U.S. Department
of Transportation
Federal Highway
Administration

West Virginia Division

December 17, 2019

154 Court Street
Charleston, West Virginia 25301
Phone (304) 347-5928
Fax (304) 347-5103

IN REPLY REFER TO:
Federal Project NHPP-0522(042)D
State Project U333-522-11.92
Fairview Connector
Morgan County

Ben L. Hark
Environmental Section Head
Engineering Division
West Virginia Division of Highways
Charleston, West Virginia 25305

Dear Mr. Hark:

Please find enclosed a copy of the approved Categorical Exclusion (CE) for the above referenced project. Should you have any questions regarding the enclosed information, please contact me at (304) 347-5435 or via email at ronald.krofcheck@dot.gov.

Sincerely yours,

Ronald A. Krofcheck

Ronald A. Krofcheck, P.E.
Corridor Management Engineer

Enclosure

CC: Project File, HEC, JEW, AB, RAK

Revised 4/11/2018

WEST VIRGINIA DIVISION OF HIGHWAYS

(For projects that will not result in significant environmental impacts and/or substantive public controversy)

I. PROJECT INFORMATION

A. Project Numbers: State: U333-522-11.92 SEC 07

Federal: NH-0522(018)C

B. Name: Fairview Connector

C: Route number:

D. County: Morgan

E. Category (Identified in 23CFR771.117 (c) or (d)):

Select Categorical Exclusion #

F. ADT: Existing -N/A Projected – N/A

G. Lat/Lon – 39°38'33.46"N, 78°12'33.93"W to 39°38'24.25"N, 78°12'2.03"W

H. Is this Project Federal Aid Eligible? YES

Prepared By Lowell R Fraum 12/10/19
(Signature & Date)

WVDOH Approval Ben Hark 12/10/19
(Signature & Date)

FHWA Approval By [signature] 12/17/19
(Signature & Date)

FHWA Approval Required? YES

I. Existing Conditions:

The proposed Fairview Connector is between the US 522 - Berkeley Springs Bypass and Fairview Drive near the War Memorial Hospital. Land use adjacent to and within the proposed project corridor is forested, barren/developed, and grasslands/Pastureland/Agricultural Land. The project will cover an approximate distance of 0.5 miles and will provide a much needed additional point on ingress and egress to the War Memorial Hospital. The connector road was proposed to enhance the community's access to the new hospital complex by rerouting emergency services traffic from the existing route via US 522 through the Town of Berkeley Springs (Route 522 North Washington Street, Fairfax Street, to Fairview Drive). The Fairview Connector Road will provide a more direct route to the hospital improving emergency services accessibility and response times.

J. Preferred Alternative:

The Fairview Connector is an approximate 0.5 mile two-lane undivided rural connector road which connects existing CR 2 (Fairview Drive) to US 522 Berkeley Springs Bypass and features a design speed of 45 miles per hour. The eastern terminus connects at the intersection of CR 2 and Healthy Way, located approximately 0.10 miles south of War Memorial Hospital. Right of way acquisition will be required.

K. Other Alternatives Considered:

Two options were originally considered for the Fairview Connector. Option 1 connected to CR 2 (Fairview Drive) north of the War Memorial Hospital and Option 2 (Preferred Alternative) connected to WV 2 south of the War Memorial Hospital. Both options were presented at the Public Meeting on April 19, 2018. Option 1 received numerous comments with concerns due to its proximity to its proximity to the Fairview Subdivision as well as the topography. Due to potential impacts to the Fairview Subdivision, the WVDOH eliminated Option 1 from further consideration.

The No Build Alternative was also considered.

II. IMPACT EVALUATION

A. SOCIOECONOMIC IMPACTS	Yes	No	Comments, Correspondence, and/or Mitigation proposed
1. Right of Way \ Easements Required	☑	☐	New road construction
a. Federal Land *	☐	☑	
2. Maintenance of Traffic	☑	☐	Temporary construction impacts
3. Public Controversy *	☐	☑	

B. CULTURAL IMPACTS	Yes	No	Comments, Correspondence, and/or Mitigation proposed
1. History	☐	☑	SHPO letter of April 15, 2019 states their concurrence of no adverse effect on the historic resources in the project area.
a) Adverse Effect*	☐	☑	
2. Archaeology	☐	☑	SHPO letter of July 9, 2019 states their concurrence of no adverse effect on the archaeological resources within the project area.
a) Adverse Effect*	☐	☑	

C. FORESTS, PARKS & REC AREAS COORDINATION	Yes	No	Comments, Correspondence, and/or Mitigation proposed
1. US Forest Service	☐	☑	
2. US Army Corp of Engineers	☐	☑	
3. National Park Service	☐	☑	
a) Wild and Scenic River	☐	☑	
b) National River	☐	☑	
4. National Wildlife Refuge	☐	☑	
5. State Park	☐	☑	
6. State Forest	☐	☑	
7. State Wildlife Management Area	☐	☑	
8. Other Park or Recreational Area	☐	☑	

D. SECTION 4(f), 6(f) Impacts	Yes	No	Comments, Correspondence, and/or Mitigation proposed
1. Historic Property *	☐	☑	
2. Park, Recreational *	☐	☑	
3. De Minimis 4(f) *	☐	☑	
4. Programmatic 4(f) *	☐	☑	
5. Individual 4(f) *	☐	☑	
6. LWCFA 6(F)	☐	☑	
7. Temporary Change of use of property 6(f)	☐	☑	
8. Conversion of property 6(f) *	☐	☑	

E. NATURAL RESOURCES COORDINATION

	Yes	No	Comments, Correspondence, and/or Mitigation proposed
1. US Fish and Wildlife	☐	☑	USFWS Concurrence Form for Myotid Bat Survey Reports on November 15, 2018. The USFWS concurred with the "have no effect/not likely to adversely affect" determination.
a) Formal Consultation *	☐	☑	
2. Division of Natural Resources	☐	☑	WVDNR 11/1/2019 letter states there are no known records of any RTE species or natural trout streams within the project area.
3. Floodplain Encroachment	☐	☑	There are no 100-year flood zone impacts associated with the project area.
4. Farmland Involvement	☐	☑	

F. PERMITS REQUIRED

	Yes	No	Comments, Correspondence, and/or Mitigation proposed
1. 404	☐	☑	
a) Nationwide	☐	☑	
b) Individual *	☐	☑	
2. USCG (Section 9 involving a bridge) *	☐	☑	
3. USCG (Section 10 doesn't involve bridge) *	☐	☑	
4. Fed Special Use Permit (Const)*	☐	☑	
a) US Forest Service *	☐	☑	
b) National Park Service *	☐	☑	
c) US Fish and Wildlife Service *	☐	☑	
G. NOISE (Mitigation Required) *	☐	☑	The US 52 Berkeley Springs Bypass and Fairview Connector Noise Study (CDM Smith, 2019) states that there are no sites that were identified as having sound level impacts.
H. AIR QUALITY	☐	☑	Temporary construction impacts.
I. Haz WASTE/UNDERGRD TANKS	☐	☑	
J. Airport Coordination (within 2 miles)	☐	☑	

III. PUBLIC INVOLVEMENT:

An open-house public meeting was held on April 19, 2018 where the Option 1 and Option 2 were presented for the Fairview Connector. A second open house public meeting was held on February 28, 2019 where the Preferred Alternative of the Fairview Connector (Option 1) was presented.

IV. ACTION(S) REQUIRED:

☐ A. Mussel Survey/Relocation for State listed Streams
☐ B. Mussel Relocation for Endangered Species Stream
☑ C. Environmental Commitment Checklist

*** If you have answered "yes" to any of the * red questions then this cannot be cleared as a Type 2 PCE (Programmatic Categorical Exclusion). It will need to be processed as a Categorical Exclusion requiring FHWA approval or a higher level of NEPA documentation. IF THE PROJECT HAS CHANGES THAT ARE NOT IN THIS DOCUMENT THE PROJECT NEEDS TO BE RESUBMITTED TO THE ENVIRONMENTAL SECTION FOR REVIEW. WASTE AND BORROW AREAS OUTSIDE OF THE PROJECT LIMITS NEED A SEPARATE REVIEW.**

List of acronyms:

- **4(f) -** Section 4(f) of The Department of Transportation Act
- **6(f) -** Section 6(f) - Land and Water Conservation Act
- **CFR –** Code of Federal Rules
- **DNR –** West Virginia Division of Natural Resources
- **FWS –** United States Fish and Wildlife System
- **MOA –** Memorandum of Agreement
- **MOU –** Memorandum of Understanding
- **MS4 –** Municipal Separate Storm Sewer System
- **NPDES –** National Pollution Discharge Elimination System
- **NRCS –** National Resources Conservation Service
- **RE –** Review Exempt
- **RTE –** Rare and Threated Species
- **Section 10 -** Section 10 of the Rivers and Harbors Appropriation Act (deals with navigable waters of US)
- **SHPO –** State Historic Preservation Office
- **THPO –** Tribal Historic Preservation Office
- **USCG –** United States Coast Guard

For your use the following table is a list of common project types and their associated CE number. If your project can't be found in the table below please refer to the list of CEs.

Categorical Exclusion #	Project Types Covered Under Category
c(8)	Traffic Signal Installation
c(9)	• Emergency Projects (declared emergency)
c(18)	• Replace Railroad Crossing Surface • Railroad Betterments • Add Railroad Track Circuits • Upgrade Railroad Crossing Device
c(21)	• Dynamic Message Sign
c(22)	• Culvert Replacement / Repair • Bank Stabilization • Slip Repair • Sediment Removal • Soil Nails • Scour Repair • Drainage Repair
c(23)	• Building Demo
c(24)	• Core Borings
c(25)	• Stream Restoration
c(26) *must meet constraints	• Pipe Installation • Resurfacing • LMC / Concrete Overlay • Clean & Paint • Drainage Structure Replacement • Box Culvert • Small Structure Replacement • Cold Mix Asphalt (CMA) Paving • Adding Turn Lane • Roadway Striping

Categorical Exclusion #	Project Types Covered Under Category
	• Recall Striping • APD Pavement Sealing • High Friction Surface Treatment (HFST) • Ramp Widening • Statewide Raised Pavement Markers (RPM)
c(27) *must meet constraints	• Guardrail • ADA Compliance • Signal Renovation / Modification • Warning Flashers (use 18 if for Railroad) • Lighting
c(28) *must meet constraints	• Bridge Repair / Replacement
d(13)	• c(26), c(27), c(28) above that don't meet the constraints

*** Must meet the following constraints:**

- An acquisition of more than a minor amount of right-of-way or that would result in any residential or non-residential displacements;
- An action that needs a bridge permit from the U.S. Coast Guard, or an action that does not meet the terms and conditions of a U.S. Army Corps of Engineers nationwide or general permit under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899;
- A finding of "adverse effect" to historic properties under the National Historic Preservation Act, the use of a resource protected under 23 U.S.C. 138 or 49 U.S.C. 303 (section 4(f)) except for actions resulting in *de minimis* impacts, or a finding of "may affect, likely to adversely affect" threatened or endangered species or critical habitat under the Endangered Species Act;
- Construction of temporary access, or the closure of existing road, bridge, or ramps, that would result in major traffic disruptions;
- Changes in access control;
- A floodplain encroachment other than functionally dependent uses (e.g., bridges, wetlands) or actions that facilitate open space use (e.g., recreational trails, bicycle and pedestrian paths); or construction activities in, across or adjacent to a river component designated or proposed for inclusion in the National System of Wild and Scenic Rivers.

For your convenience the following list of CEs from 23CFR771.117 (c) and (d) are being provided please select the appropriate CE from the list below:

c(1) Activities which do not involve or lead directly to construction, such as planning and research activities; grants for training; engineering to define the elements of a proposed action or alternatives so that social, economic, and environmental effects can be assessed; and Federal-aid system revisions which establish classes of highways on the Federal-aid highway system.

c(2) Approval of utility installations along or across a transportation facility.

c(3) Construction of bicycle and pedestrian lanes, paths, and facilities.

c(4) Activities included in the State's *highway safety plan* under 23 U.S.C. 402.

c(5) Transfer of Federal lands pursuant to 23 U.S.C. 107(d) and/or 23 U.S.C. 317 when the land transfer is in support of an action that is not otherwise subject to FHWA review under NEPA.

c(6) The installation of noise barriers or alterations to existing publicly owned buildings to provide for noise reduction.

c(7) Landscaping.

c(8) Installation of fencing, signs, pavement markings, small passenger shelters, traffic signals, and railroad warning devices where no substantial land acquisition or traffic disruption will occur.

c(9) The following actions for transportation facilities damaged by an incident resulting in an emergency declared by the Governor of the State and concurred in by the Secretary, or a disaster or emergency declared by the President pursuant to the Robert T. Stafford Act (42 U.S.C. 5121):

(i) Emergency repairs under 23 U.S.C. 125; and

(ii) The repair, reconstruction, restoration, retrofitting, or replacement of any road, highway, bridge, tunnel, or transit facility (such as a ferry dock or bus transfer station), including ancillary transportation facilities (such as pedestrian/bicycle paths and bike lanes), that is in operation or under construction when damaged and the action:

(A) Occurs within the existing right-of-way and in a manner that substantially conforms to the preexisting design, function, and location as the original (which may include upgrades to meet existing codes and standards as well as upgrades warranted to address conditions that have changed since the original construction); and

(B) Is commenced within a 2-year period beginning on the date of the declaration.

c(10) Acquisition of scenic easements.

c(11) Determination of payback under 23 U.S.C. 156 for property previously acquired with Federal-aid participation.

c(12) Improvements to existing rest areas and truck weigh stations.

c(13) Ridesharing activities.

c(14) Bus and rail car rehabilitation.

c(15) Alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons.

c(16) Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increase service to meet routine changes in demand.

c(17) The purchase of vehicles by the applicant where the use of these vehicles can be accommodated by existing facilities or by new facilities which themselves are within a CE.

c(18) Track and railbed maintenance and improvements when carried out within the existing right-of-way.

c(19) Purchase and installation of operating or maintenance equipment to be located within the transit facility and with no significant impacts off the site.

c(20) Promulgation of rules, regulations, and directives.

c(21) Deployment of electronics, photonics, communications, or information processing used singly or in combination, or as components of a fully integrated system, to improve the efficiency or safety of a surface transportation system or to enhance security or passenger convenience. Examples include, but are not limited to, traffic control and detector devices, lane management systems, electronic payment equipment, automatic vehicle locaters, automated passenger counters, computer-aided dispatching systems, radio communications systems, dynamic message signs, and security equipment including surveillance and detection cameras on roadways and in transit facilities and on buses.

c(22) Projects, as defined in 23 U.S.C. 101, that would take place entirely within the existing operational right-of-way. Existing operational right-of-way refers to right-of-way that has been disturbed for an existing transportation facility or is maintained for a transportation purpose. This area includes the features associated with the physical footprint of the transportation facility (including the roadway, bridges, interchanges, culverts, drainage,

fixed guideways, mitigation areas, etc.) and other areas maintained for transportation purposes such as clear zone, traffic control signage, landscaping, any rest areas with direct access to a controlled access highway, areas maintained for safety and security of a transportation facility, parking facilities with direct access to an existing transportation facility, transit power substations, transit venting structures, and transit maintenance facilities. Portions of the right-of-way that have not been disturbed or that are not maintained for transportation purposes are not in the existing operational right-of-way.

c(23) Federally-funded projects:

(i) That receive less than $5,000,000 (as adjusted annually by the Secretary to reflect any increases in the Consumer Price Index prepared by the Department of Labor, see *www.fhwa.dot.gov* or *www.fta.dot.gov*) of Federal funds; or

(ii) With a total estimated cost of not more than $30,000,000 (as adjusted annually by the Secretary to reflect any increases in the Consumer Price Index prepared by the Department of Labor, see *www.fhwa.dot.gov* or *www.fta.dot.gov*) and Federal funds comprising less than 15 percent of the total estimated project cost.

c(24) Localized geotechnical and other investigation to provide information for preliminary design and for environmental analyses and permitting purposes, such as drilling test bores for soil sampling; archeological investigations for archeology resources assessment or similar survey; and wetland surveys.

c(25) Environmental restoration and pollution abatement actions to minimize or mitigate the impacts of any existing transportation facility (including retrofitting and construction of stormwater treatment systems to meet Federal and State requirements under sections 401 and 402 of the Federal Water Pollution Control Act (33 U.S.C. 1341; 1342)) carried out to address water pollution or environmental degradation.

c(26) Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes (including parking, weaving, turning, and climbing lanes) that meet the following constraints.

(1) An acquisition of more than a minor amount of right-of-way or that would result in any residential or non-residential displacements;

(2) An action that needs a bridge permit from the U.S. Coast Guard, or an action that does not meet the terms and conditions of a U.S. Army Corps of Engineers nationwide or general permit under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899;

(3) A finding of “adverse effect” to historic properties under the National Historic Preservation Act, the use of a resource protected under 23 U.S.C. 138 or 49 U.S.C. 303 (section 4(f)) except for actions resulting in *de minimis* impacts, or a finding of “may affect, likely to adversely affect” threatened or endangered species or critical habitat under the Endangered Species Act;

(4) Construction of temporary access, or the closure of existing road, bridge, or ramps, that would result in major traffic disruptions;

(5) Changes in access control;

(6) A floodplain encroachment other than functionally dependent uses (e.g., bridges, wetlands) or actions that facilitate open space use (e.g., recreational trails, bicycle and pedestrian paths); or construction activities in, across or adjacent to a river component designated or proposed for inclusion in the National System of Wild and Scenic Rivers.

c(27) Highway safety or traffic operations improvement projects, including the installation of ramp metering control devices and lighting, if the project meets the following constraints.

(1) An acquisition of more than a minor amount of right-of-way or that would result in any residential or non-residential displacements;

(2) An action that needs a bridge permit from the U.S. Coast Guard, or an action that does not meet the terms and conditions of a U.S. Army Corps of Engineers nationwide or general permit under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899;

(3) A finding of "adverse effect" to historic properties under the National Historic Preservation Act, the use of a resource protected under 23 U.S.C. 138 or 49 U.S.C. 303 (section 4(f)) except for actions resulting in *de minimis* impacts, or a finding of "may affect, likely to adversely affect" threatened or endangered species or critical habitat under the Endangered Species Act;

(4) Construction of temporary access, or the closure of existing road, bridge, or ramps, that would result in major traffic disruptions;

(5) Changes in access control;

(6) A floodplain encroachment other than functionally dependent uses (e.g., bridges, wetlands) or actions that facilitate open space use (e.g., recreational trails, bicycle and pedestrian paths); or construction activities in, across or adjacent to a river component designated or proposed for inclusion in the National System of Wild and Scenic Rivers.

c(28) Bridge rehabilitation, reconstruction, or replacement or the construction of grade separation to replace existing at-grade railroad crossings that meet the following constraints.

(1) An acquisition of more than a minor amount of right-of-way or that would result in any residential or non-residential displacements;

(2) An action that needs a bridge permit from the U.S. Coast Guard, or an action that does not meet the terms and conditions of a U.S. Army Corps of Engineers nationwide or general permit under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899;

(3) A finding of "adverse effect" to historic properties under the National Historic Preservation Act, the use of a resource protected under 23 U.S.C. 138 or 49 U.S.C. 303 (section 4(f)) except for actions resulting in *de minimis* impacts, or a finding of "may affect, likely to adversely affect" threatened or endangered species or critical habitat under the Endangered Species Act;

(4) Construction of temporary access, or the closure of existing road, bridge, or ramps, that would result in major traffic disruptions;

(5) Changes in access control;

(6) A floodplain encroachment other than functionally dependent uses (e.g., bridges, wetlands) or actions that facilitate open space use (e.g., recreational trails, bicycle and pedestrian paths); or construction activities in, across or adjacent to a river component designated or proposed for inclusion in the National System of Wild and Scenic Rivers.

c(29) Purchase, construction, replacement, or rehabilitation of ferry vessels (including improvements to ferry vessel safety, navigation, and security systems) that would not require a change in the function of the ferry terminals and can be accommodated by existing facilities or by new facilities which themselves are within a CE.

c(30) Rehabilitation or reconstruction of existing ferry facilities that occupy substantially the same geographic footprint, do not result in a change in their functional use, and do not result in a substantial increase in the existing facility's capacity. Example actions include work on pedestrian and vehicle transfer structures and associated utilities, buildings, and terminals.

d(4) Transportation corridor fringe parking facilities.

d(5) Construction of new truck weigh stations or rest areas.

d(6) Approvals for disposal of excess right-of-way or for joint or limited use of right-of-way, where the proposed use does not have significant adverse impacts.

d(7) Approvals for changes in access control.

d(8) Construction of new bus storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.

d(9) Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where only minor amounts of additional land are required and there is not a substantial increase in the number of users.

d(10) Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.

d(11) Construction of rail storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and where there is no significant noise impact on the surrounding community.

d(12) Acquisition of land for hardship or protective purposes. Hardship and protective buying will be permitted only for a particular parcel or a limited number of parcels. These types of land acquisition qualify for a CE only where the acquisition will not limit the evaluation of alternatives, including shifts in alignment for planned construction projects, which may be required in the NEPA process. No project development on such land may proceed until the NEPA process has been completed.

(i) Hardship acquisition is early acquisition of property by the applicant at the property owner's request to alleviate particular hardship to the owner, in contrast to others, because of an inability to sell his property. This is justified when the property owner can document on the basis of health, safety or financial reasons that remaining in the property poses an undue hardship compared to others.

(ii) Protective acquisition is done to prevent imminent development of a parcel which may be needed for a proposed transportation corridor or site. Documentation must clearly demonstrate that development of the land would preclude future transportation use and that such development is imminent. Advance acquisition is not permitted for the sole purpose of reducing the cost of property for a proposed project.

d(13) Actions described in paragraphs (c)(26), (c)(27), and (c)(28) of this section that do not meet the constraints.

(1) An acquisition of more than a minor amount of right-of-way or that would result in any residential or non-residential displacements;

(2) An action that needs a bridge permit from the U.S. Coast Guard, or an action that does not meet the terms and conditions of a U.S. Army Corps of Engineers nationwide or general permit under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899;

(3) A finding of “adverse effect” to historic properties under the National Historic Preservation Act, the use of a resource protected under 23 U.S.C. 138 or 49 U.S.C. 303 (section 4(f)) except for actions resulting in *de minimis* impacts, or a finding of “may affect, likely to adversely affect” threatened or endangered species or critical habitat under the Endangered Species Act;

(4) Construction of temporary access, or the closure of existing road, bridge, or ramps, that would result in major traffic disruptions;

(5) Changes in access control;

(6) A floodplain encroachment other than functionally dependent uses (e.g., bridges, wetlands) or actions that facilitate open space use (e.g., recreational trails, bicycle and pedestrian paths); or construction activities in, across or adjacent to a river component designated or proposed for inclusion in the National System of Wild and Scenic Rivers.

