Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Acquisition of Site for Development of a Replacement Underground Safety Research Program Facility in Mace, West Virginia

Draft Environmental Impact Statement
Volume 1

February 2019

Draft Environmental Impact Statement

Centers for Disease Control and Prevention

In cooperation with

U.S. General Services Administration

Acquisition of Site for Development of an Underground Safety Research Program Facility

for

National Institute for Occupational Safety & Health

Mace, West Virginia

Abstract

The Centers for Disease Control and Prevention, in collaboration with the U.S. General Services Administration, is proposing to provide the National Institute for Occupational Safety and Health (NIOSH) with a new underground safety research facility in Mace, West Virginia, that would allow full-scale mine experiments and research that accurately simulates an underground mine. This Draft Environmental Impact Statement (EIS) examines the potential environmental impacts of the proposed development (Proposed Action Alternative) as well as those of the No Action Alternative. The impact areas analyzed include: noise and vibration; geology topography, and soils; water resources; utilities and infrastructure; and biological resources-vegetation and threatened and endangered species.

Comments should be submitted to:

Sam Tarr, CDC, Office of Safety, Security and Asset Management (OSSAM),

Centers for Disease Control and Prevention,

1600 Clifton Road NE, MS–K80, Atlanta, Georgia 30329–4027

or

www.regulations.gov (Docket No. CDC–2018–0057)

February 2019

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ABBREVATIONS AND ACRYONMS

Advisory Council	Advisory Council on Historic Preservation
BMP	Best Management Practice
BOM	U.S. Bureau of Mines
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted Decibel
dBL	Linear Decibel
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FR	*Federal Register*
FTA	Federal Transit Administration
GPP	Groundwater Protection Plan
GSA	General Services Administration
GSF	Gross Square Feet
Hz	Hertz
in/sec	Inches per Second
L_{dn}	Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
LLEM	Lake Lynn Experimental Mine
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRQZ	National Radio Quiet Zone
OSMRE	Department of the Interior, Office of Surface Mining Reclamation and Enforcement
PPV	Peak Particle Velocity

PSD	(Pocahontas County) Public Service District
REOI	Request for Expression of Interest
ROW	Right-of-way
SF	Square Feet
SWPPP	Stormwater Pollution Prevention Plan
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WNS	White-nose Syndrome
WVDEP	West Virginia Department of Environmental Protection
WVDNR	West Virginia Division of Natural Resources
WV SHPO	West Virginia State Historic Preservation Office

1 Purpose and Need for the Proposed Action

1.1 Introduction

This Draft Environmental Impact Statement (EIS) has been prepared by the Centers for Disease Control and Prevention (CDC), in cooperation with the United States (U.S.) General Services Administration (GSA) to assess the potential environmental impacts of the proposed acquisition of a site in Mace, West Virginia, and development of this site into a new underground safety research facility for the National Institute for Occupational Safety and Health (NIOSH). This new site would replace the previously occupied Lake Lynn Experimental Mine (LLEM). CDC would acquire the property and is the proponent for the action. As the primary real estate acquisition agency for the federal government, GSA is assisting CDC with the site selection and procurement process. This Draft EIS was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) as amended, and the President's Council on Environmental Quality's (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508).

1.2 Proposed Action

The proposed action evaluated in this Draft EIS is the acquisition by CDC of property in Mace, West Virginia, and the redevelopment of this property into a new underground safety research facility to replace the previously occupied LLEM. The site being considered for acquisition and development includes 461.35 acres located off U.S. Route 219 in Randolph and Pocahontas Counties near Mace, West Virginia.

CDC does not own the previously occupied LLEM; therefore, disposition of the property is not required and is not part of the proposed action.

1.3 Background

1.3.1 CDC and NIOSH

As 1 of 11 operating divisions of the U.S. Department of Health and Human Services, CDC was established in 1946 with the mission of controlling outbreaks of malaria and generally safeguarding the health of the American public. Since its establishment, CDC has remained at the forefront of public health efforts to prevent and control infectious and chronic diseases, injuries, workplace hazards, disabilities, and environmental health threats.

In 1970, Congress passed the Occupational Safety and Health Act to promote workplace and worker safety. The goal of the Act is to ensure employers provide their workers a place of employment that is free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, and unsanitary conditions.

To fulfill the requirements of the Act, Congress created an enforcement branch, the Occupational Safety and Health Administration, and a research branch, NIOSH. While the Occupational Safety and Health Administration—under the U.S. Department of Labor—is the main federal agency charged with the enforcement of safety and health legislation, NIOSH—administered by CDC—is responsible for conducting research and making recommendations for the prevention of work-related illnesses and injuries.

As such, NIOSH is responsible for

- enumerating hazards present in the workplace;
- identifying the causes of work-related diseases and injuries;
- evaluating the hazards of new technologies and work practices;
- creating ways to control hazards;
- training safety and health professionals; and
- recommending occupational safety and health standards.

1.3.2 NIOSH and the Lake Lynn Experimental Mine

The previously leased and operated LLEM was a unique facility that offered the opportunity for various full-scale mine experiments and research. The research performed was essential to programs focused on miner health and safety issues. The LLEM was initially constructed under a long-term lease agreement with the original landowner. Located 60 miles south of Pittsburgh, Pennsylvania, the lease agreement covered 406 acres of a 4,350-acre parcel. The original landowner conducted surface limestone mining in the area of the lease and then expanded the operation to an underground mine. Upon completion of the mining operation, the U.S. Bureau of Mines (BOM) designed the LLEM to take advantage of the existing surface facility, two flat quarry areas, and the underground workings to provide pressure expansion chambers for the mine explosion lab. NIOSH took over the lease for the facility when the mine safety and health function was transferred from the BOM to NIOSH in 1997. BOM and CDC/NIOSH leased the facility from 1982 to 2012. Underground mine safety research was conducted at the LLEM until 2008 when the roof collapsed. The underground experimental mine and aboveground fire testing facility were primarily used for studies and research on mine explosions, mine seals, mine rescue, ventilation, diesel exhaust, new health and safety technologies, ground control, and fire suppression.

Research continued at the LLEM until it was closed in December 2012. CDC/NIOSH intended to extend the lease on the facility, but no lease agreement was reached with the property owners. The facility continued to operate under a series of standstill agreements. Although the government wanted to purchase the facility and complete the rehabilitation work after obtaining title to the property, negotiations to purchase the property were unsuccessful, with the owners rejecting the multiple offers.

After the lease and purchase negotiations failed, a number of other options were considered for conducting full-scale explosion studies that required the use of the LLEM. All of the alternatives considered but eliminated are included in Section 2.2.2, Alternatives Dismissed from Further Consideration in the Draft EIS. Alternatives that are analyzed in the Draft EIS are discussed in Section 2.2.3.

1.3.3 Project History

In 2013, CDC completed a Project Development Study to outline a design solution for replacing the LLEM (CDC 2013). The study details the facility needs and site requirements, provides design concepts, and includes a rough order of magnitude cost estimate for the replacement facilities.

In 2016, to identify potentially available locations that could accommodate the space requirements defined in the 2013 study, GSA issued (on behalf of CDC) two separate Requests for Expressions of

Interest (REOI) for a site, developed or undeveloped, that could be used for the new underground safety research facility. The first REOI, advertised in June 2016, contained a limited delineated area within a 200-mile radius of NIOSH's Bruceton, Pennsylvania, research facility. The REOI set forth Minimum Criteria that would be used to evaluate the suitability of the submitted sites.

