility lines and poles can be anticipated to adequately accommodate the proposed typical sections and appropriate clear zone. Actual impacts to existing utilities will be determined during development of construction plans for the preferred alternate.

c) Education

There are no educational facilities located within the project area. In West Virginia, the project area lies within two elementary school districts. West of the Norfolk Southern Railroad,

students attend the South Jefferson Elementary School. East of the railroad, Page Jackson Elementary covers grades K-3 and Wright Denny Elementary covers grades 4-6. The project area is within the Charles Town Middle School district, which serves grades 7-9. Jefferson County High School and Washington High School both serve Jefferson County. Washington High School is immediately north of the project area along US 340 in close proximity to the middle school.

American Public University System, headquartered in Charles Town, consists of two online universities: American Public University and American Military University. The school was founded in 1991 has no physical facilities within the project area. Other nearby institutions are found in Martinsburg and Shepherdstown to the northwest and north, respectively.

d) Emergency Services

Law enforcement in Jefferson County is provided by the municipal police forces of Charles Town, Harpers Ferry/Bolivar, Ranson, Shepherdstown, and the countywide services of the State Police and the County Sheriff's Department. Municipal police may respond to emergencies outside of the jurisdiction based on urgency and the availability of other law enforcement personnel. Charles Town is the municipal police force closest to the project area. The Citizen's Fire Company, located in Charles Town, and the Independent Fire Company, located in Ranson, provide fire service for the project area. The Independent Fire Company also provides emergency medical service. The Jefferson Medical Center in Ranson is the closest hospital to the project area.

The proposed project will not directly affect any emergency facilities. By upgrading this segment of US 340, accessibility to the area for emergency reasons will be improved over the existing condition. The effect on emergency services will not vary among the build alternates under consideration.

e) Other Community Facilities

Other community facilities within the project area include two churches and a post office, which is located off of US 340, north of the community of Rippon. There are no libraries, parks, or recreation areas within the project area. The existing rail line, churches, and the post office in the project area will not be affected by any of the remaining alternates evaluated.

6. Environmental Justice

Executive Order 12898 protects minority and low income populations from experiencing disproportionately high, adverse impacts from federal actions. If disproportionately high and adverse impacts are anticipated to occur, the action cannot be completed unless it can be proven that there is a substantial need for the project, that avoidance or mitigation of the impacts is not practical, that it would have increased adverse social, economic, environmental, or human health impacts that are more severe, or that it would result in increased costs of extraordinary magnitude.

For the US 340 Improvement Study, a three part screening methodology was used to determine whether environmental justice populations might be impacted by the project:

- Census data for block groups within the project area were assembled to highlight any potential concern areas with high minority or low income population concentrations. This information was presented in Section IV.A.1 and IV.A.2 with key findings repeated below. Two thresholds can suggest an area of potential concern for minority populations: any Census Block Group where 50 percent or more of the population is minority or any Block Group with a minority population at least 10 percentage points higher than the county average. Likewise, there are two thresholds that can suggest an area of potential concern for low-income populations: any Block Group where 25 percent or more of the households are below the poverty level or any Block Group where the percentage of households below the poverty level exceeds the county average by 5 percentage points or more.

- Given the rural nature of the project area, the Census block groups in this area are fairly large in size. This means that block group-level data may not provide a completely accurate picture of the characteristics of a particular part of each block group. For this reason, a windshield survey of the project area was conducted to look for visual indicators of the potential presence of low income or minority populations. Although this is a less precise measure than conducting community surveys to apply specific thresholds set by the US Department of Health and Human Services, it was determined to represent an appropriate effort in concert with the other two components of the screening.

- For the Preferred Alternate 4A, analysts assessed each potential residential relocation to determine whether it is owned by a minority or low income household. For businesses, this also included a look at the type services rendered to determine if the business serves a niche within the community; that is, would its relocation or loss have an undue indirect effect on area residents.

The study area is comprised of a predominantly white, non-Hispanic population, at higher proportions than for the county as a whole. As shown in Table IV-1, none of the block groups exceed the thresholds for minority residents. Based on additional review of Census data and field observation, there do not appear to be any concentrated areas of minority residents in the project area. Therefore, no disproportionately high or adverse impacts to minority populations are expected to result from the No Build or any of the build alternatives.

Census data show that the median household incomes for project area block groups are generally higher than the statewide or countywide averages. As mentioned on page IV-5, two block groups have somewhat higher concentrations of households with incomes below the poverty level, slightly exceeding the threshold for low-income residents. However, based on additional review of Census data and field observation, within these block groups there do not appear to be any concentrated areas of low income residents in the vicinity of the project. While there are a few mobile homes along US 340 in the project area, there is not a disproportionately high concentration of mobile homes in the project area, as compared to the County overall. Therefore, no disproportionately high or adverse impacts to low income populations are expected to result from the No Build or any of the build alternatives.

From a relocation perspective, three residences and four businesses will be affected by the Preferred Alternate (Alternate 4A).

- Of these, none are minority owned.

- Two residences are located in the Ryan's Glen neighborhood, each over 4,000 square feet in size and with fair market values of over $300,000. A review of county tax records suggests that each of these is owner-occupied. The third is on Meyerstown Road; this home does not appear to be currently inhabited. A review of county tax records indicates that the small parcel containing this structure is owned by the same owner of the larger adjacent agricultural property, which has a 3,500 square foot house

on it. There is no indication that any of these residences serves low income residents and Census data do not suggest they are inhabited by minority residents. No mobile homes would be directly affected.

- Affected businesses include two restaurants, a car dealership and service shop, and a seasonal produce stand. Although two of the three restaurants in the project area will be affected, there are numerous restaurants in nearby Berryville, Summit Point, and Ranson. Likewise, the car sales/service shop is the only service provider of its kind within the 5-mile project area; however, numerous similar businesses exist in Ranson, approximately five miles to the north. None of these businesses appear to disproportionately serve low-income or minority residents.

Alternates 4 and 4B would affect the same four businesses as the Preferred Alternative. Neither would directly affect any mobile homes or minority-owned residences. Residential properties that would be affected by these alternates have similar characteristics as those that would be affected by the Preferred Alternative.

The extent of relocations is not expected to result in disproportionately high or adverse impacts to any environmental justice populations, and overall impacts of the project on minority and low-income populations do not appear to be disproportionately high and adverse. Benefits and burdens resulting from the project are anticipated to be equitably distributed throughout the community, and no denial of benefit is expected. All right-of-way acquisitions and displacements will follow the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended, and applicable WVDOH regulations. Replacement assistance and compensation are offered regardless of race, sex, color, or national origin.

7. Transportation Facilities

Beyond highway travel, rail access through Jefferson County is provided by Norfolk Southern Railroad and the CSX Transportation System. Commuter bus services are also part of the transportation network of Jefferson County. The Eastern Panhandle Transit Authority provides public bus service in the Martinsburg area and in various areas throughout Berkeley and Jefferson counties, using US 340 north of the project area.

Any of the build alternates will have a positive effect on accessibility by improving north-south access through Jefferson County. Each provides improved access to jobs, goods, facilities, and

services in Charles Town and the surrounding area. Each also improves access to east-west roadways such as I-66 and I-70 that connect to the major metropolitan areas of Washington DC and Baltimore, Maryland.

B. HISTORIC AND ARCHAEOLOGICAL RESOURCES

Various historic and prehistoric investigations of the project area were completed during the late 1990s and early 2000s, resulting in the documentation of 72 resources over 50 years in age. This effort identified four National Register of Historic Places (NRHP) listed or eligible historic districts, three listed and nine eligible individual properties, an eligible railroad, and an eligible battlefield. A 2015 architectural survey update for the project area was conducted to 1) update the results of earlier surveys to include any previously unrecorded resources now of 50 years of age or older; 2) provide recommendations on the NRHP eligibility of the newly recorded resources; and 3) update information on previously recorded resources including recommendations on NRHP eligibility status and any potential changes to NRHP boundaries of individual resources or historic districts.

The assessment of cultural and historic resources is part of compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 and its implementing regulations, 36 CFR Part 800, as amended. The investigations were conducted according to the Secretary of the Interior's *Standards and Guidelines for Historic Preservation Projects* (Federal Register, Vol. 48, No. 190, September 1983, P. 44716-44742, et seq.), and the scope and products of the investigation meet the guidelines issued by the West Virginia Division of Culture and History, State Historic Preservation Office (WV SHPO) (WV SHPO 2001, 2005).

This section contains a general summary of the findings of the process; each listed/eligible resource is discussed in greater detail in Section IV.B.3 (archaeological sites) and IV.B.4 (aboveground resources).

1. Overview of Effects Criteria

In accordance with the NHPA of 1966, the requirements of 36 CFR 800, and Executive Order 11593, historic and archaeological resources were identified and the impacts evaluated for the three remaining build alternates considered for the project. These resources may also be protected under Section 4(f) of the US Department of Transportation Act, as discussed in Section V.

Based on consultation with WV SHPO, a determination of effect from the previously considered build alternates in the DEIS was also made for each individual property and district listed, or eligible for listing, on the NRHP (See Appendix B in DEIS for correspondence). One of three possible determinations were provided for each of the previously considered build alternates in conjunction with each historic resource: no effect, no adverse effect, or adverse effect.

An alternate is considered to have an effect on a historic resource whenever any condition of the alternate causes or may cause any change, beneficial or adverse, in the quality of the characteristics that qualify the property to meet the criteria of the NRHP. An adverse effect will occur when an alternate diminishes the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association of the property or district that contributes to its significance in accordance with the NRHP criteria. Adverse effects on NRHP sites may occur under any one or more of the following conditions:

- Physical destruction, damage, or alteration of all or part of the property.
- Isolation of the property from or alteration of the character of the property's setting when the character contributes to the property's qualification for the National Register.
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.
- Neglect of a property resulting in its deterioration or destruction.
- Transfer, lease, or sale of a property without adequate conditions or restrictions regarding preservation of the property's significant historic features.

The effects of an alternate that will otherwise be found to be adverse may be considered as being not adverse under the following conditions:

- When the historic property is of value only for its potential contribution to archaeological, historic, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines.
- When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historic and architectural value of the

affected historic property through conformance with the Secretary of the Interior's *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*.

- When the undertaking is limited to the transfer, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant features.

2. Consultation Process

The project has been coordinated through the WV SHPO in order to satisfy requirements of the Section 106 consultation process. Previous correspondence with the WV SHPO from the DEIS can be found in Appendix B on the compact disk included in the back, inside cover of this document. In this correspondence, the WV SHPO generally concurred with the eligibility and effects findings presented in the early reports for the original build alternates considered up to 2001. Since the 2001 DEIS was approved, additional coordination, meetings, studies, and correspondence has occurred as listed below:

- **January 15, 2002**..... Public Hearing,
- **July 23, 2002** ..... Public Workshop,
- **December 2001**..... *Criteria of Effects Report Alternates 6 and 8* – Coastal Carolina Research,
- **May 2002**..... *Visual Effects Balloon Test Alternative 8*, Coastal Carolina Research,
- **September 2002**..... *Cultural Resource Studies Alternatives 8 and 9*, Coastal Carolina Research,
- **December 2002**..... *Cultural Resource Study of Proposed Bullskin Run Rural Historic District Alternatives 8 and 9*, Coastal Carolina Research,
- **March 24, 2003 .....** WV SHPO response to Coastal Carolina Research report *Cultural Resource Studies Alternatives 8 and 9* (see Appendix B),
- **September 3, 2003.....** WV SHPO response to Coastal Carolina Research report *Cultural Resource Study of Proposed Bullskin Run Rural Historic District Alternatives 8 and 9* (see Appendix B),
- **December 2003**..... *Cultural Resource Studies Alternatives 8 and 9,* Coastal Carolina Research,
- **May 2004**..... *Criteria of Effects Report Alternative 4*, Coastal Carolina Research,

- **July 5, 2005**..... WV SHPO response to Coastal Carolina Research report *Criteria of Effects Report Alternative 4* (see Appendix B),
- **September 24, 2012**.... Public Workshop
- **June 3, 2013**..... Public Hearing
- **May 29, 2014**..... Letter Report: *No Effect for Archaeological Resources*, Coastal Carolina Research,
- **June 25, 2014**..... WV SHPO reply letter regarding review of the letter report on potential effects,(see Appendix B),
- **July 8, 2014**..... WV SHPO reply letter regarding the sinkhole investigations and potential effects on Kabletown RHD and Olive Boy Farm (see Appendix B),
- **July 21, 2014**..... US Department of Transportation, Federal Highway Division response letter to June 2014 letter from SHPO (see Appendix B),
- **April 2015**..... *Archaeological Assessment of Site Potential Alternatives 4, 4A, 4B, and 4C*, Coastal Carolina Research,
- **June 2015**..... *Architectural Survey Update and Historic Property Boundary Review*, Coastal Carolina Research,
- **June 1, 2015**..... United States Department of Interior, Fish and Wildlife Service (FWS) letter on Madison Cave Isopod conclusion (see Appendix B)
- **June 24, 2015**..... WV SHPO reply letter concurring with findings of the archaeological assessment for site potential alternatives 4, 4A, 4B, and 4C (see Appendix B),
- **August 10, 2015**..... WV SHPO reply letter concurring with eligibility findings for architectural resources and requesting additional information (see Appendix B),
- **August 27, 2015**..... Commonwealth of Virginia, Department of Environmental Quality letter response of scoping request (see Appendix B),
- **September 14, 2015**.... Commonwealth of Virginia, Department of Historic Resources (DHR) letter on historic properties (see Appendix B),
- **October 7, 2015**..... Commonwealth of Virginia Department of Conservation and Recreation (DCR) letter on natural heritage resources (see Appendix B),
- **October 8, 2015**..... Virginia Outdoors Foundation (VOF) response of no significant conflict with the proposed project (see Appendix B),

- **October 9, 2015**..... WV SHPO reply letter concurring with findings of the *Architectural Survey Update and Historic Property Boundary Review*, Coastal Carolina Research (see Appendix B),
- **October 27, 2015**..... VDOT email response on signatures on the SDEIS (see Appendix B),
- **November 18, 2015**..... WV SHPO reply letter of concurrence with assessment of cemetery resource as not eligible (see Appendix B).
- **November 24, 2015**..... Commonwealth of Virginia DHR letter reply finding the project will have a "No Adverse Effect" on Long Marsh Run Historic District (See Appendix B).
- **December 22, 2015** .... US Department of the Interior FWS letter response on Indiana bat, northern long-eared bat, and Madison Cave isopod (see Appendix B),
- **August 11, 2016** ..... Letter response on SDEIS from Virginia Department of Historic Resources (VA DHR) reiterating "No Adverse Effect,"
- **August 16, 2016** ..... Commonwealth of Virginia DCR letter on natural heritage resources (see Appendix B),
- **August 30, 2016** ..... Public Workshop/Public Hearing
- **September 8, 2016**..... WV SHPO comment letter on SDEIS, requesting additional information about archaeological resources and providing comments on effects recommendations for aboveground resources (See Appendix B).
- **September 19, 2016**.... WV Division of Natural Resources Wildlife Resources Section comments on SDEIS (see Appendix B),
- **September 22, 2016**.... WV Department of Environmental Protection letter on potential air quality requirements (see Appendix B),
- **September 26, 2016**.... Jefferson County Development Authority letter supporting proposed US 340 Improvements (see Appendix B),
- **September 26, 2016**.... Commonwealth of Virginia Department of Environmental Quality (DEQ) comments on SDEIS (see Appendix B),
- **September 29, 2016**.... US Department of the Interior letter concurring there is no prudent and feasible alternative to the use of 4(f) lands (see Appendix B)
- **September 29, 2016**.... US Environmental Protection Agency comments on the SDEIS (see Appendix B),
- **February 8, 2017** ..... WV DOH submits draft MOA to WV SHPO

- **March 10, 2017**..... WV SHPO reply letter regarding initial draft MOA
- **March 22, 2017**..... Phase I Archaeological Survey Report for Alternative 4A submitted to WV SHPO,
- **April 10, 2017**..... WV SHPO reply letter regarding Phase I Archaeological Survey Report requesting additional information (see Appendix B),
- **May 8, 2017** ..... Revised Phase I Archaeological Survey Report for Alternative 4A submitted to WV SHPO,
- **June 21, 2017** ..... WV SHPO reply letter regarding Phase I Archaeological Survey Report, concurring with findings and concluding consultation process (see Appendix B),
- **June 26, 2017**..... Jefferson County Historic Landmark Commission letter regarding proposed mitigation measures in draft MOA,
- **July 12, 2017** ..... Updated draft MOA transmitted from WVDOH to FHWA for submittal to Advisory Council on Historic Preservation (ACHP) (see Appendix B),
- **July 31, 2017** ..... FHWA invites ACHP to participate in the Section 106 consultation process (see Appendix B),
- **August 11, 2017** ..... ACHP decides to participate in the Section 106 consultation process and requests additional information (see Appendix B),
- **September 18, 2017**.... JCHLC votes to approve the MOA (see Appendix B),
- **October 27, 2017**..... Letter report: E*valuation and Effects Recommendations, Summit Point Battlefield*, Commonwealth Heritage Group, submitted to WV SHPO
- **November 2, 2017**..... WV SHPO reply letter concurring with eligibility of Summit Point Battlefield and adverse effect finding for project on resource (see Appendix B),
- **November 28, 2017**..... FHWA transmits additional information requested to ACHP along with updated draft MOA (see Appendix B),
- **December 28, 2017**..... FHWA transmits additional information requested to ACHP along with updated draft MOA (see Appendix B),
- **June 26, 2018**..... ACHP transmits FINAL MOA fully executed by signatories (see Appendix B)
- **August 8, 2018**..... USFWS confirms concurrence of December 22, 2015 remains valid (see Appendix B)

3. Archaeological Sites

There are no known archaeological sites in the project area listed on the NRHP. To determine the potential to encounter previously undiscovered sites, analysts ran a predictive model and conducted field surveys for a representative sample of the Area of Potential Effect (APE), which covered a 350-foot wide corridor for Alternates 4, **4A (Preferred)**, 4B, and 4C. This predictive model was approved by the WV SHPO on February 17, 1999.

The WV SHPO reviewed and concurred with the *Phase I Cultural Resource Investigation Architectural Survey and Archaeological Assessment, Proposed Improvements to US 340 Jefferson County, West Virginia* (May 1997) and the *Predictive Model Addendum* (June 1997). The archaeological assessment of the predictive model was created to guide future archaeological research. Based on distance to water, soil characteristics, and level of slope, it is estimated that approximately 65 percent of the project area has a high probability of containing archaeological sites while 20 percent has a medium probability and 15 percent a low probability of containing archaeological sites. Paleoindian sites are likely to be rare in this project area. Early and Middle Archaic sites are likely to consist of lithic scatters. Hunting and resource procurement camps are likely to be present from all time periods. Archaeological sites from the period of early settlement in the eighteenth century through the post-bellum period can be anticipated in the project area. There may be archaeological components associated with standing structures and along old roadbeds. Additionally, several Civil War skirmishes occurred in the project area and there may be remaining archaeological evidence of these conflicts.

In consultation with the WV SHPO, the WVDOH determined that an archaeological survey of from five to seven percent of each of the high-probability, medium-probability, and low-probability areas within the selected alignments was needed to test the predictive model. The predictive model was tested and the findings reported in the *Archaeological Sample Survey Report* (August 1999). Areas were selected randomly for survey to obtain adequate coverage of the corridors and to take advantage of the natural landforms. Approximately 40 acres were examined during the sample survey. The total acreage represents five percent of each of the three probability areas within each corridor.

The findings from the sample survey recorded eight sites. Of these eight, three were discovered within the Ripon Lodge Farm National Register property boundary, one discovered on property associated with Olive Boy Farm, two were discovered on the property associated

with the Wheatlands Farm, and two isolated finds were discovered in a low-probability area near the northern end of the project area. The survey and findings included in the report were concurred with by the WV SHPO in letters dated November 23, 1999 and December 7, 1999 (Exhibits B-19 and B-20 in the DEIS, respectively). The findings of this survey recommend further investigations for four archaeological sites should they be impacted by the Preferred Alternative. These four sites have the potential to provide early historic settlement information for the project area. Three of the four sites are located within the Ripon Lodge National Register property and appear to be contributing elements while the remaining site is located on the Wheatlands Farm.

In 2003, Alternate 4 was identified as the Preferred Alternate. Subsequently, after a period of dormancy with respect to potential project funding, and as part of renewed efforts under a Supplemental Draft Environmental Impact Statement, seven new build alternates (4A, 4B, 4C, 9, 10A, 10B, and 11) were added to the study.

In 2014, additional investigation was undertaken for two sinkholes: one within the boundary of the NRHP-eligible Olive Boy Farm and one within the qualifying landscape of the NRHP-eligible Kabletown Rural Historic District. Field testing did not reveal any archaeological sites or isolated finds at either location. This effort is documented in a *Letter Report: No Effect on Archaeological Resources* dated May 29, 2014 to Mr. Ben Hark, Environmental Section Head WVDOH. The WV SHPO concurred with the assessment on July 8, 2014.

An *Archaeological Assessment of Site Potential* (April 2015) has been prepared for the current variations of Alternate 4 (Alternates 4, 4A, 4B, and 4C). The WV SHPO concurred with these findings in their letter dated June 24, 2015.

A Phase I Archaeological Survey of Preferred Alternative 4A was undertaken in 2016. In total, 29 archaeological resources, including nine isolated finds, were examined during the survey. None of these newly identified resources are recommended as eligible under Criterion D. These findings were submitted to the WV SHPO on March 22, 2017; a revised report with additional information was provided May 8, 2017; WV SHPO indicated their concurrence on June 21, 2017 (see letter in Appendix B).

a) Project Effects on Archaeological Sites

Four potentially NRHP-eligible archaeological sites have been identified based on investigations to date: three sites associated with the Ripon Lodge NRHP-listed property and a fourth site within the Wheatlands Farm.

Alternates 4, **4A (Preferred)**, and 4B will not impact the Ripon Lodge property or the contributing sites. The final determination of effect for these alternates to these sites is "no adverse effect."

Wheatlands Farm contains one site that may be considered eligible for listing on the NRHP as a historic archaeological site; Alternates 4, **4A (Preferred)**, and 4B will not impact this farm. The final determination of effect for these alternatives is "no effect."

As none of the remaining build alternates impact the Wheatlands archaeological site or any of the sites identified on Ripon Lodge, no additional work is proposed at these sites. Programmatic language is included in the project's Memorandum of Agreement for Cultural/Historic Resources that work should be suspended near any additional archaeological resources newly discovered during construction until an appropriate treatment plan is developed in consultation with WV SHPO.