Project Number U333-522-11.92 SEC 07

Fairview Connector Categorical Exclusion List of Appendices

Figure: Project Overview

SHPO Letter – Historical Resources, 4/15/2019

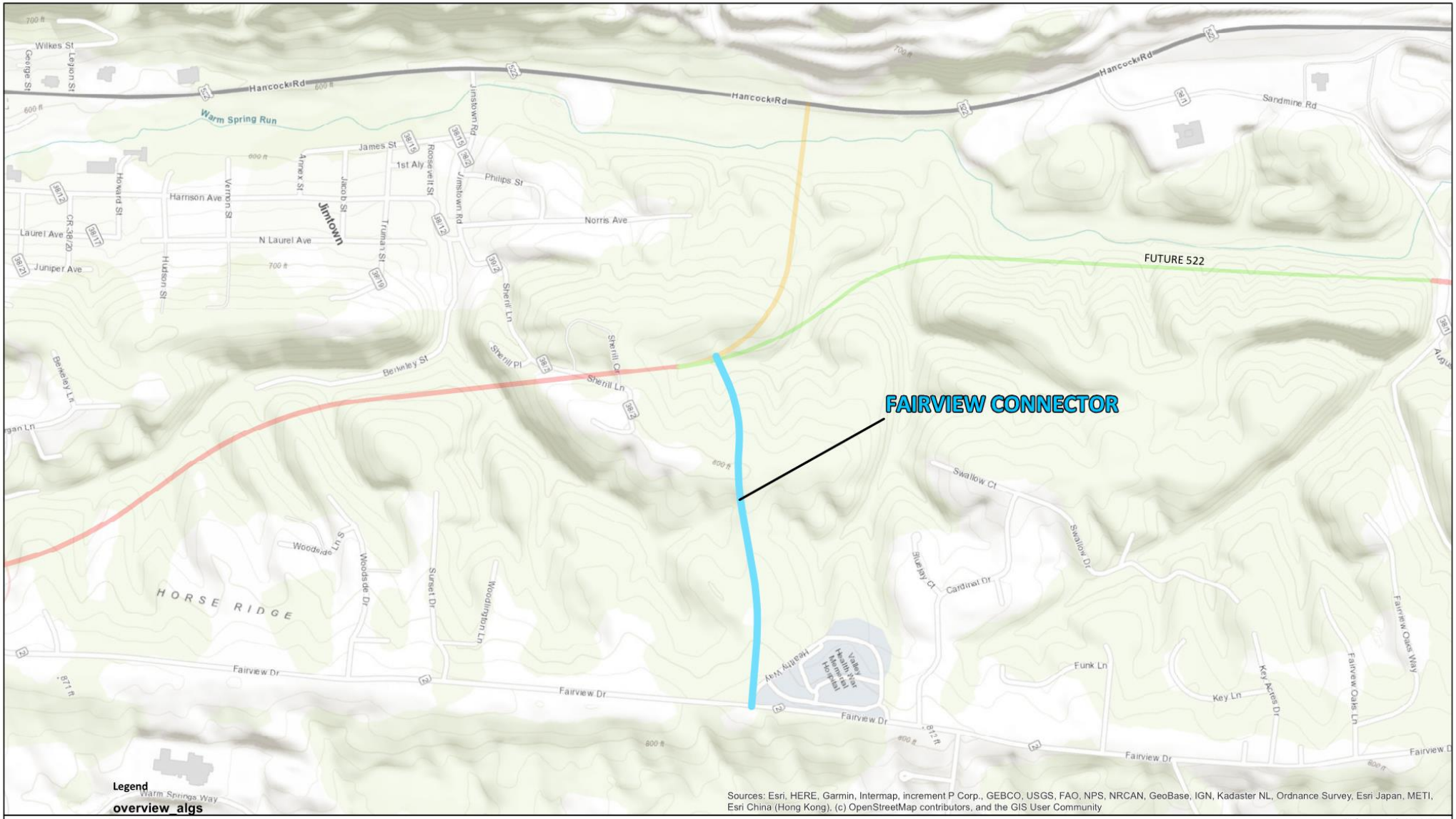
SHPO Letter – Archaeological Resources, 7/9/2019

USFWS Letter, 11/15/2018

NRCS AD Form 1006

WVDNR Letter, 11/1/2019

US 522 Berkeley Springs Bypass and Fairview Connector Project Noise Study, August 2019



Layer, RefName

- Fairview Connector
- US 522 Preferred Alternative
- Berkeley Springs Bypass
- Side Roads and Ramps
- Deviation From Preferred Alternative

US 522 FAIRVIEW CONNECTOR
PROJECT OVERVIEW

Relocated US 522
Morgan County, WV

0 375 750 1,500 Feet

CDM Smith

MARTINRW Z:\Projects\WVDOT\US 522\US 522 Draft Reevaluation\Figures\522_projectoverview_fairviewconn.mxd 7/31/2019

WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

April 15, 2019

Mr. Ben L. Hark
Environmental Section Head
Engineering Division
West Virginia Division of Highways
1334 Smith Street
Charleston, West Virginia 25305

RE: US 522–Fairview Connector Project
Morgan County, West Virginia
Federal Project No. N/A
State Project No. U333-522-11.92
FR: 19-370-MN-1

Dear Mr. Hark:

We received your submission dated March 15, 2019, which your office prepared to facilitate our review of the aforementioned project. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR § 800: "Protection of Historic Properties," we submit our comments.

According to submitted information, West Virginia Department of Transportation, Division of Highways (WVDOH) proposes to construct a new US 522 roadway to the east of Berkeley Springs and a Fairview Connector just north of Berkeley Springs in Morgan County, West Virginia. The project consultant, Cultural Resource Analysts, Inc. (CRA) documented a total of 123 properties within the proposed undertaking's area of potential effects. As the submission did not address archaeological resources, we expect to receive a separate submission to that effect in the future.

Architectural Resources:
We have completed our review of the proposed US 522–Fairview Connector Project. The consultant surveyed the undertaking with an area of potential effects (APE) of 1,000 feet on either side of the project centerline. As noted in our previous letter, this decision was made without consulting with our office; however, after review of the submitted information, aerial imagery, and topographic mapping, we accepted the proposed APE. It appears that the surrounding topography and vegetation growth will shield significant views that the Town of Bath Historic District might have of the undertaking.

Generally, we concur with the consultant's recommendations regarding the eligibility of the 123 properties documented for the undertaking. The large majority of those properties are residential

dwellings that have experienced a significant loss of historical integrity of materials and workmanship. According to the consultant, research and documentation identified no associations for the 123 properties with significant patterns or individuals that have influenced the broad patterns of our nation's history. Furthermore, the consultant argues none of the properties embody the distinctive characteristics of any type, period, or method of construction. We concur with these findings, except in the cases of seven (7) resources.

Regarding the Pines for Crippled Children/War Memorial Hospital (MN-0011-0102), it is our opinion additional information would be needed to make a comprehensive determination of eligibility for that property, especially under Criteria A and C. Certainly the Nurses' Dormitory (MN-0011-0104) retains some integrity as well as the possibility of being considered eligible under those Criteria. The same concerns extend to the US Silica Headquarters along Sand Mine Road (MN-0351).

The submitted information indicated the home at 178 Rugby Lane (MN-0273) is not eligible due to extensive renovations that occurred in 1940. But the report and inventory form failed to consider whether those changes are historic in their own right. Additional documentation and evaluation would be necessary to adequately consider the potential eligibility of that property.

Lastly, the submitted photographs struggled to document the homes located at 220 Dhayer Lane (MN-0289), 1479 Valley Road (MN-0298), and along Fairfax Street (MN-0342). Those three (3) properties were shielded from public view due to extensive vegetation growth and topography in the area. While it appears MN-0342 is likely not eligible for inclusion in the National Register, we are unable to come to the same conclusion regarding the other two properties.

There is also a small handful of properties, that, if a district were identified in the area, would contribute to that listing. The submitted report indicated no such district exists in the area, which would render those properties not eligible for inclusion in the National Register under any Criteria or property type.

After assessing the surrounding topography, nature of the undertaking, the locations of the aforementioned seven (7) properties, and the location of proposed construction work in relation to those properties, it is our opinion the project will have *no adverse effect* on those resources, even if some of them were deemed eligible for inclusion in the National Register. Surrounding construction, vegetation, and topography will shield most of the proposed work from those properties. Furthermore, it is unlikely research will reveal association any of those properties might share with patterns or individuals that have influenced the broad patterns of our nation's history. Under such circumstances, the aspect of setting would not contribute to those properties' eligibility, which is the only aspect of integrity that would be affected by the undertaking. Thus, no further consultation is necessary regarding architectural resources; however, we ask that you contact our office if your project should change.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Mitchell K. Schaefer, Structural Historian, at (304) 558-0240.*

Sincerely,

Jennifer Brennan for

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/MKS

WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

July 9, 2019

Mr. Ben L. Hark
Environmental Section Head
Engineering Division
West Virginia Division of Highways
1334 Smith Street
Charleston, West Virginia 25305

RE: US 522 – Berkeley Springs Bypass and Fairview Connector Project
Morgan County, West Virginia
State Project No. U333-522-11.92; Federal Project No. N/A
FR: 19-370-MN-2

Dear Mr. Hark:

We have reviewed the Phase I archaeological survey report, which your office submitted to facilitate our review of the aforementioned project. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR § 800: "Protection of Historic Properties," we submit our comments.

According to submitted information, the West Virginia Department of Transportation, Division of Highways (WVDOH) proposes to construct a new segment of US 522 to the east of Berkeley Springs and the Fairview Connector to the north of Berkeley Springs. The proposed connector would link Fairview Road to the new section of US 522.

Archaeological Resources:
The area of potential effect (APE) is defined as the proposed limits of disturbance (LOD) for the proposed project and consists of 11 discrete tracts located between Sandmine Road (CR 38/1) and Green Gate Road (CR 38/11). It includes the Fairview Connector 1 and Fairview Connector 2. Archaeological survey of the APE included pedestrian reconnaissance and the excavation of 598 shovel test pits. The fieldwork resulted in the identification of six new archaeological sites, 46MN187, 46MN188, 46MN189, 46MN190, 46MN191, and 46MN192.

Sites 46MN187 and 46MN189 are described as twentieth century residential sites consisting of the remnants of dwellings and outbuildings and low-density scatters of associated architectural and domestic materials. Site 46MN187 also produced one pink plastic toy fragment. Both sites exhibited evidence of prior mechanical disturbance. Due to the limited nature of the material remains, the lack of evidence for intact midden deposits and subsurface cultural features, and the sites' diminished integrity, we concur that 46MN187 and 46MN189 are not eligible for inclusion in the National Register of Historic Places.

Site 46MN188 consists of two segments (north and south) of an abandoned railroad of the Baltimore & Ohio Railroad Company and the former Berkeley Springs & Potomac Railroad Company. The north segment consists of a distinct elevated bed comprised of soil, coal, cinders and rock. The south segment appears to

have been converted into a modern access road. The railroad continues beyond the boundary of the APE. No evidence of rails, rail ties, or associated architectural or engineering features was discovered within the APE. We concur with the recommendation that the portions of 46MN188 located within the APE do not contribute to the National Register eligibility of the larger resource.

Site 46MN190 is a low-density scatter of historic era artifacts. The items recovered include flat glass, stoneware drainage pipes, fragments of yellowware and whiteware, and fragments of container glass. All materials were recovered from recent alluvial soils and likely represent a secondary deposit. Due to its lack of integrity, we concur that 46MN190 is not eligible for inclusion in the National Register of Historic Places.

Site 46MN191 consists of a low-density prehistoric lithic scatter of unknown age and cultural affiliation. The assemblage is comprised of three pieces of debitage made of chert and jasper recovered from plowzone deposits. No thermally altered rock, flaked or ground stone tools, or ceramics were recovered. Due to the limited nature of the material remains and the lack of evidence for cultural features, midden, and stratified deposits, we concur that 46MN191 is not eligible for inclusion in the National Register of Historic Places.

Site 46MN192 is described as the remains of an historic era industrial complex comprised of concrete and stone structural remnants, a concrete water impoundment dam, and an associated pond. It is our understanding that a large portion of the site is located outside of the APE. Archival evidence suggests the site represents the remains of a former sand plant that was constructed and operated between 1905 and 1927 by the Speer White Sand Company of Berkeley Springs. Shovel test pits encountered deep, unnatural deposits of sand. No artifacts were recovered. In addition, little to no surface debris was observed, indicating that the associated machinery was removed from the area once the plant ceased operations. We concur that the portion of 46MN192 located within the APE does not contribute to the National Register eligibility of the larger site.

In conclusion, we concur with recommendations made in the report. Sites 46MN187, 46MN189, 46MN190, and 46MN191 are not eligible for inclusion in the National Register of Historic Places. As well, the portions of sites 46MN188 and 46MN192 located within the APE do not contribute to the National Register eligibility of the larger sites. We also concur that no additional archaeological investigations are necessary within the APE as currently designed.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Lora A. Lamarre-DeMott, Senior Archaeologist, at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/LLD

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

Concurrence Form for Myotid Bat Survey Reports

Contact Name: Traci Cummings

Email Address or Fax Number: traci.l.cummings@wv.gov

FWS File #: 2019-I-0095 **All future correspondence should clearly reference this FWS File #.**

Project: US 522 Berkeley Springs Bypass Project, Morgan County

The U.S. Fish and Wildlife Service (Service) has reviewed the report on the bat **mist net** survey conducted in the proposed project area and submitted on October 26, 2018. The survey followed the protocol outlined in the current Range-wide Indiana Bat Summer Survey Guidelines. These Guidelines are acceptable to address the endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*Myotis septentrionalis*) (NLEB). The survey covered 8.25 acres/kilometers of potential bat habitat and was conducted at 11 net sites from 6/4-14, 7/7-12, to 7/31 & 8/11, 2018. No Indiana bats were captured.

No NLEB were captured and none were tracked during this survey.

Surveys are considered current for 5 years (the summer they are completed and the following four summer seasons). In this case, the survey will expire on May 15, 2023. If a significant amendment is proposed to change or expand this project, or if timber will be removed after that date, a new survey may be necessary and the Service should be contacted.

The area was surveyed for caves and abandoned mine portals and none were found in the project area.

Based on the information provided to us, the Service has concluded that no Indiana bats or NLEB are expected to be adversely affected by the project. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. If there is a Federal nexus for the project (e.g., Federal funding provided, Federal permits required to construct), no tree clearing or any project construction activities on any portion of the parcel should occur until consultation under section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U. S. C. 1531 et seq.),

between the Service and the Federal action agency, is completed. Section 7 consultation is not complete until the Federal action agency submits a determination of effects to this office, and the Service concurs with the Federal action agency's determination. If there is no Federal nexus associated with this project, then no further coordination with this office is required.

Should project plans change or amendments be proposed that we have not considered in your proposed action, or if additional information on listed and proposed species becomes available, or if new species become listed or critical habitat is designated, this determination may be reconsidered.

If you have any questions regarding these comments, please contact the biologist listed below at (304) 636-6586 or at the letterhead address.

Liz Stout _____ Date: 11/13/2018

Biologist

_____ Date: 11/15/2018

Field Supervisor

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request July 19, 2019	
Name of Project Fairview Connector		Federal Agency Involved FHWA	
Proposed Land Use Transportation		County and State Morgan County, WV	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS	Person Completing Form:
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☐	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	6			
B. Total Acres To Be Converted Indirectly	0			
C. Total Acres In Site	6			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)	13			
2. Perimeter In Non-urban Use	(10)	1			
3. Percent Of Site Being Farmed	(20)	1			
4. Protection Provided By State and Local Government	(20)	0			
5. Distance From Urban Built-up Area	(15)	0			
6. Distance To Urban Support Services	(15)	0			
7. Size Of Present Farm Unit Compared To Average	(10)	2			
8. Creation Of Non-farmable Farmland	(10)	0			
9. Availability Of Farm Support Services	(5)	4			
10. On-Farm Investments	(20)	0			
11. Effects Of Conversion On Farm Support Services	(10)	0			
12. Compatibility With Existing Agricultural Use	(10)	0			
TOTAL SITE ASSESSMENT POINTS	160	21	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	21	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	21	0	0	0

Site Selected: Site A	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☑

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map**,** or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

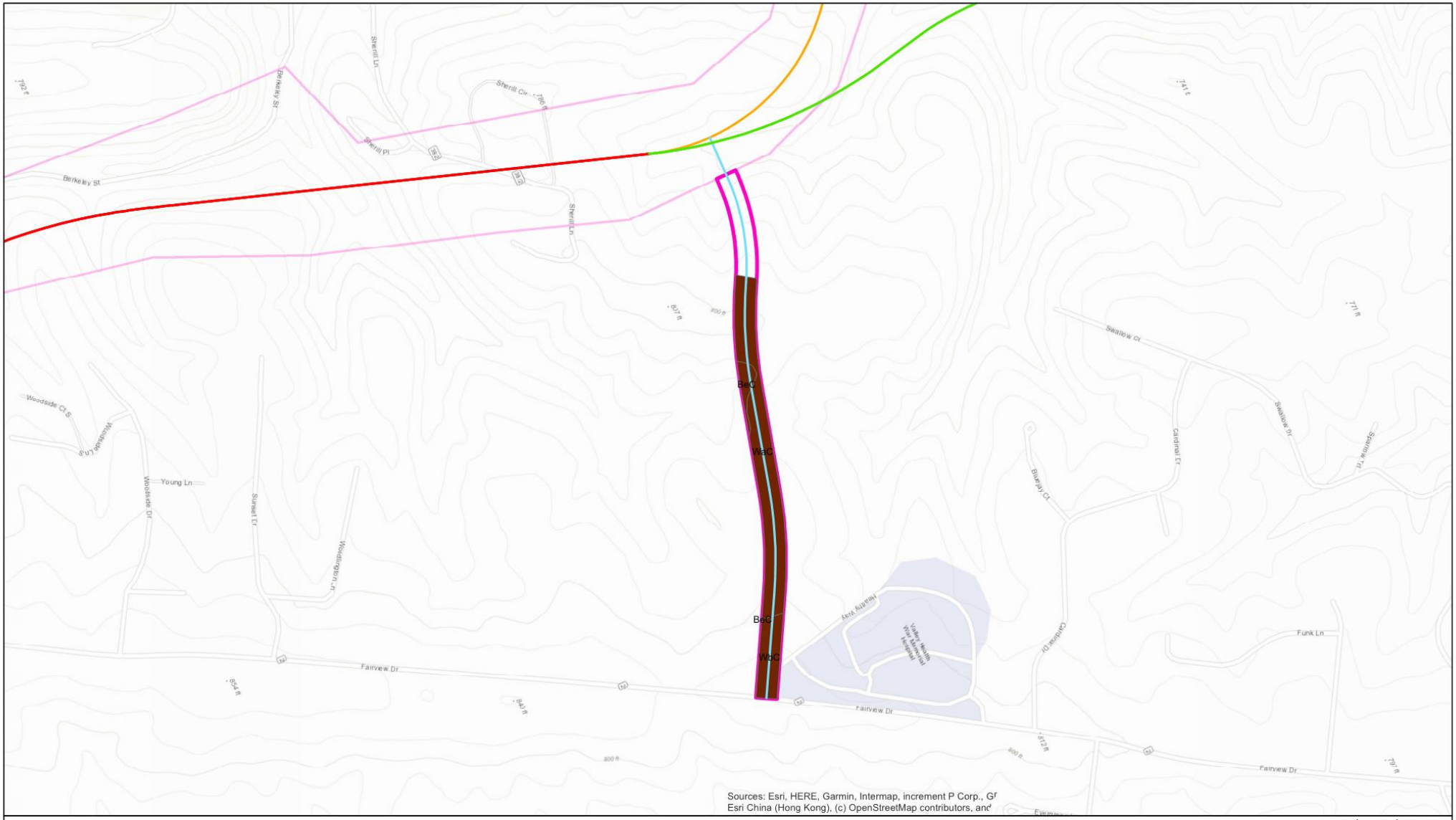
2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.



Legend

- Fairview Connector Proposed ROW
- Farmland of local importance - **4.64 AC**

US 522 FAIRVIEW CONNECTOR
FARMLAND SOILS

0 250 500 1,000 Feet

Relocated US 522
Morgan County, WV

CDM Smith

MARTINRW Z:\Projects\WVDOT\US 522\US 522 Draft Reevaluation\figures\522_CONNECTOR_FARMLAND.mxd 7/31/2019

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Elkins Operations Center
738 Ward Rd., PO Box 67
Elkins, WV 26241
Telephone 304-637-0245
Fax 304-637-0250

Stephen S. McDaniel
Director

November 1, 2019

Mr. Ben Hark
Division of Highways
Engineering Division
1334 Smith Street
Charleston, WV 25301

Dear Mr. Hark:

We have reviewed Natural Heritage Program files for information on rare, threatened and endangered (RTE) species and natural trout streams for the areas of the proposed highway projects:

TC	State Project S255-85-4.09 02 Ralston Branch Bridge No. 2 Replacement Wyoming County	There are no known occurrences of any RTE species or natural trout streams within the project area.
NM	State Project S202-11-16.50 Federal Project STBG-0011(167)D US 11 Berkeley Station Drainage Study Berkeley County	There are no known occurrences of any RTE species or natural trout streams within the project area.
AB	State Project S306-60-0.03 Col. Justice M. Chambers Bridge Replacement Cabell County	There are no known occurrences of any RTE species or natural trout streams within the project area.
SM	State Project S314-SBV/RR-6.50 Springfield Railroad Underpass Hampshire County	There are no known occurrences of any RTE species or natural trout streams within the project area.
TW	State Project 4-19/46-0.02 Depot Road Bridge Braxton County	There are no known occurrences of any RTE species or natural trout streams within the project area.
SB	State Project S325-250/13-2.13 Beechlick Run Bridge Marion County	There are no known occurrences of any RTE species or natural trout streams within the project area.