1.3.3.1 Minimum Criteria

The June 2016 REOI defined the Minimum Criteria that any suitable site must meet, as follows

- Sites offered shall be located within the following counties:
  - *Maryland*: Allegany, Carroll, Frederick, Garrett, and Washington
  - *New York:* Allegany, Cattaraugus, Chautauqua, Erie, and Wyoming
  - *Pennsylvania:* Adams, Allegheny, Armstrong, Beaver, Bedford, Blair, Butler, Cambria, Cameron, Centre, Clarion, Clearfield, Clinton, Crawford, Cumberland, Dauphin, Elk, Erie, Fayette, Forest, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Juniata, Lancaster, Lawrence, Lebanon, Lycoming, McKean, Mercer, Mifflin, Montour, Northumberland, Perry, Potter, Snyder, Somerset, Union, Venango, Warren, Washington, Westmoreland, and York
  - *Ohio:* Ashland, Ashtabula, Athens, Belmont, Carroll, Champaign, Clark, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Delaware, Erie, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hancock, Hardin, Harrison, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Monroe, Morgan, Morrow, Muskingum, Noble, Ottawa, Perry, Pickaway, Portage, Richland, Ross, Sandusky, Seneca, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Washington, Wayne, Wood, and Wyandot
  - *Virginia:* Clarke, Frederick, Loudoun, Rockingham, Shenandoah, and Warren
  - *West Virginia:* Barbour, Berkeley, Braxton, Brooke, Calhoun, Clay, Doddridge, Fayette, Gilmer, Grant, Hampshire, Hancock, Hardy, Harrison, Jackson, Jefferson, Kanawha, Lewis, Marion, Marshall, Mason, Mineral, Monongalia, Morgan, Nicholas, Ohio, Pendleton, Pleasants, Pocahontas, Preston, Putnam, Randolph, Ritchie, Roane, Taylor, Tucker, Tyler, Upshur, Webster, Wetzel, Wirt, and Wood
- Minimum site size of 316 acres to a maximum site size of 600 acres, generally rectilinear in shape with a minimum width of 3,000 linear feet and a minimum length of 4,600 linear feet.
- If the proposed site has existing or previous surface or subsurface mining:
  - The site shall contain an undisturbed rock mass that is a minimum of 600 linear feet x 1,800 linear feet x 18 vertical linear feet adjacent to the existing mine.
  - The extraction ratio in any existing mine shall not exceed 75 percent.
  - The existing mine shall not have any active or inactive hydrocarbon (oil and/or gas) wells.
  - The mine and undisturbed rock mass shall contain no sinkholes.
  - The undisturbed rock mass shall have a Rock Mass Rating value of 70 or greater and a Rock Quality Designation value of 80 or greater.

  - No more than 10 percent of the surface area of a mine shall exhibit roof.
  - There will be no previous undermining within 1,000 feet of the undisturbed rock mass.
- If the proposed site does not have any existing or previous mining activity:
  - The site shall contain an undisturbed rock mass that is a minimum of 600 linear feet x 1,800 linear feet x 18 vertical linear feet adjacent to the existing mine.
  - The undisturbed rock mass shall not have any active or inactive hydrocarbon (oil and/or gas) wells.
  - The mine and undisturbed rock mass shall contain no sinkholes.
  - The undisturbed rock mass shall have a Rock Mass Rating value of 70 or greater and a Rock Quality Designation value of 80 or greater.
- The undisturbed rock and subsurface formation will be the target formation used for constructing an underground laboratory. Under either of the above scenarios, the undisturbed rock formation must:
  - Be located at least 100 feet below the ground surface.
  - Extend no further than 500 feet from the ground surface to the bottom of the rock formation.
  - Not have a slope exceeding 7 degrees.

1.3.3.2 Additional Criteria

The REOI also defined a set of Additional Criteria that would be used to compare and rank the sites that met the Minimum Criteria. The Additional Criteria were as follows:

- Sites located closer to CDC's Bruceton Research Center in Pittsburgh, Pennsylvania, are preferred.
- Sites closer to fire and emergency medical services are preferred.
- Sites adjacent to or near a two-lane paved road are preferred.
- The site offered must be unencumbered by any easements, agreements, and/or severed estates (mineral or other estates) that would materially affect the use and enjoyment of the site for its intended purpose.
- Sites offering more reliable access to public utilities are preferred.
  - Power – Utility source shall have the capacity to handle a load of 2,500 kilovolt-amperes at 480Y/277 volts
  - Natural Gas – Availability and capacity to be provided by a municipal source. Demand (10 pounds per square inch for fire suppression building) (3,000 cubic feet per minute at low pressure for underground safety research facility)
  - Utility infrastructure – No underground gas lines; oil transmission lines; overhead power transmission lines; or radio, television, cellphone, or other similar type towers shall be located above, below, or within 1,000 linear feet of the undisturbed rock target formation

- Preference will be given to sites with developable areas that avoid or minimize impacts to regulated or protected environmental resources, including but not limited to:
    - Floodplains: Sites that contain/impact floodplains may be eliminated from further consideration if the government determines there are practicable alternatives
    - Environmental contamination: The seller should provide all available existing documentation regarding past use of the property and environmental contamination
    - Wetlands and other water resources
    - Threatened and/or endangered species
    - Protected land uses (i.e. parks, preservation areas, open space, agriculture, environmental easements)
    - Cultural (archaeological and historic) resources
    - Preference will be given to sites with compatible surrounding land uses.
- The site would preferably be an existing underground mine but could include a virgin/undisturbed rock formation.
- If the site has existing or previous surface or subsurface mining, it is preferred that no more than 20 percent of the existing mine contain standing water.
- The target formation should generally be clear of discontinuities such as faults, significant fracture patterns, or any type of sinkhole.
- Sites that are near continuous or infrequent hazards may be evaluated less favorably, and depending on the nature and severity of the hazard, may be eliminated from consideration. Hazards include but are not limited to:
    - Influx of flowing or liquid hydrocarbons
    - Detectable toxic or explosive gas in the target formation or within the existing facility
- Sites which, in the government's estimation, provide opportunities to lower overall development costs for an underground safety research facility are preferred.
- All site conditions that may affect project schedule will be considered, including but not limited to: schedule for acquisition, design, and construction. External factors that may affect schedule will also be considered, including infrastructure and utility improvements, relocation, zoning impact, and public opposition.

The second REOI was issued in October 2016 and expanded the delineated area. The Minimum and Additional Criteria were identical to the June 2016 REOI, with one change. The location of available sites could be anywhere within the contiguous United States.

Under the first REOI, GSA received one expression of interest that had the potential to meet the Minimum Criteria. After further evaluation, however, the site was found to be non-viable. Three expressions of interest were received under the second REOI for three sites. One site did not meet the Minimum Criteria. Another expression of interest did not contain all necessary information to evaluate,

and the offeror did not respond to subsequent GSA inquiries. The full dismissal rationale for all sites not meeting the Minimum Criteria is available in Section 2.2.2.

The potential site in West Virginia met the Minimum Criteria and was determined to be a viable site. The site is located near Mace, West Virginia, straddles the Randolph and Pocahontas County lines, and is less than a 4-hour drive from the Bruceton, Pennsylvania, research facility. **Figure 1-1** shows the location of the LLEM, the Bruceton facility, and the potential site in Mace, West Virginia.

1.4 Purpose and Need

The purpose of the proposed action is to provide NIOSH with an underground safety research facility that would allow full-scale mine experiments and research that accurately simulate an underground mine. The proposed action is needed because the Underground Safety Research Program's underground testing laboratory at LLEM was a leased facility, and efforts to purchase the facility or continue the lease on a long-term basis failed. After a nationwide search for alternative sites and methods for conducting the full-scale studies, no viable alternatives other than construction of a new research facility were found. The facility is needed to help meet the NIOSH mission for conducting research and making recommendations for the prevention of work-related illnesses and injuries related to the mining industry.