4. Historic Architectural Resources

The WV SHPO reviewed and concurred with the *Phase I Cultural Resource Investigation Architectural Survey and Archaeological Assessment, Proposed Improvements to US 340 Jefferson County, West Virginia* (June 1997). This survey identified the historic resources within the Area of Potential Effect (APE) for aboveground resources, which covers the entire project area. Based on this survey an "Architectural Evaluation" was prepared to evaluate the historic properties and districts and determine which properties are eligible for listing on the NRHP. The SHPO concurred with the eligible property and boundary recommendations made in the Architectural Evaluation on January 7, 2000.

Additional Phase I cultural resource investigations and architectural evaluations were prepared in response to comments provided at the January 2002 public hearing. The WV SHPO attended a field review on April 11, 2003; WV SHPO later concurred with the eligible property and boundary recommendations presented in the December 2003 *Cultural Resource Study of the Proposed Bullskin Run Rural Historic District*.

a) 2015 Survey Update

Additional effort was undertaken in 2014-2015 to provide an updated survey of historic architectural resources in the APE. Of the 72 previously recorded resources documented during the 2015 survey, eight have lost the primary resource and are listed as no longer extant; ten have lost secondary resources such as barns, smaller outbuildings or tenant houses; eight have had notable alterations such as the addition of porches, modern siding, or garages or the loss of components such as porches; and two are abandoned and in deteriorating condition. None of these changes affect the original eligibility determinations or boundaries of previously recorded individually eligible or listed resources or eligible or listed districts. One previously surveyed resource (St. John's Episcopal Church) is newly recommended as eligible under Criterion C for its architecture.

During the supplemental survey, ten new resources were recorded, which include a former store, a diner, a cemetery, a farm complex, a post office, and five dwellings. These resources have dates ranging from ca. 1850 to ca. 1965. Eight of the newly recorded resources are recommended as not individually eligible for the NRHP and not contributing to a historic district. Two of the newly recorded resources, the Adams House (JF-1224) and the McPherson-Adams House (JF-1225), are recommended as contributing resources to the Kabletown Rural Historic District. The ca. 1850 McPherson-Adams House, the oldest section of which is a one-story side-gabled stone dwelling, is also recommended as individually eligible for the NRHP.

b) 2017 Supplemental Battleground Evaluation

Additional effort was undertaken in 2017 in response to agency comments on the SDEIS. The Summit Point Battlefield (JF-0738) is a Civil War era battlefield included in the American Battlefield Protection Program. The site includes a portion of the US 340 corridor within the current Study Area as NRHP eligible; the larger battlefield complex has not been assessed as part of this project and is not evaluated herein. According to a letter report, Evaluation and Recommendations, Summit Point Battlefield (JF-0738) dated October 27, 2017, the portion of the battlefield in the US 340 Study Area is reflective of an avenue of troop movement and skirmishing, not the core area of engagement for the battlefield itself. Regarding the landscape and built environment, several pivotal individual Antebellum-period resources remain largely intact; however, numerous structures postdating the Civil War also exist along the corridor, particularly concentrated around the community of Rippon. Much of the US 340 Study Area may not reflect a recognizable build environment as it was experienced by those present during

the Civil War. Yet despite changes to the built environment, the Summit Point battlefield boundary area and its vistas are still predominantly rural, including agricultural fields and pastures, retaining its general location and setting.

The subject portion of the site (i.e., the travel corridor within the US 340 Study Area) is NRHP eligible under Criterion A. While portions of the larger battlefield site may be eligible under Criterion D as well, archaeological investigations within the US 340 Study Area during 2016 demonstrated that this portion does not qualify under Criterion D as an archaeological resource. The WV SHPO concurred with the site's eligibility in a letter dated November 2, 2017.

c) NRHP Listed & Eligible Resources in the APE

Table IV-7 summarizes the resources within the APE that have been identified as NRHP listed or eligible for NRHP listing. Resources inset beneath a historic district are contributing to that district as well as being individually listed/eligible. It should be noted that large historic districts cover approximately 90% of the project area.

The historic architectural resources noted in Table IV-7 are shown in Exhibit IV-1 through Exhibit IV-5. Exhibit IV-1 shows the extent of the Kabletown Rural Historic District, which covers a large area that extends far to the east of the project area boundary. Exhibit IV-2 shows the extent of the Bullskin Run Rural Historic District, which covers a large area extending far west of the project area boundary. Exhibit IV-3 zooms in to the project area, showing the relationship between the remaining build alternates and adjacent portions of both larger historic districts. Exhibit IV-4 shows the extent of the Summit Point Battlefield in relation to the Project Study Area. Exhibit IV-5 identifies the smaller NRHP listed or eligible resources within the project area, showing the relationship between these sites and the remaining build alternates.

Two of the newly recorded resources identified in the 2015 survey update, the Adams House (JF-1224) and the McPherson-Adams House (JF-1225), are identified as contributing resources to the Kabletown Rural Historic District.

- The Adams House is a ca. 1953 two-story, side-gabled dwelling that was built by the owner of the earlier McPherson-Adams House and is located on the same parcel.
- The ca. 1850 McPherson-Adams House, the oldest section of which is a one-story side-gabled stone dwelling, is recommended as contributing and also as individually eligible

for the NRHP. It is eligible under Criterion C as an example of mid-nineteenth-century rural architecture in southern Jefferson County. The property is also eligible under Criterion A for significance in the area of agriculture in that it represents a nineteenth-century farm that shifted to dairying at the beginning of the twentieth century.

Both the Adams House and the McPherson-Adams House are located outside the current project area.

Table IV-7: Listed & Eligible Historic Resources

Resource	Eligibility	(Site Number) Description
Long Marsh Run Rural HD	Listed	(various) 16 sq mi rural landscape with 366 contributing resources
Kabletown Rural HD	Eligible (A, C)	(various) 18 sq mi rural landscape with 25 contributing resources
Village of Rippon HD	Eligible (A, C)	(various) Commercial crossroads community with 34 contributing resources
St. John's Episcopal Church**	Eligible (C)	(JF-0062-0049) 1890 Gothic Revival church
William Grubb Farm*	Listed (A, C)	(JF-0005) 1763 "stone-ender" house & farm
Olive Boy Farm	Eligible (C)	(JF-0062-0006) 1858 Italianate farmhouse
Glenwood	Eligible (C)	(JF-0062-0011) 1845 Federal farmhouse
Wayside Farm	Eligible (C)	(JF-0062-0012) 1800s Federal farmhouse
Ripon Lodge	Listed (A, C) Eligible (D)	(JF-0062-0015 et al) 1833 Federal house & archaeological sites
Byrdland*	Eligible (A, C)	(JF-0062-0016) 1850s I-house & farm
Wheatland Farm*	Eligible (D)	(JF-0062-0017) Archaeological site on 1800s plantation complex
Straithmore*	Eligible (A, C)	(JF-0062-0019 et al) 1830s Greek Revival house & farm
Norfolk Southern Railroad*	Eligible (A)	(JF-1228) 1878 railroad line
McPherson-Adams House	Eligible (A, C)	(JF-1225) 1850s farmhouse
Bullskin Run Rural HD	Eligible (A, B, C)	(various) 20 sq mi rural landscape with 19 contributing resources
Berry Hill	Eligible (C)	(JF-0062-0029) 1800 Federal house
Beverley Farm	Listed (C)	(JF-0326) 1800 Federal house
Summit Point Battlefield	Eligible (A)	JF-0738) Civil War skirmishes

** Resource also is a contributing element within the Bullskin Run Rural Historic District*
*** Resource is also a contributing element within the Village of Rippon Historic District*

St. John's Episcopal Church (JF-0062-0049) within the Village of Rippon Historic District, also newly identified as an eligible resource, lies within the Kabletown Rural Historic District as well. Constructed in 1890 by architect J. G. Holmes, the church exhibits the Gothic-Revival style. Other features include wooden fishscale shingles, an elaborately carved round-arched

vergeboard with pendant, brick buttresses, gothic-arched windows, and matching louvered wooden shutters with brick arches above. The church is a contributing element to both of the encompassing districts.

The addition of these three resources to the Kabletown Rural Historic District will not require any form of boundary adjustment.

d) Determinations of Project Effects

Table IV-8 lists the determinations of effect from Alternate 4 on each historic resource. Due to the similarities of design alignments for Alternates 4, **4A (Preferred)**, and 4B, it is appropriate to conclude that the determination of effect is similar for each of these alternates. Each resource is discussed in more detail in Table IV-8. Viewshed and noise analyses referenced herein are presented in Sections IV.C.5 and IV.C.6.

Existing US 340 extends through the **Long Marsh Run Rural Historic District** at the south end of the project in Clarke County, Virginia. The improvements proposed for the three remaining build alternates at this location will all be constructed within the existing right of way. No property will be acquired from the rural historic district. The alternates are anticipated to have minimal visual impacts to the rural district since existing US 340 already extends through the district and the location of the roadway will not change in this area. Therefore, each of the remaining build alternates will have "no adverse effect" on Long Marsh Run Rural Historic District.

Alternates 4, **4A (Preferred)**, and 4B will impact the western edge of the **Kabletown Rural Historic District** by land acquisition for the proposed right of way. The three remaining build alternates will impact 103.5 to 106.7 acres within the district boundary based on preliminary design. Moderate visual impacts and increased noise levels at some receptors within the district may occur. Two to three contributing elements within the district fall within the acquisition areas: the Johnson House within the Village of Rippon (JF-0062-0037, taken by Alternates 4A and 4B), the US 340 bridge over Bullskin Run (JF-0062-0068, taken by all three remaining build alternates), and the 1870 tenant farmhouse at Byrdland (JF-0171, taken by Alternates 4 and 4B). Therefore, each of the remaining build alternates will have an "adverse effect" on Kabletown Rural Historic District.

Table IV-8: Determination of Effect

Resource	WV HPI #	Alt 4 Effect Determination
Long Marsh Run Rural HD	Various	No Adverse Effect
Kabletown Rural HD	Various	Adverse Effect
Village of Rippon HD	Various	Adverse Effect
St. John's Episcopal Church**	JF-0062-0049	No Adverse Effect
William Grubb Farm*	JF-0005	No Effect
Olive Boy Farm	JF-0062-0006	Adverse Effect
Glenwood	JF-0062-0011	Adverse Effect
Wayside Farm	JF-0062-0012	Adverse Effect
Ripon Lodge	JF-0062-0015 et al	No Adverse Effect
Byrdland*	JF-0062-0016	Adverse Effect
Wheatland Farm*	JF-0062-0017	No Effect
Straithmore*	JF-0062-0019 et al	Adverse Effect
Norfolk Southern Railroad*	JF-1228	No Effect
McPherson-Adams House	JF-1225	No Effect
Bullskin Run Rural HD	Various	Adverse Effect
Berry Hill	JF-0062-0029	No Effect
Beverley Farm	JF-0326	No Adverse Effect
Summit Point Battlefield	Jf-0738	Adverse Effect

** Resource also is a contributing element within the Bullskin Run Rural Historic District*
*** Resource is also a contributing element within the Village of Rippon Historic District*

The **Village of Rippon Historic District** is located along existing US 340 and encompasses the junctures with CR 21 and CR 19. Alternates 4, **4A (Preferred)** and 4B impact the southeast edge of the district along CR 21 (Meyerstown Rd). Based on the current design, land acquisition is required to accommodate the proposed right-of-way. This land acquisition includes the Johnson House (JF-0062-0037) located at 31 Meyerstown Road. Although not individually eligible itself, the 1940s vernacular residence is a contributing element to the Village of Rippon Historic District. Further, these alternates visually impact the district by moving the primary highway outside the central portion of this crossroads hamlet. Therefore, each of the alternates will have an "adverse effect" on the Village of Rippon Historic District.

St. John's Episcopal Church (JF-0062-0049) is located along the east side of existing US 340 at the intersection of US 340 and Long St. just south of CR 19. The building is a contributing element of the Village of Rippon Historic District. Alternates 4, **4A (Preferred)** and 4B are located east of the existing US 340 alignment. The property will not be directly impacted by land acquisition. There will be a buffer of trees, shrubs, and out buildings between the church and the proposed US 340 facility, therefore visual impacts are anticipated to be low. The project will have "no adverse effect" on this resource.

The **William Grubb Farm** (JF-0005) is located on the north end of the project along Wheatland Road, west of the existing US 340. All the proposed build alternates are located east of the historic property. It is not directly impacted by land acquisition under any of the remaining alternates and no visual impacts are anticipated. Therefore, each of the remaining build alternatives will have "no effect" on the William Grubb Farm.

The **Olive Boy Farm** (JF-0062-0006) property is located along CR 38 east of US 340. It is directly impacted by land acquisition for the proposed right of way by Alternates 4, **4A (Preferred)** and 4B with acquisition ranging from 6.3 to 10.7 acres based on preliminary design. No contributing structures are impacted. These three alternates also have a low visual impact on the Olive Boy Farm. Therefore, each of the remaining build alternates will have an "adverse effect" on the Olive Boy Farm. It may be possible to widen the existing alignment to the west, reducing impacts within Olive Boy, without resulting in substantially greater impacts to the surrounding environment; this will be examined during final design.

The **Glenwood** (JF-0062-0011) property is located south of the community of Rippon on the east side of US 340. A proposed access road may take property from the southwest corner of the farm. In addition, Alternates 4, **4A (Preferred)**, and 4B result in a moderate visual impact of the property with Alternate 4 in the closest proximity. Also, since the proposed US 340 facility will be closer to the house, it will likely result in increased noise. As currently designed, the project will have an "adverse effect" on Glenwood.

The **Wayside Farm** (JF-0062-0012) property is located southeast of the community of Rippon on the east side of US 340. Alternates 4, **4A (Preferred)**, and 4B will have a moderate visual impact on the property. None of the remaining build alternates require right of way acquisition within the historic boundary. Therefore, each of the remaining build alternates have an "adverse effect" on the Wayside Farm.

The **Ripon Lodge** (JF-0062-0015 et al) is located along existing US 340 just north of the Village of Rippon and is one of the most prominent properties within the area. Alternates **4A (Preferred)**, and 4B are all on new location to the east of the existing US 340 and will not require right of way acquisition within the historic boundary. The remaining build alternates result in low visual impacts and reduced noise levels compared to the future no build scenario. Therefore, each of the remaining build alternates have a "no adverse effect" on the Ripon Lodge.

Byrdland (JF-0062-0016) is located at the north end of the project along the east side of US 340. It is directly impacted by Alternates 4, **4A (Preferred)**, and 4B as a result of land acquisition for the proposed right of way, with acquisition ranging from 25.7 to 28.5 acres based on conceptual designs. Alternates 4 and 4B result in the loss of one contributing structure: the 1870 tenant house (JF-0171) located on the north corner of the property. This frame I-house is currently vacant and its condition is deteriorating. In addition, these alternates lead to moderate visual impacts on the property. Therefore, each of the remaining build alternates have an "adverse effect" on Byrdland.

The archaeological site at **Wheatland Farm** (JF-0062-0017), discussed further in Section IV.B.3, is not impacted and results in a "no effect" determination.

The **Straithmore** property (JF-0062-0019 et al) is located on the north end of the project along the east side of existing US 340. The mainline alignment for all of the proposed build alternates lie west of the historic property. However, the property is impacted by land acquisition for driveway realignment associated with Alternates 4, **4A (Preferred)**, and 4B. No contributing structures would be impacted. In addition, all of these alternates have a low visual impact to the property. Therefore, each of the remaining build alternates have an "adverse effect" on Straithmore.

The **Norfolk Southern Railroad** (JF-1228) right of way, historically known as the Shenandoah Railroad, runs parallel to and west of existing US 340. Alternates 4, **4A (Preferred)**, and 4B are not located in the vicinity of the railroad. No visual impacts are anticipated with Alternates 4, **4A (Preferred)**, and 4B. Therefore, each of the remaining build alternates have "no effect" on the railroad.

The **McPherson-Adams House 9** JF-1225) is located east of existing US 340 at the terminus of an unpaved lane extending off Meyerstown Road (CR 21). The dwelling is surrounded by grass, a few trees, and a number of small outbuildings. Although the dwelling is outside of the project limits, the proposed NRHP Boundary does extend into the project study area. No right of way acquisition is expected within the proposed NRHP Boundary and no visual impacts are anticipated therefore, the project will have "no effect" on the resource.

The **Bullskin Run Rural Historic District** lies predominately west of the Norfolk Southern Railroad throughout most of the project area. North of CR 340/2, the boundary abuts the existing right of way of US 340. Based on preliminary design, the remaining three build alternates will impact approximately 21.3 – 24.1 acres towards the northern end of the project adjacent to the existing US 340 alignment. This includes removal of the small bridge (a contributing element) that currently carries US 340 across Bullskin Run and removal of the 1870s tenant farmhouse at Byrdland. Alternates 4, **4A (Preferred)**, and 4B are anticipated to have no visual impacts to the District. Therefore, each of the remaining build alternates have an "adverse effect" on the Bullskin Run Rural Historic District.

Berry Hill (JF-0062-0029) is located west of the railroad near the south end of the project area. No right of way is required from this property with any of the build alternates. All the remaining build alternates will have no visual impact to the property. Therefore, each of the remaining build alternates have "no effect" on Berry Hill.

The **Beverly Farm** (JF-0326) is located at the northern end of the project area, west of existing US 340. Based on preliminary design, all the alternates will require right of way from this property ranging from 0.5 to 0.9 acres, adjacent to the existing US 340 right of way. Low visual impacts to the property are anticipated as a result of implementing any one of the remaining three build alternates. Therefore, each of the remaining build alternates have a "no adverse effect" on the Beverly Farm. It may be possible to widen the existing alignment to the east, reducing impacts within the property, although this would result in greater impacts within the Straithmore property.

The portion of the **Summit Point Battlefield** (JF-0738) within the US 340 Study Area follows the historic path of Berryville Pike, representing an avenue of troop movements and skirmishes during the Civil War. Based on preliminary design, all of the remaining alternates will require right of way from this property, ranging from 71.3 – 96.2 acres. Moderate visual impacts are

anticipated as a result of implementing any one of the remaining build alternates. Therefore, each of the remaining build alternates have an "adverse effect" on the Summit Point Battlefield.

e) Mitigation Measures for Preferred Alternate

As discussed previously, the WVDOH coordinated the effects determinations from Alternates 4, **4A (Preferred)**, or 4B with the WV SHPO and informed the Advisory Council on Historic Preservation in accordance with Section 106 of the NHPA. Mitigation measures for the Preferred Alternate are identified in a Memorandum of Agreement (MOA). Mitigation measures include the enhancement of positive effects as well as the minimization or elimination of negative effects. The MOA includes the following commitments to mitigate for adverse effects on NRHP listed and eligible resources: funding to prepare National Register of Historic Places nominations for Wayside Farm, Olive Boy Farm, Byrdland, and the Village of Rippon Historic District; funding to develop an oral history collection; funding for interpretive signs; inclusion of the project area on a History Through Highways website.

In an attempt to minimize or eliminate impacts associated with the Preferred Alternate, mitigation measures that will be incorporated during subsequent design phases and construction plan preparation may include:

- Final roadway design and engineering attempts to blend the new road into the existing topography and natural landscape.
- In the areas where the alternate is aligned with an existing road, the horizontal and vertical alignments of the existing road are followed, consistent with design criteria.
- Selective clearing of trees along the right of way is used to minimize the loss of vegetation.
- An aesthetically pleasing highway is provided, with gently rounded grassed shoulders beyond the edge of paving to enhance the view of the road and the view from the road.
- Native vegetation may be planted to screen the highway at strategic locations.

The MOA was signed by the FHWA, the WVDOH, and the Advisory Council on Historic Preservation on June 27, 2018. A copy is included in Appendix B.

C. NATURAL ENVIRONMENT

1. Geology & Terrestrial Habitats

Jefferson County, West Virginia is located in two geologic provinces, the Blue Ridge Province and the Great Limestone Valley of the Ridge and Valley Province. The project area lies within the Ridge and Valley Province, specifically in the Shenandoah Valley. The project area is underlain by extensive limestone outcrops, giving way to rolling hills with exposed rock outcrops. The foothills of the Blue Ridge Mountains are visible in the distance. Elevations in the immediate project area vary between 450 feet above mean sea level and 580 feet above mean sea level.

The project area is generally agricultural in nature with little land remaining in native vegetation. Native vegetation generally remains only along fence lines and the stream corridors within the project area.

a) Soils

The Soil Survey of Jefferson County, West Virginia identifies two general soil associations in the project area.

- The Duffield-Frankstown association, which covers the majority of the project area, consists of deep, medium-textured, dominantly nearly level to strongly sloping soils formed in material weathered from limestone and limey shale on uplands.

- The Hagerstown-Frederick-Huntington local alluvium association occurs mainly to the west of the project area with a small portion extending into the northwestern edge of the project area. This association consists of deep, medium-textured and moderately fine-textured, dominantly nearly level to moderately steep soils formed in material weathered from limestone on uplands and along drainage ways.

Specific soil types which occur in the project area are Hagerstown silt loam, Hagerstown silty clay loam, Hagerstown and Frederick cherty silt loams, Hagerstown and Frederick very rocky silt loams, Hagerstown and Frederick cherty silty clay loams, Hagerstown and Frederick very rocky silty clay loams, Huntington silt loam, Duffield silt loam, Alluvial land-marl substratum, Frankstown shaly silt loam, and Lindside silt loam within West Virginia. The specific soil types which occur within the project area of West Virginia include Timberville silt loam,

Pomplimento-Webbtown Complex-rocky, Pomplimento-Webbtown Complex, Pomplimento silt loam-rocky, and Pomplimento-Rock Outcrop Complex.

Table IV-9 summarizes the impacts to each soil type for each of the remaining build alternates.

Table IV-9: Soil Types by Alternate (Jefferson County, WV)

Soil Type (Map symbol)	**Area Within Proposed Right of Way**		
	Alt. 4 (Acres)	**Alt. 4A (Preferred) (Acres)**	Alt. 4B (Acres)
Fairplay (marl) silt loam (Fa)	3.0	**3.6**	3.8
Funkstown silt loam (Fk)	7.2	**5.7**	5.2
Hagerstown silt loam, 3 to 8 percent slopes (HbB)	23.7	**29.4**	30.0
Hagerstown silty clay loam, 8 to 15 percent slopes (HcC)	6.6	**5.6**	6.2
Hagerstown silt loam, 3 to 8 percent slopes, very rocky (HeB)	0.1	**0.3**	0.3
Hagerstown silt loam, 8 to 15 percent slopes, very rocky (HeC)	9.2	**7.5**	7.6
Hagerstown-Opeqquon-Rock outcrop complex, 15 to 35 percent slopes (HgE)	0.0	**0.0**	0.0
Hagerstown-Rock outcrop complex, 3 to 8 percent slopes (HrB)	1.0	**1.3**	1.3
Hagerstown-Rock outcrop complex, 8 to 15 percent slopes (HrC)	8.0	**3.6**	3.6
Lindside silt loam (Ln)	3.5	**3.6**	3.9
Poplimento silt loam, 3 to 8 percent slopes (PmB)	0.9	**0.0**	0.5
Poplimento silt loam, 8 to 15 percent slopes (PmC)	39.6	**41.6**	44.4
Poplimento-Rock outcrop complex, 8 to 15 percent slopes (PrC)	28.5	**37.5**	36.4
Toms silt loam (Tm)	0.2	**0.0**	0.0
Urban land-Udorthents (Uu)	4.1	**3.4**	3.2

The Soil Survey of Clarke County, Virginia also identifies two general soil associations within the project area:

- The Pomplimento-Timberville soil association occurs on uplands and consists of deep, well-drained soils that have a clayey or loamy subsoil and formed in materials weathered from interbedded limestone, shale, and siltstone or colluvium.