LF State Project U333-522-11.92 SEC 07 Federal Project NH-0522(018)C Fairview Connector Morgan County	There are no known occurrences of any RTE species or natural trout streams within the project area.
JB State Project S303-3-39.58 Federal Project NFA-2117(017)D Seng Creek Bridge Boone County	There are no known occurrences of any RTE species or natural trout streams at the project site; however, this project is within a habitat buffer for the Indiana bat.
JB Sate Project 11-33-21.92 Stewart Creek Channel Beam Gilmer County	There are no known occurrences of any RTE species or natural trout streams within the project area.
TB State Project S324-84-3.10 Anawalt Ridge Road Culvert Replacement McDowell County	There are no known occurrences of any RTE species or natural trout streams within the project area.

The Wildlife Resources Section knows of no surveys that have been conducted in these areas for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the areas under review.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, extension 2048.

Sincerely,

NOV 0 1 2019

Barbara Sargent
Environmental Resources Specialist
Environmental Coordination
Operations Unit

US 522
BERKELEY SPRINGS BYPASS AND FAIRVIEW CONNECTOR PROJECT

STATE PROJECT U333-522-11.92 SEC 02
FEDERAL PROJECT NFA-2317(005)D

NOISE STUDY

AUGUST 2019

US 522 – BERKELEY SPRINGS BYPASS AND FAIRVIEW CONNECTOR PROJECT

STATE PROJECT U333-522-11.92 SEC 02 | FEDERAL PROJECT NFA-2317(005)D

NOISE STUDY

Prepared for:

U.S. Department of Transportation, Federal Highway Administration

West Virginia Department of Transportation, Division of Highways

Prepared by:

CDM Smith

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIX

ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
CNE	Common Noise Environment
dB	decibel
dB(A)	A-weighted sound level in decibels
FHWA	Federal Highway Administration
Hz	Hertz
L_{eq}	equivalent sound pressure level
NAC	Noise Abatement Criteria
WVDOH	West Virginia Division of Highways
NW	Noise Wall
SPL	sound pressure level
TIP	Transportation Improvement Program
TNM 2.5	FHWA Traffic Noise Model Version 2.5
USDOT	United States Department of Transportation

Section 1. Summary

The West Virginia Department of Transportation Division of Highways is considering the improvements and updates to US 522 through Morgan County, West Virginia. The West Virginia Division of Highways (WVDOH) has requested a re-evaluation of the US 522 FEIS and ROD for construction of the Berkeley Springs Bypass. The Berkeley Spring Bypass project is part of the US 522 project that consists of a four-lane roadway on new alignment from the Virginia/West Virginia state line to the Maryland state line for a distance of approximately 19 miles. This project includes the portion of US 522 beginning just south of CR 13, Winchester Grade Road, to the north of WV 9 (Segment 1) and the portion from north of WV 9 including a connection to existing US 522 and the Fairview Connector, which connects Fairview Drive to US 522 (Segment 2). This Traffic Noise Impact Study identifies all potential traffic noise impacts and follows guidelines established by the Federal Highway Administration (FHWA) relative to environmental studies for Type I roadway improvement projects. Ambient (existing) field noise levels were monitored following the FHWA procedures described in *Sound Procedures for Monitoring Highway Noise*. The noise analysis procedure used to project traffic noise was the TNM 2.5 computer model developed by the FHWA.

TNM 2.5 was used to estimate both existing and future noise levels associated with the proposed alignment. Input data needed for the noise level analysis included roadway coordinates, site location coordinates, receiver coordinates, traffic volumes, and vehicle speeds. Traffic volumes were obtained from the February 5, 2019, Traffic Study completed by CDM Smith. The report reflects 2018 existing traffic volumes and 2043 projected traffic volumes.

Noise-sensitive land uses were identified and grouped into nine unique Common Noise Environments (CNEs) to facilitate the analysis. A good correlation exists between monitored and modeled existing noise levels (3 decibels [dBA] or under) at most CNE locations, although some experienced a higher difference. The TNM 2.5 computer model does not take into account ambient noise sources (e.g., airplanes, dogs barking, people talking, and construction noise) other than vehicular traffic. These noise sources affect the overall monitored noise levels but cannot be modeled by TNM 2.5.

The analysis performed for this study followed the FHWA guidelines for traffic generated noise impacts. The FHWA traffic generated noise impacts are defined as "impacts which occur when the predicted noise levels approach or exceed the noise abatement criteria or when the predicted traffic noise levels substantially exceeds the existing noise levels" (title 23 Code of Federal Regulations Part 772 [23 CFR 772], *Procedures for Abatement of Highway Traffic Noise and Construction Noise*). In addition, WVDOH has developed guidelines to determine when substantial noise increases occur in *DD-253 Noise Analysis and Abatement Guidelines* (updated November 15, 2016).

Noise impact assessment sites (all residences, commercial uses, churches, motels, hotels, and hospitals) within 152 meters (500 feet) of the proposed segments were analyzed for noise impacts. A total of 181 receptors were analyzed using the above criteria in the model. All the sites along the proposed highway segments are classified as either Activity Category B, Category C or Category E of the FHWA Noise Abatement Criteria (NAC). Thus, if the noise level at a site was predicted to be 66 dBA (Category B and C)

or greater or 71 dBA (Category E) or greater, the FHWA NAC considers it as impacted, and noise abatement measures should be studied at the location. The sites were also analyzed for noise level increases. The increase in noise level was calculated by comparing the projected noise level to both the noise levels calculated by the existing condition TNM model, and the field monitored noise levels. There was no noise level increase of 15 dBA or greater; therefore, no "Substantial Impacts" occurred.

The preliminary analysis indicated that there were five sites that were identified as having sound level impacts. All five sites were sound level impacts. After the required right of way was established and applied to the impacts, three of the sites were identified as relocations.

In accordance with WVDOH's *DD-253 Noise Analysis and Abatement Guidelines* (updated November 15, 2016), noise abatement measures must be both reasonable and feasible. Feasibility deals primarily with engineering considerations (e.g., can a barrier be built given the topography of the location; can a substantial noise reduction be achieved given certain access, drainage, snow, safety or maintenance requirements; are other noise sources present in the area, etc.) Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision.

For noise abatement measures for US 522, were reviewed for receptors A-6, A-7, B-8, D-3 and G-7. Receptors A-6 and A-7 are located along US 522, and noise barrier would not be feasible/reasonable and still allow access to the property. Receptor B-8, D-3, and G7 would be relocated due to right of way required for the proposed project. Due to the reasoning above no barrier, walls were modeled or recommended for construction as part of the Berkeley Springs Bypass project.

Table 1.1: Impacted Receiver Locations

Receiver	Location Description	dBA Reading	Impact	Abatement Measure
A-6	A residential lot, 75 feet from US 522, adjacent to the intersection of Winchester Grade Road. The property has direct access to US 522.	66.7	Sound Level	None Recommended
A-7	A residential lot, 80 feet from US 522 (Valley Road). The property has direct access to US 522.	66.2	Sound Level	None Recommended
B-8	On Dakota lane, 800 feet from US 522 (Valley Road) and approximately 790 feet from Winchester Grade Road. The structure appears to be an outbuilding and will be required to be relocated.	67.5	Sound Level	None Recommended
D-3	Approximately 40 feet from Johnsons Mill Road, and approximately 50 feet from the US 522 Bypass. The residential structure will be required to be relocated due to the project.	66	Sound Level	None Recommended
G-7	On Sherill Lane approximately 2280 feet from Fairview Road. The lot is residential and heavily wooded. This property access is being impacted by the US 522 Bypass and G-7 and G-8 will be required to be relocated due to the project.	67.7	Sound Level	None Recommended

Section 2. Introduction

This section describes the proposed project.

2.1 Project Description

The West Virginia Department of Transportation Division of Highways is considering the improvements and updates to US 522 through Morgan County, West Virginia. The West Virginia Division of Highways (WVDOH) has requested a re-evaluation of the US 522 FEIS and ROD for construction of the Berkeley Springs Bypass. The Berkeley Spring Bypass project is part of the US 522 project that consists of a four-lane roadway on new alignment from the Virginia/West Virginia state line to the Maryland state line for a distance of approximately 19 miles. This project includes the portion of US 522 beginning just south of CR 13, Winchester Grade Road, to north of WV 9 (Segment 1) and the portion from north of WV 9 including a connection to existing US 522 and the Fairview Connector, which connects Fairview Drive to US 522 (Segment 2) as shown in **Figure 2.1**

2.2 Procedures

The noise analysis identifies impacts associated with the construction of the Berkeley Springs Bypass along with realignments of several existing roads that result from the location of the proposed facility.

This analysis has been prepared in accordance with the FHWA's 23 CFR 772 and the *WVDOH's DD-253 Noise Analysis and Abatement Guidelines* (updated November 15, 2016).

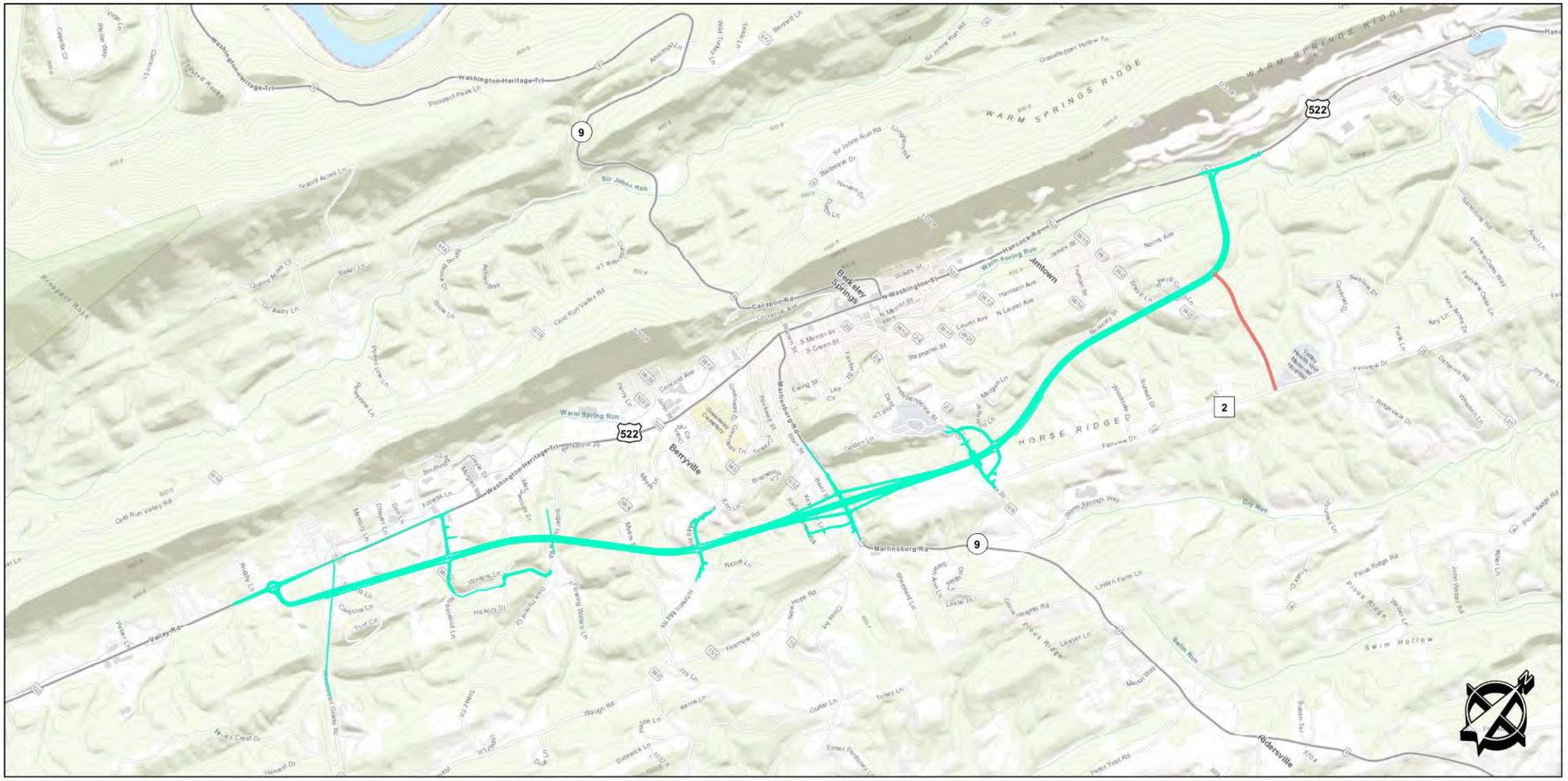
The analysis was conducted using data that was generated by FHWA's Traffic Noise Model (FHWA TNM V 2.5) to establish the Base Year 2018, and the predicted No-Build and Build scenarios for the year 2043. The model used peak hourly traffic volumes for both 2018 and 2043 that were provided by the Traffic Report (see Appendix D).

Noise sensitive land use within the study area is residential, commercial, and churches surrounded by agriculture and undeveloped land. A Type 2 SoundPro DL dosimeter was used to collect ambient noise readings in the field on May 24 and 25, 2018. Data collection occurred from 4:00 pm to 6:30 pm on May 24 and from 7:00 am to 9:00 am on May 25. The weather was dry on both days, with winds less than five miles per hour. Data collection was conducted at a total of ten sites, with the major noise source being traffic noise.

Data collected was incorporated into the existing scenario TNM models and used to establish the baseline conditions and model validations. These models were used to develop the final Existing (2018), No Build (2043), and Build (2043) models.

Three scenarios were modeled in the TNM: Existing, No-Build, and Build. Current design plans for sections US 522 Bypass were used for the Build scenario.

Figure 2.1: Project Location Map



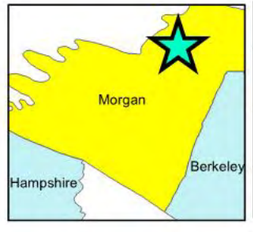
Legend

- US 522 Bypass
- Fairview Connector

US 522 Re-evaluaton Noise Study Study Area Map

0 0.25 0.5 1 Miles

1 inch = 2,000 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 7/31/2019

Traffic data obtained for the project was provided as peak hourly volumes and entered into the models. Since the project is on new location, many of the noise levels predicted by the Existing TNM model were lower than the noise levels recorded in the field. The minimum noise level collected in the field was 55.5 dBA; for those sites that did not reach 55.5 dBA in the Existing model, the average noise level of 55.5 dBA was used to set baseline decibel levels in the Build model.

During the analysis, the proposed design for the Berkeley Springs Bypass was overlaid on top of the existing receptors. It was determined that 17 receptors would be relocated due to the construction of the roadway, and these sites were removed from further analysis.

Noise abatement measures were analyzed for each impacted receptor.

2.3 Purpose and Need

The major north-south roadway traversing Morgan County and the Eastern Panhandle through the community of Berkeley Springs is US 522. The roadway is a two-lane highway that has variable shoulder widths and restricted passing areas. Segments of US 522 have high accident rates, and within Berkeley Springs high levels of traffic congestion are present.

The WVDOH is considering improvements and upgrading of US 522 in Morgan County. The improvements are intended to relieve traffic congestion in Berkeley Springs, reduce the accident rate on US 522 within West Virginia and increase the capacity of the road in general. Several alternative actions were considered to upgrade the 18.74 miles (30.2 kilometers) segment from the Virginia state line through Morgan County, West Virginia to the Maryland state line. The WVDOH has identified Build Alternate I as the selected alternative for this project.

2.4 Statement of Compliance

This analysis will follow the FHWA's 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* and the *WVDOH's DD-253 Noise Analysis and Abatement Guidelines* (updated November 15, 2016).

According to FHWA and WVDOH, there are three types of projects:

- ***Type I Project*** - Noise abatement accomplished in conjunction with a construction or reconstruction project on a section of federal-aid highway, as designated in 23 CFR Part 772.
- ***Type II Project*** - Noise abatement on an existing section of a federal-aid highway which does not include construction or reconstruction, as designated in 23 CFR Part 772.
- ***Type III Project*** - A Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project, as designated in 23 CFR Part 772.

The proposed project is designated as a Type I project due to the following:

- Construction of a roadway along new location;
- Increase in the number of through-traffic lanes on an existing highway;
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange.

2.5 Date of Public Knowledge

The Date of Public Knowledge or the date of approval of the final environmental document for the Berkeley Springs Bypass was August 2001.

The criteria for determining when undeveloped land is "permitted" for development will be the approval date of a building permit for an individual lot. After the Date of Public Knowledge for the project, federal and state governments are no longer responsible for providing noise abatement measures for new development within the noise impact area of the proposed highway project. It is the responsibility of local governments and private landowners to ensure that noise compatible designs are used for development permitted after the Date of Public Knowledge.

The state and federal policy applies only to developed land and undeveloped land for which development is permitted before the project Date of Public Knowledge. Mitigation measures studied in this Traffic Noise Impact Study are evaluated for developed locations and undeveloped land permitted prior to the Date of Public Knowledge.

Section 3. Fundamentals of Noise and Methodology

This section describes basic noise terminology and concepts, applicable regulations, the noise monitoring procedure, and measured noise levels in the study area.

3.1 Fundamentals of Noise

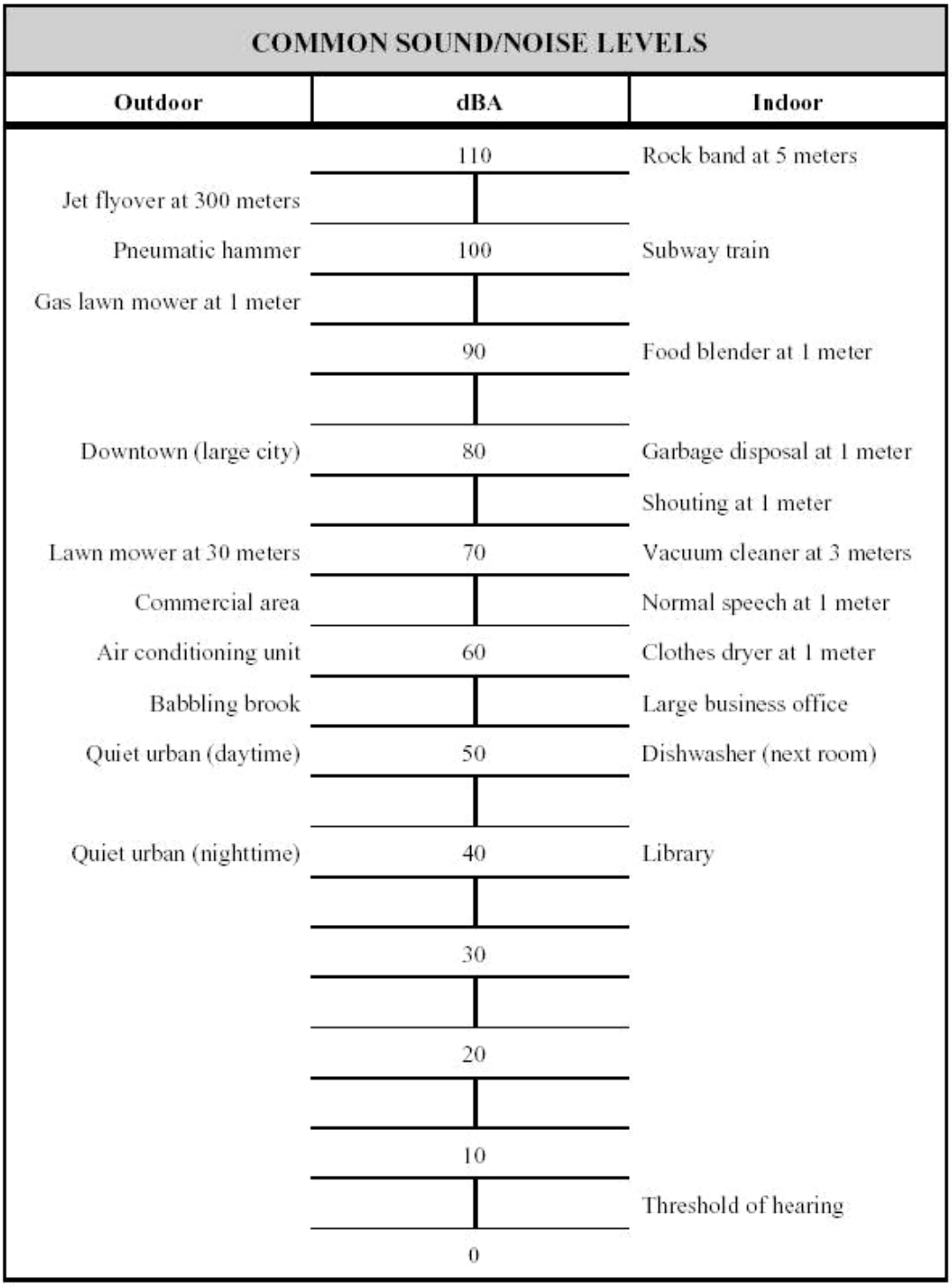
Noise can be defined as unwanted sound. Noise can disrupt normal activities when the noise reaches certain levels and when the noise is distinctly louder than the typical ambient noise environment. **Figure 3-1** shows some examples of common noise sources and their sound levels.

The magnitude of noise or the deviation from the ambient noise level is usually described by sound pressure. The magnitude of noise is usually described by a ratio of its sound pressure to a reference sound pressure, which is usually 20 micro-Pascals. A logarithmic scale is used to relate sound pressure to a common reference pressure, yielding the sound pressure level (SPL). SPL is measured in dimensionless units of decibels (dB) and are modified by frequency response of human hearing or weighting. The commonly accepted limits of human hearing to detect sound are between the threshold of hearing at 0 dB and the threshold of pain at 140 dB. Sound frequencies are represented in units of Hertz (Hz), which correspond to the number of vibrations per second of a given tone. Sound occurs over a wide range of frequencies.

Three weightings have been established for measuring sound pressure: A, B, and C. The commonly accepted audible frequency is between 20 Hz and 20,000 Hz, and human hearing is most sensitive to the frequencies between 1,000 Hz and 6,000 Hz. The A-weighted scale is adjusted to frequencies most sensitive to human ears. Sound levels that are measured using the A-weighted scale are often expressed as dB(A). All noise levels in this report will be expressed in dB(A).

A key concept in evaluating potential noise impacts is the perceived effect of incremental increases in existing noise levels. The relationships between changes in sound levels, loudness, and acoustic energy are presented in **Table 3-1**. For example, the table shows that an increase of 3 dB(A) is barely perceptible, an increase of 5 dB(A) is readily perceptible, and a 10 dB(A) increase would be perceived by someone to be a doubling of the noise level (loudness).