1.5 National Environmental Policy Act and Related Regulatory Requirements

This Draft EIS has been prepared to comply with NEPA and the CEQ regulations implementing NEPA (40 CFR Part 1500–1508). Under NEPA, all branches of the federal government must consider the potential impacts of their proposed actions on the human environment. Preparation of an EIS is required for major federal actions with the potential to result in significant impacts. An EIS analyzes and describes the positive and negative environmental effects of the proposed action and considers any reasonable alternatives. Preparation of an EIS also provides an opportunity for the public to learn about and comment on major federal actions that may affect their communities. The findings of the EIS are considered by the proposing federal agency when making a decision on which alternative to implement.

Preparation of this Draft EIS is also intended to document or support compliance with other applicable environmental statutes, regulations, and executive orders, including:

- The Clean Water Act (CWA) of 1977 as amended, 33 United States Code (U.S.C.) §§ 1251 et seq.
- The Clean Air Act of 1970 as amended, 42 U.S.C. §§ 7401 et seq.
- The National Historic Preservation Act of 1966 (NHPA), 16 U.S.C. §§ 470 et seq.
- The Endangered Species Act (ESA), 16 U.S.C. §§ 1531–1544
- Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- EO 11988, Floodplain Management
- EO 11990, Protection of Wetlands

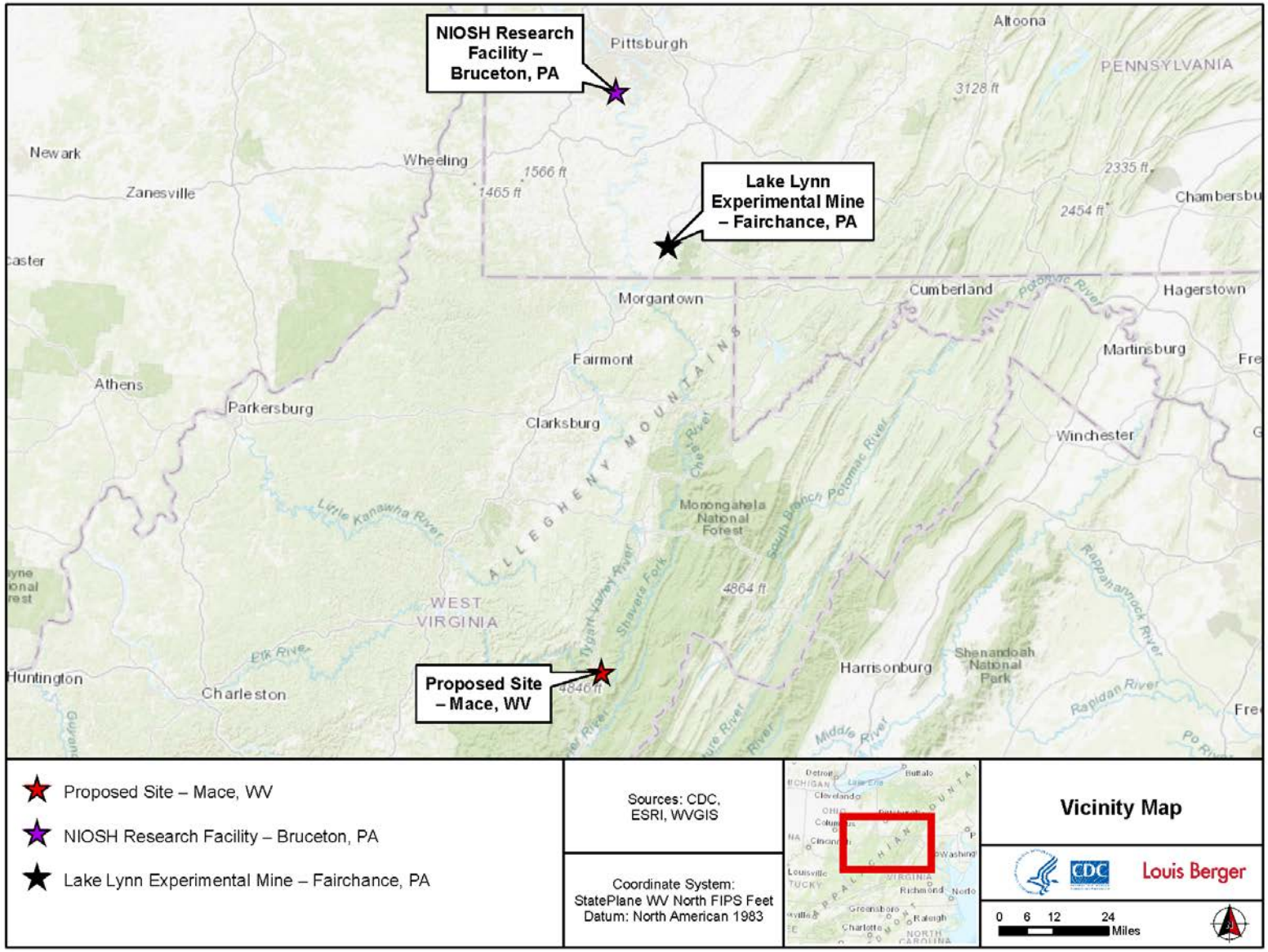


Figure 1-1: Locations of LLEM, NIOSH Research Facility, and Proposed Site

The above is not intended to be a comprehensive list of the environmental regulatory requirements that may apply to the proposed action but only a list of those requirements directly or indirectly addressed in this Draft EIS.

1.6 Cooperating Agency

Cooperating agencies are federal agencies other than a lead agency that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal or reasonable alternative (40 CFR 1508.5). CEQ regulations state that a cooperating agency shall participate in the NEPA process at the earliest possible time; participate in the scoping process; assume, on request of the lead agency, responsibility for developing information and preparing environmental analyses including portions of the EIS concerning which the cooperating agency has special expertise; and make available staff support at the lead agency's request to enhance the latter's interdisciplinary capability (40 CFR 1501.6).

CDC is the lead agency for the proposed action considered in this Draft EIS. The proposed action involves the acquisition by CDC of property in Mace, West Virginia. As the primary federal agency for real estate procurement and transactions, GSA has specialized expertise with respect to the acquisition of property for federal use. In this capacity, GSA has assisted CDC with identifying and screening potential sites for the proposed underground safety research facility (see Section 1.3.3) and will assist the agency with the site procurement process should CDC decide to proceed with the proposed action.

As an agency with special expertise pertaining to the proposed action and its potential environmental impacts, GSA meets the CEQ definition of a cooperating agency and, as such, reviews and comments on the various iterations of the EIS; participates in public meetings; and generally provides specific information pertinent to the acquisition of property, the development of the EIS, and other relevant matters over which it has jurisdiction by law or special expertise.

1.7 Scoping and Public Participation

1.7.1 Notice of Intent

A Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* (FR) on June 14, 2018 (Docket No. CDC–2018–0057). Publication of the NOI initiated a 30-day scoping period during which CDC and GSA solicited comments from the public and from federal, state, and local agencies and organizations. The NOI provided the following methods to submit scoping comments: online at https://www.regulations.gov; by mail to: Sam Tarr, Office of Safety, Security and Asset, Management, Centers for Disease Control and Prevention, 1600 Clifton Road NE, MS–K80, Atlanta, Georgia 30329–4027; and by attending a public scoping meeting hosted by CDC and GSA on June 26, 2018.

1.7.2 Mailings and Newspaper Notices

In addition to publishing the NOI in the *Federal Register*, CDC published an advertisement announcing the initiation of the EIS process and the public scoping meeting in the following newspapers:

- *Pocahontas Times* (June 21, 2018)
- *Randolph Inter-Mountain* (June 18, 21, and 25, 2018)

CDC mailed a scoping letter announcing the beginning of the EIS process and the public scoping meeting, and soliciting comments on June 19, 2018, to 49 state and local elected officials; federally recognized

Native American tribes; federal, state, and local government agencies; non-governmental organizations; and businesses or individuals with a known or potential interest in the proposed action and its environmental impacts, including 9 adjacent property owners.