- The Pomplimento-Webbtown-Timberville association consists of deep or moderately deep, well-drained soils that have a clayey or loamy subsoil and formed in materials weathered from interbedded limestone, shale, and siltstone or colluvium and occurs in uplands.

(1) Land Cover

The project area is primarily rural and consists of one built subdivision, a mobile home park, a post office, a church, businesses along US 340, and scattered home sites. Open fields are the predominant land type. There are tree lines along property boundaries and some wooded areas along Bullskin Run and around Wheatland.

(2) Farmlands

Per the 2012 Census of Agriculture, collected by the US Department of Agriculture, Jefferson County contains 501 farms with an average size of 134 acres. In total, approximately 39,000 acres are devoted to harvested crops, including primarily hay (14,000 acres), corn (11,000 acres), and soybeans (7,500 acres). Countywide, 239 farms raise cattle, representing over 15,000 animals. The average market value of agricultural products sold per farm is approximately $71,000 per year.

Section 1504(c)(1) of the Farmland Protection Policy Act (FPPA) defines farmland as either prime farmland, unique farmland, farmland other than prime or unique that is of statewide importance, or farmland other than prime or unique that is of local importance. These definitions refer to areas where the soils are conducive to agricultural production, not just areas currently or historically used as farmland.

- Prime Farmland soils are those soils best suited for producing food, feed, fiber, forage, and oilseed. According to the Act, prime farmland does not include land already in or committed to urban development or water storage.

- Unique farmland is land, other than prime farmland, that has combined conditions to produce sustained high quality and high yields of specialty crops, such as citrus, nuts, fruits, and vegetables when properly managed.

- Soils of statewide importance are those soils with seasonal wetness, erosion, or drought that limit their suitability for some crops but can still produce a moderate to high yield of adaptable crops with modern farming methods.

- Other Lands are soils that are not suited for crop production without extensive management inputs. Other Lands include water storage and urban and built-up areas as well as areas that have been zoned by a local planning authority to be something other than agricultural or silvicultural.

In accordance with the FPPA and State Executive Order Number 96, an assessment was conducted for the potential impacts of land acquisition and construction activities on prime, unique, and local or statewide important farmland soils, as defined by the Natural Resource Conservation Service (NRCS).

The NRCS assigns ratings to potential farmland impacts in order to determine the level of significance of 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 scale 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 added together for a possible total rating of 260 points. Sites receiving a total score of 160 points or more are given increasingly higher levels of consideration for protection.

All of the project build alternates involve the use of prime farmland and state and locally important farmland soils. These impacts are summarized in Table IV-10 and Exhibit IV-6 graphically. In accordance with the FHWA's *Guidelines for Implementing the Final Rule of the Farmland Protection Policy Act for Highway Projects*, a Farmland Conversion Impact Rating (FCIR) assessment for corridor type projects was prepared and submitted to the NRCS. A copy of the FCIR form can be found in Appendix A. Since the alternates are similar, the scores in each of the corridors is similar, ranging from 116 to 120. Each of the project build alternates result

in a total score of less than 160 points. Therefore, in accordance with the FPPA, no further consultation is required.

Table IV-10: Farmland Impacts

	Prime and Unique Farmland (Acres)*	Statewide or Locally Important Farmland (Acres)*	Total Impact (Acres)*
Alternate 4	56.6	41.3	97.9
Alternate 4A (Preferred)	**58.5**	**45.0**	**103.5**
Alternate 4B	61.5	50.0	111.5

* Excludes areas within the existing right of way.

Registered agricultural districts add an extra level of protection for farmlands. The Clarke County Agricultural District is located near the beginning of the project in Clarke County, Virginia. If the acquisition of land from this district is in excess of one acre from any one parcel or in excess of ten acres from the entire district, a notice of intent must be filed at least 30 days prior with local authorities (Code of Virginia 15.1-1512). One 17.82 acre parcel within this district is adjacent to the project but no right of way acquisition is anticipated in Clarke County, Virginia.

2. Water Resources

a) Streams

Two perennial streams that cross US 340, including an unnamed tributary (UT) to Long Marsh Run (S-01) and Bullskin Run (S-02), and seven wetlands were found within the project study area. Just beyond the project study area to the north, a third stream, North Fork of Bullskin Run (S-03), and two wetlands were identified. All of the streams were perennial reaches that ran from west of US 340 to outlet east of the road. Table IV-11 summarizes the streams' dimensions and connectivity within the Study Area. All of the streams in the Study Area are perennial and with low slopes.

The West Virginia Division of Environmental Protection, Office of Water Resources was contacted for information on water quality within the project area. All streams in the project area are designated as Category B Waters. Category B Waters are for the propagation and

maintenance of fish and other aquatic life. There are also subcategorizations within Category B. Bullskin Run and Long Marsh Run are considered to be in Category B2, Trout Waters. Bullskin Run is stocked, January through May, in the project area. Long Marsh Run and Bullskin Run are listed in the 2016 Mussel Survey Protocols as Group 1. Group 1 streams are High Quality (HQ) streams that may contain state protected freshwater mussels. WVDOH will conduct a mussel survey of the two streams prior to construction. The tributary of Long Marsh Run does not meet the definition of Trout Waters. This stream falls under Category B3, small, non-fishable streams.

Table IV-11: Stream Characteristics

Name	Map ID	Flow	Bankfull Dimension	Natural Stream Channel within Study Area	Connectivitiy within Study Area
UT to Long Marsh Run	S-01	Perennial	2 ft wide/ 5 inches deep	258 ft upstream 126 ft between culv 150 ft downstream 534 ft	90 ft existing culvert under US 340 WB 112 ft existing culvert under US 340 EB
Bullskin Run	S-02	Perennial	15 ft wide/ 8 inches deep	1,045 ft upstream 473 ft downstream 181 ft downstream 1,699 ft	46 ft existing bridge on US 340
North Fork of Bullskin Run	S-03	Perennial	4.5 ft wide/ 6 inches deep	58 ft upstream 28 ft downstream 86 ft	335 ft existing culvert under US 340

There are no wild or scenic rivers within the project area.

According to the 2014 update of West Virginia's 303(d) list of impaired waterways, the entire length of Bullskin Run is impaired with fecal coliform and nitrite. The proposed alignment crosses Bullskin Run towards the northern end of the project near Wheatland. Virginia's 2014 update identifies Long Marsh Run in Clarke County, VA as impaired due to e. coli levels. Long Marsh Run lies south of where the US 340 widening would begin. An unnamed tributary (UNT) to Long Marsh Run in Jefferson County, WV is not listed as an impaired waterway by either state. The UNT to Long Marsh Run is located towards the southern end of the project.

Two stream reaches cross the proposed alignment. Table IV-12 summarizes the stream impacts for each of the remaining alternates, which are shown graphically in Exhibit IV-7.

- The unnamed tributary to Long Marsh Run is located in Clarke County, Virginia; no impacts to this tributary are anticipated from any of the build alternates since it crosses the existing 4-lane divided highway section.

- Alternates 4, **4A (Preferred)**, and 4B are on a similar alignment and cross Bullskin Run near the existing US 340 alignment just south of Wheatland Road.

All stream crossings are contained within box or pipe culverts located to minimize channel modifications. As necessary, channel lining is utilized to minimize erosion at the culvert ends. Possible roadway construction impacts to streams include increased sedimentation and the removal of the streamside canopy. Impacts to stream crossings will be minimized to the maximum extent possible through strict adherence to best management practices. None of the remaining alternates impact protected drinking water supplies. Best Management Practices, including erosion and sedimentation controls as well as spill prevention controls and countermeasures, should be implemented at the project site to avoid impacts to public water drinking sources.

Table IV-12: Stream Impacts

Alternate	Bullskin Run (ft)
4	578
4A (Preferred)	**743**
4B	743

b) Ponds

Three excavated ponds have been identified within the project vicinity. Pond #1 is located on the north side of CR 21. Pond #2 is located on the east side of CR 21 which turns in a northerly direction east of Pond #1. Pond #3 is located on the south side of Access Road, east of the railroad tracks. The locations of these ponds in relation to the various build alternates are

depicted in Exhibit IV-7. Alternates 4, **4A (Preferred)**, and 4B pass between the ponds and US 340 and therefore will not impact any of the three ponds identified.

c) Springs

Springs in West Virginia is a manuscript that identifies the locations of springs throughout the state and gives the characteristics of each spring. A literature search of this book identified four springs within the project area boundary. Lippett Springs is located on Olive Boy Farm and discharges 140 gallons of water per minute at a constant temperature of 54.0 degrees Fahrenheit. The Henry Baker Farm Spring, Baker Farm Spring, and the Joseph Bell Farm Spring are located along Bullskin Run. The Henry Baker Farm spring lies west of US 340 and the Joseph Bell Farm Spring lies adjacent to the east side of US 340. The Henry Baker Farm Spring discharges 160 gallons per minute at a temperature of 54 degrees Fahrenheit. The Joseph Bell Farm Spring discharges 520 gallons per minute at a temperature of 53 degrees Fahrenheit.

The locations of these springs relative to the build alternates are depicted in Exhibit IV-7. All build alternates (4, **4A (Preferred)**, and 4B) will impact the Joseph Bell Farm Spring. These alternates include construction east of existing US 340 where this spring is located. The remaining build alternates will not impact any of the other springs within the project area.

d) Ground Water

Two major types of aquifers exist in West Virginia: unconsolidated alluvial deposits and sedimentary bedrock. Ordovician and Cambrian age sedimentary bedrock aquifers consisting of sandstone, shale, and limestone underlie the majority of Jefferson County.

In its *Groundwater Programs and Activities – Biennnial Report to the West Virginia 2014 Legislature*, the West Virginia Department of Environmental Protection, Division of Water and Waste Management states:

> "Although there seems to be adequate supplies of groundwater for public and private use, industry must usually rely on other sources of water. Groundwater quantity is highly variable throughout the state. Yields range considerably, even from location to location within the same water-bearing formation. Water-bearing formations in areas of fractured limestone in the southeastern and eastern part of the state and wells drilled in alluvium along the Ohio River tend to have the greatest yields. Water-bearing formations produce from a few gallons per minute (gpm) to more than 2,300 gpm in

some sand and gravel aquifers along the Ohio River. Average yields throughout the state are around 260 gpm.

Groundwater quality is affected by human activities and can be degraded as a result of industrial waste disposal, coal mining, oil and gas drilling, agricultural activities, domestic or municipal waste disposal, transportation, and rural development. Waters sampled at the 53 locations show that background levels of parameters tested occur at concentrations far below action levels set by groundwater quality standards, with a few exceptions.

Two major concerns are the high concentrations of radon in certain watersheds and the presence of pharmaceuticals and endocrine disrupting chemicals in groundwater. Radon is a naturally occurring element found in many soils and rock types.

The discovery of the presence of pharmaceuticals and endocrine disrupting chemicals in groundwater has raised concerns regarding their effects on human health and the continued viability of antibiotic medications. Endocrine disrupting chemicals are found in a wide variety of products; their presence appears to be ubiquitous in the environment. Bioassays of fish in the Potomac River found intersex characteristics in the fish sampled. One such mutation is the presence of eggs in the testes of male fish. Another concern is the presence of certain antibiotics in ground and surface waters. As many of these compounds are known endocrine disruptors, their presence even at low concentrations warrant additional scrutiny.

The practice of land applying biosolids from waste treatment facilities and livestock operations on agricultural areas must be reevaluated in light of recent research, as these biosolids have been shown to be laden with a wide variety of pharmaceuticals, endocrine disrupting chemicals, and especially, antibiotics. At this time, more study needs to be done in this area to determine the appropriate course of action needed to address this concern."

The project does not involve large amounts of excavation that would normally affect ground water and the project will implement proper sediment and erosion control to minimize any affects to groundwater in the area.

e) Floodplains

A floodplain evaluation was conducted in accordance with Executive Order 11988, Floodplain Management, and 23 CFR Chapter 1, Subpart A. This evaluation is based on the results of the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Mapping for the project area. The community panel used to determine the 100-year floodplain boundaries is 540065 0065B in West Virginia. Exhibit IV-8 depicts the 100-year floodplain limits in relation to the build alternates.

Generally, encroachment on floodplains by structures and fill can reduce flood-carrying capacity, increase flood height and velocities, and increase flood hazards beyond encroachment itself. As part of the National Flood Insurance Program, FEMA has determined floodway boundaries as a tool for floodplain management. Based on FEMA's definition, the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that need to be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to one foot, provided that hazardous velocities are not produced. The area between the floodway and the 100-year floodplain is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water surface elevations above FEMA's published floodway elevation.

Location studies and conceptual design have taken into consideration all factors to minimize impacts to floodplains. All remaining build alternates cross the floodplain that is associated with Bullskin Run. Due to the orientation of the proposed alignments relative to the floodplain, all crossings are perpendicular or at near perpendicular angles. Alternates 4, **4A (Preferred)**, and 4B cross the floodplain near the location of the existing US 340 alignment. Table IV-13 contains the floodplain impacts for these build alternates. Alternate 4 has the least effect on floodplains with 5.1 acres of impact. Alternate 4B has the greatest impact on floodplains with 6.3 acres. The location and conceptual design of the build alternates at floodplains were carefully addressed to successfully mitigate increases in flooding risk and substantial environmental impacts. Potential impacts to the floodplains throughout the project area as a result of erosion will be mitigated through strict adherence to best management practices.

Table IV-13: Floodplain Impacts

Alternate	Floodplain Impacts
4	5.1 acres
4A (Preferred)	**6.1 acres**
4B	6.3 acres

Construction of any of the build alternates increases the amount of impervious surface area within the project area, thereby increasing stormwater runoff. The increased amount of paved surface draining into the area is very small in relation to overall drainage areas. Detailed hydraulic surveys and studies will be performed during the design phase of the project. The effect of the new roadway on stormwater discharge will be evaluated to ensure no substantial increase in downstream flooding occurs when residences are present along the stream. It is expected that backwater elevations and velocity increases at floodplain encroachments are nonexistent or minimal. Limits within which activity could take place are restricted to that necessary for the conduct of work. Under the conditions described herein, any impacts to the natural and beneficial floodplain values associated with the project are negligible.

The adopted comprehensive plan of Jefferson County, West Virginia defines floodplains as a natural resource which needs to be protected from development, deforestation, and draining or filling of wetland areas. No incompatible floodplain development is anticipated in conjunction with the no-build or build alternates.

f) Required Permits

Construction of this project along any of the build alternates require a Section 404 Dredge and Fill Permit from the US Army Corps of Engineers, a Section 401 Water Quality Certification from the West Virginia Department of Environmental Protection, Division of Water and Waste Management, and a National Pollutant Discharge Elimination System (NPDES) General Water Pollution Control Permit also from the Department of Environmental Protection. The West Virginia Erosion and Sediment Control Best Management Practice Manual has been prepared to address erosion and sediment control for earth disturbing construction activities. In Virginia, WVDOH will consult with Department of Environmental Quality (DEQ), Valley Regional Office

(VRO) to determine the need for any permits prior to commencing work that could impact surface waters and wetlands.

In Virginia, Erosion and Sediment Control Plans must be submitted to the Valley Regional Office of the Department of Environmental Quality (DEQ) for review and compliance. Furthermore, a Virginia Stormwater Management Program (VSMP) General Permit for Stormwater Discharges from Construction Activities is required. The DEQ is also responsible for this VSMP General Permit. A project specific stormwater pollution prevention plan (SWPPP) must be submitted with the registration statement under the general permit.

Coordination with the Virginia Marine Resources Commission (VMRC) may be required if the proposed design encroaches channelward of the ordinary high water along Long Marsh Run. Any jurisdictional impacts will be reviewed by VMRC during their monthly Interagency Coordination Meetings.

3. Wetlands

Wetland environs are described by the USACE (33 CFR 328.3) and the EPA (40 CFR 230.3) and jointly defined as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The 1987 *Corps Wetland Delineation Manual* (1987 Manual) defines wetlands as those areas that have a predominance of hydrophytic vegetation, exhibit characteristics of wetland hydrology, and contain hydric soils (Environmental Laboratory, 1987).

Wetland determinations were made following the Routine Determination Method, as described in the 1987 Manual (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE, 2010).

At each sample location, standard methods described in the Routine Determination Method were used to determine presence of hydrophytic vegetation, hydric soils, and wetland hydrology indicators (Environmental Laboratory, 1987). If all three parameters were present, the site was determined to be a wetland, and a Routine Wetland Determination form was completed. For comparison purposes, the adjacent non-wetland or upland area was sampled, and a Routine Wetland Determination form was completed to document the characteristics of

the upland area. Routine Wetland Determination forms and photographs of each wetland are included in AppendixA of the *US 340 Four-Lane Improvement VA Line to Charles Town Bypass Preliminary Jurisdictional Determination Report* (Michael Baker, Jr., Inc. – June 2017).

Wetland boundaries were recorded with a mapping grade differential Global Positioning System (GPS)and overlain on digital base mapping from which acreage was calculated. Additional wetland forms were completed to comply with the Manual. The wetland boundaries were transferred onto project mapping to calculate anticipated wetlands impacts.

Two small wetlands, W-03 and W-04, abutted S-03 at either end of the culvert under US 340 (Exhibit IV-7). W- 03 and W-04 were small, emergent (PEM) wetlands dominated by reed canary grass (Phalaris arundinacea) with hydric silt loam soils in the 10 YR 2/2 to 3/1 range. These wetland systems are beyond the limits of the US 340 Improvements project.

The remaining seven wetlands abut S-02. Wetlands W-05, W-06, W-07, W-08, W-02 and W-01 were all east of US 340. W-09 abutted S-02 west of US 340 (Exhibits IV-7 and IV-9). W-09, comprised of an emergent (PEM) portion (W-09a) and a forested (PFO) portion (W- 09b) abutted S-02 north of US 340 (Exhibit IV-7). The emergent (PEM) portions of the S-02 wetlands, W-01a, W-07a, W-05a, and W-09a, were dominated by jewelweed (Impatiens capensis), sweet flag (Acorus calamus), and field horsetail (Equisetum arvense) with some fox sedge (Carex vulpinoidea) and reed canary grass. Canopies in forested (PFO) portions of W-02b, W-09b, and W-07b were dominated by sugar maple (Acer saccarhum) and box elder maple (Acer negundo). Scrub Shrub (PSS) portions of W-01b and W-05b were dominated by black willow (Salix nigra) with some young box elder maple. All of the wetlands abutting S-02 had hydric silt loam soils dominated by 10 YR 3/1 or 3/2 matrices.

a) Project Impacts

Table IV-14 summarizes the impacts to each wetland by each build alternate.

Because the wetland systems within the project area are linear and generally perpendicular to the project, avoidance of all wetland areas is not practical. Minimization of wetland impacts was incorporated into the engineering studies for this project. Wetland areas were mapped and given consideration during the development of alternate alignments. The linear wetlands found in the project area were crossed at perpendicular or near perpendicular angles to minimize impacts. The acreage of wetlands provided are those within the proposed right of

way. During final design of the Preferred Alternate, further efforts to minimize impacts to wetlands will be reviewed. Any wetland resources impacted by the Preferred Alternate will be assessed in accordance with the US Army Corps of Engineers' Eastern Mountain and Piedmont Supplement to the 1987 delineation manual.

Conceptual mitigation for unavoidable wetland impacts typically involves enhancement and/or replacement. One option for enhancement of the existing streams in the area is replanting the banks adjacent to the streams with indigenous species. In many areas, little vegetation remains along the streams due to the surrounding agriculture. Replacement of wetland losses is accomplished adjacent to streams with minimal excavation, followed by planting with indigenous wetland species. Any compensatory mitigation will comply with the 2008 *Final Rule on Compensatory Mitigation* established by the EPA and US Army Corps of Engineers.

Table IV-14: Wetland Impacts by Alternate

Map ID	Cowardin Class.*	Wetland Area (Acres)	Alternate 4 (Acres)	Alternate 4A (Preferred) (Acres)	Alternate 4B (Acres)
W-01	PEM, PES	0.240	- -	**- -**	- -
W-02	PEM, PFO	0.040	0.001	**- -**	- -
W-03	PEM	0.002	- -	**- -**	- -
W-04	PEM	0.014	- -	**- -**	- -
W-05	PEM, PSS	0.140	0.140	**0.140**	0.140
W-06	PEM	0.002	0.002	**0.002**	0.002
W-07	PEM, PFO	0.120	0.081	**0.050**	0.097
W-08	PEM	0.130	0.130	**0.086**	0.119
W-09	PEM, PFO	0.260	- -	**0.049**	0.049
Totals			0.354	**0.327**	0.407

*Cowardin Classification: Palustrine Emergent (PEM), Palustrine Scrub Shrub (PSS), and Palustrine Forested (PFO)

4. Wildlife

Deer (*Odocoileus virginianus*) and a variety of small mammals such as raccoons (*Procyon lotor*), gray squirrels (*Sciurus carolinensis*), opossums (*Didelphis virginiana*), skunks (*Mephitis*

mephitis), mice (*Peromyscys* spp.), shrews (*Sorex* spp.) and moles (*Scalopus aquaticus*) are likely to exist within the project area. A variety of birds are also likely to be seen in the area including warblers (*Dendroica* spp.), sparrows (*Ammodramus* spp., *Ammospiza* spp., *Spizella* spp.) woodpeckers (*Dryocopus pileatus*, *Melanerpes* spp., *Picoides* spp.), vireos (*Vireo* spp.), ovenbirds (*Seiurus* spp.), thrushes (*Hylocichla mustelina*, *Catharus* spp.), blackbirds (*Agelaius phoeniceus, Euphagus carolinus*), grackles (*Quiscalus* spp.), and starlings (*Sturnus vulgaris*). Reptiles which may occur in the project area include rattlesnakes (*Sistrurus miliarius, Crotalus* spp.), garter snakes (*Thamnophis* spp.), rat snakes (*Elaphe* spp.), water snakes (*Nerodia* spp.), copperheads (*Agkistrodon contortrix*), box turtles (*Terrepene carolina*), and painted turtles (*Chrysemys picta*). Common amphibians such as toads (*Bufo* spp.) and frogs (*Hyla* spp., *Acris* spp., *Pseudocris* spp., *Rana* spp.) can also be expected.