Figure 3.1: Common Sound/Noise Levels



Source: FHWA 1980

Table-3.1: Relationships between Changes in Sound Levels, Loudness, and Acoustic Energy

Sound Level Change	Change in Loudness[1,2]	Relative Change in Acoustic Energy[3]
+30 dB(A)	Eight Times as Loud	1,000
+20 dB(A)	Four Times as Loud	100
+10 dB(A)	Twice as Loud	10
+5 dB(A)	Readily Perceptible	~3
+3 dB(A)	Barely Perceptible	2
0 dB(A)	No Change	0
-3 dB(A)	Barely Perceptible	1 / 2
-5 dB(A)	Readily Perceptible	~1 / 3
-10 dB(A)	Half as Loud	1 / 10
-20 dB(A)	1/4 as Loud	1 / 100
-30 dB(A)	1/8 as Loud	1 / 1000
+30 dB(A)	Eight Times as Loud	1,000

Source: FHWA 2011

Notes:

[1] Loudness pertains only to the perceived magnitude of a sound or sounds. Loudness does not describe the tonal qualities of one or more sounds. Two sounds can have the same sound level magnitudes, and can sound "just as loud", and be distinguishable because of differing tones (frequencies).

[2] Relative to the loudness of an initial sound level (e.g. the loudness of a 63 dB(A) sound would be barely perceptible from the loudness of a 60 dB(A) sound. An 80 dB(A) sound would generally be perceived as four times as loud as a 60 dB(A) sound.)

[3] Relative to the acoustic energy of an initial sound level (e.g. a sound level of 63 dB(A) has twice the acoustic energy as an initial sound level of 60 dB(A). A sound level of 80 dB(A) has 100 times the acoustic energy as 60 dB(A).)

The degree of disturbance or annoyance of unwanted sound depends on three conditions:

- The amount and nature of intruding noise;
- The relationship between the ambient noise and the intruding noise; and
- The type of activity occurring when the intruding noise is heard.

It is important to note that individuals have different hearing sensitivity to noise. Loud noises bother some people more than others, and some individuals become angered if an unwanted noise persists. The time patterns of noise also enter into a person's judgment of whether or not a noise is objectionable. For example, noises occurring during sleeping hours are usually considered to be more objectionable than the same noises in the daytime.

Individuals tend to judge the annoyance of an unwanted sound in terms of its relationship to noise from other sources (ambient noise). The blowing of a car horn at night, when ambient noise levels are approximately 45 dB(A), would generally be much more objectionable than the blowing of a car horn in the afternoon, when ambient noise levels might be 55 dB(A).

Over a period of time, individuals tend to accept the noises that intrude into their daily lives, particularly if the noises occur at predicted intervals and are expected. Attempts have been made to regulate many types of noises, including airplane noise, factory noise, railroad noise, and highway traffic noise.

Noise levels in this analysis are based on a L_{eq} descriptor. The L_{eq}, or equivalent sound level, refers to the steady-state (constant sound) A-weighted sound level, which contains the same acoustic energy as the actual time-varying sound levels during the same time period. In other words, the fluctuating sound levels of the traffic noise over a period of time are represented in terms of a constant noise level with the same energy content. For this analysis, the time period used corresponds with the loudest hour of the day.

3.2 Traffic Noise and Propagation

Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Traffic noise can also be increased by defective mufflers or other faulty equipment on vehicles. Any condition (such as a steep incline) that causes heavy laboring of motor vehicle engines will also increase traffic noise levels.

Vehicle traffic sounds are generally considered to be unwanted, or noise, to most people. The level of highway traffic noise depends on three things:

- the volume of the traffic;
- the speed of the traffic; and
- the number of trucks in the flow of traffic.

Highway traffic noise is never constant. The noise level is always changing with the number, speed, and type of vehicles which produce the noise as well as the driving habits of the vehicle operator. Heavier traffic volumes, higher speeds, and a greater number of trucks increase traffic noise as shown in **Figure 3-2**.

As a person moves away from a highway, traffic noise levels are reduced by distance, terrain, vegetation, and natural and manmade obstacles. Noise emanating from a roadway can follow four paths to reach nearby receptors (**Figure 3-3**):

1. Direct Path: The noise follows a straight path from the source to the receptor.
2. Diffracted Path: The noise follows a path from the source to the top of a barrier and then is bent down toward the receptor.
3. Reflected path: The noise is bounced off of a barrier and concerns only the receptor on the opposite side of the roadway from the barrier.
4. Transmitted Path: The noise is transmitted directly through the barrier.

Thus, a wall, building, earth berm, hill, or any type of solid structure or terrain feature, if large enough, can serve as a sound barrier and can provide some reduction at receptors in the “shadow zone” created by the barrier. Maximum reduction is achieved by breaking the line of sight between the noise source and the receptor.

In some cases, refracted traffic noise transmission can be more annoying than direct transmission because the occurrence is generally inconsistent, and it introduces exposure to sounds that are different

than the source noise. This refraction is typically caused by wind and temperature gradients and can increase or decrease noise levels locally.

Figure 3.2: Effect of Traffic Volume, Speed, and Vehicle Types on Noise Levels

How Volume Affects Traffic Noise

2000 vehicles per hour sound twice as loud as

200 vehicles per hour

How Speed Affects Traffic Noise

Traffic at 65 miles per hour sounds twice as loud as

traffic at 30 miles per hour

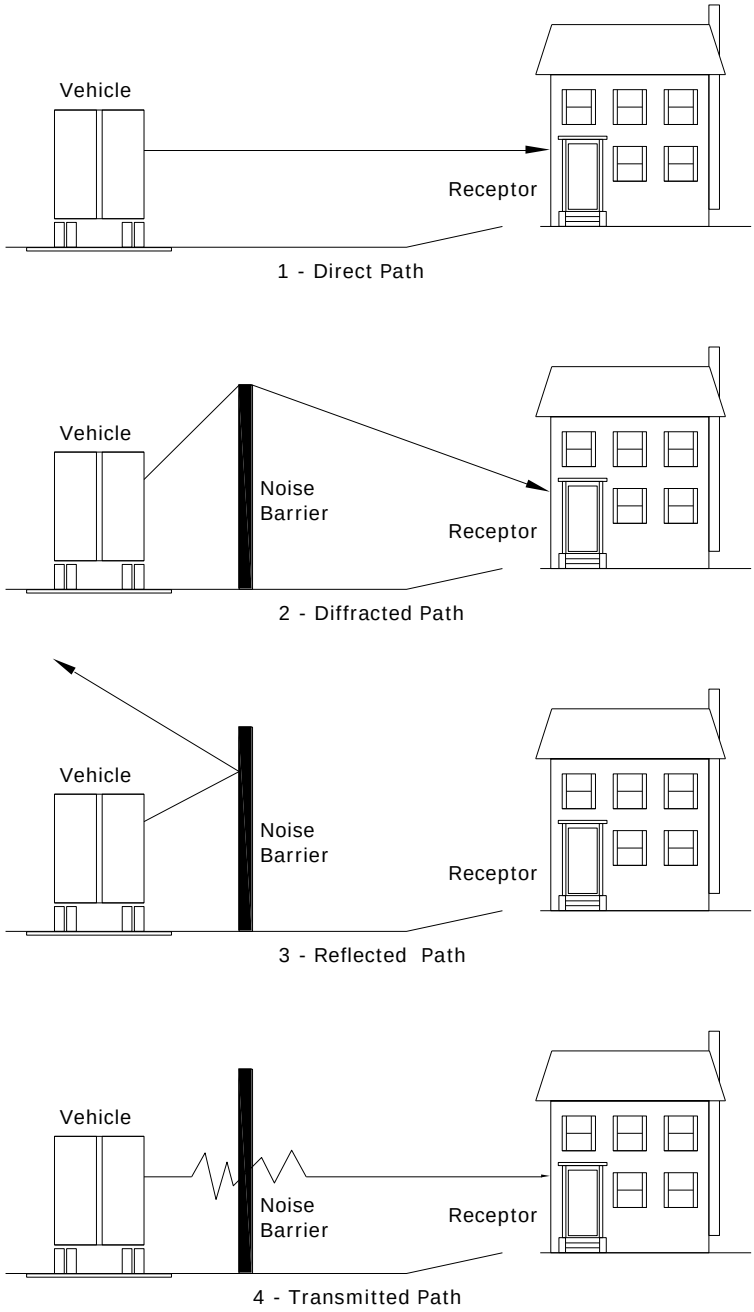
How Trucks Affect Traffic Noise

One truck at 55 miles per hour sounds as loud as

12 cars at 55 miles per hour

Source: FHWA 1980

Figure 3-3.3: Different Paths Followed by Noise



Source: FHWA 1980

3.3 HIGHWAY NOISE REGULATIONS

To determine if highway noise levels are compatible with various land uses, the FHWA has developed noise abatement criteria (NAC) and procedures to be used in the planning and design of highways. These abatement criteria and procedures are in accordance with 23 CFR Part 772. A summary of the federal NAC adopted by WVDOH for various land uses are presented in **Table 3-2**.

Table 3.2: Noise Abatement Criteria Hour A-Weighted Sound Levels in Decibels

Activity Category	Activity $L_{eq}(h)$ (dB(A))	Evaluation Location	Activity Description
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[1]	67	Exterior	Residential
C[1]	67	Exterior	Active sport 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, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[1]	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	NA	NA	Agriculture, 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	NA	NA	Undeveloped lands that are not permitted for development.

Source: 23 CFR Part 772

Note: [1] Includes undeveloped lands permitted for this activity category.

A receptor is defined as a discrete or representative location of a noise-sensitive area for any of the land uses listed in Table 3-2. Receptors are impacted if noise levels approach (within 1 dB(A)) or exceed the NAC, as defined by WVDOH in *DD-253 Noise Analysis and Abatement Guidelines* (updated November 15, 2016). Impacted receptors would benefit from noise mitigation measures that lower noise levels. In addition to the NAC, WVDOH uses a range of substantial increase criteria of 15 dB(A) or greater to define noise increase from the existing level.

3.4 NOISE ABATEMENT

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area, including

traffic management, alteration of alignments, acquisition of property to create a buffer zone, providing noise insulation and/or air conditioning of buildings, and constructing a noise barrier.

The feasibility and reasonableness of noise barriers are covered in detail in Section VI of WVDOH's *DD-253 Noise Analysis and Abatement Guidelines* (updated November 15, 2016). Feasibility of noise barriers is determined by their ability to achieve substantial noise reduction given the conditions of a specific location. Site conditions that can affect the ability of noise barriers to achieve an actual noise reduction include 1) topography; 2) animal migratory paths; 3) cultural resources such as historic places; 4) access requirements for driveways, ramps, etc.; 5) maintenance issues and utility encumberments; 6) the presence of local cross streets; or 7) other noise sources in the area, such as aircraft, trains, or industry. WVDOH does not consider a noise barrier to be feasible unless a noise reduction of at least 5 dBA can be achieved for an impacted receptor.

Reasonableness is more subjective than feasibility and implies that a decision regarding noise barriers has been based on common sense and good judgment as well as careful consideration of all of the specific circumstances of a particular project. WVDOH makes a final determination of reasonableness only after thorough consideration of a wide range of criteria, but will not approve the construction of noise barriers if a majority of benefited receptors do not want them. Viewpoints of benefited receptors are typically surveyed following the public meeting for the design phase of the project to determine if a noise barrier is desired.

According to 23 CFR 772, the following reasonableness factors must all be achieved in order for noise barriers to be deemed reasonable:

- The construction of a noise barrier is not reasonable unless a majority of residents and property owners of the benefited receptors (receptors that receive a noise reduction of 5 dBA or more from the noise barrier) want a noise barrier even if all other criteria indicate that a noise barrier is reasonable.

- The construction of a noise barrier is not reasonable if the cost is more than $30,000 per benefited receptor. The barrier cost will include the cost of construction (material and labor), the cost of additional right-of-way, the additional cost of relocating utilities, and any other costs associated with the barrier. The estimated cost of construction (material and labor) will be $25 per square foot. The allowable cost per benefited receptor and the cost for construction shall be re-analyzed every 5 years. All receptors with noise reductions of 5 dBA or more will be counted. Each house or apartment unit will be counted as one receptor. Every 100 linear feet of frontage will be counted as one receptor when considering parks, active sports areas, campgrounds, cemeteries, and other similar outdoor noise-sensitive land uses. For non-residential uses such as schools, places of worship, community centers and auditoriums, the following equation will be used to determine the equivalent number of receptors:

- Equivalent No. of Receptors = (no. of occupants/3) X (usage) where usage = (no. of hours used per day/24) X (no. of days used per year/365)

- Each barrier must reduce the noise level by at least 7 dBA at ten percent or more of the benefited receptors.

The following optional reasonableness factors may also be considered, but no single optional reasonableness factor can be used to determine reasonableness:

- The construction of a noise barrier is not reasonable if the impacted receptors were not constructed or the building permits were not issued before the date of public knowledge of the project.
- The date of development of impacted receptors should be an important part of the determination of reasonableness. More consideration will be given to impacted receptors that predated initial highway construction.
- More consideration will be given to impacted receptors with larger increases over existing noise levels. If the future build noise levels are at least 5 dBA greater than the existing noise levels, more consideration will be given.
- More consideration will be given to areas where larger changes in traffic noise levels are expected to occur if the project is constructed than if it is not. If the future build noise levels are at least 3 dBA greater than the future no-build noise levels, additional consideration will be given.
- More consideration will be given to benefited receptors with future build noise levels at or above the 23 CFR 772 Noise Abatement Criteria.

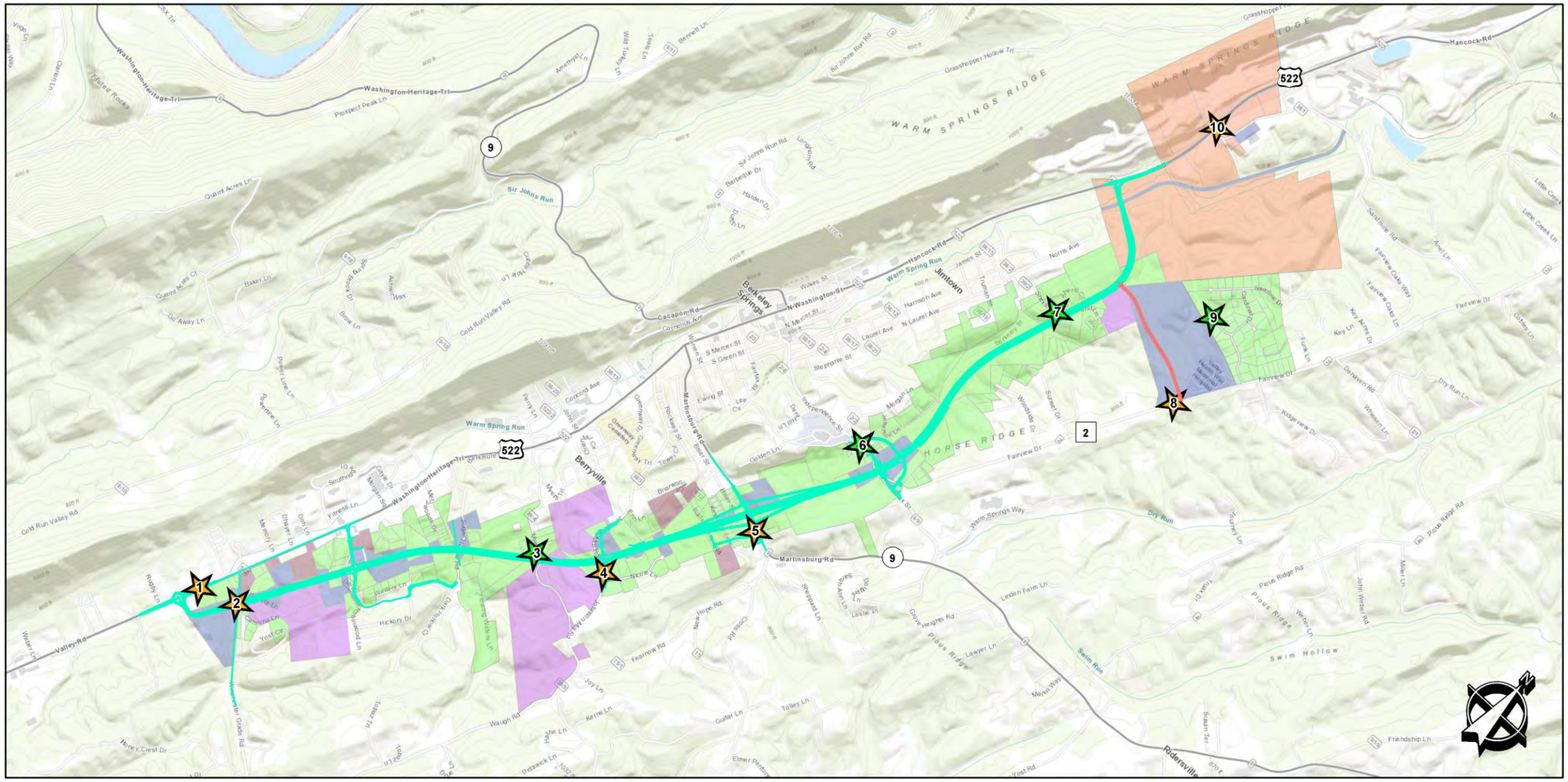
3.5 METHODOLOGY

3.5.1 Noise Monitoring Procedure

The initial step in a noise analysis involves measuring ambient noise levels at various locations throughout the study area. Noise from natural and mechanical sources and human activity typically constitute the ambient noise in an area. The purpose of the ambient noise level measurement is to quantify the existing acoustic environment and provide a baseline for assessing the impact of future noise levels to the receptors in the vicinity of the proposed action resulting from increased traffic and the new roadway alignment. Field measurements will also assist in evaluating the level of noise reduction that may be provided by existing elements such as fences and scattered vegetation that cannot be precisely modeled by the computer. This information will be an important consideration in the determination of noise impacts and the evaluation of any associated noise abatement measures for the project.

Noise levels were measured at 10 locations, as shown in **Figure 3-4**. Traffic volumes were collected during noise measurements at six of these locations (Sites 1, 2, 4, 5, 8, and 10). Traffic volumes and vehicle speeds were so low at Sites 3, 6, 7, and 9 that traffic noise was not the major noise source and, therefore; were used as part of the TNM model validation. However, the noise readings were used to determine the ambient noise levels within those CNE areas.

Figure 3.4: Field Measurement and TNM Validation Locations



Legend

- Field Locations TNM Validation
- Field Locations Base Readings
- US 522 Bypass
- Fairview Connector

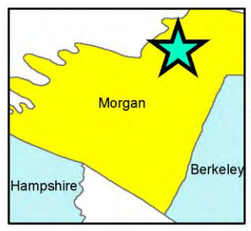
Landuse Type

- Commercial
- Exempt
- Farm
- Industrial
- Residential

US 522 Re-evaluaton Noise Study Field Measurements and TNM Validation Locations

0 0.25 0.5 1 Miles

1 inch = 2,000 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019

Outdoor measurements were taken using a Type 2 SoundPro DL sound level meter on May 24 and 25, 2018. The noise meters were placed four feet above the ground level. Noise levels were measured for 15 minutes at each ambient location. The equivalent steady-state sound level (L_{eq}) was collected for each site logged in one-minute intervals. One-minute data logging is important to determine any aberrant noise events at each site. The traffic counts at Sites 1, 2, 4, 5, 8, and 10 were categorized into automobiles, medium trucks, heavy trucks, buses, and motorcycles. Associated documents for the ambient noise measurements are provided in **Appendix A**. No interior noise level measurements were performed.

3.5.2 Noise Analysis Procedure

FHWA's Traffic Noise Model Version 2.5 (TNM 2.5) traffic noise prediction and analysis software is capable of predicting highway traffic noise. Released in April 2004, TNM 2.5 is the latest version currently available and is the required noise analysis software on all federal-aid highway projects. TNM 2.5 predicts noise levels at receptor locations based on vehicle volume, speed, fleet mix, distance to the receptor, and area terrain.

The traffic noise scenarios evaluated in this analysis include the following:

- Existing (2018) loudest-hour noise levels;
- Design year (2043) No-Build loudest-hour noise levels; and
- Design year (2043) Build loudest-hour noise levels.

Maximum design hour traffic volumes for major streets in the study area in 2018 and 2043 were obtained from WVDOH.

Receptors in the model were placed at every residential, institutional, commercial, and industrial property within the study area. A total of 181 receptors representing 181 receivers were modeled. Receptor locations are shown in **Appendix B**.

Section 4. Existing Noise Environment

This section describes the short-term noise monitoring process, noise model validation, common noise environment determination, traffic data for noise prediction, and existing conditions in the study area.

4.1 Short-Term Noise Monitoring

A summary of measured noise levels is provided in **Table 4.1**. Measured noise levels ranged from 55.5 dB(A) to 72.1 dB(A). A summary of output from the noise meter at each monitoring location is included in **Appendix B**. Recorded traffic counts during the 15-minute noise measurement, and equivalent hourly volumes are summarized in **Table 4.2.** Light winds were observed during noise measurements, as noted in field data sheets provided in Appendix A.

Table 4.1: Measured Noise Levels

Monitoring Location	Monitored Period	Location	Land Use	Leq (dB(A))
1	05/24/18 16:00 - 16:15	US 522	Commercial	72.1
2	05/24/18 16:40 - 16:55	Winchester Grade Road	Residential	66.4
3	05/24/18 17:15 - 17:30	Myers Road	Residential	56.1
4	05/24/18 17:45 - 18:00	Johnson Mill Road	Residential	61.5
5	05/24/18 18:05 - 18:20	Martinsburg Road	Residential	66.3
6	05/25/18 08:45 - 09:00	Fairfax Street	Residential	63.1
7	05/25/18 08:20 - 08:35	Sherill Lane	Residential	60.0
8	05/25/18 07:50 - 08:05	Fairview Drive	Hospital	65.2
9	05/25/18 07:18 - 07:33	Bluebird Court	Residential	55.5
10	05/25/18 07:00 - 07:15	US 522	Industrial	65.9

Table 4.2: Traffic Volume Collected during Noise Monitoring

Monitoring Location	Road Name	Speed (mph)	Direction	15-Minute Traffic Count					Equivalent Hourly Traffic Volume				
				A	MT	HT	B	M	A	MT	HT	B	M
1	US 522	45	NB	140	5	14	2	3	560	20	56	8	12
			SB	105	6	13	0	0	420	24	52	0	0
2	Winchester Grade RD	40	EB	31	0	0	0	0	124	0	0	0	0
			WB	53	2	0	1	0	212	8	0	4	0
4	Johnson Mill RD	35	NB	6	0	0	0	1	24	0	0	0	4
			SB	8	0	0	0	1	32	0	0	0	4
5	Martinsburg RD	55	EB	34	0	0	0	0	136	0	0	0	0
			WB	28	0	0	0	0	112	0	0	0	0
8	Fairview Drive	35	NB	16	0	0	0	0	64	0	0	0	0
			SB	23	0	0	0	0	92	0	0	0	0
10	US 522	55	NB	58	3	8	1	0	232	12	32	4	0
			SB	49	3	11	0	0	196	12	44	0	0

Key: A = automobile, B = bus, EB = eastbound, HT = heavy truck, M = motorcycle, MT = medium truck, NB = northbound, SB = southbound, WB = westbound

4.2 Noise Model Validation

Modeled noise levels for the existing conditions using traffic volumes collected during noise monitoring were compared against monitored noise levels presented in Table 4-1 to evaluate the accuracy of the model setup. **Table 4.3** compares monitored noise levels and the respective modeled noise levels. The comparison was not made at ambient noise level monitoring locations.