On August 29, 2018, CDC emailed all meeting attendees who provided an email address, as well as people who provided public comments electronically, to provide continued communication to interested stakeholders throughout the process. CDC requested that the email recipients forward the email to friends and neighbors who would like to receive regular email updates on the project. CDC updated the project distribution list throughout the development of the EIS, and project updates were sent on September 27, 2018, and on the day the Draft EIS was published in the *Federal Register*.

1.7.3 Public Scoping Meeting

An open-house public scoping meeting was held on June 26, 2018, from 5:30 PM to 8:30 PM at the Linwood Community Library in Slatyfork, West Virginia. Information on the NEPA process and the proposed action was made available through poster stations, fact sheets, and informal conversation with representatives of CDC, NIOSH, and GSA. In addition, a PowerPoint presentation ran on a loop in the corner of the meeting space. The PowerPoint included the same information as the poster stations plus additional information on LLEM. It described actions that would occur on-site, provided expanded information on NEPA and Section 106 of the NHPA, and described opportunities for public involvement. Meeting attendees were encouraged to submit written comments via https://www.regulations.gov or verbal comments via a stenographer present at the meeting.

1.7.4 Summary of Public Scoping Comments

Public comments received during the scoping period fell into five broad thematic categories:

- **General Opinion about the Project.** Expressions of support and opposition were received during the public scoping period. Some commenters opposed the location of the site but were supportive of the overall mission of NIOSH.
- **Site Selection.** One commenter provided multiple comments regarding site selection, including support for the dismissal of Department of Defense and international facilities as viable alternatives after CDC investigation showed these sites could not support the research program over the long term. The commenter opposed the No Action Alternative and requested that the continued use of the LLEM be retained as a viable alternative. The commenter suggested CDC acquire the LLEM by eminent domain.

  Some commenters were unclear why the proposed site is the only site available for consideration and questioned why no closed mines could be used. All alternatives considered, including those dismissed from further analysis, are included in Section 2.2 of this Draft EIS.
- **Water Supply and Water Quality:** A number of commenters expressed concern about the potential for development and operation of the facility to harm their water supply. Commenters noted that the area is karstic, and the limestone has cracks through which the water flows, and that the flows can change. Many in the community get their water from springs where the limestone cracks intersect with the surface. Commenters were concerned that blasting associated with the project would affect the water supply. Several commenters mentioned the 2011 earthquake in Virginia and how it affected springs and wells. One commenter was

concerned about the settling ponds that would be needed at the facility, and another was concerned that on-site spills could contaminate the water supply. These topics are considered in Section 4.1 and 4.2 of this Draft EIS.

- **Community Impacts:** Commenters noted that the primary economic driver in the area is tourism, specifically the Snowshoe Mountain Resort, which is near the proposed project site. Commenters voiced concern that the noise and vibration associated with the project may not be compatible with activities at the resort. Tourism could be affected if the water supply is affected. One commenter mentioned community plans to convert the railroad right-of-way (ROW) to a rail-to-trail facility.

  An adjacent property owner expressed concern that the proposed facility might limit or preclude oil and gas exploration on his property and the associated right to earn an income from it.

  Multiple commenters expressed concerns that the noise and vibration from construction blasting and operation of the facility would be noticeable from adjacent and nearby properties. Commenters noted that a new natural gas pipeline is being constructed nearby, and several concerns were raised about the pipeline, including that the blasting at the proposed project site could harm the pipeline.

  Commenters expressed concern that the fence that would surround the property could be an eyesore if it is not set back from the road and from adjoining properties.

  One commenter raised concerns that the volunteer fire department would be unable to provide adequate response in the case of an accident at the facility.

  These topics are considered in Sections 1.8, 4.1, and Appendix E of this Draft EIS.

- **Requests.** One commenter requested the information provided at the public meeting; another commenter requested an extension of the public scoping period.

1.7.5 Summary of Agency Comments

Scoping comments were received from the following agencies (copies of the comments are in Appendix A).

- **U.S. Environmental Protection Agency:** By letter dated July 13, 2018, the U.S. Environmental Protection Agency (U.S. EPA) provided recommendations on the preparation of the EIS pertaining to the following topics: purpose and need; alternatives; land use; air quality; water resources; physiography; terrestrial resources and threatened and endangered species; hazardous waste management; environmental justice and other community concerns; energy efficiency; resiliency and design; and cumulative impacts. This Draft EIS addresses impacts pertaining to those areas of concern.

- **Advisory Council on Historic Preservation:** On July 6, 2018, the Advisory Council on Historic Preservation (Advisory Council) provided a letter requesting additional information on the project. On September 19, 2018, CDC provided the Advisory Council with a copy of a letter it had sent to the West Virginia State Historic Preservation Office (WV SHPO) containing a viewshed

analysis and a list of known structures eligible for listing on the National Register of Historic Places. Consultation with the Advisory Council is ongoing.

- **West Virginia Division of Culture and History (State Historic Preservation Office**): On July 9, 2018, the WV SHPO sent an email request for additional information to assist in the completion of its formal agency response letter. CDC responded by email on July 11, 2018, and confirmed that that no mining facility exists on the site. CDC indicated that consultation with the West Virginia Department of Environmental Protection (WVDEP) is underway regarding permitting requirements, and that CDC is reviewing viewsheds and the potential for historic resources in and around the project site and will provide the WV SHPO with the findings when they are complete. On September 19, 2018, CDC provided the WV SHPO with a viewshed analysis, a list of known structures eligible for listing on the National Register of Historic Places, and the phase I archaeology survey. On October 17, 2018, the WV SHPO provided comments related to archaeological and architectural resources submitted by CDC. The WV SHPO requested additional information and documentation associated with the phase I archaeology survey. CDC prepared the requested additional phase I archaeology survey report information and historic architecture report and submitted a formal response to comments in a letter to the WV SHPO on December 21, 2018. Consultation with the WV SHPO is ongoing.
- **West Virginia Department of Environmental Protection:** On June 25, 2018, WVDEP called the CDC project manager to request additional information regarding the permitting associated with the LLEM. CDC responded by email on July 3, 2018, and noted that internal research indicates that no air quality permits were needed at LLEM. CDC also indicated that it has no records of mining permits because the LLEM was developed originally by BOM. CDC/NIOSH will continue a discussion with WVDEP representatives regarding the proposed action to determine if mining permits would be required to develop the facility.
- **West Virginia Division of Natural Resources:** On July 12, 2018, the West Virginia Division of Natural Resources (WVDNR) sent a letter confirming there are no known records of rare, threatened, or endangered species or sensitive habitats within the project boundary. WVDNR noted that the project site is within the habitat buffer for the Indiana bat and recommended consultation with the U.S. Fish and Wildlife Service (USFWS). The letter also noted caves are located on the northern part of the property that could provide potential habitat for rare invertebrates in addition to bat populations.
- **U.S. Fish and Wildlife Service:** On June 19, 2018, CDC sent a letter to the USFWS West Virginia Field Office to initiate informal consultation regarding potential impacts on threatened and endangered species from the proposed action, pursuant to ESA Section 7. CDC received a response letter from the USFWS West Virginia Field Office on August 3, 2018, which included an official species list for the project area and proposed next steps, including field surveys and measures to avoid or minimize adverse impacts on federally listed species. A follow-up teleconference was held on September 10, 2018. In the letter and during the teleconference, USFWS requested additional information about the project area and proposed action. On September 19, 2018, CDC sent a response letter to the USFWS West Virginia Field Office providing the requested information, confirming commitments to avoid or minimize adverse impacts on federally listed species, and describing next steps for ongoing Section 7 consultation.