The project area is dominated by large agricultural fields with large residential lots and some commercial properties scattered along existing US 340. For a majority of its length, there is existing fencing at the existing right of way line on one side of US 340 or the other or both. While many of the smaller mammals, reptiles, and amphibians can likely cross through the type of fencing that exists, the larger mammals may not, although the deer, in all likelihood, can leap over the fencing. It is anticipated that fencing will be replaced at the proposed right of way line following construction of the new 4-lane, median divided facility.

Communication with USFWS and the USACE did not mention the need for special consideration of wildlife passage within the project area. The impediment that the existing fencing may or may not present to wildlife for crossing US 340, will be similar in the post-construction environment. Where the existing bridge that carries US 340 over Bullskin Run, a replacement structure will be designed to allow for the passage of aquatic life. This replacement structure may take the form of a bridge, a 3-sided culvert, or a box culvert with a buried base.

a) Threatened and Endangered Species

Under federal law, any action which is likely to result in a negative impact to federally protected plants or animals is subject to review by the US Fish and Wildlife Service (USFWS), under one or more provisions of the Endangered Species Act (ESA) of 1973. Section 7 of the ESA states that "each federal agency shall … ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of

[critical] habitat of such species…" (50 CFR 420.07 a (2)). This requirement means that federal agencies are required to consider two main issues during Section 7 consultation with respect to a threatened and endangered species: (1) whether the proposed action is likely to jeopardize the continued existence of the species, and (2) whether the proposed action would destroy or adversely modify designated "critical habitat" for that species. If the federal agency finds, based on a Biological Assessment, that an action is not likely to adversely affect a species and the USFWS concurs with that finding, then it is presumed that the action will not jeopardize the species and the Section 7 consultation is concluded.

A letter was sent by WVDOH to USFWS in December 2015 to request updated information on threatened and endangered species for Jefferson County, WV. The USFWS reply letter, dated December 22, 2015 confirmed that there are three species listed for Jefferson County, WV. These species are identified below along with a biological assessment for each species. Email correspondence with USFWS dated August 28, 2018 stated there are no new occurrences in Jefferson County and since there are no changes to the project, the concurrence is still valid (see Appendix B). The biological conclusions from the letter are restated below. For the full biological assessment, please refer the December 22, 2015 letter in Appendix B.

Indiana bat **Biological Conclusion: Not Likely to Adversly Affect**

Because the project 1) will affect less than 17 acres of potential bat foraging or roosting habitat, 2) is not within bat hibernacula or summer use buffers, and 3) will not affect any caves or mines that could be used as a hibernacula, the project is not likely to adversely affect Indiana bat.

Northern long-eared bat **Biological Conclusion: Not Likely to Adversly Affect**

Because the project 1) will affect less than 17 acres of potential bat foraging or roosting habitat, 2) is not within bat hibernacula or summer use buffers, and 3) will not affect any caves or mines that could be used as a hibernacula, the project is not likely to adversely affect the Northern long-eared bat.

Madison Cave Isopod **Biological Conclusion: Not Likely to Adversly Affect**

The Service received results of the Phase I surveys for MCI on October 9, 2011, and Phase II survey results were carried out by Wil Orndorff, an expert on MCI and karst

habitats, on December 15, 2014. As a result of these efforts, the Service concurred that the project may effect, but is not likely to adversely affect MCI in a letter on June 1, 2015. The concurrence has not changed.

In Virginia, the Gaylord Calcareous Marsh Conservation Site is located within 2 miles of the project site. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity ranking based on the rarity, quality and number of element occurrences they contain; on a scale of 1-5 with 1 being the most significant. Gaylord Calcareous Marsh Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. For more information, refer to the Virginia Department of Conservation and Recreation's (DCR) letter dated August 24, 2016 in Appendix B.

To minimize impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of, and strict adherence to, applicable state and local erosion and sediment control/stormwater management laws and regulations as discussed in Section IV.C.2.f.

According to the Virginia Department of Game and Inland Fisheries (VDGIF), Loggerhead shrikes have been documented adjacent to the project area. The Loggerhead Shrike is a State-listed species classified as "threatened" with records throughout most of the state with a current stronghold in the Shenandoah Valley. It usually nests, forages, and perches in open fields and pastures where there are scattered trees for nesting and utility poles or fences for perching. Essential habitat requirements include open country with scattered trees or shrubs and conspicuous perches. A thorny shrub, such as hawthorn, is a favored nesting site. Loggerhead shrikes sometimes impale their food on thorny shrubs, barbed wire fences, and other suitable objects to be eaten later or to feed their young.

Threats to the Loggerhead shrikes include loss of open habitats through reforestation and conversion to cropland, and removal of hedgerows. They may experience negative impacts from insecticide use and predation.

Due to the legal status of the Loggerhead shrike in Virginia, WVDOH will coordinate with the Virginia Department of Game and Inland Fisheries to ensure compliance with the Virginia Endangered Species Act.

5. Visual Characteristics

a) Existing Visual Environment

Lying in the Shenandoah Valley, the project area is underlain by extensive limestone outcrops, giving way to rolling hills with exposed rock outcrops. The foothills of the Blue Ridge Mountains are visible in the distance. Elevations in the immediate project area vary between 450 feet above mean sea level and 580 feet above mean sea level. Although most of the area has been cleared for agriculture, some natural vegetation still exists. Deciduous trees and some evergreen trees are present throughout the project area, primarily along fence lines. Seasonal vegetation exists on farmed lands in the form of row crops. Fruit orchards also occur within the project vicinity.

Throughout the project area, the landscape has been altered by development. Lands bordering US 340 have been cleared for row crops, orchards, livestock grazing, and light residential and commercial development. The Norfolk Southern Railroad parallels US 340 to the west. Above ground utility lines are located throughout the area. There are seven billboards along the existing roadway in the project area.

The project area is rural with sporadic development concentrated around the communities of Rippon and Wheatland. Development consists mainly of residential properties and farm complexes. Some commercial properties exist along the project area, consisting of a few restaurants and small businesses.

Approaching the project area from the south, US 340 is a four-lane divided facility. Prior to crossing into West Virginia, the four-lane roadway transitions to a two-lane facility. Continuing north on US 340, travelers pass the Rainbow Road Club, a seasonal produce stand, John's Family Restaurant, Chapman's Trailer Park, and B & G Painting. Along US 340 in the community of Rippon are private residences, a church, old storage buildings, the Rippon Grocery, an antique store, the Rippon Post Office, St. John's Episcopal Church, and the entrance to the historic Ripon Lodge. Development immediately north of Rippon is sparse and consists of single-family homes and farms. As US 340 continues north, it passes through the community

of Wheatland where Dave's Auto Service, the Rainbow Diner Truck Stop, Thomas B. Kern, Inc., and a seasonal produce stand are located adjacent to the road. Leaving the project area, the two-lane US 340 transitions back to a four-lane facility and continues north through Jefferson County.

b) Visual Impacts

The introduction of any large facility in an area alters the local perception of the visual environment. A location may be deemed visually sensitive for its visual quality, uniqueness, cultural importance, and viewer characteristics. According to FHWA Guidelines, high visual quality is obtained when area landscape components have impressive characteristics that convey visual excellence. Striking landscapes are not limited to the natural environment and can be associated with urban areas as well. Visual quality is subjective in that it is also determined by a viewer's perception of an area.

A field review was conducted in order to investigate the area for its overall visual quality. The review did not yield any significant findings of special or unique natural areas, officially designated recreation areas, or officially designated scenic overlooks within the immediate project area. The open fields and rolling terrain are characteristic for much of Jefferson County. US 340 throughout the county has been identified in the Jefferson County Comprehensive Plan by the Jefferson County Parks and Recreation Commission as a scenic route due to its historical significance and scenic quality for various points along the roadway. However, no publicly accessible historic sites are located within the project area. Four historic districts and several private historic properties do exist within the project area. These properties were investigated further for their visual sensitivity.

A rating scale was used to qualify the relative degree of project impact based on the importance of the visual resource, existing landscape, sensitivity of the viewer, and the visual contrast imposed by an improved facility to the existing visual surroundings. The ratings are characterized as follows:

- No Impact - The view of the proposed action has minor implications to the existing landscape or there is no impact at all.

- Low Impact - The view of the project is limited, the visual resource is limited in importance, there are dominating visual intrusions in the viewshed from other sources,

or there is a weak visual contrast between the facility and the landscape. If any of the proposed actions are closer to the resource than the existing facility, but do not necessarily create a visual impact, per se, due to visual intrusions, it has been rated as having a low impact.

- Moderate Impact - The view of the proposed action is a moderate intrusion into the visual environment with greater contrast than the low impact but not as great as a high impact.

- High Impact - The proposed action is in close proximity and highly visible to viewers, has a strong contrast with the landscape, is in an area of importance with limited visual intrusions, or involves substantial viewer sensitivity.

Based on these definitions, each visually sensitive historic site was evaluated for visual impacts associated with each of the build alternates. Table IV-15 summarizes the degree of impact from Alternate 4 to each visually sensitive resource. Due to the similarity of design alignments and relative proximity to the historic resources, visual impacts for all of the remaining build alternates would be similar.

Existing US 340 extends through the **Long Marsh Run Rural Historic District** in Clarke County, Virginia, which is noted for its remarkably unaltered and picturesque rural land. The proposed improvements for the build alternates will remain within the existing right of way. There will be no grade or elevation changes made to US 340 in this area. The visual change for this area will include the modification of the existing two-lane roadway to a new four-lane divided roadway, and this change will occur at the at the same location as existing US 340 within existing right of way. All alternates are evaluated as having a low visual impact to this historic resource.

The **Kabletown Rural Historic District** is characterized by rich well-drained limestone soils over rolling terrain with several springs and two fairly large streams. The combination of hills and open land interspersed with forestland as well as the dramatic eastern backdrop of the Blue Ridge Mountains provides many varied and spectacular vistas of a true rural countryside. These natural landscape elements are further complimented by cultural features such as farms, crossroads, roadbeds, tree lines, hedgerows, field patterns, and fences. Existing US 340 currently provides a two-lane road extending north to south through the western edge of this

district. A majority of the large farms and country estates contributing to the pristine agricultural landscape are located east of existing US 340. Alternates 4, **4A (Preferred)**, and 4B are located east of US 340. These alternates introduce a visual intrusion into the agricultural landscape by dividing this landscape from some of the other contributing elements, such as Wayside Farm and the Village of Rippon, by a new four-lane roadway. Alternates 4, **4A (Preferred)**, and 4B are considered to have a moderate visual impact on the district.

Currently, US 340 is a two-lane road through the Village of Rippon Historic District, a rural hamlet dating to the late 19th and early 20th centuries. Improvements would route traffic east of the village. Alternates 4, 4A (Preferred), and 4B have a moderate impact to the visual environment looking east of the village because of the close proximity of the alignments to the village and the contrast of the new facility with the existing landscape.

Table IV-15: Visual Impact Rating

Resource Name (WV HPI #)	Impact Rating
Long Marsh Run Rural HD (various)	Low
Kabletown Rural HD (various)	Moderate
Village of Rippon HD (various)	Moderate
St. John's Episcopal Church (JF-0062-0049)	Low
William Grubb Farm (JF-0005)	No
Olive Boy Farm (JF-0062-0006)	Low
Glenwood (JF-0062-0011)	Moderate
Wayside Farm (JF-0062-0012)	Moderate
Ripon Lodge (JF-0062-0015 et al)	Low
Byrdland (JF-0061-0016)	Moderate
Straithmore (JF-0062-0019 et al)	Low
Norfolk Southern Railroad (JF-1228)	No
McPherson-Adams House (JF-1225)	No
Bullskin Run Rural HD (various)	No
Berry Hill (JF-0062-0029)	No
Beverley Farm (JF-0326)	Low
Summit Point Battlefield (JF-0738)	Moderate

St. John's Episcopal Church (JF-0062-0049) is located along the east side of existing US 340 just north of the US Post Office near Rippon, WV. The building is a contributing element of the Village of Rippon Historic District. Alternates 4, **4A (Preferred)**, and 4B are located east of the existing US 340 alignment. The property will not be directly impacted by land acquisition. There will be a buffer of trees, shrubs, and out buildings between the church and the proposed US 340 facility, therefore visual impacts are anticipated to be low.

The **William Grubb Farmhouse** (JF-0005) dates back to 1763 with additions throughout the house's existence. The house is a rare vernacular building type that combines a stone end with log construction. A barn with a silo, a corncrib, a well house, a chicken coop, and a studio are included on the property. From the front of the main house, the existing US 340 is not visible because of the natural topography and vegetation. Alternates 4, **4A (Preferred)**, and 4B are located about 1,450 feet east of the Grubb Farm. Each remaining build alternate has been evaluated as having no impact due to the fact that they are east of existing US 340 and any view of the facility is obstructed.

The **Olive Boy Farm** (JF-0062-0006) is located along CR 38 (Smith Road), east of existing US 340. This Italianate style house is believed to have been constructed in the 1840's. In addition to the main house, there are several outbuildings including a kitchen/slave quarters, springhouse, barn, and tenant house. A family cemetery dating to the 1850's is also located on this farm. The main residence is at an elevation of 500 feet above mean sea level. To the west, the topography varies slightly and gently slopes down towards a tributary to Long Marsh Branch and gradually rises back up to existing US 340. To the east, the topography generally slopes down from 500 feet above mean sea level to 475 feet above mean sea level. Looking east from the back of the house, the viewshed includes a tributary to Long Marsh Run and pastures. Alternates 4, **4A (Preferred)**, and 4B will traverse the western most edge of the property and lie approximately 1,300 feet west of the historic house. A clear view of Alternates 4, 4A, and 4B are obstructed due to the existing landscape. Visually, these alternates have been evaluated as having a low impact to the property based on their close relationship to the existing facility. This evaluation is based on the visibility of the facility and the contrast between the existing landscape and the new facility.

Glenwood (JF-0062-0011) is located south of the community of Rippon on the east side of US 340. The property consists of a main residence and several outbuildings, dating back to 1844. The Glenwood property is at an elevation of approximately 500 feet above mean sea

level. Looking west from the front yard of Glenwood, the terrain varies in elevation by about 10 feet. A clear view of existing US 340 is obstructed by trees and shrubs. Looking east, the terrain levels out and mountains are present in the background. Alternate 4 lies approximately 950 feet west of Glenwood. Alternates **4A (Preferred)** and 4B lie approximately 1,200 feet west of the house. Alternates 4, 4A, and 4B have been evaluated as having a moderate impact to the property. This evaluation is based on the close proximity of each alternate to the property and the contrast of the new facility with the existing landscape.

The **Wayside Farm** (JF-0062-0012) main residence was originally built in 1816 with later additions in 1829 and 1880. Other buildings located on the farm are a meathouse, stone milk house, early to mid-nineteenth century log slave quarters/kitchen, a late-nineteenth century timber-framed bank barn on a stone foundation, a late-nineteenth century corncrib, a frame workshop dating to about 1900, and a modern chicken coop. The main residence is at an elevation of approximately 500 feet above mean sea level and faces southwest. Alternates 4, **4A (Preferred)**, and 4B lie to the west of the house, approximately 400-500 feet away at an elevation of 510 feet above mean sea level and impose upon the existing landscape as seen from the house. Based on the close proximity to the property and the degree of contrast of this facility with the landscape, these alternates have been evaluated as having a moderate impact on the visual environment.

The **Ripon Lodge** (JF-0062-0015 et al) is one of the most prominent properties within the area. The lodge (now a private residence) dates back to 1833; the property also has many nineteenth and early-twentieth century outbuildings. The Ripon Lodge is situated at an elevation of about 540 feet above mean sea level. The surrounding landscape consists of gentle hills, with variations in elevation of about 5 feet, and planted trees and shrubs. Surrounding land is used for grazing livestock and other agricultural purposes. The lodge faces east, towards existing US 340, and is approximately 1,700 feet west of the existing roadway. Alternates 4, **4A (Preferred)**, and 4B are located east of existing US 340 by 1,600 feet to 2,100 feet. All of these alternates disturb the existing landscape and are somewhat visible from the Ripon Lodge because of open fields associated with this portion of the project area. As a result, these alternates have been evaluated as having a low impact to the perceived visual environment.

Byrdland (JF-0061-0016) was constructed between 1830 and 1850. The property consists of a large I-house of log construction with stucco cladding and many outbuildings that date the late 1800's and early 1900's. The property is located on a hill surrounded by mature trees. The

main residence is situated at an elevation of about 525 feet above mean sea level and faces west towards the existing US 340. It is approximately 750 feet east of the existing roadway. However, US 340 is barely visible due to varying elevations and existing vegetation. All of the proposed alignments lie west of the main house. Alternates 4, **4A (Preferred)**, and 4B transect the western edge of the historic boundary of the property. The natural characteristics of the land surrounding the main house preclude a clear view of the existing alignment; however, the introduction of a four-lane facility within the historic boundaries will have some visual implications. For this reason, these build alternates have been evaluated as having a moderate visual impact to the Byrdland property.

Straithmore (JF-0062-0019 et al) is a Federal-style house and is believed to have been constructed in 1827. Also located on the property are the ruins of a stone mill and other stone and wood remnants from various outbuildings. The house faces west and is situated on top of a hill that grades down to Bullskin Run. US 340 currently lies about 1,150 feet west of the main house. The topography between the house and the roadway varies in elevation. This undulating terrain makes it difficult, if not impossible, to see the existing roadway. Alternates 4, **4A (Preferred)**, and 4B are in the same approximate location along existing US 340 in this area of the project. Since the alternates will introduce a modern four-lane roadway along the historic boundary, Alternates 4, 4A, and 4B have been evaluated as having a low impact to the visual environment of this property.

The **Norfolk Southern Railroad** (JF-1228), completed in 1882, is located west of existing US 340, extending the length of the project area. The railroad elevation ranges from 525 feet at the south end to 520 feet at the northern end of the project area. Alternates 4, **4A (Preferred)**, and 4B are located at a minimum of 400 feet east of the railroad, will not require any right of way, and are considered to have no visual impacts to the railroad right of way.

The **McPherson-Adams House** (JF-1225) is located east of existing US 340 at the terminus of an unpaved lane extending off Meyerstown Road (CR 21). The dwelling is surrounded by grass, a few trees, and a number of small outbuildings. Although the dwelling is outside of the project limits, the proposed NRHP boundary does extend into the project study area. No right of way acquisition is expected within the proposed NRHP boundary and no visual impacts are anticipated.

The **Bullskin Run Rural Historic District** includes an outstanding collection of historic buildings that illustrate the growth and development of the area from the mid-1730s up to the mid-twentieth century. The majority of resources are farm and estate dwellings and their associated outbuildings. Also included are mills, cemeteries, churches, a school, a tavern, and other historic resources that further develop and illustrate Jefferson County's history. The district encompasses approximately 21 square miles, predominantly west of the existing Norfolk Southern Railroad. A portion of the eastern end of the district surrounds the community of Wheatland and extends across existing US 340. Alternates 4, **4A (Preferred)**, and 4B are anticipated to have no visual impact to the district since existing US 340 already extends through the district.

Berry Hill (JF-0062-0029) is a fine example of a circa 1800 stone Federal-style dwelling. This property is located west of the Norfolk Southern Railroad in the vicinity of Franklintown. The house sits at an elevation of 570 feet and is approximately one mile from existing US 340. Alternates 4, **4A (Preferred)**, and 4B will have no visual impact to the property because they are located near the existing US 340 alignment.

The **Beverly Farm** (JF-0326) is one of the finest Federal-style brick dwellings within the Bullskin Run Rural Historic District. The house sits at an approximate elevation of 500 feet. A large fill slope was located next to this property when existing US 340 was constructed. Existing US 340 is the eastern boundary for the Beverly Farm and is at an elevation of 520 feet. Alternates 4, **4A (Preferred)**, and 4B will connect with existing US 340 just south of the property and extend to the four-lane section of US 340 at CR 340/3. These alternates are considered to have a low impact on the property.

The portion of the **Summit Point Battlefield** (JF-0738) within the US 340 Study Area follows the historic path of Berryville Pike, representing an avenue of troop movements and skirmishes during the Civil War. Based on preliminary design, all of the remaining alternates will require right of way within this resource, ranging from 71.3 – 96.2 acres. Moderate visual impacts are anticipated as a result of implementing any one of the remaining build alternates.

c) Mitigation

In compliance with the FHWA's Guidelines with respect to the visual environment, mitigation measures will be addressed for the visual effects of the Preferred Alternate on the project area.

The remaining build alternates are not anticipated to have any high rating visual effects to the project area. However, there are moderate visual impacts anticipated to the Kabletown Rural Historic District, Village of Rippon Historic District, Glenwood, Wayside, Byrdland, and the Summit Point Battlefield. Low visual impacts are anticipated for Long Marsh Run Historic District, St. John's Episcopal Church, Olive Boy Farm, Ripon Lodge, Straithmore, and Beverly Farm.

Mitigation includes the enhancement of positive effects as well as the minimization or elimination of negative effects. In an attempt to minimize or eliminate impacts associated with the Preferred Alternate, the following mitigation measures will be incorporated, as appropriate, during final design:

- Final roadway design and engineering attempts to blend the new road into the existing topography and natural landscape.
- In the areas where the alternate is aligned with an existing road, the horizontal and vertical alignments of the existing road are followed, consistent with design criteria.
- Selective clearing of trees along the right of way is used to minimize the loss of vegetation.
- An aesthetically pleasing highway is provided, with gently rounded grassed shoulders beyond the edge of paving to enhance the view of the road and the view from the road.
- Where practical, use native vegetation to screen the highway at strategic locations.

6. Noise

The noise impacts for the proposed improvements have been assessed in accordance with FHWA regulations published in 23 CFR, Part 772, and the WVDOH *Traffic Noise Policy*, July 13, 2011.

There are two types of traffic noise impacts: Noise Abatement Criteria and substantial increase.

The Noise Abatement Criteria (NAC) established by Part 772 and listed in Table IV-16, represents the noise level at which noise abatement must be considered. The NAC apply to areas having regular human use and where lowered noise levels are desired. They do not apply

to the entire tract of land on which the activity is based, but only to that portion where the activity takes place. The NAC are given in terms of the A-weighted, hourly equivalent sound level in decibels or dB(A).