Table 4.3: Measured and Modeled Noise Levels

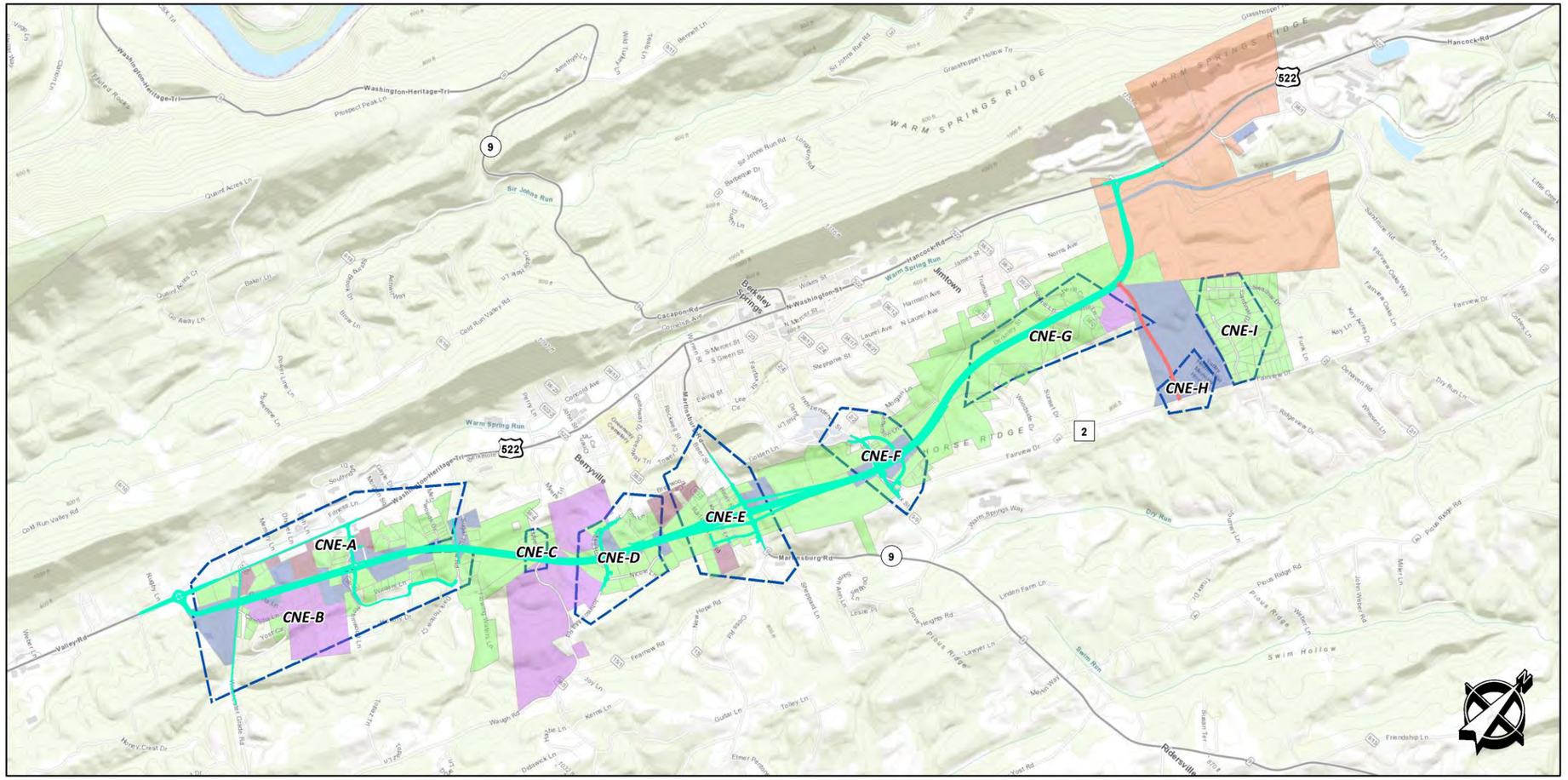
Monitoring Location	Measured Leq (dB(A))	Modeled Leq (dB(A))	Difference (dB(A))
1	72.1	72.0	-0.1
2	66.4	67.9	1.5
4	61.5	58.7	-2.8
5	66.3	67.3	1.0
8	65.2	62.4	-2.8
10	65.9	67.1	1.2

The FHWA and WVDOH accept modeled noise levels that are within +/- 3.0 dB(A). All locations evaluated are within the FHWA and WVDOH tolerance.

4.3 Common Noise Environment Determination

A common noise environment (CNE) is defined as a group of receptors that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. There are nine distinct geographic areas within the project area containing noise-sensitive land uses within 500 feet of the construction limits that can be considered similar in acoustical environment. The CNE's within the project area are shown in **Figure 4.1**.

Figure 4.1: Common Noise Environments within the Project Area



Legend

- US 522 Bypass
- Fairview Connector
- Common Noise Environment (CNE)

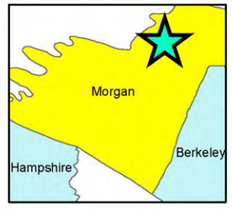
Landuse Type

- Commercial
- Exempt
- Farm
- Industrial
- Residential

US 522 Re-evaluaton Noise Study
Common Noise Environments within the Project Area

0 0.25 0.5 1 Miles

1 inch = 2,000 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019

4.4 Traffic Data for Noise Prediction

Noise levels were predicted for existing (2018), and design year (2043) loudest-hour traffic volumes at receiver locations that represent 181 receivers in existing land uses. The number and types of predicted traffic noise impacts in each scenario and impact type are shown in **Table 4.4.** The magnitude of the predicted noise levels and their increase over existing levels determine if a noise impact occur and the type of impact, such as receivers exceeding FHWA NAC or substantial increase criteria.

Noise levels for the design year scenarios were calculated and compared to the existing noise levels. The increase in future traffic volumes and the addition of travel lanes closer to receptors would result in noise levels higher than the existing conditions. The modeled receivers currently experience noise levels between 28.1 and 66.3 dB(A) and two modeled receivers in the study area are exceeding the NAC. Based on field data, a minimum existing ambient hourly equivalent noise level threshold of 55.5 dB(A) was applied to all receptors that were modeled to be lower than 55.5 dB(A) for no-build and design year scenarios.

Noise levels in 2040 are expected to be 29 to 67.4 dB(A) if no change is made to the existing highway. Noise levels would approach or exceed the NAC at five residential receivers without the project. The average increase in noise levels in the design year is approximately 1 dB over existing levels without the project. The increase is due to growth in traffic volume between 2018 and 2043.

With the proposed project, the estimated range is 38.7 to 68.7 dB(A). Five residential receivers would be impacted by this scenario. Traffic volume increase would change the noise level at all receptors by an average of 3.5 dB(A). The noise impact summary for the existing year (2018) and design year (2043) are shown in **Table 4.4**.

A summary of the 2018 existing, 2043 No Build, and 2043 Build predicted noise levels by receiver number are also provided in **Appendix C**.

Table 4.4: Traffic Noise Impact Summary

Scenario	Approximate # of Impacted Receivers Approaching or Exceeding the NAC				Substantial Noise Level Increase[1]	Impacts due to Both Criteria[2]	Total Impacts per 23 CFR 772[3]
	A	B	C	E			
Existing	0	2	0	0	0	0	2
No-Build	0	5	0	0	0	0	5
Build	0	5	0	0	0	0	5
Total Modeled Receivers	0	181	0	0	N/A	N/A	181

Notes:
[1] Predicted WVDOH "substantial increase" traffic noise level impact.
[2] Predicted traffic noise level impact due to exceeding NAC and "substantial increase" in build noise levels.
[3] The total number of predicted impacts is not duplicated if receptors are predicted to be impacted by more than one criterion.

4.5 Existing Conditions

A discussion of existing conditions for each CNE is provided below.

4.5.1 CNE A

CNE A is located in the southern portion of the project area on both sides of US 522 and west of the proposed alignment of the Berkeley Springs Bypass. It is primarily comprised of residential and commercial land uses, with property owned by the WVDOH, Calvary Bible Church, and Berkeley Baptist Church also located within its boundaries (see **Figure 4-2**). Noise monitoring occurred at the 19th Hole Café located immediately alongside US 522 where a traffic noise level of 72.1 dBA was measured, which is representative of the traffic noise levels within this CNE. Existing traffic noise levels were modeled between 34.8 and 66.3 dBA. The major noise source at this location is traffic traveling on US 522, where the posted speed limit is 45 miles per hour.

4.5.2 CNE B

CNE B is located adjacent to CNE A, east of the proposed Berkeley Springs Bypass and stretching north to Sugar Hollow Road. Residences and farmland comprise the majority of this CNE, but similar to CNE A, there are also properties owned by Berkeley Baptist Church and the WVDOH located within its boundaries (see Figure 4-2). A traffic noise level of 66.4 dBA was measured on Winchester Grade Road near Carolina Lane, with existing traffic noise levels modeled between 28.3 and 52.9 dBA in the TNM. Traffic traveling on Winchester Grade Road is the dominant noise source in CNE B and therefore the dominant component of the existing acoustic environment.

4.5.3 CNE C

CNE C is located east of US 522 near the intersection of Myers Road and the proposed alignment of the Berkeley Springs Bypass. One of the smallest CNEs, it is situated in a heavily wooded area with several residences found alongside Myers Road. Noise monitoring occurred near these residences, with a noise level of 56.1 dBA measured. Existing traffic noise levels were modeled between 47.6 dBA and 55.4 dBA. Traffic traveling on Myers Road is the dominant noise source in CNE C. The primary source of this traffic is an apartment complex located west of the CNE.

4.5.4 CNE D

CNE D is situated north of CNE C along Johnsons Mill Road near its intersection with the alignment of the proposed Berkeley Springs Bypass. This CNE is located among numerous residences, wooded area, and open farmland (see Figure 4-2). Traffic using Johnsons Mill Road is the dominant noise source, with noise monitoring near the intersection of Nicole Lane and Johnsons Mill Road providing a measurement of 61.5 dBA. Existing traffic noise levels modeled in the TNM ranged from 32.7 to 58.7 dBA.

4.5.5 CNE E

CNE E is located immediately north of CNE D. Martinsburg Road traverses this CNE in an east-west direction and is the dominant component of the existing noise environment. The alignment of the proposed bypass runs north-south through the CNE near the intersection of Martinsburg Road and Keystone Lane. Numerous residences are located in this heavily wooded area along with a few

properties owned by commercial enterprises and the WVDOH (see Figure 4-2). Noise measurement of 66.3 dBA was recorded along Martinsburg Road near Keystone Lane, with existing traffic noise levels modeled in the TNM ranging from 36.7 dBA to 66.3 dBA.

4.5.6 CNE F

CNE F is located toward the northern extent of the proposed Berkeley Springs Bypass. Fairfax Street, Independence Street, and Fairview Drive are the major roads that traverse it, with the Berkeley Springs Bypass running north-south near the intersection of Fairfax Street and Fairview Drive. CNE F is comprised of several residences situated within an area characterized by a combination of tree cover and open fields. Some properties are owned by the WVDOH (see Figure 4-2). Background noise in the CNE is minimal. Noise monitoring occurred near the intersection of Independence Street and Fairfax Street, with a noise measurement of 63.1 dBA being recorded. Existing traffic noise levels were modeled between 35.6 and 55.1 dBA.

4.5.7 CNE G

CNE G is the northernmost CNE located along the proposed alignment of the Berkeley Springs Bypass. Land use within the CNE is almost entirely residential, with the far northeast portion designated as farmland (see Figure 4-2). CNE G is densely wooded, with no major streets located within its boundaries. The Berkeley Springs Bypass would run north-south through the middle of the CNE. Noise measurement of 60.0 dBA was recorded at a noise monitoring site on Sherill Lane, which is a dead-end road. Background noise in this area is minimal. Existing traffic noise levels in CNE G were modeled between 28.2 and 31.4 dBA in the TNM.

4.5.8 CNE H

CNE H is located due east of the northern portion of CNE G. War Memorial Hospital is the primary landowner in this CNE, with a few residences located across from the hospital along Fairview Drive (see Figure 4-2). The major noise source is road traffic on Fairview Drive. Noise monitoring occurred near the hospital entrance at Healthy Way and Fairview Drive, where a noise measurement of 65.2 dBA was recorded. Modeled noise levels in the TNM ranged from 28.1 to 29.1 dBA.

4.5.9 CNE I

CNE I is located north of CNE H in an area comprised of residential development. The major noise sources are daily residential activities. Noise monitoring occurred in a cul de sac on Bluejay Court, where a noise measurement of 55.5 dBA was recorded. This area was located far enough away from the Fairview Connector, so no receptors were modeled in this area.

Section 5. Design Year Conditions

WVDOH proposes to construct the Berkeley Springs Bypass and Fairview Connector. The bypass will begin at Winchester Road (County Route 13) and extend to Sandmine Road (County Route 38/1). The Fairview Connector will link US 522 to Fairview Drive near War Memorial Hospital, which are currently separated by a distance of approximately four miles. The Berkeley Springs Bypass will be a four-lane, controlled-access expressway with a grassed median and a design speed of 60 miles per hour. The Berkeley Springs Bypass is part of the US 522 project that was studied in the mid-1990s to early 2000s. That project consists of a four-lane roadway on a new alignment from the Virginia/ West Virginia state line to the Maryland state line for a distance of approximately 19 miles.

For this analysis, it is anticipated that traffic noise levels for the design year (2043) No-Build condition will increase compared to the existing noise environment. This is due to the projected growth in traffic volumes on the roadway network in the project area.

Current design engineering plans for the Berkeley Springs Bypass projected design year (2043) traffic volumes, and future terrain features were used to build the TNM for the design year (2043) Build condition. Noise levels predicted by the TNM for the existing (2018) condition, future design year (2043) No-Build condition, and future design year (2043) Build condition are provided in Appendix A. Design year conditions for each CNE are discussed below. As previously explained, because the Berkeley Springs Bypass project is on new location, many of the noise levels predicted by the Existing TNM were lower than the noise levels recorded in the field. The minimum noise level collected in the field was 55.5 dBA; for those sites that did not reach 55.5 dBA in the Existing model, the average noise level of 55.5 dBA was used to set baseline noise levels in the Build model. Potential noise impacts at receptor locations in the Build condition where this situation applied were identified by calculating noise level increases using the 55.5 dBA baseline.

The NAC used to determine noise impacts is either 66 or 71 dBA, depending on land use type for receptors located within each CNE. The NAC used for receptors located at residences, churches, and health offices located within each CNE is 66 dBA, and the NAC used for receptors located at restaurants and commercial enterprises is 71 dBA (see **Table 5.1**).

Table 5.1: Traffic Noise Receptor Table

CNE	Receptor ID	Landuse	Noise Abatment Criteria (dBA)	2017 Modeled Noise Level	2018 Modeled Noise Level	% Change +/-
CNE - A	A-1	Commercial	71	64.2	64.3	0.1
	A-2	Residential	66	60.8	62.2	1.4
	A-3	Residential	66	56	60.2	4.2
	A-4	Residential	66	58.9	60.8	1.9
	A-5	Residential	66	57.6	62.2	4.6
	A-6	Residential	66	66.3	66.8	0.5
	A-7	Residential	66	65.5	66.2	0.7
	A-8	Commercial	71	63	64.1	1.1
	A-9	Residential	66	55.5*	60.7	5.2
	A-10	Commercial	71	65.9	66.6	0.7
	A-11	Residential	66	64.3	65.2	0.9
	A-12	Residential	66	60.1	61.5	1.4
	A-13	Residential	66	59.2	60.6	1.4
	A-14	Church	66	55.5*	61.3	5.8
	A-15	Residential	66	55.5*	54.9	0
	A-16	Residential	66	55.5*	53.2	0
	A-17	Residential	66	55.5*	52.4	0
	A-18	Office	66	55.5*	51.7	0
	A-19	Commercial	71	55.5*	51.1	0
	A-20	Commercial	71	55.5*	50.3	0
	A-21	Restaurant	71	55.5*	49.8	0
	A-22	Commercial	71	55.5*	50.4	0
	A-23	Residential	66	55.5*	50.6	0
	A-24	Commercial	71	55.5*	51	0
	A-25	Commercial	71	55.5*	52.3	0
	A-26	Commercial	71	55.5*	53.6	0
	A-27	Residential	66	55.5*	58.1	2.6
	A-28	Residential	66	55.5*	61.3	5.8
	A-29	Commercial	71	55.5*	49.7	0
	A-30	Commercial	71	55.5*	49	0
	A-31	Commercial	71	55.5*	49.6	0
	A-32	Commercial	71	55.5*	51.4	0
	A-33	Office	66	55.5*	53.5	0
	A-34	Restaurant	71	55.5*	54.8	0
	A-35	Residential	66	55.5*	54.2	0
	A-36	Residential	66	55.5*	54.4	0
	A-37	Residential	66	55.5*	51.1	0
	A-38	Residential	66	55.5*	52.7	0
	A-39	Residential	66	55.5*	55.1	0
	A-40	Residential	66	55.5*	59.4	3.9
	A-41	Residential	66	55.5*	47.9	0
CNE - B	B-1	Commercial	71	55.5*	57.3	1.8
	B-2	Residential	66	55.5*	65.3	9.8
	B-3	Residential	66	55.5*	60.6	5.1
	B-4	Residential	66	55.5*	59.7	4.2
	B-5	Residential	66	55.5*	56.5	1
	B-6	Residential	66	55.5*	53.5	0
	B-7	Residential	66	55.5*	53.2	0
	B-8	Barn	66	55.5*	68.5	13
	B-9	Residential	66	55.5*	55.1	0
	B-10	Residential	66	55.5*	54.3	0

CNE	Receptor ID	Landuse	Noise Abatment Criteria (dBA)	2017 Modeled Noise Level	2018 Modeled Noise Level	% Change +/-
	B-11	Residential	66	55.5*	58.6	3.1
	B-12	Residential	66	55.5*	57.8	2.3
	B-13	Residential	66	55.5*	57	1.5
	B-14	Residential	66	55.5*	57.7	2.2
	B-15	Residential	66	55.5*	54.1	0
	B-16	Residential	66	55.5*	52.9	0
	B-17	Residential	66	55.5*	51	0
	B-18	Residential	66	55.5*	57.5	2
	B-19	Residential	66	55.5*	56.6	1.1
	B-20	Residential	66	55.5*	58.5	3
	B-21	Residential	66	55.5*	53.5	0
	B-22	Residential	66	55.5*	51	0
	B-23	Residential	66	55.5*	51.1	0
	B-24	Residential	66	55.5*	50.5	0
	B-25	Residential	66	55.5*	49.9	0
	B-26	Residential	66	55.5*	54.7	0
	B-27	Residential	66	55.5*	50.9	0
	B-28	Residential	66	55.5*	55.9	0.4
CNE- C	C-1	Residential	66	55.5*	60.6	5.1
	C-2	Residential	66	55.5*	59	3.5
	C-3	Residential	66	55.4	65.1	9.7
	C-4	Residential	66	55.5*	65	9.5
CNE - D	D-1	Residential	66	55.5*	58	2.5
	D-2	Residential	66	55.5*	55.5	0
	D-3	Residential	66	55.9	66.8	10.9
	D-4	Residential	66	55.5*	57.8	2.3
	D-5	Residential	66	55.5*	56.1	0.6
	D-6	Residential	66	55.5*	54.8	0
	D-7	Residential	66	55.5*	56.6	1.1
	D-8	Residential	66	58.7	60.3	1.6
	D-9	Residential	66	55.5*	52.6	0
	D-10	Residential	66	55.5*	52.5	0
	D-11	Residential	66	55.5*	52.9	0
	D-12	Residential	66	55.5*	55.8	0.3
	D-13	Residential	66	55.5*	54.3	0
	D-14	Residential	66	55.5*	52.7	0
	D-15	Residential	66	55.5*	53.1	0
	D-16	Residential	66	55.5*	53.6	0
	D-17	Residential	66	55.5*	55.2	0
	D-18	Residential	66	55.5*	59	3.5
	D-19	Residential	66	55.5*	55.9	0.4
	D-20	Residential	66	55.5*	61.6	6.1
	D-21	Residential	66	55.5*	62.5	7
	D-22	Residential	66	55.5*	52.7	0
	D-23	Residential	66	55.5*	56.8	1.3
	D-24	Residential	66	55.5*	64.6	9.1
	D-25	Residential	66	55.5*	55.6	0.1
CNE - E	E-1	Residential	66	66.3	63.2	-3.1
	E-2	Residential	66	55.5*	54	0
	E-3	Residential	66	65.3	62.5	-2.8
	E-4	Residential	66	65.1	62.5	-2.6
	E-5	Residential	66	55.5*	51.1	0