Habitat assessments for the three federally listed animals and two listed plants and a conservation plan for the Indiana bat (*Myotis sodalis*) were submitted to USFWS on December 21, 2018. CDC submitted a biological assessment for all five species to USFWS on December 21, 2018. Section 7 consultation is ongoing.

1.7.6 Summary of Tribal Comments

The CDC sent a scoping notice to 23 federally recognized tribes with a potential interest in actions conducted in Randolph and Pocahontas Counties in West Virginia that may affect cultural resources. One tribe, the Cherokee Nation, submitted a response, noting that Randolph and Pocahontas Counties are outside the tribe's area of interest and the tribe defers to other tribes that may have an interest in this area. Both the Catawba Indian Nation and Absentee Shawnee Tribe of Oklahoma responded that they have no immediate concerns regarding the project but requested to be notified should artifacts or human remains be located during the ground disturbance phase of the project.

1.8 Scope of the Draft EIS

Based on the scoping comments as well as the character and location of the proposed action, this Draft EIS analyzes impacts on the following resources:

- Noise and vibration
- Water resources
- Geology, topography, and soils
- Utilities and infrastructure
- Biological resources – vegetation and threatened and endangered species

Consistent with 40 CFR 1501.7(a)(3), the following resources are not considered in this Draft EIS because the proposed action has no potential to significantly affect them:

- **Cultural resources:** A phase I archaeological reconnaissance survey identified one isolated artifact and confirmed low potential for additional archaeological resources. A viewshed analysis indicates that the potential for affecting the view from aboveground historic resources is minimal, with the greatest potential during leaf-off conditions. There would be no off-site visual impacts during leaf-on conditions. However, the viewshed analysis also notes that the distance to historic or potentially eligible properties would be far enough and the profile of the proposed structures low enough that the effect on viewsheds from these properties would be negligible. Noise and vibration effects would be limited to the project site. Noise and vibrations would not affect the potentially eligible railroad tracks located on the project site, and aboveground disturbances would avoid this resource. The proposed fence would not cross over the railroad tracks, and the proposed fence would not have any direct or indirect effects on historic resources. No observable direct impacts on cultural resources are anticipated. Section 106 consultation under the NHPA is ongoing and will be documented in the record of decision.
- **Land use, zoning, and plans:** Randolph and Pocahontas Counties do not have countywide zoning. The proposed site is not zoned for a specific use, and no known County land use plans include the proposed site. There would be no restriction on land or land use on properties adjacent to the proposed site. No impacts are anticipated.

- **Community facilities:** The number of personnel on-site daily is not anticipated to adversely affect community facilities. During the public scoping period, one commenter was concerned that an unintentional fire on the property may be too large for the local volunteer fire departments to handle. The fire suppression facility is designed to provide fire suppression, but it also contains additional methods for containing an accidental fire. All facilities would be located on pavement, away from the tree line and vegetation, and a fire would be unlikely to spread beyond the developed area. No impacts are anticipated.
- **Socioeconomics and environmental justice:** The project site is currently unoccupied. No businesses would be directly affected or relocated by the development of the project. During the construction period, construction workers would be on-site daily for four years. Because of the rural nature of the project location and the specialized nature of the workforce required to construct the facility, construction workers could be temporarily relocated to the project site during construction. However, given the geographic area and the current employment patterns, it is possible that the skilled labor necessary for construction could be found locally. Any construction materials purchased locally would support local sales, jobs, income, and taxes. Any additional purchases made locally by those traveling to the site or by the local workforce would similarly support local sales, jobs, income, and taxes. The beneficial impact would be minor and temporary, lasting only during the project's construction period.

  During the operation of the facility, approximately 12 staff would be permanently assigned to the project site. These staff members would be on site daily, Monday through Friday, from 7:00 AM to 5:00 PM. In addition, an estimated 25 staff and/or visitors from other locations would likely be on-site two times a week. If there is a meeting or training, there may be an estimated 50 additional staff or visitors approximately two times a month. Specific days and times would vary. Workers would travel to the project site to perform work and tests when necessary. The impact on the local economy would be negligible and beneficial if these workers purchase goods or services in the project area during their visits. However, it is likely that any purchases made by visiting employees would be small and would not require local workers to remain in the local community overnight. Therefore, long-term economic benefits are expected to be negligible.

  Communities of concern identified through the environmental justice analysis in Appendix B would likely experience negligible to small beneficial economics impacts from the project. Members of the local community, including groups identified in the environmental justice analysis, may be employed during construction to support project development.

  The health and well-being of children in the community and the viability of facilities and programs serving children would not be affected, either during construction or during the operation of the facility. Impacts on socioeconomics and environmental justice are anticipated to be negligible and are not carried forward for analysis in the Draft EIS based on the technical report provided in Appendix B.
- **Air quality:** The construction and operation of a new underground safety research facility would generate emissions. Construction activities would result in emissions of criteria pollutants through fugitive dust and vehicle exhaust. Fugitive dust associated with the construction projects would result from unpaved roads and construction equipment on disturbed soils, including grading and filling activities. Air quality impacts during construction would be

minimized by including standard construction dust control best management practices (BMPs) in the erosion and sediment control plan approved by WVDEP. Long-term operational effects on air quality would be negligible. A detailed air quality analysis related to stationary or mobile sources is not necessary because operation of the facility would entail minimal stationary or mobile sources of air pollution. Minor mobile source emissions from vehicles would occur as operators travel to and from the facility and during routine maintenance. The proposed action would not involve new major stationary sources of air emissions; however, the facility would include a backup generator on-site. Emissions from the generator would include monthly testing and potential emissions during a power outage.

The proposed underground safety research facility is not anticipated to be a major source of hazardous air pollutants based on previous operations at the LLEM. Research activities may contribute minor sources of air pollutants, including burn testing, explosives testing, and explosives detonation.

Overall, the proposed action would not contribute long-term measurable impacts on air quality and is not anticipated to affect the attainment status of either Randolph or Pocahontas County. Emissions during the construction period would be temporary and are not anticipated to have a noticeable effect on air quality. The application of BMPs to reduce fugitive emissions would further limit the potential impacts on air quality. A full analysis of potential air quality impacts from the proposed action is provided in Appendix C.

- **Hazardous substances:** No hazardous substances would be stored on-site beyond standard equipment found in a regular maintenance facility, such as fluids for power equipment. No hazardous substances would be used in the underground safety research facility testing or within the fire suppression facility. No impacts are anticipated.
- **Visual quality:** The majority of the facility would be located underground, with minimal surface disturbance. To determine the potential visibility for aboveground structures, a viewshed analysis was completed for both leaf-on and leaf-off conditions. The viewshed analysis confirmed that the facility would not be visible during leaf-on conditions because of existing tree cover and topography. During leaf-off conditions, the facility may be visible from areas north of the project area but would not represent a noticeable change to the existing viewshed because of the small size of the buildings and the presence of existing residences nearby. In both leaf-on and leaf-off conditions, the surface facilities would not be visible from nearby Snowshoe Mountain and would not affect tourism.
- **Transportation:** The proposed action would not noticeably increase traffic around the project area. A temporary increase of construction traffic would result during the preparation for and construction of the project, which would last four years. Construction traffic would include hauling in and out of heavy machinery, building materials, and excavated material. The proposed action would add a minimal number of vehicle trips along U.S. Route 219 from points north or south from staff and visitors accessing the site Monday through Friday, including approximately 12 staff on a regular daily basis between 7:00 AM and 5:00 PM, an estimated 25 additional staff or visitors twice a week at irregular times, and an estimated 50 additional staff or visitors twice a month at irregular times. No other traffic impacts are anticipated during construction or operation of the proposed action.