Table IV-16: Noise Abatement Criteria

Activity Category	Leq (h)[1] dB(A)[2]	Description of Activity
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B [3]	67 (Exterior)	Residential
C [3]	67 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studies, trails and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studies
E [3]	72 (Exterior)	Hotels, motels, offices, restaurants/bars and other developed lands, properties or activities not included in A-D or F.
F	----	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	----	Undeveloped lands that are not permitted

Source: *FHWA 23 CFR 772*

1 The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same period of time, with Leq(h) being the hourly value of Leq.

2 The Leq(h) activity criteria values are for impact determination only, and are not design standards for noise abatement measures.

3 Includes undeveloped lands permitted for this activity category.

The noise impact assessment is made using the criteria listed in Table IV-16. If, for a given activity, the design year noise levels "approach or exceed the NAC", then the activity is impacted and a variety of abatement measures must be considered. The WVDOH has defined "approach" as one decibel less than the NAC.

The Federal guidelines provide a second criterion for assessing impact. For some locations, a project may impose a large increase in noise levels over base year levels, although the levels may not reach the NAC. The WVDOH *Traffic Noise Policy* defines the "substantial increase" as 15 dB(A) or greater between the base year and design year.

When traffic noise impacts are identified, noise abatement measures shall be considered for feasibility and reasonableness and may include traffic management measures, alteration of horizontal and vertical alignments, establishment of buffer zones, noise insulation for Activity Category D land uses, and the construction of noise barriers. The final decision to construct noise abatement measures will be made upon completion of the project design and the public involvement process.

a) Characteristics of Noise

Noise is defined as unwanted or irritating sound. It is emitted from numerous sources, including airplanes, factories, railroads, animals, construction activity, trucks and automobiles. On-road vehicle noise is primarily comprised of noises from engine exhaust, drive train, and the tire/roadway interaction. Of these sources, tire/roadway noise is typically the most offensive at highway travel speeds.

The magnitude of noise is usually described by its sound pressure. Because the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference pressure, yielding the sound pressure level. Sound pressures levels are expressed in units of decibels (dB) and are often modified by frequency-weighted scales (e.g., A- or C-weighted scales). Table IV-17 presents some common noise sources and their corresponding dB(A) measures.

The A-weighted scale is used almost exclusively when measuring vehicle noise because it places a stronger emphasis on the frequency range to which the human ear is most sensitive (approximately 1,000-6,000 hertz). Sound levels filtered with the weighted A- weighted scale are often expressed as dB(A). Throughout this discussion, noise levels are expressed in dB(A).

Since most environmental noise fluctuates from moment to moment, it is common practice to condense all of this information into a single number called the equivalent sound level (Leq). The Leq is the value of a steady sound level that represents the same sound energy as the actual time-varying sound levels evaluated over the same period. For highway traffic noise assessment, Leq

is typically evaluated over a one hour period, and is denoted as Leq(h). Throughout this report, all noise levels are expressed in a one hour equivalency.

Table IV-17: Common Indoor and Outdoor Noise Levels

Common Outdoor Noise Levels	Noise Level dB(A)	Common Indoor Noise Levels
	110	Rock Band
Jet Flyover at 1000 feet	100	Inside Subway Train (NY)
Gas Lawn Mower at 3 feet		
Diesel truck at 50 feet	90	Food Blender at 3 feet
Noisy Urban Daytime	80	Garbage Disposal at 3 feet
Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher in the Next Room
Quiet Urban Nighttime	40	Large Conference Room
Quiet Suburban Nighttime		Library
	30	
Quiet Rural Nighttime		Bedroom at Night
	20	
		Broadcast and Recording Studio
	10	
	0	Threshold of Hearing

Adapted from the *Guide on Evaluation and Attenuation of Traffic Noise*, American Association of State Highway and Transportation Officials (AASHTO). 1974 (revised 1993).

b) Measurement of Existing Noise Levels

The two most commonly used methods of obtaining noise levels for existing conditions are by computer modeling and field measurements. Computer modeling is feasible only when the predominant noise source is vehicular traffic. In situations where traffic is not the primary noise source, field measurement (noise monitoring) is the accepted method for determining the existing ambient noise level.

Noise monitoring was performed in October 2014 along the project alternatives with a Larson-Davis Model 824 Type I Sound Level Meter. Sixteen measurements were taken over a span of three days. Noise measurement levels ranged from 49.2 dB(A) to 64.5 dB(A).

The data collected was used in the validation of the noise model. The model is considered validated if the measured noise levels and the predicted noise levels for the existing condition are within +/- 3 dB(A).

The noise measurements validated use of the FHWA Traffic Noise Model, Version 2.5 (TNM) as appropriate for use in determining the traffic generated noise levels. The model accounts for such factors as ground absorption, roadway geometry, receptor distance, existing buildings, topography, vehicle volumes and speeds, and volumes of medium trucks (vehicles with 2 axles/6 tires) and heavy trucks (3 axles or more). All of the measurements were validated except for one: FM 21 was taken at a distance from any traffic noise source and where the dominant noise was non-traffic sources such as insects, sporadic vehicle traffic, air planes and other natural phenomena.

c) Predicted Existing Noise Levels

Traffic noise emissions are composed of several variables, including the number, types, and travel speeds of the vehicles, as well as the geometry of the roadways on which the vehicles travel. Additionally, variables such as weather and intervening topography affect the transmission of traffic noise from the vehicles to noise sensitive receptors.

In accordance with industry standards and accepted best practices, detailed computer models were created using the FHWA TNM 2.5. The computer models were validated to within acceptable tolerances of field-monitored traffic noise data, and were used to predict traffic noise levels for receptor locations in the vicinity of the proposed project. Sporadic traffic noises such as horns, squealing brakes, screeching tires, etc. are considered aberrant and are not included within the predictive model algorithm. Traffic noise is not constant; it varies in time depending upon the number, speed, type, and frequency of vehicles that pass by a given receptor. Furthermore, since traffic noise emissions are different for various types of vehicles, the TNM algorithm distinguishes between the source emissions from the following vehicle types: automobiles, medium trucks, heavy trucks, buses, and motorcycles, as shown in Table IV-18. The computer traffic noise prediction model uses the number and type of vehicles on the planned roadway, vehicle speeds, the physical characteristics of the road (curves, hills, depressions, elevations, etc.), receptor location and height, and, if applicable, barrier type, barrier ground elevation, and barrier segment top elevations.

Table IV-18: Traffic Noise Model (TNM) Vehicle Classification Types

TNM Vehicle Type	Predicted Design-Year Noise Level Increase[2] Leq(h)
Autos	All vehicles with two axles and four tires, including passenger cars and light trucks, weighing 9,900 pounds or less
Medium Trucks	All vehicles having two axles and six tires, weighing between 9,900 and 26,400 pounds
Heavy Trucks	All vehicles having three or more axles, weighing more than 26,400 pounds
Buses	All vehicles designed to carry more than nine passengers
Motorcycles	All vehicles with two or three tires and an open-air driver / passenger compartment

Sources: FHWA *Measurement of Highway-Related Noise*, § 5.1.3 Vehicle Types.
FHWA *Traffic Monitoring Guide*, § 4.1 Classification Schemes

Noise levels in this study have been determined for base year (2011/2012) existing conditions and the design year (2033) build and no-build conditions. Table IV-19 presents a summary of the existing ambient noise measurements along with corresponding predicted values from the computer model, based on the traffic data collected during the noise monitoring. The location of these Noise Monitor Sites are shown on Exhibit IV-10. At the 16 locations where the predominant noise source is from vehicular traffic, the predicted values, obtained from the computer model, were all within 3 dBA's of the measured values.

Table IV-19: Ambient Noise Levels

Noise Monitor Site No.	Site Description	Distance to US 340 (feet)	Measured Ambient (dBA)	Predicted Value (dBA)
FM01	Residence off US 340 / Oakland Ln	70	64.5	63.5
FM02	Residence off Shepherd's Mill Rd	860	52.4	53.2
FM03	Residence off US 340 behind Rainbow Road Club	125	64.3	62.1
FM04	Residence off US 340 / Lewisville Rd	135	61.8	62.5
FM05	Residence off US 340 north of Scooter Ln	280	55.7	55.4
FM08	Residence off Jenkins Hill Rd	760	49.2	51.1
FM09	Residence off Wheatland Rd	535	51.4	52.4
FM10	Residence off US 340 at north end of project	160	64	61.7
FM11	Residence off US 340 south of Allen Ln	260	53.8	56.8
FM12	Residence off Birdland Way	200	55.6	57.0
FM13	Residence off Earl Ellinfritz Dr	120	63.8	63.9
FM14	Residence off Meyerstown Rd	1140	51.3	51.3
FM15	Abandoned residence off Meyerstown Rd	565	53.4	54.6
FM16	Residence east of US 340, south of USPO	155	60.0	59.7
FM21	Residence at 227 Ryan's Glen Dr	975	51.5	45.8
FM22	Residential cul-de-sac (Rippon Commons)	525	53.0	51.8

d) Traffic Noise Impact Analysis

The initial task in determining noise impacts is to identify activity areas along the project corridors that are sensitive to noise. Impact assessments have been performed for 83 receptors within the project corridors which represent 84 residential properties, one commercial property, and one church. Any properties that were not represented either have no outdoor noise-sensitive human activity or were determined to be Activity Category F, which are areas that are not sensitive to noise and therefore do not have NAC impact criteria.

Traffic noise abatement is warranted and must be considered when traffic noise impacts are created by either of the following two conditions:

- The predicted traffic noise levels for the design year approach (reach one decibel less than) or exceed the NAC contained in 23 CFR 772 and in Table IV-16.

- The predicted traffic noise levels for the design year substantially exceed base year (2011/2012) noise levels, defined as a 15 dB(A) increase.

The noise prediction results are detailed for each noise sensitive area in Table IV-20. Included for each site are the applicable NAC category and the worst hourly equivalent sound level for the base year (2011/2012) and the build condition for the design year (2033) for each of the four build alternates studied.

The results of the traffic noise analysis indicate that the proposed US 340 improvement will both increase and decrease noise levels at noise sensitive receptors in the immediate vicinity of the proposed facility. The remaining build alternates will result in design year outdoor build noise levels which range from 50 to 68 dB(A), ranging from a -14 dB(A) decrease to a 13 dB(A) increase over existing noise levels. The indoor noise level at the one church studied will decrease from 50 dB(A) in the base year condition to 41 dB(A) in the build condition. For reference purposes, an increase of three decibels is considered barely perceivable, and an increase of ten decibels doubles the loudness.

A comparison of the design year (2033) build noise levels with the applicable NAC reveals that two receptors along Alternates 4 and **4A (Preferred)** and one receptor along Alternate 4B will receive traffic noise levels which approach or exceed the NAC. A comparison of the design year build noise level increases with the applicable criteria reveals that no receptors will experience design year build noise levels that will be substantially higher than base year levels.

Based on the previously outlined NAC, noise impacts were determined for the remaining build alternates. Except for two receptors under the remaining alternates, all receptors fall under Land Use Activity Category B (67 dBA). The two non-Category B receptors are one Category D church (R124) and one Category C commercial (R131) property.

Levels that exceed the noise criteria (approaching NAC criteria) are highlighted in Table IV-20 for individual receptors (R005 and R086). None of the receptors exceed the "substantial increase" criteria.

Table IV-20: Leq Traffic Noise Levels

Receptor	Properties Represented	NAC Land Use Category	Approaching NAC Criteria	Noise Levels* dB (A)									
				Existing (2012)	No-Build		Alt 4		**Alt 4A (Preferred)**		Alt 4B	
					Level	Diff	Level	Diff	**Level**	**Diff**	Level	Diff
R003	1	B	66	53	55	2	55	2	**55**	**2**	55	2
R005	1	B	66	65	67	2	68	3	**68**	**3**	68	3
R015	1	B	66	53	55	2	55	2	**55**	**2**	55	2
R016	1	B	66	61	63	2	63	2	**63**	**2**	63	2
R017	1	B	66	63	65	2	65	2	**65**	**2**	65	2
R020	1	B	66	56	58	2	59	3	**59**	**3**	59	3
R021	1	B	66	54	56	2	57	3	**57**	**3**	57	3
R026	1	B	66	53	54	1	51	-2	**54**	**1**	54	1
R027	1	B	66	54	56	2	51	-3	**55**	**1**	55	1
R028	1	B	66	58	60	2	54	-4	**57**	**-1**	57	-1
R029	1	B	66	64	66	2	56	-8	**60**	**-4**	60	-4
R030	1	B	66	70	72	2	**	0	**62**	**-8**	62	-8
R031	1	B	66	57	59	2	52	-5	**55**	**-2**	55	-2
R033	1	B	66	67	68	1	56	-11	**59**	**-8**	58	-9
R034	1	B	66	68	69	1	58	-10	**63**	**-5**	61	-7
R035	1	B	66	68	69	1	57	-11	**62**	**-6**	61	-7
R036	1	B	66	71	73	2	58	-13	**60**	**-11**	60	-11
R037	1	B	66	65	67	2	55	-10	**58**	**-7**	57	-8
R038	1	B	66	60	61	1	53	-7	**56**	**-4**	55	-5
R039	1	B	66	57	59	2	52	-5	**55**	**-2**	54	-3
R041	1	B	66	58	59	1	52	-6	**54**	**-4**	53	-5
R042	1	B	66	60	61	1	53	-7	**55**	**-5**	54	-6
R044	1	B	66	70	72	2	57	-13	**59**	**-11**	58	-12
R045	1	B	66	56	58	2	51	-5	**53**	**-3**	52	-4
R046	1	B	66	59	60	1	52	-7	**54**	**-5**	53	-6
R047	1	B	66	58	60	2	51	-7	**54**	**-4**	52	-6
R048	1	B	66	70	72	2	57	-13	**59**	**-11**	58	-12
R049	1	B	66	68	70	2	57	-11	**57**	**-11**	56	-12
R050	1	B	66	72	73	1	59	-13	**60**	**-12**	59	-13
R051	1	B	66	72	73	1	60	-12	**62**	**-10**	60	-12
R052	1	B	66	63	65	2	59	-4	**65**	**2**	60	-3
R054	1	B	66	50	51	1	60	10	**56**	**6**	61	11
R055	1	B	66	70	71	1	61	-9	**64**	**-6**	61	-9
R060	1	B	66	60	62	2	55	-5	**57**	**-3**	55	-5

Receptor	Properties Represented	NAC Land Use Category	Approaching NAC Criteria	Noise Levels* dB (A)								
				Existing (2012)	No-Build		Alt 4		**Alt 4A (Preferred)**		Alt 4B	
					Level	Diff	Level	Diff	**Level**	**Diff**	Level	Diff
R061	1	B	66	64	65	1	55	-9	**58**	**-6**	56	-8
R062	1	B	66	74	75	1	64	-10	**65**	**-9**	64	-10
R063	1	B	66	74	75	1	64	-10	**65**	**-9**	64	-10
R064	1	B	66	70	72	2	60	-10	**63**	**-7**	61	-9
R065	1	B	66	72	74	2	60	-12	**64**	**-8**	63	-9
R066	1	B	66	70	71	1	58	-12	**62**	**-8**	61	-9
R067	1	B	66	64	66	2	54	-10	**58**	**-6**	56	-8
R069	1	B	66	71	73	2	58	-13	**62**	**-9**	62	-9
R070	1	B	66	65	67	2	56	-9	**60**	**-5**	57	-8
R071	1	B	66	74	75	1	60	-14	**64**	**-10**	64	-10
R074	1	B	66	60	61	1	57	-3	**60**	**0**	56	-4
R076	1	B	66	72	74	2	59	-13	**60**	**-12**	59	-13
R078	1	B	66	60	62	2	54	-6	**56**	**-4**	55	-5
R079	1	B	66	60	61	1	56	-4	**57**	**-3**	56	-4
R080	1	B	66	58	59	1	55	-3	**56**	**-2**	55	-3
R084	1	B	66	54	56	2	57	3	**59**	**5**	59	5
R085	1	B	66	59	61	2	63	4	**62**	**3**	64	5
R086	1	B	66	63	66	3	68	5	**66**	**3**	**	0
R089	1	B	66	60	62	2	**	0	**64**	**4**	**	0
R095	4	B	66	61	62	1	62	1	**61**	**0**	61	0
R102	1	B	66	64	66	2	65	1	**64**	**0**	64	0
R103	1	B	66	63	65	2	64	1	**64**	**1**	65	2
R109	1	B	66	58	60	2	64	6	**62**	**4**	63	5
R116	1	B	66	63	64	1	62	-1	**62**	**-1**	62	-1
R117	1	B	66	53	55	2	55	2	**55**	**2**	55	2
R118	1	B	66	60	61	1	**	0	**62**	**2**	61	1
R119	1	B	66	61	62	1	**	0	****	**0**	**	0
R120	1	B	66	60	62	2	**	0	****	**0**	**	0
R121	1	B	66	55	57	2	**	0	**62**	**7**	62	7
R122	1	B	66	52	53	1	65	13	**58**	**6**	58	6
R123	1	B	66	72	74	2	58	-14	**60**	**-12**	60	-12
R124	1	D	51	50	51	1	40	-10	**41**	**-9**	40	-10
R125	1	B	66	69	71	2	60	-9	**61**	**-8**	60	-9
R127	1	B	66	68	69	1	58	-10	**60**	**-8**	59	-9
R128	1	B	66	50	51	1	63	13	**59**	**9**	**	0

Receptor	Properties Represented	NAC Land Use Category	Approaching NAC Criteria	Noise Levels* dB (A)								
				Existing (2012)	No-Build		Alt 4		**Alt 4A (Preferred)**		Alt 4B	
					Level	Diff	Level	Diff	**Level**	**Diff**	Level	Diff
R129	1	B	66	73	74	1	60	-13	**64**	**-9**	63	-10
R130	1	B	66	70	71	1	57	-13	**59**	**-11**	57	-13
R131	1	C	71	53	55	2	55	2	**56**	**3**	57	4
R132	1	B	66	51	53	2	**	0	**56**	**5**	56	5
R133	1	B	66	51	52	1	59	8	**55**	**4**	55	4
R134	1	B	66	51	53	2	58	7	**55**	**4**	55	4
R135	1	B	66	52	53	1	57	5	**55**	**3**	54	2
R136	1	B	66	48	49	1	53	5	**50**	**2**	50	2
R137	1	B	66	49	51	2	55	6	**53**	**4**	52	3
R138	1	B	66	49	50	1	55	6	**52**	**3**	53	4
R139	1	B	66	50	52	2	59	9	**53**	**3**	54	4
R140	1	B	66	50	51	1	**	0	**54**	**4**	55	5
R141	1	B	66	57	59	2	60	3	**59**	**2**	59	2
R142	1	B	66	59	60	1	58	-1	**61**	**2**	56	-3

*Noise levels determined for a design year of 2033
** Potential acquisition of the receptor under the build alternate

e) Potential Noise Abatement Measures

Section 23 CFR Part 772 identifies certain noise abatement measures that may be considered in the project design to reduce traffic noise impacts. These abatement measures include: traffic management, alteration of alignments, buffer zones, building insulation, and the construction of noise barriers.

- Highway alignment selection involves the horizontal or vertical orientation of the proposed improvements in such a way as to minimize impacts and costs. The selection of alternate alignments for noise abatement purposes must consider the balance between noise impacts and other engineering and environmental parameters. For noise abatement, horizontal alignment selection is primarily a matter of locating the roadway at a sufficient distance from noise sensitive areas. The alternates in this study were developed to minimize costs and environmental impacts. Hence, further

alteration of the proposed horizontal alignments is not reasonable or feasible from a planning and design standpoint.

- Traffic management measures that limit vehicle type, speed, volume, and time of operations are often effective noise abatement measures. For this project, traffic management measures are not considered appropriate for noise abatement due to their effect on the capacity and level of service on the proposed roadway. Additionally, US 340 is a primary rural highway and elimination of truck traffic will not be in keeping with the function of the facility.

- Although vegetation does not generally make an efficient sound barrier, the use of landscaping can have psychological effects on decreasing perceived sound levels. The design of landscaping for such a purpose is dependent upon location and site-specific criteria and requires details beyond the scope of this analysis. Therefore, vegetation was not considered for noise mitigation purposes in this report.

- WVDOH policy does not allow for the purchasing of properties for the purpose of noise abatement. Therefore, property acquisition was not considered for noise abatement purposes in this report.

The only remaining feasible abatement measure is the construction of noise barriers. To be considered for construction, a noise barrier must be both feasible and reasonable according to WVDOH policy.

The feasibility of a noise barrier is based on its effectiveness in reducing traffic noise levels as well as any adverse impacts to property access, drainage, topography, utilities, safety, and maintenance requirements. A barrier which reduces noise levels by a minimum of five dB(A) at a minimum of one impacted receptor is considered feasible.

The construction of a noise barrier is not reasonable if the cost is greater than $30,000 per benefited receptor. If the cost of the abatement exceeds this cost per receptor, then the mitigation measure is not considered reasonable. The estimated cost of construction (material and labor) is $25 per square foot. In the analysis, each residential unit is considered a single residential property. To remain in compliance with Federal regulations, the allowance analysis must also consider receptors which are not impacted but which will also benefit from the construction of a noise barrier. The area of noise barrier per benefited receptor

calculation considers all benefitted receptors without regard to whether they are predicted to be impacted or not.

The barrier must also provide a 7 dB(A) reduction in noise to at least ten percent of the benefited receptors.

Noise Barriers were investigated at two locations along the three build alternates. For each barrier investigated, multiple heights, lengths and locations were studied. During the design phase of this project it likely will be possible to refine the end points, variations in height, and the locations of the barriers relative to the proposed roadways in order to maximize their efficiency and enhance their aesthetics. During the design phase of the project there may also be modifications to the horizontal and vertical alignments which could change the effectiveness of the barriers. The investigations completed for this phase of the analysis were intended to identify the likelihood of a barrier being both feasible and reasonable and not to identify its final configuration.

Barrier 1

A noise barrier was investigated to mitigate the predicted traffic noise level impact to one impacted residential receptor (R005 – residence behind Rainbow Road Club). Barrier 1 is 700 feet long and is located along the west side of US 340. At a height of 14 feet, it will provide a 7 dB(A) reduction in noise at the receptor. The total wall cost is $245,000 for one benefited receptor. This exceeds $30,000 per benefited receptor per the WVDOH *Highway Traffic Noise Policy* (Effective July 13, 2011). This barrier is preliminarily considered feasible but not reasonable and is not recommended for further consideration.