CNE	Receptor ID	Landuse	Noise Abatment Criteria (dBA)	2017 Modeled Noise Level	2018 Modeled Noise Level	% Change +/-
	E-6	Residential	66	55.5*	51.3	0
	E-7	Residential	66	55.5*	52.7	0
	E-8	Residential	66	55.5*	54.5	0
	E-9	Residential	66	60.9	58.4	-2.5
	E-10	Residential	66	59.2	57.2	-2
	E-11	Residential	66	55.5*	53.3	0
	E-12	Residential	66	55.5*	52.2	0
	E-13	Residential	66	55.5*	53	0
	E-14	Residential	66	55.5*	54.6	0
	E-15	Residential	66	55.5*	54.7	0
	E-16	Residential	66	55.5*	60.3	4.8
	E-17	Commercial	71	55.5*	56.9	1.4
	E-18	Residential	66	59.3	60.5	1.2
	E-19	Residential	66	55.5*	56.7	1.2
	E-20	Residential	66	60.2	61.2	1
	E-21	Residential	66	55.5*	54.4	0
	E-22	Residential	66	55.5*	58.8	3.3
	E-23	Residential	66	55.5*	65	9.5
	E-24	Residential	66	55.5*	63.6	8.1
	E-25	Residential	66	55.5*	61.3	5.8
	E-26	Residential	66	55.5*	56.8	1.3
	E-27	Commercial	71	55.5*	57.2	1.7
	E-28	Residential	66	55.5*	58.1	2.6
	E-29	Residential	66	60.5	57.8	-2.7
	E-30	Commercial	71	55.5*	53.7	0
	E-31	Residential	66	55.5*	55.2	0
	E-32	Residential	66	55.5*	58.8	3.3
	E-33	Residential	66	56.5	55	-1.5
	E-34	Residential	66	57.4	58.9	1.5
	E-35	Residential	66	55.5*	54	0
CNE - F	F-1	Commercial	71	55.5*	51.6	0
	F-2	Commercial	71	55.5*	56.7	1.2
	F-3	Residential	66	55.5*	52.8	0
	F-4	Residential	66	55.5*	56.7	1.2
	F-5	Residential	66	55.5*	52.3	0
	F-6	Residential	66	55.5*	52	0
	F-7	Residential	66	55.5*	52.1	0
	F-8	Residential	66	55.5*	52.7	0
	F-9	Residential	66	55.5*	59.4	3.9
	F-10	Residential	66	55.5*	53	0
	F-11	Residential	66	55.5*	58.1	2.6
	F-12	Residential	66	55.5*	56.7	1.2
	F-13	Residential	66	55.5*	59	3.5
	F-14	Residential	66	55.5*	55.4	0
	F-15	Residential	66	55.5*	55.9	0.4
	F-16	Residential	66	55.5*	57.3	1.8
	F-17	Residential	66	55.5*	57.4	1.9
	F-18	Residential	66	55.5*	58.1	2.6
	F-19	Residential	66	55.5*	63.2	7.7
	F-20	Residential	66	55.5*	59.1	3.6
	F-21	Residential	66	55.5*	54.7	0
	F-22	Residential	66	55.5*	53.9	0

CNE	Receptor ID	Landuse	Noise Abatment Criteria (dBA)	2017 Modeled Noise Level	2018 Modeled Noise Level	% Change +/-
	F-23	Residential	66	55.5*	55.2	0
	F-24	Residential	66	55.5*	57.6	2.1
	F-25	Residential	66	55.5*	54.7	0
	F-26	Residential	66	55.5*	55.1	0
	F-27	Residential	66	55.1	59	3.9
CNE - G	G-1	Residential	66	55.5*	54.5	0
	G-2	Residential	66	55.5*	55	0
	G-3	Residential	66	55.5*	56.2	0.7
	G-4	Residential	66	55.5*	57.6	2.1
	G-5	Residential	66	55.5*	62.6	7.1
	G-6	Residential	66	55.5*	61.4	5.9
	G-7	Residential	66	55.5*	68.7	13.2
	G-8	Residential	66	55.5*	65.6	10.1
	G-9	Residential	66	55.5*	61.4	5.9
	G-10	Residential	66	55.5*	58.4	2.9
	G-11	Residential	66	55.5*	57	1.5
	G-12	Residential	66	55.5*	60.8	5.3
	G-13	Residential	66	55.5*	64.7	9.2
	G-14	Residential	66	55.5*	53.9	0
CNE - H	H-1	Commercial	71	55.5*	38.7	0
	H-2	Commercial	71	55.5*	47.1	0
	H-3	Residential	66	55.5*	46.5	0
	H-4	Residential	66	55.5*	47.4	0
	H-5	Residential	66	55.5*	46.3	0
	H-6	Residential	66	55.5*	41.4	0
	H-7	Residential	66	55.5*	40.4	0

** Based on field data, a minimum existing ambient hourly equivalent noise level threshold of 55.5 dB(A) was applied to all receptors that TNM predicted to be lower than 55.5 dB(A) for the existing baseline scenario.*

Red Text indicated impacted receptor

5.1 CNE A

For CNE A, existing noise levels were modeled to range between 34.8 and 66.3 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 47.9 and 66.8 dBA. Traffic noise levels are predicted to range from a decrease of 7.6 dBA to an increase of 5.8 dBA at receptor locations throughout the CNE. Only two receptors, A-6 and A-7, both residences, are predicted to be impacted by noise increases exceeding the NAC of 66 dBA. The TNM predicts receptors A-6 and A-7 will experience noise increases of 0.5 dBA and 0.7 dBA, respectively. Noise abatement measures should be considered for receptors A-6 and A-7 within CNE A.

5.2 CNE B

For CNE B, existing noise levels were modeled to range between 28.3 and 52.9 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 49.9 and 68.5 dBA. Traffic noise levels are predicted to range from a decrease of 5.6 dBA to an increase of 13.0 dBA at receptor locations throughout the CNE. The only receptor predicted to be impacted by noise exceeding the NAC of 66 dBA

is a barn located at receptor B-8. Receptor B-8 is predicted to experience a noise level increase of 13.0 dBA. Noise abatement measures should be considered for receptor B-8 within CNE B.

5.3 CNE C

For CNE C, existing noise levels were modeled to range between 47.6 and 55.4 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 59 and 65.1 dBA. Traffic noise levels are predicted to increase from 3.5 dBA to 9.7 dBA at receptor locations throughout the CNE. No receptors are predicted to experience noise levels approaching or exceeding the NAC, so no noise abatement measures warrant consideration within CNE C.

5.4 CNE D

For CNE D, existing noise levels were modeled to range between 32.7 and 58.7 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 52.5 and 66.8 dBA. Traffic noise levels are predicted to range from a decrease of 3 dBA to an increase of 10.9 dBA at receptor locations throughout the CNE. The only receptor predicted to be impacted by noise exceeding the NAC of 66 dBA is a residence located at receptor D-3. The TNM predicts receptor D-3 will experience noise increase of 10.9 dBA. Noise abatement measures should be considered for receptor D-3 within CNE D.

5.5 CNE E

Existing noise levels at CNE E were modeled to range between 36.7 and 66.3 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 51.1 and 63.6 dBA. Traffic noise levels are predicted to range from a decrease of 4.4 dBA to an increase of 9.5 dBA at receptor locations throughout the CNE. No receptors are predicted to experience noise levels approaching or exceeding the NAC, so no noise abatement measures warrant consideration within CNE E.

5.6 CNE F

For CNE F, existing noise levels were modeled to range between 35.6 and 55.1 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 51.6 and 63.2 dBA. Traffic noise levels are predicted to range from a decrease of 3.9 dBA to an increase of 7.7 dBA at receptor locations throughout the CNE. No receptors are predicted to experience noise levels approaching or exceeding the NAC, so no noise abatement measures warrant consideration within CNE F.

5.7 CNE G

For CNE G, existing noise levels were modeled to range between 28.2 and 31.4 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 53.9 and 68.7 dBA. Traffic noise levels are predicted to range from a decrease of 1.6dBA to an increase of 13.2 dBA at receptor locations throughout the CNE. The only receptor predicted to be impacted by noise exceeding the NAC of 66 dBA

is a residence located at receptor G-7. The TNM predicts receptor G-7 will experience a noise increase of 13.2 dBA. Noise abatement measures should be considered for receptor G-7 within CNE G.

5.8 CNE H

For CNE H, existing noise levels were modeled to range between 28.1 and 29.1 dBA in the TNM, and design year (2043) traffic noise levels were modeled to range between 38.7 and 47.4 dBA. Traffic noise levels are predicted to decrease between 8.1 and 16.8 dBA at receptor locations throughout the CNE. No receptors are predicted to experience noise levels approaching or exceeding the NAC, so no noise abatement measures warrant consideration within CNE H.

Section 6. Mitigation Alternatives and Consideration

6.1 Acceptable Noise Abatement Measures

Noise abatement measures are considered when predicted noise levels approach or exceed the FHWA noise abatement criteria or when predicted noise levels would substantially exceed existing noise levels. Abatement measures, such as noise walls, earth berms, and depressed roadway segments, are intended to reflect or absorb highway traffic noise to reduce noise to acceptable levels. The WVDOH noise policy discusses various measures that can be considered as a means for reducing or eliminating traffic noise impacts. Following is a discussion of measures considered for the proposed project for the impacted receptors within the study area:

6.1.1 Traffic Management Measures

Traffic management measures that limit vehicle type, speed, volume, and time of operations are often effective noise abatement measures. However, these types of measures are not considered appropriate for this project due to their effect on the capacity and level of service of the proposed alternatives and the fact that they would not meet the purpose of and need for the proposed project.

6.1.2 Roadway Alignment Selection

Roadway alignment selection involves the horizontal or vertical orientation of the proposed improvements in such a way to minimize noise impacts and costs. The selection of roadway 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.

Changes in vertical alignment can be effective in limiting noise impacts of certain roadway facilities. Depressing or raising the highway elevations can create cut and fill slopes which may block the line of sight from a receptor to a road and provide shielding from traffic noise. Modifications to the currently proposed alignments for the reduction of traffic noise levels and traffic noise impacts will not be reasonable for this project.

6.1.3 Buffer Zones

In areas of impacted receptors where other abatement measures were considered and found to be not reasonable, a vegetative barrier could be considered for psychological and aesthetic screening. Vegetation that is high enough, wide enough, and dense enough it cannot be seen through, can decrease highway traffic noise. Studies have shown that a 200-foot (61-meters) width of dense vegetation can reduce noise levels by 10 dB(A). However, it is often impractical to plant this quantity of vegetation to achieve such reductions.

The development of buffer zones to provide noise mitigation was not considered appropriate as a noise abatement measure for this project. The amount of additional right-of-way required to create effective buffer zones would negatively impact existing adjacent residential land uses.

6.1.4 Noise Walls

This measure involves the construction of solid mass barriers to effectively diffract, absorb, and reflect highway traffic noise. A noise barrier must be high enough and long enough to shield the receptor from significant sections of the highway in order to provide sufficient noise reduction. Access openings in the barrier severely reduce the noise reduction provided by the barrier. It is economically unreasonable to construct a barrier for a small noise reduction. Safety at access openings (driveways, crossing streets, etc.) due to restricted sight distance is also a concern.

Furthermore, to provide a sufficient reduction, a barrier's length would normally be eight times the distance from the barrier to the receptor. For example, a receptor located 50 feet (15 meters) from the barrier would normally require a barrier of 400 feet (120 meters) long. An access opening of 40 feet (10 percent of the area) would limit its noise reduction to approximately 4 dB(A).

For noise abatement measures for US 522, were reviewed for receptors A-6, A-7, B-8, D-3 and G-7. Receptors A-6 and A-7 are located along US 522 and property access includes drives that connect to US 522. A noise barrier would not be feasible and still allow access to the property. Receptor B-8 appears to be an outbuilding associated with the residential structure that will be removed due to the proposed project and may include the removal of this structure. Receptor D-3 is a single isolated receptor and barriers for a single receptor are not cost-effective, in addition, the structure is located within 50 feet of the design of the US 522 Bypass, and it is anticipated that this structure will need to be removed. Receptor G-7 is located next to the US 522 Bypass and is anticipated as a relocation since its access is being impacted by the proposed design of the US 522 Bypass. Due to the reasoning above no barrier walls were modeled or recommended for construction as part of the Berkeley Springs Bypass project.

Table 6.1: Impacted Receiver Locations

Receiver	Location Description	dBA Reading	Impact	Abatement Measure
A-6	A residential lot, 75 feet from US 522, adjacent to the intersection of Winchester Grade Road. The property has direct access to US 522.	66.7	Sound Level	None Recommended
A-7	A residential lot, 80 feet from US 522 (Valley Road). The property has direct access to US 522.	66.2	Sound Level	None Recommended
B-8	On Dakota lane, 800 feet from US 522 (Valley Road) and approximately 790 feet from Winchester Grade Road. The structure appears to be an outbuilding and will be required to be relocated.	67.5	Sound Level	None Recommended
D-3	Approximately 40 feet from Johnsons Mill Road, and approximately 50 feet from the US 522 Bypass. The residential structure will be required to be relocated due to the project.	66	Sound Level	None Recommended
G-7	On Sherill Lane approximately 2280 feet from Fairview Road. The lot is residential and heavily wooded. This property access is being impacted by the US 522 Bypass and G-7 and G-8 will be required to be relocated due to the project.	67.7	Sound Level	None Recommended

Section 7. Construction Noise Abatement

The major construction activities for this project are expected to be earth removal, hauling, grading, and paving. Temporary and localized construction noise impacts will likely occur as a result of these activities. Temporary speech interference for passers-by and individuals living or working near the project can be expected. Noise levels in the study area will be increased during construction. The sound levels resulting from construction activities at nearby noise-sensitive receptors will be a function of the types of equipment utilized, the duration of the activities, and the distances between construction activities and nearby land uses. Default sound levels from construction equipment used in FHWA's Roadway Construction Noise Model (RCNM) are shown in **Table 7.1**.

Pile-drivers and impact-hammers will cause temporary, sporadic, and acute construction noise impacts. Other equipment, such as paving equipment, produce more steady noise levels and if operated at night, may interfere with sleep. Sporadic noise emissions from backup alarms and lift gate closures will be perceived as distinctly louder than the steady noise levels of construction equipment and will likely cause impacts to noise-sensitive receptors (residences).

Low-cost and easily implemented construction noise control measures should be incorporated into the project plans and specifications to the extent possible. These measures include but are not limited to, work-hour limits, equipment exhaust muffler requirements, haul-road locations, elimination of "tailgate banging," ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication.

Table 7.1: FHWA RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Use Factor	Spec 721.560 Lmax @ 50ft (dB(A), slow)	Actual Measured Lmax @ 50 ft (dB(A), slow)
Auger Drill Rig	No	20%	85	84
Backhoe	No	40%	80	78
Boring Jack Power Unit	No	50%	80	83
Chain Saw	No	20%	85	84
Clam Shovel (dropping)	Yes	20%	93	87
Compactor (ground)	No	20%	80	83
Compressor (air)	No	40%	80	78
Concrete Mixer Truck	No	40%	85	79
Concrete Pump Truck	No	20%	82	81
Concrete Saw	No	20%	90	90
Crane	No	16%	85	81
Dozer	No	40%	85	82
Drill Rig Truck	No	20%	84	79
Drum Mixer	No	50%	80	80
Dump Truck	No	40%	84	76
Excavator	No	40%	85	81
Flat Bed Truck	No	40%	84	74
Front End Loader	No	40%	80	79

Equipment Description	Impact Device?	Acoustical Use Factor	Spec 721.560 Lmax @ 50ft (dB(A), slow)	Actual Measured Lmax @ 50 ft (dB(A), slow)
Generator	No	50%	82	81
Generator (<25KVA, VMS signs)	No	50%	70	73
Gradall	No	40%	85	83
Grader	No	40%	85	N/A
Grapple (on backhoe)	No	40%	85	87
Horizontal Boring Hydr. Jack	No	25%	80	82
Hydra Break Ram	Yes	10%	90	N/A
Impact Pile Driver	Yes	20%	95	101
Jackhammer	Yes	20%	85	89
Man Lift	No	20%	85	75
Mounted Impact Hammer (hoe ram)	Yes	20%	90	90
Pavement Scarifier	No	20%	85	90
Paver	No	50%	85	77
Pickup Truck	No	40%	55	75
Pneumatic Tools	No	50%	85	85
Pumps	No	50%	77	81
Rock Drill	No	20%	85	81
Roller	No	20%	85	80
Scraper	No	40%	85	84
Shears (on backhoe)	No	40%	85	96
Tractor	No	40%	84	N/A
Vibratory Concrete Mixer	No	20%	80	80
Vibratory Pile Driver	No	20%	95	101
Warning Horn	No	5%	85	83
Welder/Torch	No	40%	73	74

Source: USDOT 2006

Section 8. Coordination with Local Officials

Highway traffic noise is often not considered as a component of future land use decision-making at the local level. Consideration of highway traffic noise by local planning and zoning officials can lead to mitigation efforts by developers and result in avoiding potential noise impacts. Local land-use planning and development decisions are an autonomous process for local governments; WVDOH can only encourage and coordinate with local officials and developers to consider highway traffic noise impacts during the development review process.

Local planning officials should use the information from this Traffic Noise Impact Study for preliminary identification of noise-sensitive receptors and to determine suitable future development and zoning. Local communities and developers are encouraged to use noise compatible land use planning in order to avoid future noise impacts.

The Date of Public Knowledge or the date of approval of the final environmental document and coordination with a local official for the Berkeley Springs Bypass was August 2001.

Section 9. Conclusion

This Traffic Noise Impact Study documents the evaluation of existing ambient noise levels at ten noise monitoring locations and the assessment of predicted loudest -hour equivalent Existing, No Build, and Build condition traffic noise levels and traffic noise impacts for 181 noise sensitive receivers for the US 522 Bypass and Fairview Connector.

Only 5 noise impacts were identified for the proposed project. Two of the receptors were located along the existing US 522 and will be impacted whether the project is built or not. The remaining impacts are anticipated to be relocated due to their proximity to the proposed design for the US 522 Bypass. No residences adjacent to the Fairview Connector alignment are anticipated to be impacted. In accordance with WVDOH Traffic Noise Abatement Policy, abatement measures were considered for the benefit of all five predicted noise impacts under the Design Year 2040 Build-condition.

All abatement measures were determined not to be reasonable due to location of the sites and access issues associated with the properties.

A copy of this traffic noise analysis can be provided to local officials to ensure, to the maximum extent possible, future developments are planned, designed, and programmed in a manner that will avoid traffic noise impacts. The final decision for noise mitigation should be made upon completion of the project design and any additional public involvement process required for FHWA approval.

Construction noise impacts, some of them potentially extreme, will occur due to the proximity of numerous noise-sensitive receptors to project construction activities. It is the recommendation of this report that all reasonable efforts should be made to minimize exposure of noise-sensitive areas to construction noise impacts.

Section 10. List of Preparers and Reviewers

Michael L. Belvin

Senior Environmental Planner

CDM Smith

David W. Clawson

Senior Planner

CDM Smith

Wade F. Luther, II, AICP

Transportation Planner

CDM Smith

Ariel L. Weyandt, AICP

Planner

CDM Smith

Appendix A Noise Field Notes

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI / POTTER

Date 05/24/18 Monitor Site # 01 US 522

travel lanes 2 Direction of Lanes N/S

Speed limit 45 Surface Conditions DRY

Grade ~ 2% Wind Speed < 5 mph Humidity

Surrounding Land uses 19TH HOLE CAFE

Time monitoring began 1600 Time monitoring ended 1615

Traffic # (15 min)	SB Lane			NB Lane		
Cars	105	# 420	VPH	140	# 560	VPH
Medium Truck	6	# 24	VPH	5	# 20	VPH
Heavy Truck	13	# 52	VPH	14	# 56	VPH
Bus	0	# 0	VPH	2	# 8	VPH
Motorcycle	0	# 0	VPH	3	# 12	VPH
Total	124	# 496	VPH	163	# 652	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 72.1 dB

Distance from Travel Lane 50 ft

Height above roadway 5 ft

Height above Ground 4 ft

Site Sketch if needed

Background Noise

Major Noise Source ROAD TRAFFIC

Unusual Events PAVING PROJECT (MAJESTIC TO TABOR)

Comments

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IECUN / POTTER

Date 05/24/18 Monitor Site # 02 Winchester Grade Road

travel lanes 2 Direction of Lanes E/W

Speed limit 40 Surface Conditions DRY

Grade 2% Wind Speed < 5 MPH Humidity

Surrounding Land uses RESIDENTIAL

Time monitoring began 1640 Time monitoring ended 1700

Traffic # (15 min)	EB Lane			WB Lane		
Cars	31	# 124	VPH	53	# 212	VPH
Medium Truck	0	# 0	VPH	2	# 8	VPH
Heavy Truck	0	# 0	VPH	0	# 0	VPH
Bus	0	# 0	VPH	1	# 4	VPH
Motorcycle	0	# 0	VPH	0	# 0	VPH
Total	31	# 124	VPH	56	# 224	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 66.4 dB Distance from Travel Lane 20 ft

Height above roadway 5 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise MINIMAL

Major Noise Source ROAD

Unusual Events NONE

Comments < 0.25 MI. TO SHEETZ & US52/CR13 I/S
@ ENTR TO BERKELEY BAPTIST CHURCH

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI / POTTER

Date 05/24/18 Monitor Site # 03 Myers Road

travel lanes _____ Direction of Lanes E/W

Speed limit 25 Surface Conditions DRY

Grade 5% Wind Speed < 5 MPH Humidity _____

Surrounding Land uses RESIDENTIAL

Time monitoring began 1715 Time monitoring ended 1730

Leq Noise Level L(avg) 56.1 dB Distance from Travel Lane 20 ft

Height above roadway 4 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise MINIMAL

Major Noise Source ROAD

Unusual Events _____

Comments RESIDENT STATED PRIMARY SOURCE OF TRAFFIC IS APT COMPLEX TO THE WEST

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI / POTTER

Date 05/24/18 Monitor Site # 04 Johnson Mill Road

travel lanes 2 Direction of Lanes NE/SW

Speed limit 35? Surface Conditions DRY

Grade 3% Wind Speed <5 MPH Humidity

Surrounding Land uses RES

Time monitoring began 1745 Time monitoring ended 1800

Traffic # (15 min)	NE Lane			SW Lane		
Cars	6	# 24	VPH	8	# 32	VPH
Medium Truck	0	# 0	VPH	0	# 0	VPH
Heavy Truck	0	# 0	VPH	0	# 0	VPH
Bus	0	# 0	VPH	0	# 0	VPH
Motorcycle	1	# 4	VPH	1	# 4	VPH
Total	7	# 28	VPH	9	# 36	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 61.5 dB Distance from Travel Lane 30 ft

Height above roadway 4 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise CLOSE TO MAILBOXES