A full analysis of potential impacts on transportation is provided in Appendix D.

- **Floodplains:** The proposed site is not within the 100-year or 500-year floodplain (Federal Emergency Management Agency Flood Hazard Map 54075C0235D and 54083C0725C); therefore, there is no potential for impacts on floodplains. The proposed action is consistent with EO 11988.
- **Biological resources - wildlife:** The majority of the facility would be located underground, with minimal surface disturbance. The slight loss of habitat, consisting mostly of deciduous hardwood forest, would not result in noticeable impacts on wildlife populations either locally or regionally, given the large amount of similar surrounding habitat in and adjacent to the project area that would remain undisturbed.

1.9 Organization of the Draft EIS

The Draft EIS is organized as follows:

- **Chapter 1** presents the purpose of and need for the proposed action, provides background information on the proposed action, and describes the scoping effort.
- **Chapter 2** provides a description of the proposed action and the alternatives analyzed in the Draft EIS, including the No Action Alternative; **Chapter 2** also described alternatives considered but dismissed.
- **Chapter 3** describes the various aspects of the existing environment that would potentially be affected by the implementation of the alternatives.
- **Chapter 4** analyzes the potential impacts of the alternative on the existing environment.
- **Chapter 5** addresses cumulative impacts (impacts of the proposed action and alternatives when added to those of past, present, and reasonably foreseeable future actions).
- **Chapter 6** lists the documents referenced in the Draft EIS.
- **Chapter 7** lists the agencies, organizations, and persons that will be notified of the publication of the Draft EIS and invited to comment.
- **Chapter 8** lists the persons who prepared the Draft EIS.

2 Proposed Action and Alternatives

2.1 Description of the Proposed Action

The proposed action evaluated in this draft EIS is the acquisition by CDC of property in Mace, West Virginia, and the redevelopment of this property into a new underground safety research facility that would allow NIOSH to conduct full-scale mine experiments and research. The underground facility would primarily house studies and research on mine explosions, mine seals, mine escape and rescue, refuge alternatives, ventilation, diesel exhaust, new health and safety technologies, ground control, and fire suppression. The activities previously associated with NIOSH's now-closed LLEM would recommence at the new facility.

2.1.1 Site Acquisition

CDC would acquire the property (hereafter, the Site), consisting of six parcels comprising 461.35 acres located off U.S. Route 219 in Randolph and Pocahontas Counties near Mace, West Virginia. The Site is undeveloped with mountainous and forested areas; its location is shown on **Figure 2-1**. The Site includes one existing dirt and gravel access road; an inactive railroad track traverses a portion of the Site. Currently, a single landowner, the Consortium for Silver Creek Investment Group, owns the Site's six parcels. Under the proposed action, CDC, working with GSA as its agent, would negotiate and execute agreements with the landowner for the purchase of the Site.

2.1.2 Site Development

Following the acquisition of the Site, CDC would develop it into a new NIOSH underground mining safety research facility. Based on the 2013 Project Development Study (CDC 2013), the new facility would provide surface and underground laboratory, research, support, and office space. For the purposes of this Draft EIS, it is assumed that the new facility would include a new underground safety research facility (approximately 164,000 gross square feet [GSF] located 500 feet underground) and surface facilities and support areas, including office and storage and control facilities (approximately 17,000 to 25,000 GSF). The total area of development for the surface support facilities would also include a parking area and preparation space. Approximately 5.5 acres of aboveground disturbance would be required to develop the surface support facilities. The entrance to the underground facility would be located adjacent to the surface facilities. A second entrance/exit to the underground facility would be developed for secondary/emergency use. While there would be no support facilities located at this entrance, additional tree clearing would be required. **Figures 2-2 and 2-3** display the potential layout of the facilities.