Barrier 2

A noise barrier was investigated to mitigate the predicted traffic noise level impact to one impacted residential receptor (R086 – residence opposite Jenkins Hill Rd on US 340) along Alternatives 4 and **4A (Preferred)**. Barrier 2 is 1300 feet long and is located on the east side of US 340 between Birdland Way and Strathmore Farm Lane. At a 16-foot height, the sound barrier wall will provide a 7 dB(A) reduction in noise at the impacted receptor. The barrier will also benefit two receptors located along Strathmore Farm Lane (R089 and R109). The total wall cost is $455,000, or $151,700 per benefited receptor. This exceeds the allowable cost of $30,000 per benefited receptor per the WVDOH *Highway Traffic Noise Policy* (Effective

July 13, 2011). This barrier is preliminarily considered feasible but not reasonable and is not recommended for further consideration.

f) Construction Noise

The major construction elements of this project are expected to be earth removal, hauling, grading, and paving. General construction noise impacts, such as temporary speech interference for passersby and those individuals living or working near the project, can be expected particularly from paving operations and grading equipment. Extremely loud construction noise activities such as the usage of impact hammers will provide sporadic, temporary, and potentially substantial noise impacts in localized areas.

Whenever possible, measures should be taken to reduce the duration and intensity of construction noise impacts, such as work-hour limitations, enforcing equipment muffler and maintenance requirements, locating haul-road locations sensitive to neighboring land use, and the restriction of tailgate banging. In addition, the neighboring property owners and users should be provided with a means to register complaints about construction noise that includes timely response and follow-up procedures.

To reduce the potential for noise impacts at the majority of residential receptors, work should not be allowed during typical sleeping hours and should be limited during weekends. Impact-type activities especially should be conducted in residential areas while people are at work and children are at school. Any construction activities that are necessary during evening and overnight hours should be closely coordinated so that appropriate mitigation strategies can be put into place before the construction activities are started.

There is one church among the residential and commercial receptors along this project. Evening and weekend work should be scheduled to be sensitive to not interrupting activities and services being conducted at the church property.

7. Air Quality

An *Air Quality Analysis* Report was completed in compliance with the Clean Air Act (CAA) and its amendments, related Federal regulations, and FHWA Guidance.

Jefferson County is included in the Hagerstown / Eastern Panhandle Metropolitan Planning Organization and this project is included in the 2014-2017 *Transportation Improvement Program* and the 2040 *Long Range Transportation Plan Update*.

The primary pollutants from motor vehicles are unburned hydrocarbons, nitrogen oxides (NOx), carbon monoxide (CO) and particulates. Hydrocarbons (HC) and NOx can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO_2. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. These pollutants are regional problems.

Clarke and Jefferson Counties are in attainment with the United States Environmental Protection Agency's (EPA) National Ambient Air Quality Standards (NAAQS). Since a CO hot spot analysis was performed for the 1997 air quality evaluation, the hot-spot analysis was updated in January 2015.

a) Carbon Monoxide

For each of the three build alternates evaluated in the SDEIS, the roadway segment having the potential for generating the highest CO concentration was identified. This critical segment happens to be identical for all alternates and is located between Meyerstown Road and CR 19 (Withers Larue Road). Since the alignment, traffic, and right of way are identical for all build alternates along this segment, only one analysis at one receptor site was required. The selected receptor site is located on the proposed right of way line. Air quality projections were calculated for the existing condition (2012), the year of project completion (2020), interim year after project completion (2025), and the design year (2033).

For comparison purposes, air quality projections were calculated for the no build alternate using the existing alignment and traffic volumes projected for the same years as examined in the analysis of the build alternates. The critical segment having the highest volume and lowest estimated speed is located in Rippon, north of the intersection of US 340 and Meyerstown Road. The receptor used in the analysis is located at the edge of the existing right of way line.

Speeds for the build and no build scenarios were estimated using the Highway Capacity Software (HCS2010) package and the *Highway Capacity Manual*.

Carbon Monoxide 1-hour and 8-hour concentrations of 0.7 ppm and 0.6 ppm, respectively, were used for background concentrations in the analysis. These values were obtained from the USEPA's AirData website and were observed in 2014 at the nearest air monitoring station for CO in Howard County, Maryland.

In comparing the projected CO concentration levels with the NAAQS, no violations of the 1-hour standard (35 ppm) or 8-hour standard (9 ppm) are expected for the no build or any of the build alternates. The highest 1-hour and 8-hour CO concentrations for any of the years analyzed are not expected to exceed 1.4 and 1.0 ppm (including background contributions), respectively, at the investigated site. These values are shown in Table IV-21.

Table IV-21: Maximum Predicted Carbon Monoxide Concentrations

1-Hour Concentrations (including 0.7 ppm background concentration)		
Year	**Concentration (ppm)**	
	No Build	**All Alternates - Build**
2012 - Existing	1.4	N/A
2020 - Year of Project Completion	1.2	0.9
2025 - Interim Year	1.0	0.7
2033 - Design Year	0.9	0.7
8-Hour Concentrations (including 0.6 ppm background concentration)		
Year	**Concentration (ppm)**	
	No Build	**All Alternates - Build**
2012 - Existing	1.0	N/A
2020 - Year of Project Completion	0.9	0.7
2025 - Interim Year	0.8	0.6
2033 - Design Year	0.7	0.6

National Ambient Air Quality Standards: 35 ppm (1-hour) & 9 ppm (8-hour)

b) Mobile Source Air Toxics (MSAT)

Air toxics analysis is a continuing area of research. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential health risks posed by MSAT

exposure should be factored into project-level decision making. As such, the FHWA has developed a tiered approach for analyzing MSATs in NEPA documents, depending on specific project circumstances. The FHWA has identified three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential for MSAT effects; and
- Quantitative analysis to differentiate between alternatives for projects with higher potential MSAT effects.

The US 340 improvement project is included in the middle category.

For each alternate, the amount of MSAT emitted would be proportional to the vehicle miles traveled, assuming other variables such as fleet mix are the same between alternates. Because the traffic volumes for the No Build Alternate are the same as any of the Build Alternates, higher levels of MSAT are not expected from any of the build alternates compared to the no build. In addition, because the estimated vehicle miles traveled under each of the build alternates is the same, it is expected that there would be no appreciable difference in overall MSAT emissions amount between the remaining build alternates. Also, regardless of the chosen alternate, design year emissions will likely be lower than present levels as a result of the EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections; however, the magnitude of the EPA-projected reductions is so great that MSAT emissions in the project area are likely to be lower in the future in virtually all locations.

Under each alternate, there may be localized areas where vehicle miles traveled would increase and others where it would decrease. Therefore, it is possible that localized changes in MSAT emissions may occur. The localized increases in MSAT emissions would likely be more pronounced along new alignment sections; localized decreases would be likely to occur where through-traffic is diverted to the new alignment, such as Rippon. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of the EPA's vehicle and fuel regulations.

c) Permits

Jefferson County is currently designated as attainment/unclassified for all National Ambient Air Quality Standards (NAAQS) criteria pollutants. Therefore, based upon the current regulatory

requirements, this project as described does not appear to require any pre-construction permits, authorizations, or air quality analyses by West Virginia Division of Air Quality. Exceptions are:

- If it is necessary to burn land clearing debris; in which case approval by the West Virginia Department of Environmental Protection (WVDEP) Secretary or his or her authorized representative is required.

- The project entails demolition, either partially or totally, of a structure, building, or installation, irrespective of the presence or absence of asbestos-containing materials, and is subject to the asbestos National Emission Standards for Hazardous Air Pollutants. If such is the case, a formal Notification of Abatement, Demolition, or Renovation must be completed and timely filed with the WVDEP Secretary's authorized representative and approval received before commencement of activities addressed in the Notification.

- Backup or emergency generators may be subject to federal and state requirements and require an air permit in accordance with WVDEP, Office of Air Quality Legislative Rule 45CSR13.

- Fuel-burning equipment (boilers, generators, compressors, etc.) or any other air-pollution-emitting equipment may be subject to registration or permitting requirements with the Commonwealth of Virginia Department of Environmental Quality.

d) Climate Change

Transportation sources contribute to greenhouse gases through the burning of petroleum-based fuel. According to FHWA, transportation sources are responsible for approximately one quarter of greenhouse gas emissions in the US. Under the CAA, the EPA has the authority to establish motor vehicle emissions standards for CO and other greenhouse gases, although such standards have not yet been established as part of the NAAQS.

The purpose and need for the proposed improvements to US 340 is to address traffic operations and improve safety deficiencies along the existing two-lane facility. Currently, US 340 in the project area operates at a Level of Service (LOS) E representing an unacceptable level of delay and congestion. Motor vehicles use more fuel during braking and acceleration than when cruising at a constant rate of speed. Not only does the individual motor vehicle consume/burn more fuel, there is more energy expended to extract, refine, and

deliver that additional fuel to the individual consumer. The proposed improvements will provide a 4-lane facility between the Virginia-West Virginia State line and the Charles Town Bypass that matches the 4-lane facilities at either end of the project and will be designed using current AASHTO standards. With these improvements, traffic will operate at a level-of-service "B" or better with drastically reduced delays when compared to the No-Build conditions. Reduced travel times, more efficient vehicle operations, and a safer facility will result from the proposed improvements. This translates to lower greenhouse gas emissions (GHG) from motor vehicles.

The *Envision Jefferson 2035 Comprehensive Plan* designates the area east of US 340 in the project area for Rural/Agriculture uses and Large Lot Residential uses. The future land use guide designates much of the area between US 340 and the Norfolk Southern Railroad as a Preferred Growth Area (PGA), including a mix of Industrial or Commercial uses, Mixed Use Residential/Commercial uses, and Low Density Residential uses. This area is called the US 340 South PGA and the plan acknowledges that the improvements to US 340 have the potential to create some growth pressures along this corridor. However, the lack of water and sewer infrastructure will inhibit future growth. The project will not induce any significant growth in the project corridor due to the lack of water/sewer and the County's desire to preserve the most important features of Jefferson County: the rural landscape, the natural beauty of the rivers, the rolling terrain, and the strong sense of community.

Construction of the project will require the use of heavy equipment for excavating, hauling, lifting, and paving operations. There may be traffic delays due to the sequence of construction operations. The combined effect of these activities are higher greenhouse gas emissions. There are several mitigation strategies that can be implemented to help offset the GHG effects from highway construction, including:

- The use of Warm-mix asphalt,
- Use of recycled asphalt pavement as a substitute for aggregate or bitumin,
- The use of recycled concrete aggregate as a substitute for stone base, and
- Alternative fuels and use of hybrid vehicles for long-term maintenance activities.

The impacts associated with a highway construction project are considered to be temporary and the long-term benefits will outweigh the short-term "cost" over the life of the project.

8. Hazardous Materials

An initial assessment of potential contamination sites was conducted for the project. This review consisted of a field visit to determine business names, types, and site characteristics of parcels that were within the project vicinity and review of computer database files from the West Virginia Division of Environmental Protection. In general, the sites discussed are contained within the proposed right of way or within 500 feet of the proposed right of way for the build alternates under consideration. The West Virginia Department of Environmental Protection's database files provided information on known hazardous waste generators, underground storage tanks, and reported contamination incidents. The Jefferson County Planning Commission and the County Engineer were consulted for any available information on potential contamination sites. They did not have information relevant to the project area. Research into past land uses was conducted. Past land uses may present a concern since contaminants can remain in the environment for many years. Historic aerial photography from 1979 was available from the Jefferson County Planning Commission for the project area but did not indicate any additional potential contamination sites. Long-time residents of the area were also questioned regarding past land uses. A few gas stations formerly existed in the community of Rippon; however, these are too far from the locations of the proposed alternates to be of concern. Table IV-22 lists the potential hazardous materials sites in the project area.

After review of the available information on each site, a determination was made of the risk of encountering unknown contamination at that site. These assessments were based on the likelihood that contamination exists at the site and on the degree of concern this presents relative to the build alternates under consideration.

The risk system identifies four degrees of risk: No, Low, Medium, and High. This categorization is for general purposes. Sites where known spills or leaks have occurred may not necessarily present a high degree of concern if the environmental agencies are aware of the situation, enforcement actions are being taken, and remedial activities are either completed or underway. The degrees of risk are defined as follows:

- No Risk means that the observed condition of the site, the state records, and the current or previous business activity does not support a contamination risk.

- Low Risk means that the business handles hazardous materials or petroleum products but has a clean appearance and no known violations. An example of such a business might be a gas station with new underground storage tanks, monitoring wells, leak prevention system, no automotive maintenance, and a clean record in the environmental agency's files.

- Medium Risk indicates there is a higher concern or may include sites of known contamination. Medium risk sites may require some follow-up prior to right of way acquisition.

- High Risk suggests that additional studies are recommended and that soil and groundwater sampling and laboratory analysis may be required.

Table IV-22: Likelihood to Encounter Hazardous Materials

Site	Risk
Rainbow Road Club	Low
Residence near Chapman Trailer Court	No
Ripon Lodge	No
Byrdland	Low
Dave's Auto Sales	Medium

The **Rainbow Road Club** is located just north of the state line between Virginia and West Virginia on the west side of the existing US 340. Upon field review, there was a lot of farm equipment to the rear of the building with a large garage on the property. It appears that light repair work is done at this location. Two rusted tanks were also observed to the rear of the property, of the size typically used for home heating oil. Alternates 4, **4A (Preferred)**, and 4B are located adjacent to the property along the existing US 340. This property is given an assessment of low risk for all of the build alternates based on the minimal quantities of hazardous materials likely to be utilized on-site.

One **residence** of concern is located on the west side of the existing US 340, east of Chapmans Trailer Court and west of the community of Rippon. An underground storage tank was identified on this property. During field review, an antique gas pump was visible. The house

was built around 1920. The owner was questioned about the gas pump. It was there when he bought the property in the 1970's and he was unaware if there was an underground storage tank on the property. There was no record of this site in the West Virginia Division of Environmental Management's underground storage tank database. The site poses no risk to Alternates 4, **4A (Preferred)**, and 4B due to their distance from the site.

Ripon Lodge is located north of the community of Rippon, west of the existing US 340. An underground storage tank could be located next to the Ripon Lodge. Upon field review, the only possible indication of this tank was a hill that appeared to have been created by fill. There was no evidence to confirm that a tank once existed or exists on this property. The West Virginia Department of Environmental Protection database did not have any information on this site. The site poses no risk to the Alternates 4, **4A (Preferred)**, or 4B.

Byrdland is located on the east side of the existing US 340, south of Bullskin Run. Another antique gas pump was observed at this residence during field review. No information is available on if the underground storage tank associated with this pump has been removed. This site could not be found in the West Virginia Division of Environmental Management's database. Alternates 4, **4A (Preferred)**, and 4B are located approximately 400 feet from the gas pump. Despite the lack of information on a potential underground storage tank at this site, it is given an assessment of low risk for the build alternates due to the distance from the proposed right of way.

Dave's Auto Sales is located on the east side of the existing US 340, just north of Bullskin Run in the Wheatland area. There is currently a 275 gallon used oil tank on-site that is picked up and recycled by a company operating out of Baltimore. The building was formerly Baney's Mill Garage. It was a gas station at one time. According to the current business owner, the tanks were removed during the 1990's and there are no known contamination problems on-site related to these tanks. The US EPA Hazardous Waste Identification Number is WVD988786414. Records indicate that the facility generates less than 220 lbs. per month of hazardous materials. The facility lies directly within the proposed right of way for the Alternates 4, **4A (Preferred)**, and 4B. This site is given an assessment of medium risk for the Alternates 4, 4A, and 4B based on the available information.

If the project entails demolition, either totally or partially, of a structure, building, or installation, irrespective of the presence or absence of asbestos-containing materials (ACM),

and is subject to the asbestos National Emission Standards for Hazardous Air Pollutants, a formal Notification of Abatement, Demolition, or Renovation must be completed and timely filed with the WVDEP Secretary's authorized representative. Approval must be received prior the commencement of activities addressed in the Notification. In The Commonwealth of Virginia, if ACM and/or lead-based paint (LBP) are found, in addition to the federal waste-related regulations, state regulations 9VAC20-81 for ACM and 9VAC20-60 261 for LBP must be followed.

Any soil/sediment that is suspected of contamination or wastes that are generated during construction-related activities must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations.

In Virginia, the contractor will report evidence of a petroleum release, if discovered during the construction of this project, to DEQ, as authorized by Code of Virginia Section 62.1-44.34.8-9 and 9 Virginia Administrative Code 25-580-10 et. Seq.

D. OTHER POTENTIAL IMPACTS

1. Energy

The short-term energy requirement for construction of the Alternates 4, **4A (Preferred)**, or 4B is greater than the energy requirements for the No Build Alternative. However, the post-construction operational energy requirement of the facility is less with a build alternative than with the No Build Alternative. The savings in operational energy requirements offset construction energy requirements and thus, in the long-term, result in net savings in energy usage. The proposed facility reduces traffic congestion, thereby reducing overall vehicular energy consumption.

2. Construction Impacts

All of the build alternates considered for the project have similar construction impacts. All of the construction impacts listed below are temporary in nature. Construction activities for the proposed project may impact air quality, noise, water quality, and traffic flow. There are also visual impacts for those residents and travelers within the immediate vicinity of the project.

- The air quality impact will be temporary and primarily consists of emissions from diesel-powered construction equipment, dust from embankment and the haul road area, and burning of debris.

    - **Dust**. During land-disturbing activities, fugitive dust must be kept to a minimum by using control methods prescribed by the West Virginia Department of Environmental Protection, Office of Air Quality Legislative Rule 45CSR17 or outlined in Commonwealth of Virginia Administrative Code 9VAC5-50-60 et seq. of the regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following:

        - Use, where possible, of water or suitable chemicals for dust control during the proposed demolition and construction operations and from material stockpiles;
        - Installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials;
        - Covering of open equipment for conveying materials; and
        - Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.
        - Do not use water for dust control to the extent that it results in runoff to surface waters or wetlands.

    - **Open Burning.** If project activities include the burning of vegetative debris or construction material, this activity must meet the requirements under Commonwealth of Virginia Administrative Code 9VAC5-130 et seq. of the regulations for open burning, and it may require a permit. The regulations provide for, but do not require, the local adoption of a model ordinance concerning open burning. Contact officials with the locality to determine what local requirements, if any, exist.

      The DEQ Valley Regional Office (VRO) states that any open burning of vegetative debris must be performed in accordance with the open-burning regulation (http://www.deq.virginia.gov/Programs/Air/AirQualityPlans/OpenBurning.aspx) and coordinated with the local fire official to ensure that all local

ordinances are met.

Shredding or chipping of vegetative debris and reuse on site is desired over open burning.

- **Fuel-Burning Equipment.** Fuel-burning equipment (boilers, generators, compressors, etc.) or any other air-pollution-emitting equipment may be subject to registration or permitting requirements with the Commonwealth of Virginia Department of Environmental Quality. Furthermore, their use may require a permit in West Virginia in accordance with 45CSR13.

- Short-term noise and vibration impacts may be created through heavy equipment movement and other construction activities such as pile driving.

- Water quality impacts from erosion and sedimentation will be controlled through best management practices.

- During final design work zone plans will be developed and finalized. The plans include maintenance of traffic and sequence of construction and will be scheduled to minimize traffic delays throughout the project. Signs will be utilized where appropriate to provide notice of road closures and other pertinent information to the traveling public. The local news media will be notified in advance of road closings and other construction related activities that could excessively inconvenience the community so that motorists, residents, and businesses could plan their day and travel routes in advance. Access to all businesses and residences will be maintained to the extent practical through controlled construction scheduling. Traffic delays will be minimized to the extent possible where many construction operations are in progress at the same time.

- For residents living along the proposed facility, some of the materials stored for project construction may be displeasing visually; however, this condition is only temporary.

Construction of the roadway and structures may require excavation of unsuitable material, placement of embankments, and use of materials such asphalt concrete and portland cement concrete. Disposal may be on-site in a retention area or off-site. The removal of structures and debris will be accomplished in accordance with local and state regulations. The contractor is

responsible for the methods of controlling pollution on haul roads, in borrow pits, other material pits, and areas used for disposal of waste materials from the project. Temporary erosion control features will comply with best management practices and will be designed in accordance with VDOT and WVDOH design standards.

3. Cumulative and Secondary Impacts

In accordance with the NEPA, potential secondary and cumulative impacts related to the proposed project have been identified. Guidelines prepared by the Council on Environmental Quality (CEQ) for implementing NEPA broadly defined secondary impacts as those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Cumulative impacts are those that "result from the incremental impacts of an action when added to other past and reasonably foreseeable future actions" (40 CFR 1508.7). They are similar to secondary impacts in the geographic context. However, cumulative impacts consider past, present, and future trends.

a) Secondary Impacts

Also commonly known as induced development, secondary impacts are the downstream ramifications of the initial action. A wide variety of effects can occur. Generally, the analysis works through three questions to identify potential secondary effects: 1) where does the project have the potential to improve accessibility? 2) Where is the increased accessibility likely to cause changes in development patterns? 3) What impacts are likely to occur based on the change in development patterns?

The proposed project is intended to meet the transportation needs of the area including capacity, safety, and road deficiencies. It is driven more by system linkage and safety considerations than improving access. As such, it has a lower potential to induce secondary growth than a transportation improvement designed to increase access, such as building a new facility.

The local comprehensive plan, *Envision Jefferson 2035*, clearly defines how county planners envision future growth patterns. One of its highest priorities is promoting economic growth within farming communities, recognizing that the county has the highest composition of arable land by area within the state. Current societal trends embrace niche farming, community markets, and localized food sources, adding value to assist farmers in maintaining active farms.

More abstract recommendations in the comprehensive plan prioritize preservation of historic and cultural resources, the natural environment, and recreational facilities. County leaders' commitment to protecting the rural heritage of the county—enforced through zoning restrictions, subdivision regulations, development guidelines, etc.—further limit the likely magnitude of induced development that will occur once the US 340 corridor is widened.

As shown on Exhibit II-7 in Section II, the project area consists of primarily rural land use with most zoned as rural agricultural. Public water and wastewater infrastructure does not exist within the vicinity, greatly limiting the potential for the area to see development at higher densities or intensities than the current patterns. This limitation will in turn limit the amount of growth likely to occur in the area, as growth is limited to the same types of rural land uses currently characterizing the area. As envisioned by the county's comprehensive plan, future development is primarily intended to occur within the Preferred Growth Area, where industrial-commercial, residential growth-light industrial-commercial, and Rippon Village District land use designations have been defined between existing US 340 and the Norfolk Southern Railroad. Within the Preferred Growth Area, denser development is targeted to occur over the 20 year planning horizon; however, the plan acknowledges that water, sewer, and other shared infrastructure investments are needed to spur the restoration and revitalization of villages, including Rippon. There is no identified timeline or funding to secure such infrastructure, making the timing of these development changes uncertain.