Major Noise Source ROAD

Unusual Events

Comments NICOLE LANE / JOHNSONS MILL RD

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI/POTTER

Date 05/24/18 Monitor Site # 05 Martinsburg Road

travel lanes 2 Direction of Lanes E/W

Speed limit 55 Surface Conditions DRY

Grade 2% Wind Speed 0 Humidity

Surrounding Land uses VACANT LOT

Time monitoring began 1805 Time monitoring ended 1820

Traffic # (15 min)	WB Lane			EB Lane		
Cars	28	# 112	VPH	34	# 136	VPH
Medium Truck	0	# 0	VPH	0	# 0	VPH
Heavy Truck	0	# 0	VPH	0	# 0	VPH
Bus	0	# 0	VPH	0	# 0	VPH
Motorcycle	0	# 0	VPH	0	# 0	VPH
Total	28	# 112	VPH	34	# 136	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 66.3 dB Distance from Travel Lane 25 ft

Height above roadway 4 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise MINIMAL

Major Noise Source ROAD

Unusual Events

Comments

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI/POTTER

Date 05/24/18 Monitor Site # 05

travel lanes 2 Direction of Lanes E/W

Speed limit 55 Surface Conditions DRY

Grade 2% Wind Speed 0 Humidity

Surrounding Land uses VACANT LOT

Time monitoring began 1805 Time monitoring ended 1820

Traffic # (15 min)	WB Lane			EB Lane		
Cars	28	# 112	VPH	34	# 136	VPH
Medium Truck	0	# 0	VPH	0	# 0	VPH
Heavy Truck	0	# 0	VPH	0	# 0	VPH
Bus	0	# 0	VPH	0	# 0	VPH
Motorcycle	0	# 0	VPH	0	# 0	VPH
Total	28	# 112	VPH	34	# 136	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 66.3 dB Distance from Travel Lane 25 ft

Height above roadway 4 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise MINIMAL

Major Noise Source ROAD

Unusual Events

Comments

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI/ POTTER

Date 05/25/18 Monitor Site # 06 Fairfax Street

travel lanes 2 Direction of Lanes E/W

Speed limit 25 Surface Conditions DRY

Grade 3% Wind Speed < 5 MPH Humidity

Surrounding Land uses RESIDENTIAL

Time monitoring began 0845 Time monitoring ended 0900

Leq Noise Level L(avg) 63.1 dB Distance from Travel Lane 40 ft

Height above roadway 4 ft Height above Ground 4 ft

Background Noise MINIMAL

Major Noise Source

Unusual Events

Comments STOP SIGN SB

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI / POTTER

Date 05/25/10 Monitor Site # 07 Sherill Lane

travel lanes 1 Direction of Lanes E/W

Speed limit 25? Surface Conditions DRY

Grade 5% Wind Speed <5 MPH Humidity

Surrounding Land uses RESIDENTIAL

Time monitoring began 0820 Time monitoring ended 0835

Leq Noise Level L(avg) 60.0 dB Distance from Travel Lane 10 ft

Height above roadway 3 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise MINIMAL

Major Noise Source

Unusual Events

Comments DEAD END ROAD

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI/POTTER

Date 05/25/18 Monitor Site # 08 Fairview Drive

travel lanes 2 Direction of Lanes N/S

Speed limit 35 Surface Conditions DRY

Grade 3% Wind Speed <5 MPH Humidity

Surrounding Land uses HOSPITAL

Time monitoring began 0750 Time monitoring ended 0805

Traffic # (15 min)	SB Lane			NB Lane		
Cars	23	# 92	VPH	16	# 64	VPH
Medium Truck	0	# 0	VPH	0	# 0	VPH
Heavy Truck	0	# 0	VPH	0	# 0	VPH
Bus	0	# 0	VPH	0	# 0	VPH
Motorcycle	0	# 0	VPH	0	# 0	VPH
Total	23	# 92	VPH	16	# 64	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 65.2 dB Distance from Travel Lane 8 ft

Height above roadway 4 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise

Major Noise Source ROAD TRAFFIC

Unusual Events

Comments NEAR HOSPITAL ENTRANCE/EXIT
DISTANT LOW "HUMMING" SOUND FROM HOSPITAL

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI / POTTER

Date 05/25/18 Monitor Site # 09 Bluebird Court

travel lanes 2 Direction of Lanes E/W

Speed limit 15 Surface Conditions DRY

Grade 2% Wind Speed < 5 MPH Humidity

Surrounding Land uses RESIDENTIAL

Time monitoring began 0718 Time monitoring ended 0733

Leq Noise Level L(avg) 55.5 dB Distance from Travel Lane 3 ft

Height above roadway 4 ft Height above Ground 4 ft

Site Sketch if needed

Background Noise MINIMAL

Major Noise Source BIRDS CHIRPING

Unusual Events

Comments DISTANT CONSTRUCTION EQUIPMENT AT PLANT
HELICOPTER PAD AT HOSPITAL (NOT USED DURING STUDY)
CONSTANT LOW "HUM" FROM HOSPITAL

CDM Smith

Project #:
County: MORGAN
Division:

Observer's Name IEZZI/ POTTER

Date 05/25/18 Monitor Site # 10 US 522

travel lanes 2 Direction of Lanes NB/SB

Speed limit 55 Surface Conditions DRY

Grade 2% Wind Speed < 5 MPH Humidity

Surrounding Land uses INDUSTRIAL PLANT

Time monitoring began 0700 Time monitoring ended 0715

Traffic # (15 min)	NB Lane			SB Lane		
Cars	58	# 232	VPH	49	# 196	VPH
Medium Truck	3	# 12	VPH	3	# 12	VPH
Heavy Truck	8	# 32	VPH	11	# 44	VPH
Bus	1	# 4	VPH	0	# 0	VPH
Motorcycle	0	# 0	VPH	0	# 0	VPH
Total	70	# 280	VPH	63	# 252	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 65.9 dB Distance from Travel Lane 50 ft

Height above roadway 2 ft Height above Ground 4 ft

Site Sketch if needed

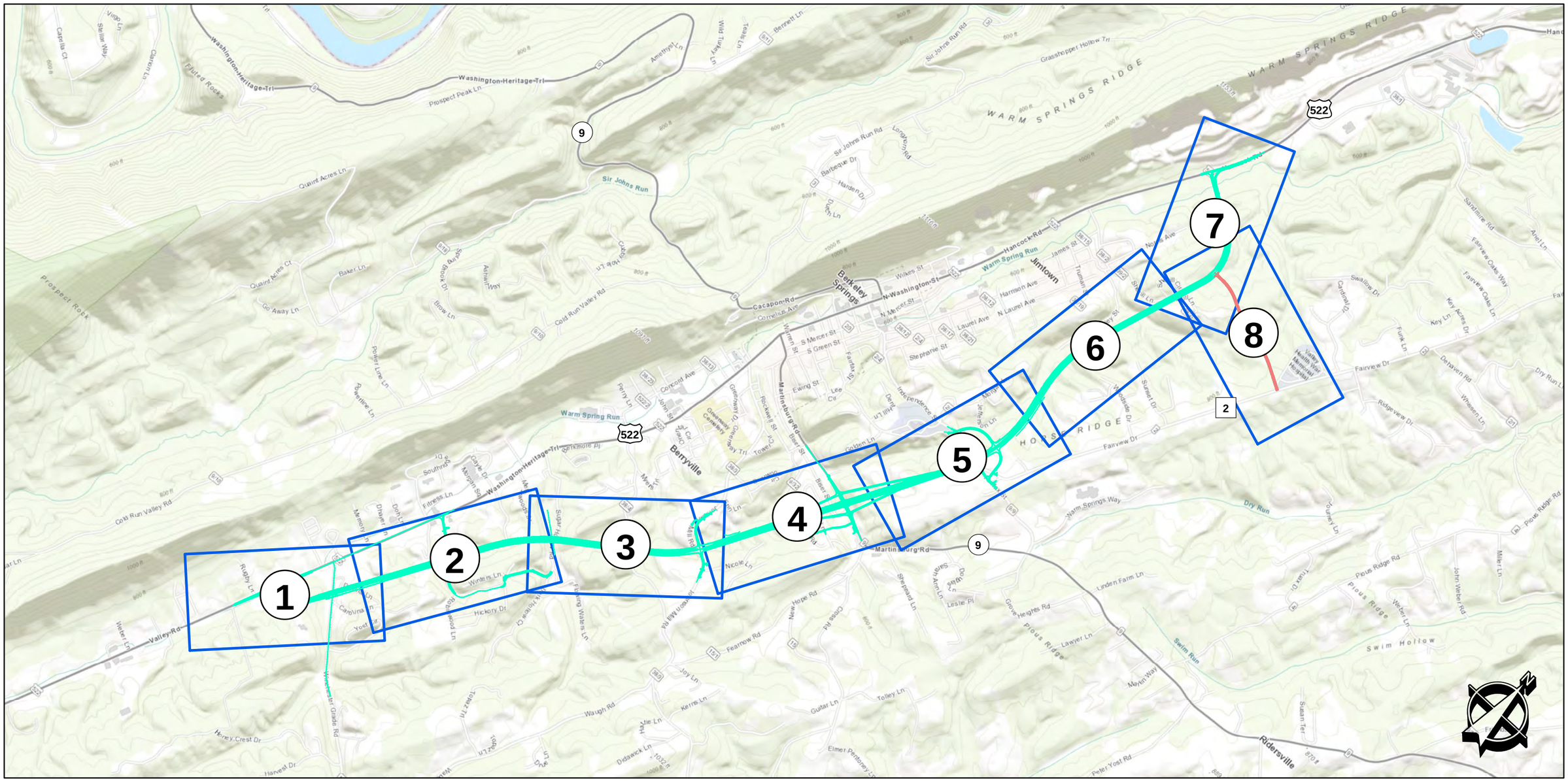
Background Noise

Major Noise Source ROAD TRAFFIC

Unusual Events GROUP OF TRUCKS LEAVING AT SAME TIME @ 0703

Comments

Appendix B Receiver Sites



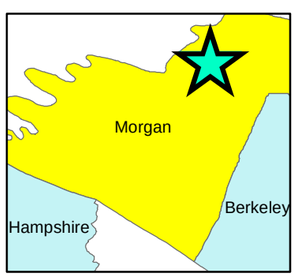
Legend

- US 522 Bypass
- Fairview Connector
- Mapbook Page

US 522 Re-evaluaton Noise Study Overview Map

0 0.25 0.5 1 Miles

1 inch = 2,000 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 7/31/2019

Legend

Build Impact

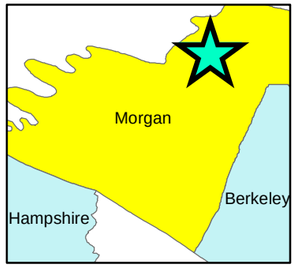
- No Impact
- Sound Level Impact

- US 522 Bypass
- Fairview Connector
- Right-of-Way

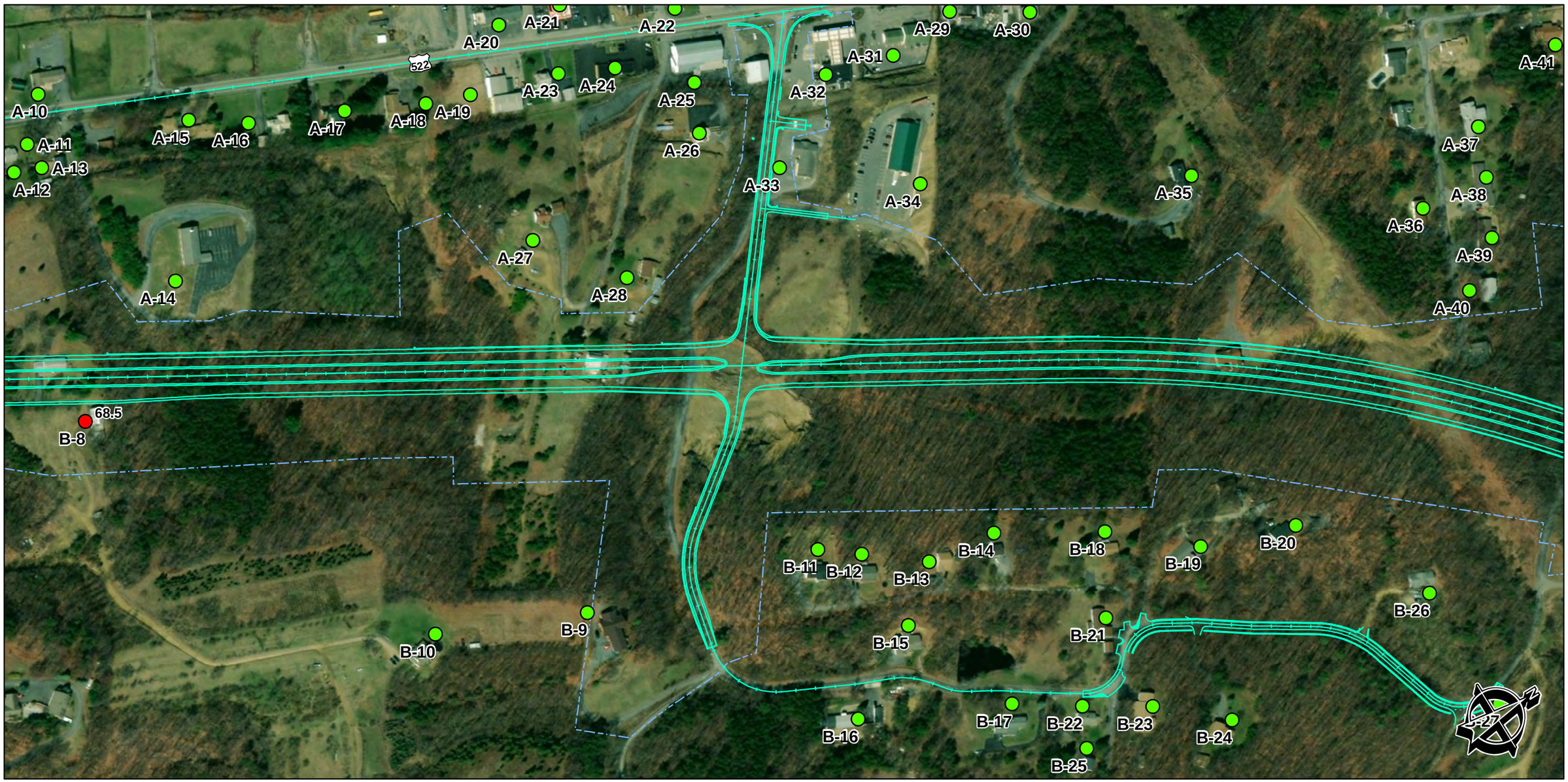
US 522 Re-evaluaton Noise Study Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019



Legend

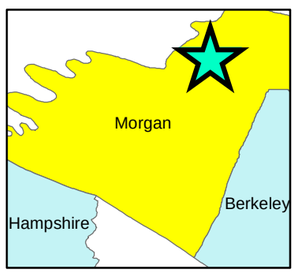
Build Impact

- No Impact
- Sound Level Impact
- US 522 Bypass
- Fairview Connector
- Right-of-Way

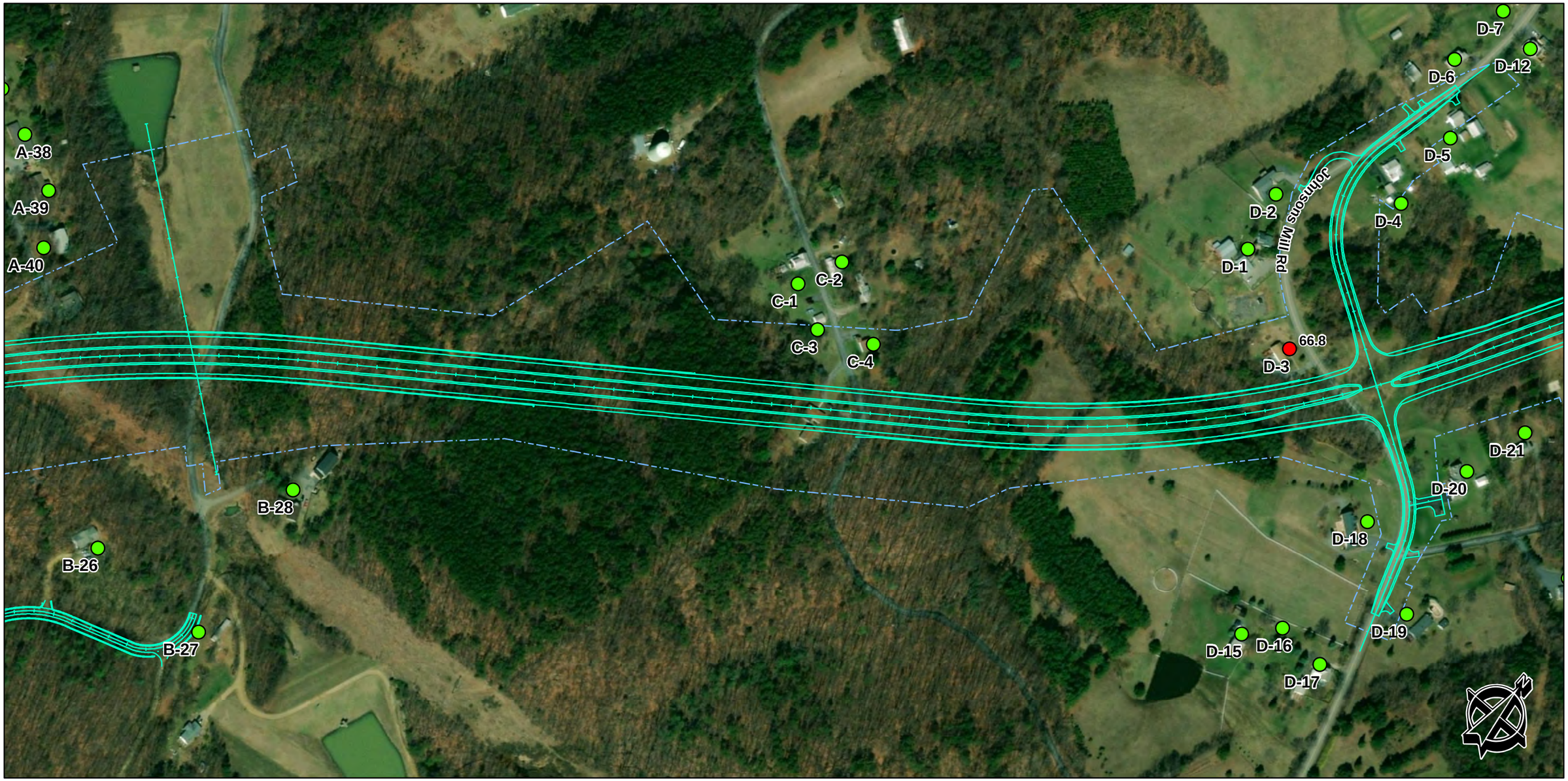
US 522 Re-evaluaton Noise Study
Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019



Legend

Build Impact

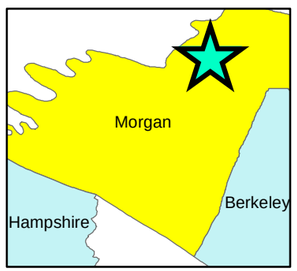
- No Impact
- Sound Level Impact

- US 522 Bypass
- Fairview Connector
- Right-of-Way

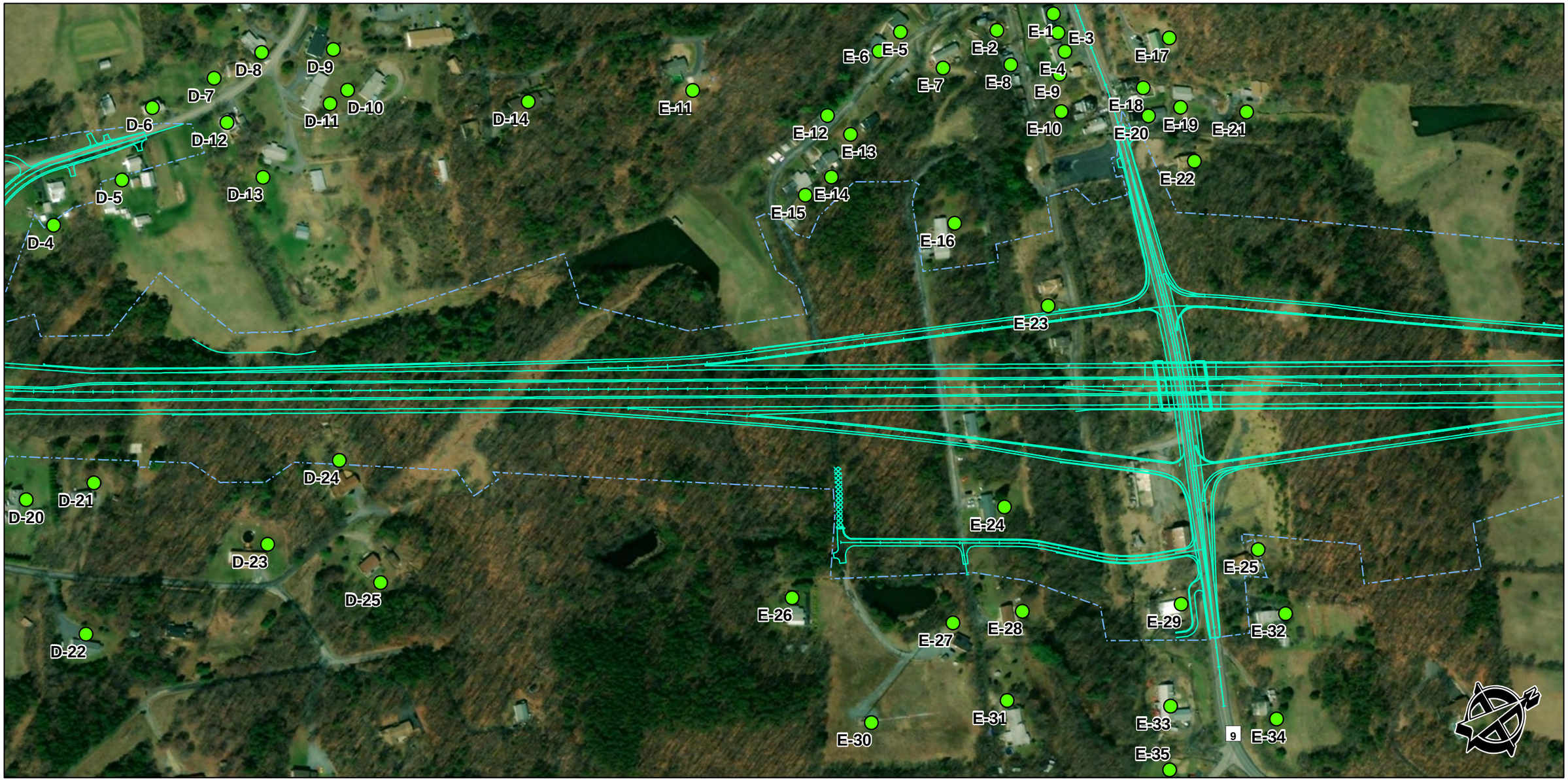
US 522 Re-evaluaton Noise Study Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019