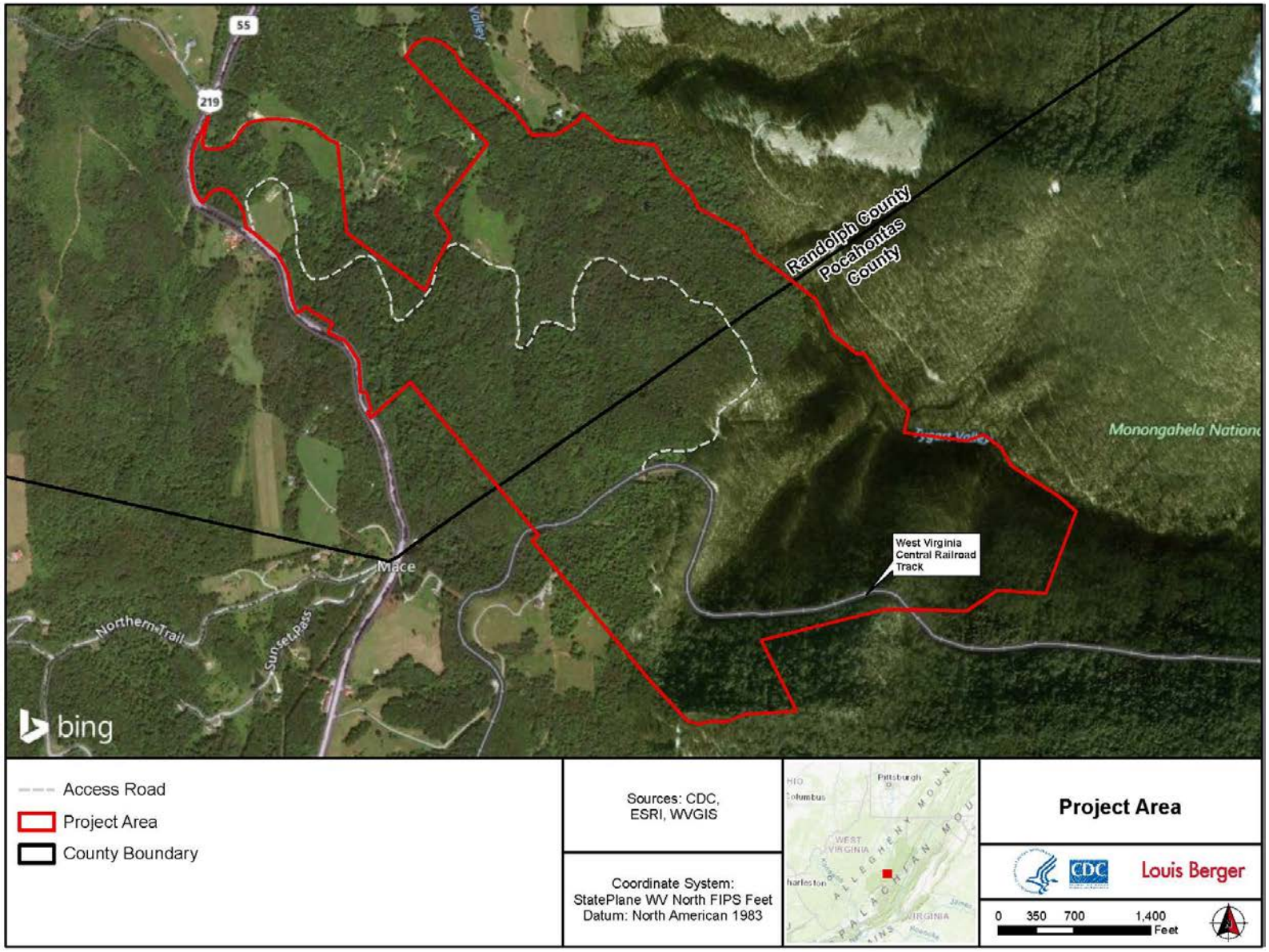


Figure 2-1: Site Location

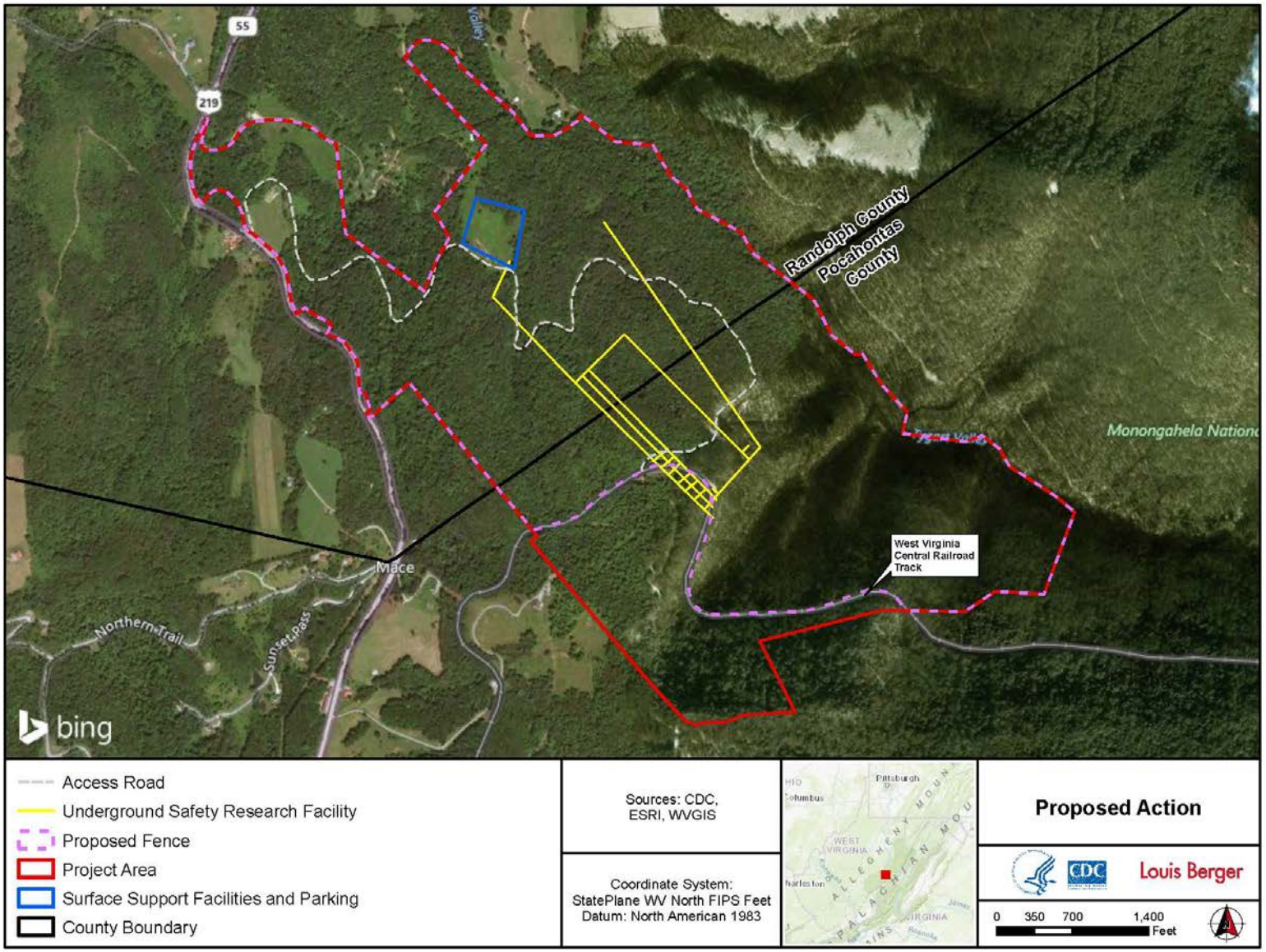


Figure 2-2: Conceptual Layout

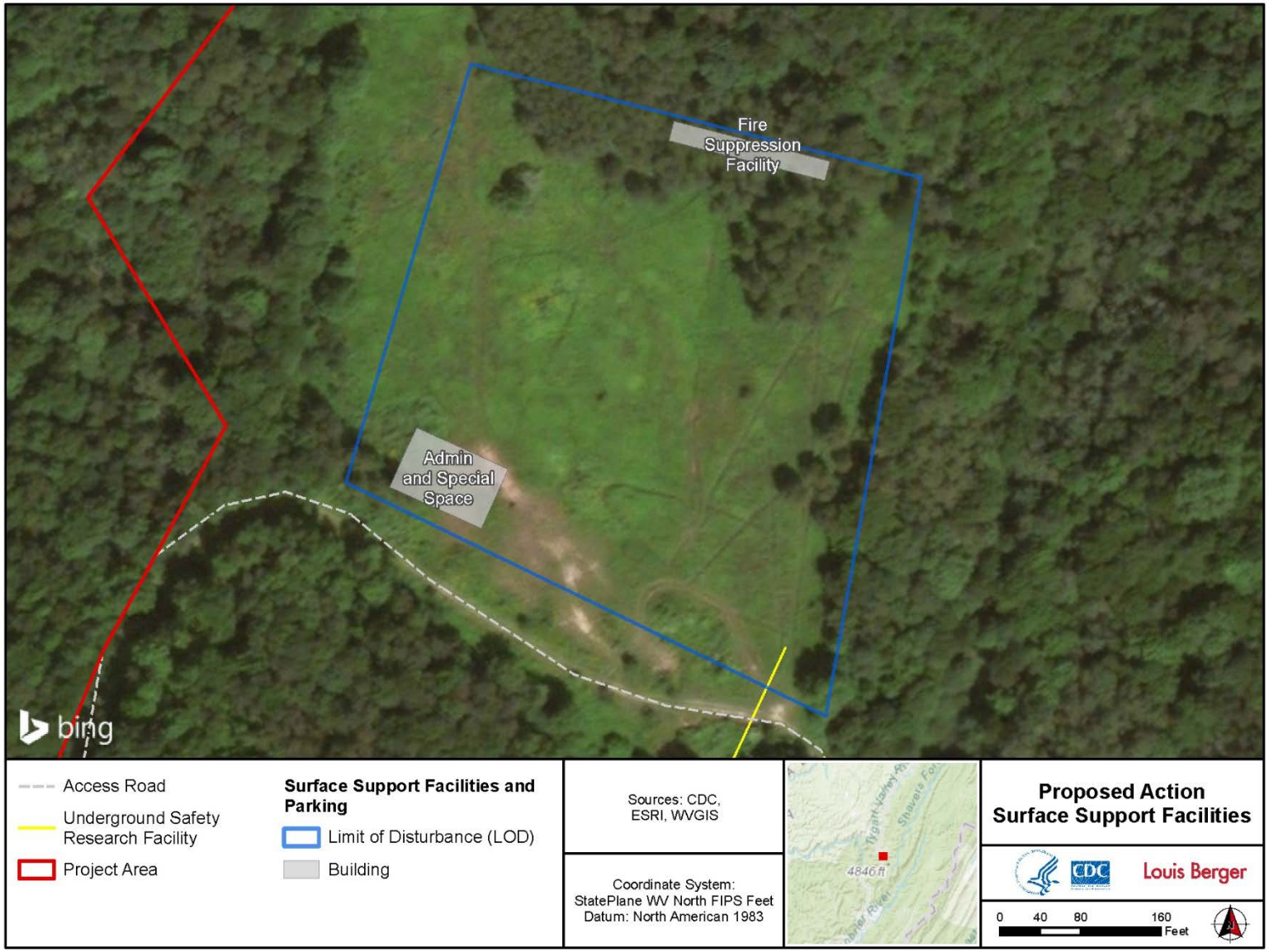


Figure 2-3: Conceptual Layout of Surface Facilities

In addition to the development above and below ground, the majority of the property would be enclosed by a an 8-foot-high chain link fence, and occupied buildings would be set back from the nearest public street in accordance with applicable federal antiterrorism/force protection standards. While the railroad track is currently inactive, the State Rail Authority is planning to reactivate the section of railroad that traverses the project area. Therefore, the fence would run along the north side of the railroad ROW. The southwest portion of the project area would remain unfenced. No aboveground structures are anticipated in this section of the project area.