As a whole, Jefferson County is slowly beginning to transition to a residential community for metropolitan DC commuters. Jefferson County experienced significant housing growth in the 1970's (55% increase in housing units). Since 1980, the County's number of housing units has grown at a rate of 20-26% per decade. The majority of Jefferson County's population growth has resulted from people relocating into the County drawn to its proximity to the Washington, D.C., Baltimore, MD, Northern Virginia, and Frederick, MD/I-270 core employment centers. Prospective residents are seeking historic, scenic and recreational resources, culturally active communities and a low cost of living. Those settling in Jefferson County can choose between five unique municipalities, a rural lifestyle, eight village communities, and new residential neighborhoods. New residents come seeking a variety of housing options including a home on a large or small lot, homes with limited yard maintenance, small community, or rural living styles. There are also instances where commuters may seek the community feeling that a residential subdivision, village or town center setting can offer. While the cost of housing in

Jefferson County may be lower than much of the Washington, D.C. and Baltimore, MD Metropolitan Areas, other counties in the Eastern Panhandle are more affordable. However, when considering the cost associated with commuting, including lost time and automotive expenses, home buyers relocating to Jefferson County have been willing to pay slightly more to be closer to their place of employment. Relative to other Washington, D.C. and Baltimore, MD area counties, Jefferson County is still considered an affordable place to live with median home sales $200,000 less than that of adjoining counties (Loudoun County, VA or Montgomery County, MD). With or without the proposed project, this trend is anticipated to continue. Although the improved facility will follow a new alignment in places, it is not anticipated to induce notable additional growth beyond levels already anticipated for the area. However, it is possible that the project may indirectly influence the timing of this background residential growth as travel times improve. In general, though, because the project will likely have minimal effects on induced land development and because water and sewer infrastructure are limited, the project is not likely to have notable indirect effects on water resources, wetlands, floodplains, stormwater runoff, and natural communities. Any potential secondary impacts on these resources would be mitigated by the requirement for all future development to comply with existing regulations and ordinances.

- Through compliance with the Federal Clean Water Act, the West Virginia State Code of Regulations Title 46, and the Groundwater Protection Act, adverse impacts to water resources will be minimized. The incorporation of best management practices is often used to minimize water resource impacts.

- The Federal Clean Water Act regulates impacts to wetlands. A Section 404 permit is required for any project that impacts wetlands. The permitting process requires that wetland impacts have been avoided or minimized. The Chesapeake Bay Watershed Protection program limits discharges into and from county waterways. Wetland mitigation may be required to compensate for unavoidable wetland losses.

- Jefferson County has a floodplain ordinance in effect that requires compliance with FEMA regulations. FEMA requires that residential structures be elevated to the base-flood elevation, non-residential structures to be floodproofed to the base flood elevation, and no construction is permitted within any floodway that will increase the 100-year flood elevation. Jefferson County's ordinance also prohibits construction

within floodplains on new lots. According to the Jefferson County Subdivision Ordinance, a stormwater management plan must be developed that is capable of controlling the two-year storm, passing the ten-year storm through the principal control structure, and providing an emergency spillway or routing for the 100-year storm.

b) Cumulative Impacts

Cumulative impacts of past, present, and future projects on the social or natural environment are viewed as a whole. Changes due to individual projects may seem insignificant, but the cumulative analysis considers how these small changes add up. This assessment examined anticipated countywide trends over the past two decades and next two decades.

Development projects within the project area could result in cumulative effects on surrounding environmental resources, including water resources, wetlands, floodplains, and natural communities. The prevalence of historic sites and districts indicates that development projects could impact these resources as well – if not directly within the footprint of the districts, certainly within the viewshed.

The project area has not drastically changed within the past twenty years. Countywide, SR-9 was constructed as a four lane facility between the Virginia line and Berkeley County while residential and commercial growth occurred concentrated in Charles Town and Shepherdstown. The US 340 project area is predominantly agricultural. One modern subdivision has been constructed to date; Ryan's Glen includes about a dozen large, single family homes on two acre lots. The majority of the existing development occurred prior to 1980, although the region is slowly beginning to transition to a residential community for metropolitan DC commuters. The comprehensive plan identifies the potential to extend public infrastructure (water, natural gas, and telecommunications) further into the county, although no timelines or funding sources are identified. The MPO's long range transportation plan does not include any additional highway capacity improvement projects within the vicinity of the project corridor. For these reasons, there are minimal plans for future development-related projects that could affect the surrounding environment.

Because there has been relatively little change in the area in the past twenty years, there are minimal plans for future development projects, and the project itself is not expected to have a notable influence on land development, potential cumulative impacts of the project are

anticipated to be minimal. Aside from the construction of the Ryan's Glen neighborhood within the last decade, little to no growth has occurred in the vicinity. While there is one other planned subdivision in the project area, future growth is anticipated to be modest. Future development is somewhat constrained by the lack of public water and sewer infrastructure and by the region's commitment to its rural heritage. The *Envision Jefferson 2035* comprehensive plan notes, "one of the highest priorities of the [plan] and public was the desire to preserve rural landscapes, heritage, and lifestyle that attracted many residents to Jefferson County… to balance the demands of growth with the protection of agricultural lands." The plan states that, between 1974 and 2007, approximately 14,000 acres of land within the county were removed from agricultural production.

4. Short-term Use versus Long-term Productivity

The build alternates under consideration would have similar impacts on local short-term uses of resources and enhancement of long-term productivity. There may be limited adverse short-term effects on the human environment during project construction. There may be minor siltation of local surface waters during construction. This is minimized by strict adherence to best management practices. Increased noise levels due to construction would also be short-term.

The proposed project is classified as a long-term productive facility. It is consistent with planning efforts at both the state (Statewide Transportation Improvement Program) and local level (Envision Jefferson 2035 Comprehensive Plan and the Hagerstown/Eastern Panhandle Metropolitan Planning Organization). This project, with its improved design characteristics, provides for safe and efficient vehicle operation for future as well as present travel time. The benefits such as reduced operating costs, reduced travel time, increased safety, and general enhancement of the area offered by the long-term productivity of this project should more than offset the short-term inconvenience and any adverse effects on the human environment.

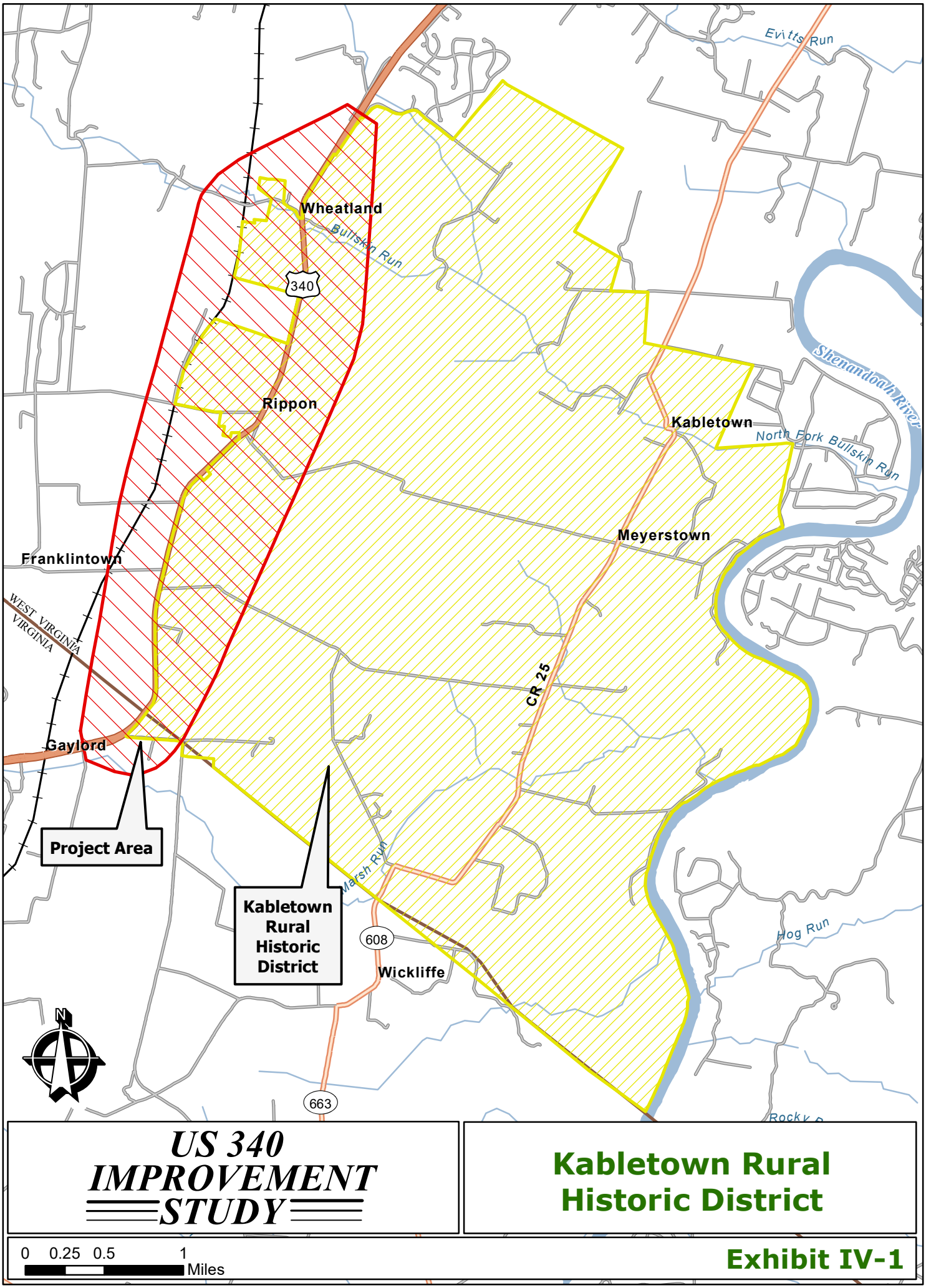
5. Irreversible and Irretrievable Commitment of Resources

Implementation of the proposed project involves a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for use of the land or if the highway facility

is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion will be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material are expended. Additionally, large amounts of labor and natural resources are used in the fabrication and preparation of construction materials. These materials are generally not retrievable. They are not in short supply and their use does not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of state/federal funds that are not retrievable.

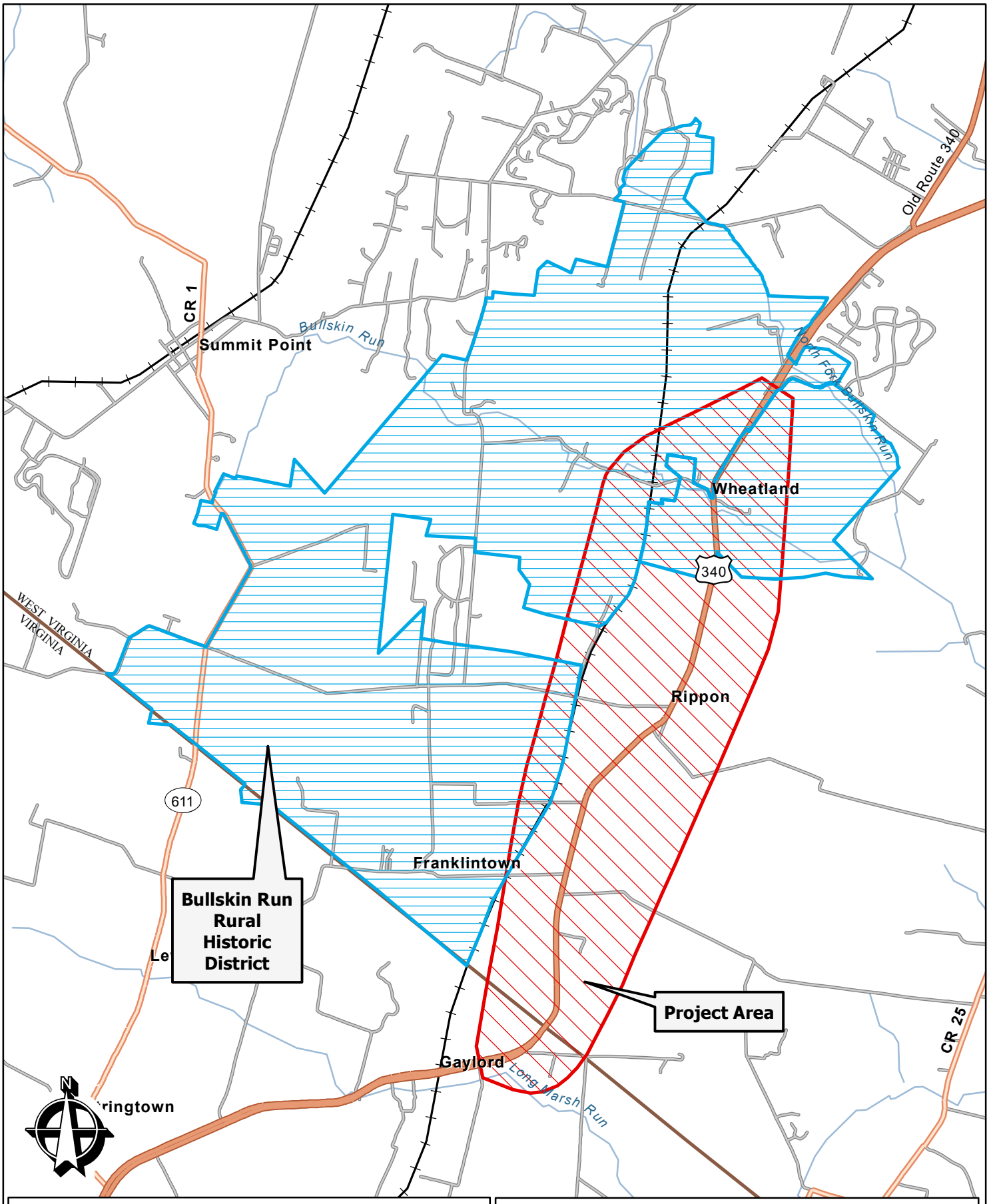
The commitment of these resources is based on the concept that residents in the immediate area, region, and state benefit by the improved quality of the transportation system. These benefits consist of improved quality, accessibility and safety, savings in time, and greater availability of quality services that are anticipated to outweigh the commitment of these resources.