Legend

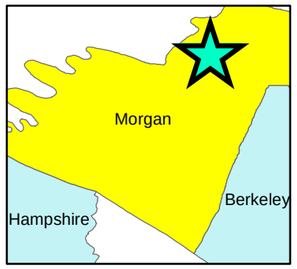
Build Impact

- No Impact
- Sound Level Impact
- US 522 Bypass
- Fairview Connector
- Right-of-Way

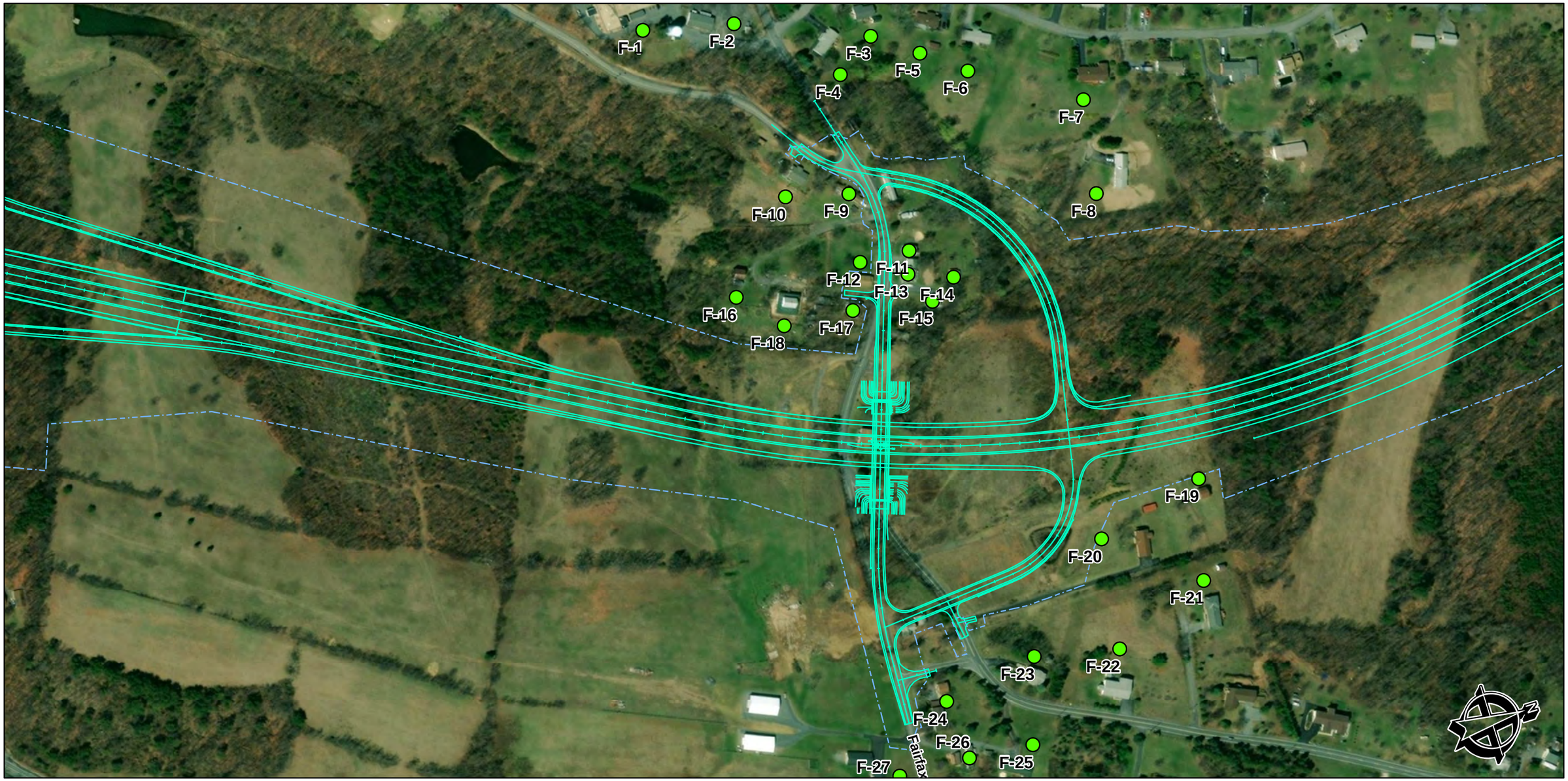
US 522 Re-evaluaton Noise Study
Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019



Legend

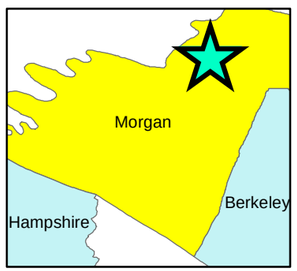
Build Impact

- No Impact
- Sound Level Impact
- US 522 Bypass
- Fairview Connector
- Right-of-Way

US 522 Re-evaluaton Noise Study
Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019

Legend

Build Impact

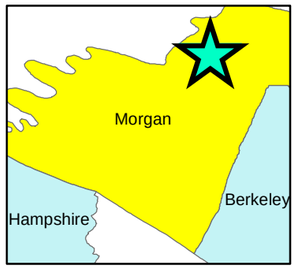
- No Impact
- Sound Level Impact

- US 522 Bypass
- Fairview Connector
- Right-of-Way

US 522 Re-evaluaton Noise Study
Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019

Legend

Build Impact

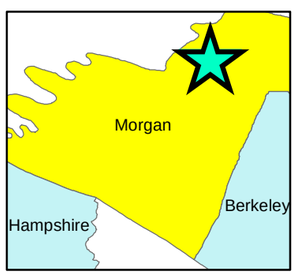
- No Impact
- Sound Level Impact

- US 522 Bypass
- Fairview Connector
- Right-of-Way

US 522 Re-evaluaton Noise Study Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019

Legend

Build Impact

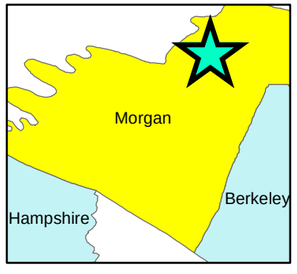
- No Impact
- Sound Level Impact

- US 522 Bypass
- Fairview Connector
- Right-of-Way

US 522 Re-evaluaton Noise Study Build Impact Map

0 187.5 375 750 Feet

1 inch = 250 feet



US 522 Relocation
State Project: U333-522-11.92
Federal Project: NFA-2317(005)D
Date: 8/2/2019

Appendix C Noise Meter and Calibration Certificates

PREMIER SAFETY
CALIBRATION LABORATORY

Calibration Certificate No. 1113320

Instrument: **Sound Level Meter**
Model: **SoundPro SE_DL2**
Manufacturer: **Quest**
Serial number: **BIJ070006**
Tested with: **Microphone QE7052 s/n 31531**
Preamplifier n/a s/n 0308 1757
Type (class): **2**
Customer:
Tel/Fax: **/**

Date Calibrated: **8/3/2017** *Cal Due:* **8/03/2018**

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No
Calibration service: __ Basic _X_ Standard
Address:

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/22/2012
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31079	June 22. 2017	Norsonic SA	June 22, 2018
DS-360-SRS	Function Generator	123268	June 22, 2017	SRS	June 22, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY53003818	July 14, 2017	Agilent Provider #93107	July 14,2018
SD700-Extech	Meteo Station	Q769118	June 22,2017	INNOCAL	June 22, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	34103	July 18, 2017	Scantek, Inc./ NVLAP	July 18, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.0	101.00	42.0

Calibrated by:	Steven Boertmann	**Authorized signatory:**	Dale Taylor
Signature	STEVEN BOERTMANN	Signature	DALE TAYLOR
Date	8-3-17	Date	8-3-17

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES [1] FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT[2,3]	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - ANSI S1.4 CLAUSE 3.2	Passed	0.20.15
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.1 CLAUSE 12	Passed	0.2
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.1 CLAUSE 12	Passed	0.2
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.1 CLAUSE 12	Passed	0.2
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.1 CLAUSE 13	Passed	0.2
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.1 CLAUSE 14	Passed	0.3
LEVEL LINEARITY INCLUDING THE LEVEL RANGE CONTROL - IEC 61672-3 ED.1 CLAUSE 15	Passed	0.3
TONEBURST RESPONSE - IEC 61672-3 ED.1 CLAUSE 16	Passed	0.3
PEAK C SOUND LEVEL - IEC 61672-3 ED.1 CLAUSE 17	Passed	0.35
FILTER TEST 1/1OCTAVE: FLAT FREQUENCY RESPONSE - IEC 61260, CLAUSE 4.10 & #5.9	Passed	0.25
FILTER TEST 1/3OCTAVE: FLAT FREQUENCY RESPONSE - IEC 61260, CLAUSE 4.10 & #5.9	Passed	0.25

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2 Parameters are certified at actual environmental conditions.

3

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone: Quest QE7052 s/n 31531 for acoustical test
Preamplifier: Quest n/a s/n 0308 1757 for all tests
Other: line adaptor ADP005 (18pF) for electrical tests and 1448 (18pF) for noise test
Accompanying acoustical calibrator: Quest QC-20 s/n QOH040008
Windscreen: none

Measured Data: in Test Report # of ... pages.

Place of Calibration: Premier Safety
46410 Continental Dr.
Chesterfield, MI 48047
Ph/Fax: 586-840-3220/ -3221
www.premier safety.com

SoundPro SE_DL2 s/n: BIJ070006 ID:
Date: 8/3/2017 By: SB
Due: 8/03/2018

Argus Hazco
CALIBRATION LABORATORY

ARGUS-HAZCO
A better experience.

Calibration Certificate 0004856

114 (1KHZ)

Instrument: **Acoustical Calibrator**
Model: **QC-20**
Manufacturer: **Quest**
Serial number: **QOH040008**
Class (IEC 60942): **1**
Barometer type:
Barometer s/n:

Date Calibrated: **8/3/2017** *Cal Due:* **8/03/2018**

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No

Customer:
Tel/Fax: /

Address:

Tested in accordance with the following procedures and standards:
Calibration of Noise Dosimeters, Sound Meters, and Calibratos., Rev. Chf 04

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31079	June 22. 2017	Norsonic SA	June 22, 2018
DS-360-SRS	Function Generator	123268	June 22, 2017	SRS	June 22, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY53003818	July 14, 2017	Agilent Provider #93107	July 14,2018
SD700-Extech	Meteo Station	Q769118	June 22,2017	INNOCAL	June 22, 2018
140-Norsonic	Real Time Analyzer	1405966	June 22, 2017	Norsonic SA	June 22, 2018
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
40AG-GRAS	Microphone	173539	July 18, 2017	Scantek, Inc. / NVLAP	July 18, 2018
NN1203-Norsonic	Preamplifier	138531	July 18, 2017	Norsonic SA	July 18, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Steven Boertmann	**Authorized signatory:**	Dale Taylor
Signature	STEVEN BOERTMANN	Signature	DALE TAYLOR
Date	8-3-17	Date	8-3-17

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES[1] FROM STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		Unit older than the standard
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		Unit older than the standard
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	Unit older than the standard
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		Unit older than the standard
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		Unit older than the standard
Older standards (obsolete)			
IEC 60942: 1997 B.2 - Preliminary inspection	X		
IEC 60942: 1997 B.3.3 - Sound pressure level	X		
IEC 60942: 1997 B.3.4 - Sound pressure level stability	X		
IEC 60942: 1997 B.3.5 - Frequency	X		
IEC 60942: 1997 B.3.6 - Total harmonic distortion	X		
ANSI S1.40: 1984 (R1997) 4.4.2 Sound pressure level in the coupler	X		Not applicable
ANSI S1.40: 1984 (R1997) 4.4 Frequency sound in the coupler	X		Not applicable
ANSI S1.40: 1984 (R1997) 4.10 Total harmonic distortion	X		Not applicable

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2

Main measured parameters [3]:

Measured[4]/Acceptable[5] Tone frequency (Hz):	Measured[4]/Acceptable[5] Total Harmonic Distortion (%):	Measured [4]/Acceptable Level[5] (dB):
990.91 ± 0.99/1000.0 ± 10.0	0.00 ± 0.10/ < 3	114.07 ± 0.00/114.0 ± 0.4

3 The stated level is valid at reference conditions.

4 The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

5 Acceptable parameters values are from the current standards

Barometer indication	Nominal indication

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.0 ± 1.0	101.00 ± 0.001	42.0 ± 2.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:
Other:

Adjustments: Unit was not adjusted.
Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.

Place of Calibration: Premier Safety
46410 Continental Dr.
Chesterfield, MI 48047
Ph/Fax: 586-840-3220/ -3221
www.premier safety.com

Appendix D Traffic Data

					Peak Hourly Volumes						
					Total				Per Lane		
	Road Name	Description	TNM Model	Lane#	Peak Hourly Volumes	Autos	Medium Trucks	Heavy Trucks	Direction Medium Autos	Direction Medium Trucks	Direction Heavy Trucks
Existing 2018	US 522 (Valley Rd)	South of Winchester Grade Rd (NB)	US_522_South_NB	1	414	360	27	27	360	27	27
	US 522 (Valley Rd)	South of Winchester Grade Rd (SB)	US_522_South_SB	1	429	352	39	39	352	39	39
	US 522 (Valley Rd)	North of Winchester Grade Rd (NB)	US_522_South_NB	1	428	372	28	28	372	28	28
	US 522 (Valley Rd)	North of Winchester Grade Rd (SB)	US_522_South_SB	1	493	404	44	44	404	44	44
	Winchester Grade Rd	West leg of intersection	Winchester_Grade_Road_EB	1	155	153	1	1	153	1	1
	Winchester Grade Rd	East leg of intersection	Winchester_Grade_Road_WB	1	105	103	1	1	103	1	1
	Sugar Hollow Rd (38/14)	West leg of intersection	Sugar_Hollow_Road_EB	1	11	9	1	1	9	1	1
	Sugar Hollow Rd (38/14)	East leg of intersection	Sugar_Hollow_Road_WB	1	30	28	1	1	28	1	1
	Myers Rd (38/4)	West leg of intersection	Myers_Road_EB	1	75	73	1	1	73	1	1
	Myers Rd (38/4)	East leg of intersection	Myers_Road_WB	1	84	82	1	1	82	1	1
	Johnsons Mill Rd (38/3)	West leg of intersection	Johnson_Mill_Road_EB	1	43	41	1	1	41	1	1
	Johnsons Mill Rd (38/3)	East leg of intersection	Johnson_Mill_Road_WB	1	24	22	1	1	22	1	1
	Martinsburg Rd (9)	West leg of intersection	Martinsburg_Road_EB	1	212	210	1	1	210	1	1
	Martinsburg Rd (9)	East leg of intersection	Martinsburg_Road_WB	1	212	210	1	1	210	1	1
	Fairfax St (9/9)	West leg of intersection	Fairfax_Street_EB	1	58	56	1	1	56	1	1
	Fairfax St (9/9)	East leg of intersection	Fairfax_Street_WB	1	100	98	1	1	98	1	1
	Independence St	West leg of intersection	Fairview_Drive_EB	1	39	37	1	1	37	1	1
	Independence St	East leg of intersection	Fairview_Drive_WB	1	46	44	1	1	44	1	1
NoBuild 2043	US 522 (Valley Rd)	South of Winchester Grade Rd (NB)	US_522_South_NB	1	531	462	35	35	462	35	35
	US 522 (Valley Rd)	South of Winchester Grade Rd (SB)	US_522_South_SB	1	551	452	50	50	452	50	50
	US 522 (Valley Rd)	North of Winchester Grade Rd (NB)	US_522_South_NB	1	549	478	36	36	478	36	36
	US 522 (Valley Rd)	North of Winchester Grade Rd (SB)	US_522_South_SB	1	633	519	57	57	519	57	57
	Winchester Grade Rd	West leg of intersection	Winchester_Grade_Road_EB	1	199	197	1	1	197	1	1
	Winchester Grade Rd	East leg of intersection	Winchester_Grade_Road_WB	1	135	133	1	1	133	1	1
	Sugar Hollow Rd (38/14)	West leg of intersection	Sugar_Hollow_Road_EB	1	14	12	1	1	12	1	1
	Sugar Hollow Rd (38/14)	East leg of intersection	Sugar_Hollow_Road_WB	1	38	36	1	1	36	1	1
	Myers Rd (38/4)	West leg of intersection	Myers_Road_EB	1	97	95	1	1	95	1	1
	Myers Rd (38/4)	East leg of intersection	Myers_Road_WB	1	109	107	1	1	107	1	1
	Johnsons Mill Rd (38/3)	West leg of intersection	Johnson_Mill_Road_EB	1	55	53	1	1	53	1	1
	Johnsons Mill Rd (38/3)	East leg of intersection	Johnson_Mill_Road_WB	1	30	28	1	1	28	1	1
	Martinsburg Rd (9)	West leg of intersection	Martinsburg_Road_EB	1	272	270	1	1	270	1	1
	Martinsburg Rd (9)	East leg of intersection	Martinsburg_Road_WB	1	272	270	1	1	270	1	1
	Fairfax St (9/9)	West leg of intersection	Fairfax_Street_EB	1	75	73	1	1	73	1	1
	Fairfax St (9/9)	East leg of intersection	Fairfax_Street_WB	1	129	127	1	1	127	1	1
	Independence St	West leg of intersection	Fairview_Drive_EB	1	50	48	1	1	48	1	1
	Independence St	East leg of intersection	Fairview_Drive_WB	1	59	57	1	1	57	1	1
Build 2043	US 522 (Valley Rd)	South of Winchester Grade Rd (NB)	US_522_South_NB	1	536	466	35	35	466	35	35
	US 522 (Valley Rd)	South of Winchester Grade Rd (SB)	US_522_South_SB	1	508	417	46	46	417	46	46
	US 522 (Valley Rd)	North of Winchester Grade Rd (NB)	US_522_South_NB	1	229	199	15	15	199	15	15
	US 522 (Valley Rd)	North of Winchester Grade Rd (SB)	US_522_South_SB	1	154	126	14	14	126	14	14
	US 522 Bypass SB	Southern Roundabout to Martinsburg Rd	S-US-522-BP-SB-LN-01 &02	2	484	397	44	44	198	22	22
	US 522 Bypass NB	Southern Roundabout to Martinsburg Rd	S-US-522-BP-NB-LN-01 &02	2	438	381	28	28	191	14	14
	US 522 Bypass SB	Martinsburg Rd to Northern Roundabout	N-US-522-BP-SB-LN-01 & 02	2	453	394	29	29	197	15	15
	US 522 Bypass NB	Martinsburg Rd to Northern Roundabout	N-US-522-BP-NB-LN-01 & 02	2	406	353	26	26	177	13	13
	US 522 Bypass NB	Martinsburg Rd NB Off Ramp	Martinsburg_Rd_Ramp_D	1	71	62	5	5	62	5	5
	US 522 Bypass SB	Martinsburg Rd NB On Ramp	Martinsburg_Rd_Ramp_C	1	35	29	3	3	29	3	3
	US 522 Bypass NB	Martinsburg Rd SB Off Ramp	Martinsburg_Rd_Ramp_A	1	70	61	5	5	61	5	5
	US 522 Bypass SB	Martinsburg Rd SB On Ramp	Martinsburg_Rd_Ramp_B	1	89	73	8	8	73	8	8
	US 522 Bypass NB	Fairfax - NB Off Ramp	Fairfax_Ramp_B	1	27	22	2	2	22	2	2
	US 522 Bypass NB	Fairfax - NB On Ramp	Fairfax_Ramp_A	1	47	39	4	4	39	4	4
	US 522 Bypass SB	Fairfax - SB Off Ramp	Fairfax_Ramp_C	1	26	21	2	2	21	2	2
	US 522 Bypass SB	Fairfax - SB On Ramp	Fairfax_Ramp_D	1	25	21	2	2	21	2	2
	Winchester Grade Rd	West leg of intersection	Winchester_Grade_Road_EB	1	201	199	1	1	199	1	1
	Winchester Grade Rd	East leg of intersection	Winchester_Grade_Road_WB	1	333	134	1	1	134	1	1
	Sugar Hollow Rd (38/14)	West leg of intersection	Sugar_Hollow_Road_EB	1	0	9	1	1	9	1	1
	Sugar Hollow Rd (38/14)	East leg of intersection	Sugar_Hollow_Road_WB	1	47	38	1	1	38	1	1
	Myers Rd (38/4)	West leg of intersection	Myers_Road_EB	1	204	96	1	1	96	1	1
	Myers Rd (38/4)	East leg of intersection	Myers_Road_WB	1	26	14	1	1	14	1	1
	Johnsons Mill Rd (38/3)	West leg of intersection	Johnson_Mill_Road_EB	1	0	71	0	0	71	0	0
	Johnsons Mill Rd (38/3)	East leg of intersection	Johnson_Mill_Road_WB	1	99	28	1	1	28	1	1
	Martinsburg Rd (9)	West leg of intersection	Martinsburg_Road_EB	1	0	151	0	0	151	0	0
	Martinsburg Rd (9)	East leg of intersection	Martinsburg_Road_WB	1	319	168	1	1	168	1	1
	Fairfax St (9/9)	West leg of intersection	Fairfax_Street_EB	1	65	63	1	1	63	1	1
	Fairfax St (9/9)	East leg of intersection	Fairfax_Street_WB	1	119	104	8	8	104	8	8
	Independence St	West leg of intersection	Fairview_Drive_EB	1	48	39	4	4	39	4	4
	Independence St	East leg of intersection	Fairview_Drive_WB	1	36	31	2	2	31	2	2
			S to TC-US-522-BP-SB-LN-01	2	474	412	31	31	206	15	15
			S to BP NB	1	374	325	24	24	325	24	24
			US_522_South-TC_NB-LN-01	2	536	466	35	35	233	17	17
	Traffic Circle		US_522_TC_SB-LN-01 & 02	2	508	442	33	33	221	17	17
			US_522_TC_NB-LN-02	1	162	141	11	11	141	11	11
			TC-NB US 522	1	67	58	4	4	58	4	4
			US_522_North-TC_NB LN01 & 02	2	229	199	15	15	100	7	7
			US_522_North-TC_SB LN01 & 02	2	154	134	10	10	67	5	5