US 340 IMPROVEMENT STUDY

Kabletown Rural Historic District

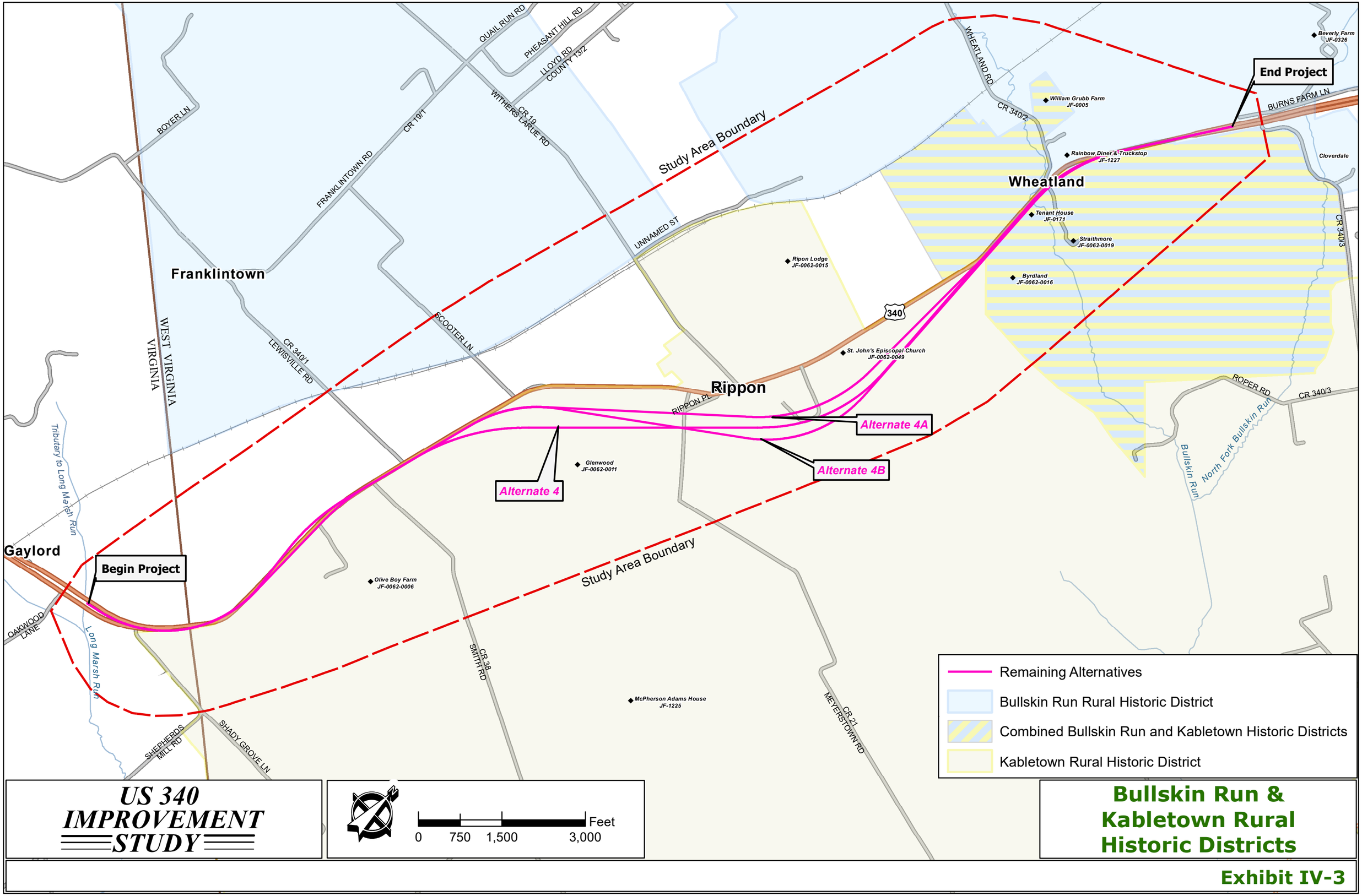
Exhibit IV-1



US 340 IMPROVEMENT STUDY

Bullskin Run Rural Historic District

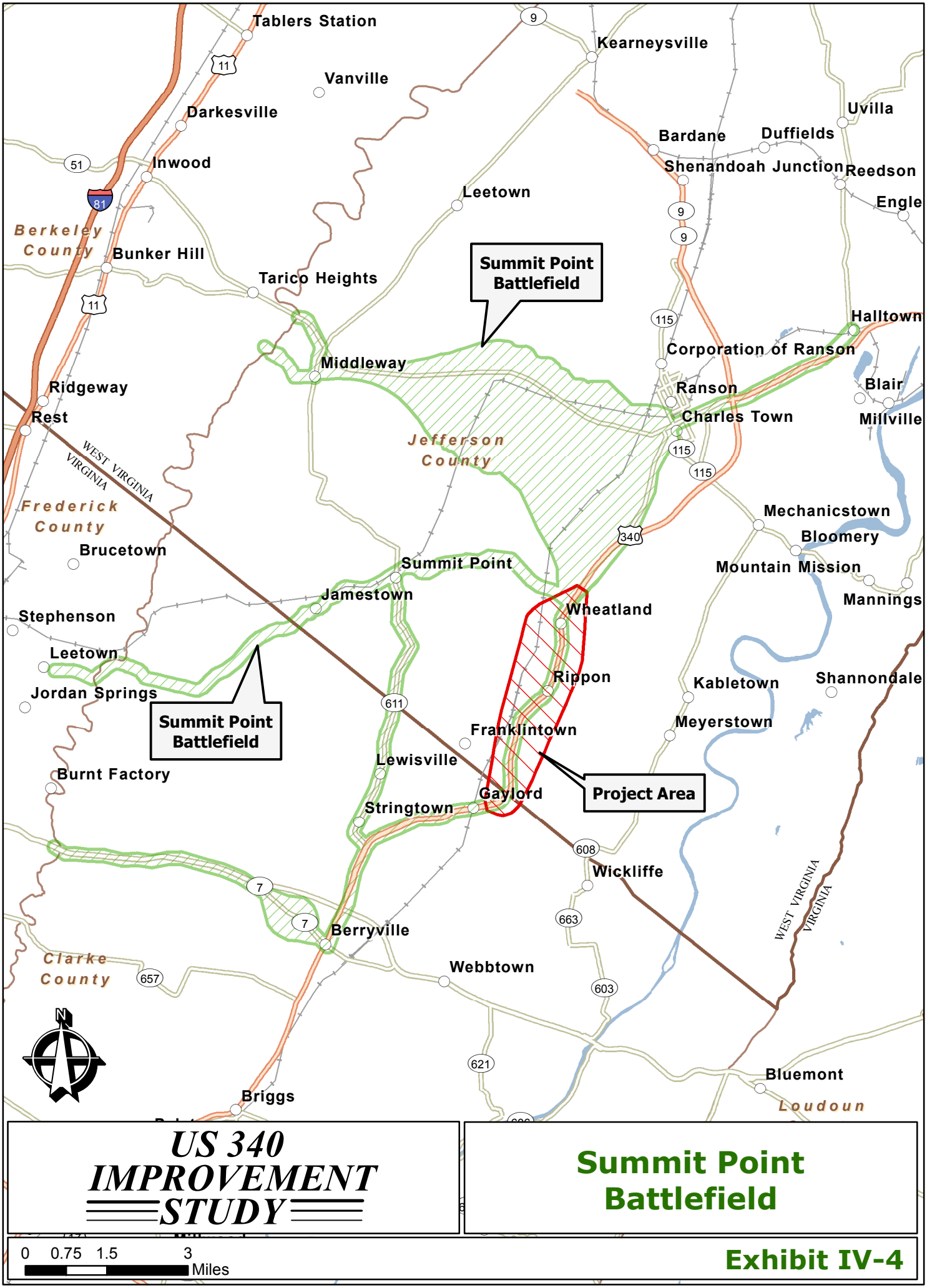
Exhibit IV-2



US 340 IMPROVEMENT STUDY

Bullskin Run & Kabletown Rural Historic Districts

Exhibit IV-3

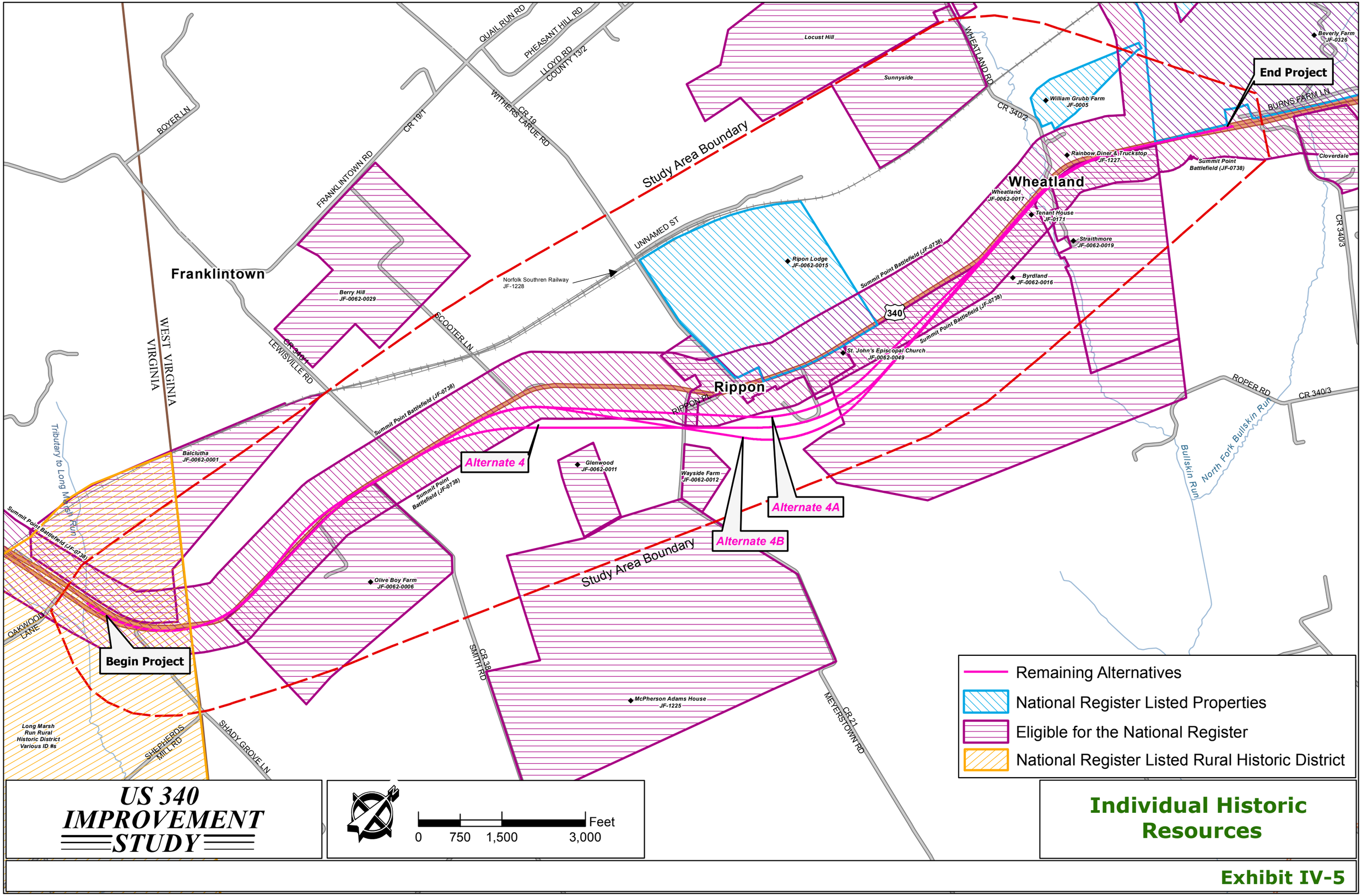


US 340 IMPROVEMENT STUDY

Summit Point Battlefield

0 0.75 1.5 3 Miles

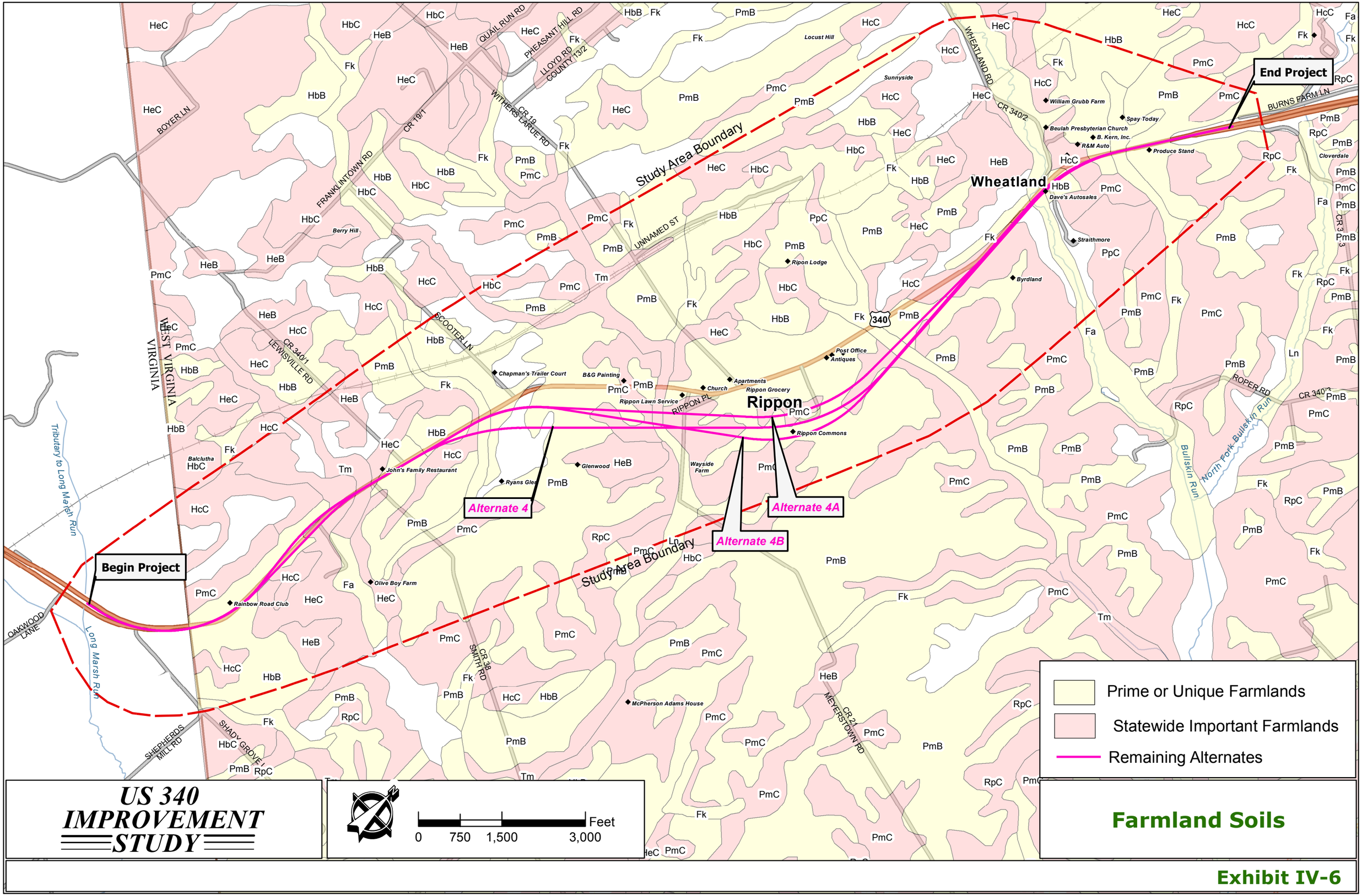
Exhibit IV-4

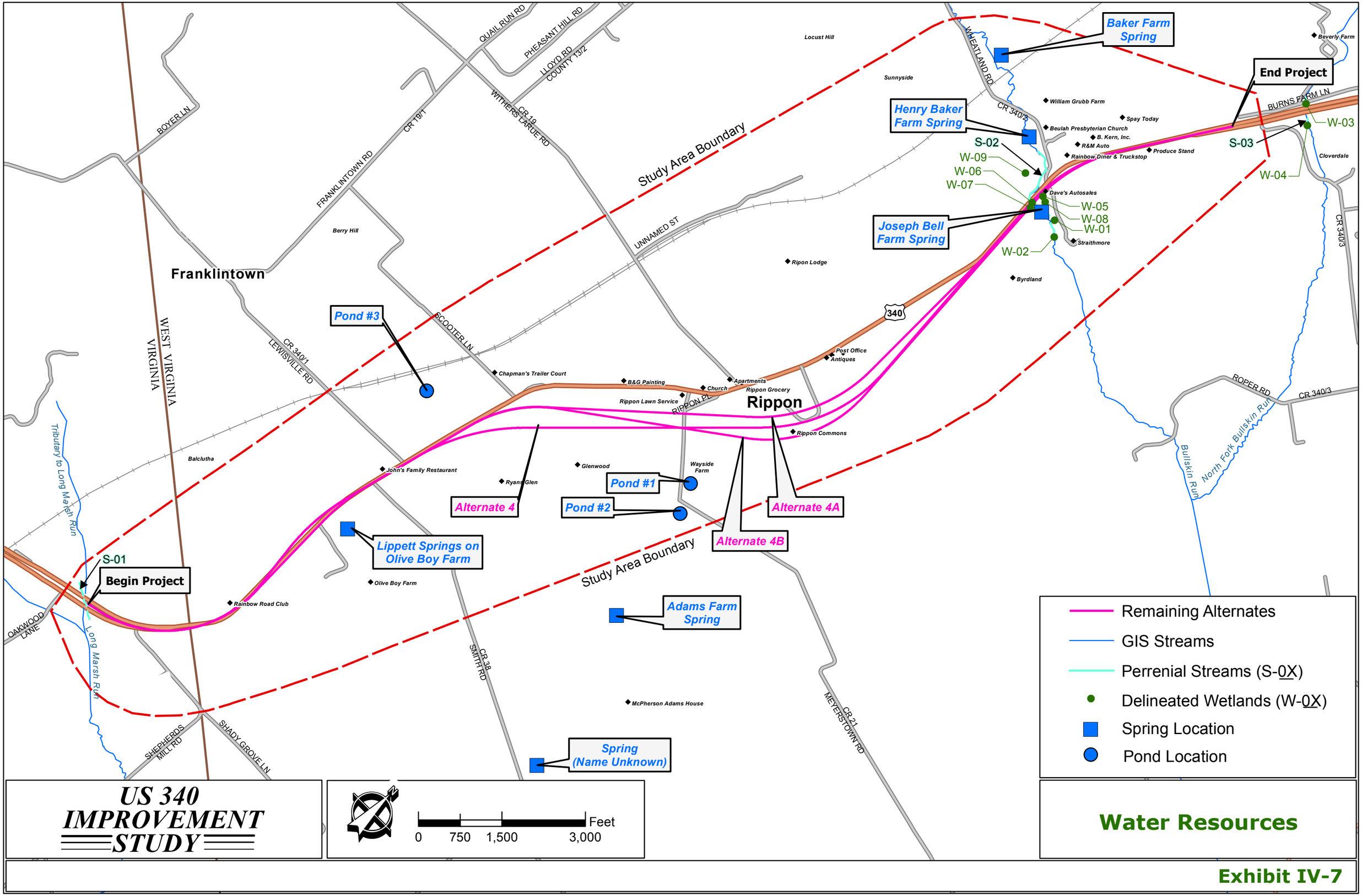


US 340 IMPROVEMENT STUDY

Individual Historic Resources

Exhibit IV-5

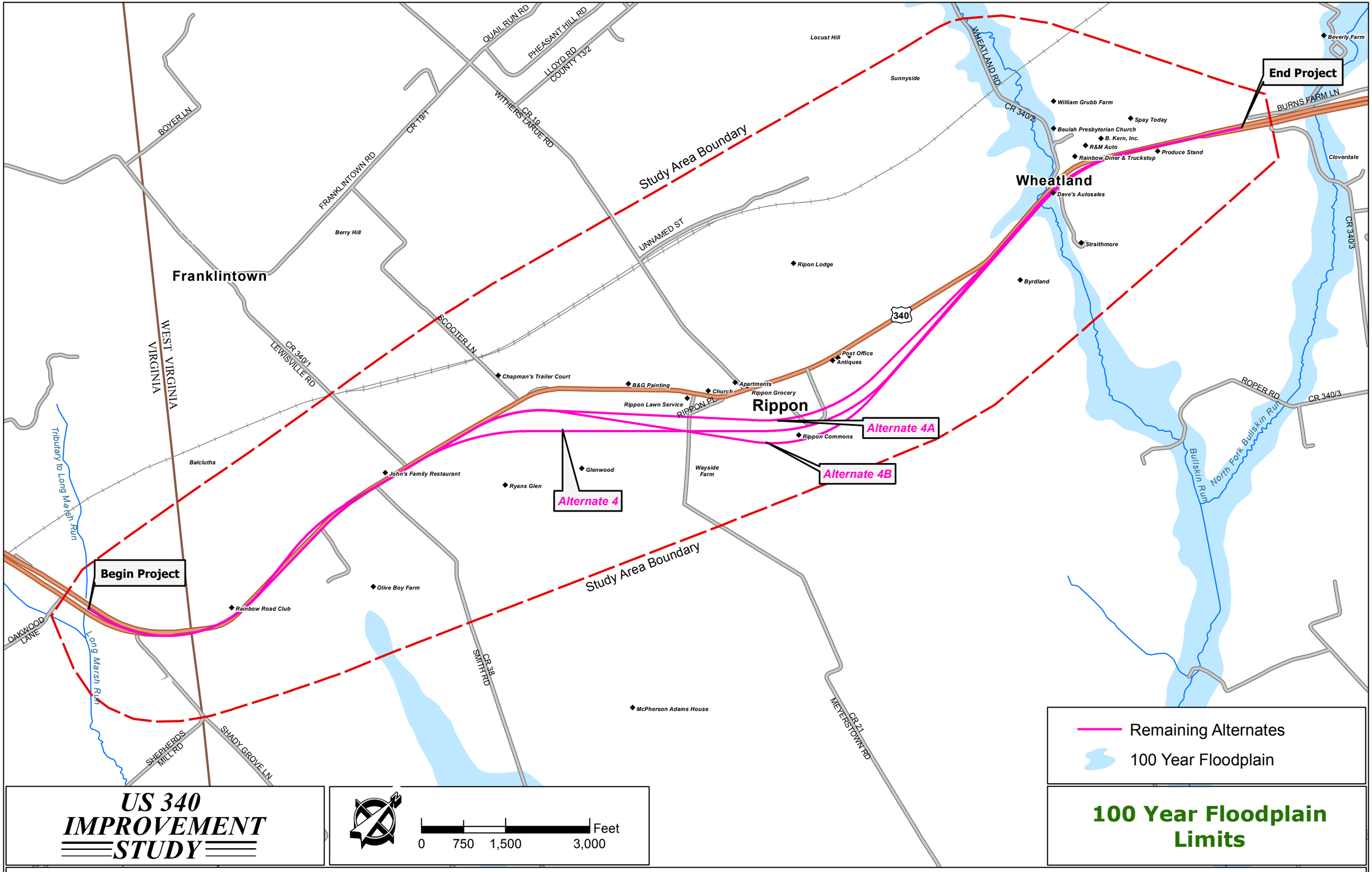

End Project
Begin Project
Alternate 4
Alternate 4A
Alternate 4B
Study Area Boundary
Study Area Boundary
Wheatland
Rippon
WEST VIRGINIA
VIRGINIA
BOYER LN
FRANKLINTOWN RD
CR 19/1
QUAIL RUN RD
PHEASANT HILL RD
LLOYD RD
COUNTY 13/2
WITHERS LARUE RD
CR 19
UNNAMED ST
SCOOTER LN
LEWISVILLE RD
CR 340/1
WHEATLAND RD
CR 340/2
BURNS FARM LN
RIPPON PL
ROPER RD
CR 340/3
MEYERSTOWN RD
CR 24
SMITH RD
CR 38
SHADY GROVE
SHEPHERDS MILL RD
OAKWOOD LANE
Long Marsh Run
Tributary to Long Marsh Run
North Fork Bullskin Run
Bullskin Run
Locust Hill
Sunnyside
Berry Hill
Balclutha
Wayside Farm
Cloverdale
Dave's Autosales
Straithmore
Byrdland
Ripon Lodge
Post Office Antiques
Chapman's Trailer Court
B&G Painting
Church
Apartments
Rippon Grocery
Rippon Lawn Service
Rippon Commons
William Grubb Farm
Spay Today
Beulah Presbyterian Church
B. Kern, Inc.
R&M Auto
Produce Stand
John's Family Restaurant
Glenwood
Ryans Glen
Olive Boy Farm
Rainbow Road Club
McPherson Adams House
340
Prime or Unique Farmlands
Statewide Important Farmlands
Remaining Alternates
US 340 IMPROVEMENT STUDY
0 750 1,500 3,000 Feet
Farmland Soils
Exhibit IV-6



US 340 IMPROVEMENT STUDY

Water Resources

Exhibit IV-7



US 340 IMPROVEMENT STUDY

100 Year Floodplain Limits

Exhibit IV-8

500
475
525
CR 340/2
S-02
W-09
W-08
W-05
W-06
W-07
W-01
W-02
Straightmore Farm Ln
Dave's Autosales
Cloverdale
Straithmore
Alternate 4A
Alternate 4
Alternate 4B
340

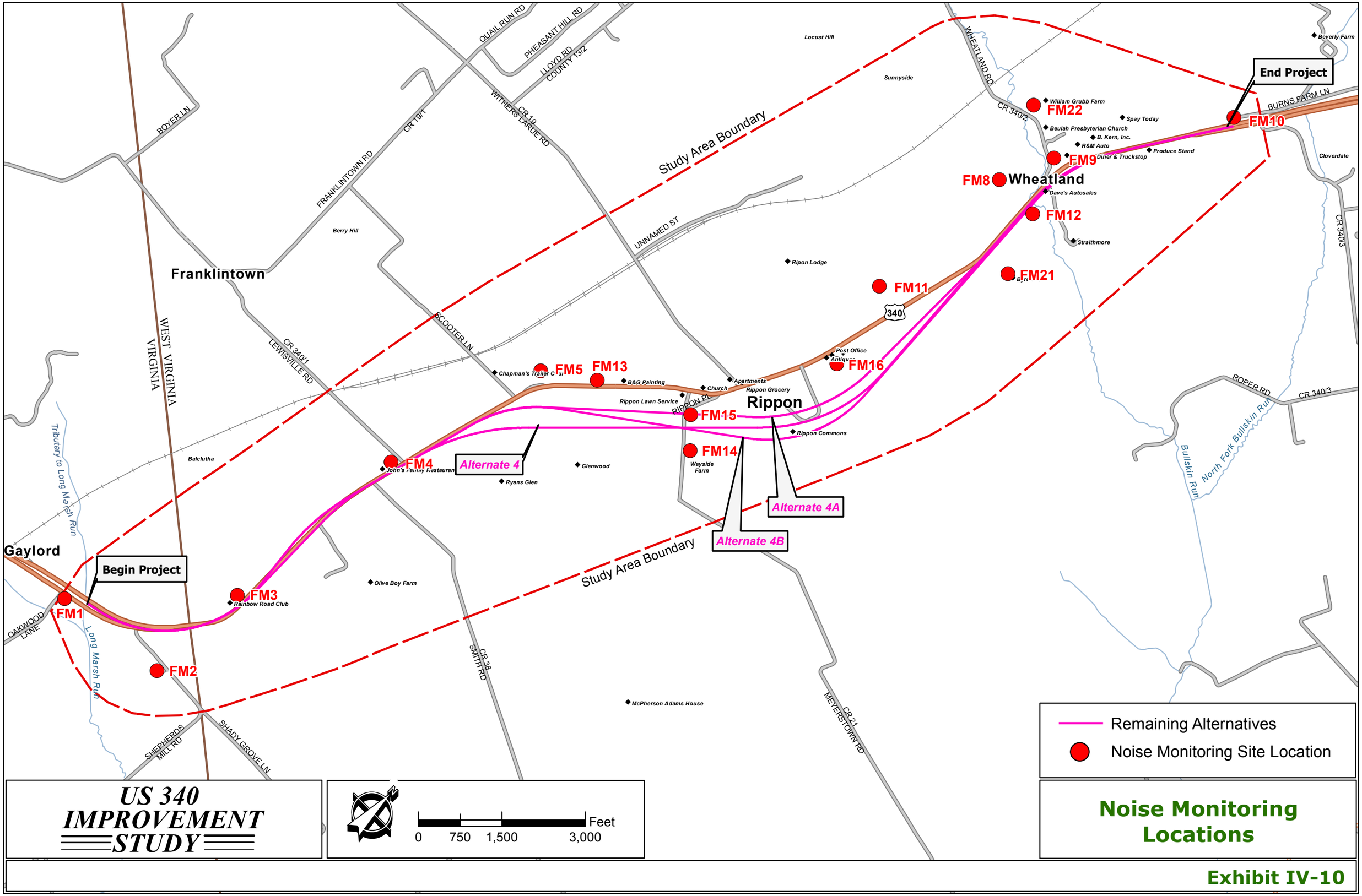
Perrenial Streams (S-0X)
Delineated Wetlands (W-0X)
Alternate 4 ROW
Alternate 4A ROW
Alternate 4B ROW

0 75 150 300 Feet

US 340 IMPROVEMENT STUDY

Stream and Wetland Impacts

Exhibit IV-9


Study Area Boundary
End Project
Begin Project
Alternate 4
Alternate 4A
Alternate 4B
FM1
FM2
FM3
FM4
FM5
FM8
FM9
FM10
FM11
FM12
FM13
FM14
FM15
FM16
FM21
Wheatland
Rippon
Franklintown
Gaylord
Locust Hill
Sunnyside
Berry Hill
Ripon Lodge
Balclutha
Glenwood
Olive Boy Farm
McPherson Adams House
Cloverdale
Beverly Farm
William Grubb Farm
Spay Today
Beulah Presbyterian Church
B. Kern, Inc.
R&M Auto
Diner & Truckstop
Produce Stand
Dave's Autosales
Straithmore
Post Office
Antiques
Chapman's Trailer Ct
B&G Painting
Church
Apartments
Rippon Grocery
Rippon Lawn Service
Rippon Commons
Wayside Farm
John's Family Restaurant
Ryans Glen
Rainbow Road Club
BOYER LN
FRANKLINTOWN RD
CR 19/1
QUAIL RUN RD
PHEASANT HILL RD
LLOYD RD
COUNTY 13/2
WITHERS LARUE RD
CR 19
WHEATLAND RD
CR 340/2
BURNS FARM LN
UNNAMED ST
SCOOTER LN
RIPPON PL
340
CR 340/3
ROPER RD
CR 340/1
LEWISVILLE RD
WEST VIRGINIA
VIRGINIA
Tributary to Long Marsh Run
Long Marsh Run
North Fork Bullskin Run
Bullskin Run
OAKWOOD LANE
SHEPHERDS MILL RD
SHADY GROVE LN
CR 38
SMITH RD
CR 21
MEYERSTOWN RD
Remaining Alternatives
Noise Monitoring Site Location
US 340 IMPROVEMENT STUDY
0
750
1,500
3,000
Feet
Noise Monitoring Locations
Exhibit IV-10