From the property entrance off U.S. Route 219 to the parking lot, the existing access road would be widened to 20 feet. The access road would be improved to U.S. Forest Service standards and surfaced with gravel. From the parking lot to the end of the access road, near the railroad tracks, the access road would be widened to 15 feet and surfaced with gravel. Because of the steeper topography along the access road in this area, some regrading or culvert installation may also be required. Vehicular access for employees, visitors, and construction vehicles would be from U.S. Route 219.

The construction period is anticipated to last approximately four years. Site preparation would consist of excavating approximately 362,000 tons of material, and development of the underground safety research facility would require excavating approximately 152,000 tons of sedimentary rock, including limestone, shale, and sandstone. Approximately 2/3 of the total material would be reused on-site as fill to grade the location of the surface facilities, and the remaining 1/3 would be hauled off-site to the local quarry, approximately 15 miles away. Once site preparation is complete, construction of the surface and underground facilities would commence. A facility construction timeline would be established once a facility design and construction plan is developed.

2.1.3 Site Operation

After construction is complete, research activities previously conducted at the LLEM would resume at the new Site. As noted in **Chapter 1**, the CDC does not own the LLEM; therefore, disposition of the property is not required and is not part of the proposed action. Approximately 12 people would report to the site daily. In addition to daily staff, up to an estimated 25 additional staff or visitors would be on-site twice a week, and an estimated 50 additional staff or visitors would be on-site twice a month.

Site operations would consist of experiments and research in surface facilities and in an underground facility that replicates a full-scale mine. Surface activities, to be conducted within the support facilities, surface preparation areas, and office space, would be research focused and support underground activities. Underground activities would be composed of underground mine safety and fire suppression research. Specifically, this research could consist of igniting a volume of natural or methane gas at the closed end of a drift and allowing the resultant flame and pressure wave to travel through a large zone of rock dust and coal dust located immediately next to the gas zone. A typical test would involve ignition of approximately 500 cubic feet of gas using electric matches. Mixtures of coal dust and rock dust would be spread immediately out by the gas zone on the floor and/or on polystyrene shelving suspended from the roof. The length of the dusted zone would vary according to test requirements, but would average 200–300 feet. After each test, the test area would be washed down and dried with dehumidified air before the next test. Depending on weather conditions and availability of needed materials, no more than two tests per week are anticipated. Pressure, heat, and flame data would be collected throughout the length of dusted and undusted zones.

2.2 Alternatives

2.2.1 Reasonableness Criteria

NEPA regulations direct agencies to use "the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the environment" (40 CFR 1500.2[e]). Alternatives not found to be reasonable do not need to be evaluated.

To be considered reasonable, alternatives must, at a minimum, meet the purpose and need for the proposed action (see Section 1.4) as well as any requirements that are essential to achieving the purpose and need. In the case of the proposed action addressed in this Draft EIS, to be considered reasonable, an alternative must meet the following criteria:

- Provide the capacity to perform full-scale underground mine research.
- Provide enough developable land to accommodate NIOSH's needs as defined in the 2013 Project Development Study for underground and aboveground mine safety research facilities.

2.2.2 Alternatives Dismissed from Further Consideration in the Draft EIS

2.2.2.1 Purchase of Previously Leased and Operated LLEM

The LLEM was initially constructed under a long-term lease agreement with the landowner, covering 406 acres of the overall property parcel of approximately 4,350 acres. The original landowner conducted surface limestone mining in the area of the lease and then expanded the operation to an underground mine. Upon completion of the mining operation, the original landowner leased the 406 acres to the BOM for the LLEM. CDC/NIOSH leased the property from the owner until December 2012 when the LLEM closed after multiple attempts to extend the lease and purchase the property were rejected by the owner.

2.2.2.2 Use of Existing Mining Facilities in Poland and South Africa

After the lease and purchase negotiations for the LLEM failed, CDC/NIOSH explored options to use the Central Mining Institute's Experimental Mine Barbara in Poland and a similar facility in South Africa. Ultimately, the facility in Poland did not have sufficient reserves in the area to expand the mine to meet the CDC/NIOSH dimensional requirements to match U.S. mining conditions, and the facility in South Africa did not meet research experiment requirements.

2.2.2.3 Use of Existing Property owned by the Department of Defense

CDC/NIOSH explored the option of using the Large Blast Thermal Simulator owned by the Department of Defense at the White Sands Missile Range to facilitate full-scale underground research, but the configuration does not replicate a mine and would not accommodate the size requirements for methane and dust propagation experiments.

2.2.2.4 Replacement of the LLEM with a Surface Facility

CDC/NIOSH researched the option to replace the LLEM with a surface facility, but determined that this option would be cost prohibitive.

2.2.2.5 Sites Identified in GSA-Issued Request for Expressions of Interest

As discussed in Section 1.3.3, to identify potentially available locations that could accommodate the space requirements defined in the 2013 Project Development Study, GSA (on behalf of CDC) issued two separate REOIs for a site, developed or undeveloped, that could be used for the new underground safety research facility. The first REOI, advertised in June 2016, contained a limited delineated area within a 200-mile radius of the Bruceton, Pennsylvania, research facility. GSA received one expression of interest. Information collected from core holes drilled at the site indicated that the subsurface formations did not meet the Minimum Criteria contained in the REOI, and it was dismissed from consideration.

GSA issued a second REOI in October 2016, expanded the delineated area to the entire contiguous United States, and received three expressions of interest. The subsurface target rock formation at one site did not meet the Minimum Criteria and was dismissed from consideration. Another expression of interest did not contain all necessary information to evaluate, and the offeror did not respond to subsequent GSA inquiries. The third expression of interest is the proposed site.

2.2.3 Alternatives Analyzed in the Draft EIS

This Draft EIS analyzes the potential impacts of two alternatives: the No Action Alternative and the Proposed Action Alternative.

2.2.3.1 No Action Alternative

Under the No Action Alternative, CDC would not acquire property for the development of a new underground safety research facility.

The No Action Alternative would not meet CDC's purpose and need because the LLEM is no longer available for use by CDC, and no full-scale mine research could be conducted. However, the potential impacts of the No Action Alternative are considered in this Draft EIS consistent with 40 CFR 1502.14(d). The potential impacts of the No Action Alternative provide a baseline against which those of the action alternative(s) can be measured.

2.2.3.2 Proposed Action Alternative

Under the Proposed Action Alternative, the proposed action as described in Section 2.1 would be implemented. CDC, working with GSA, would acquire the property near Mace, West Virginia, and develop a new underground safety research facility. Pending available funding, construction of the underground safety research facility is expected to be completed in 2023.

2.3 Summary and Comparisons of Potential Impacts

The potential impacts of the No Action Alternative and Proposed Action Alternative are summarized and compared in **Table 2-1**; potential significant impacts are included in bold lettering.

TABLE 2-1. SUMMARY OF IMPACTS

Resource Area	No Action Alternative	Proposed Action Alternative
Noise and Vibration	No impacts	Direct, adverse impacts from construction activities but noise and vibration levels would be below required thresholds outside the project area. Long-term, direct, adverse impacts from airblasts. All impacts from noise and vibration would be below regulated thresholds.
Geology, Topography, and Soils	No impacts	Direct, adverse impacts from drilling, filling, grading, and excavation.
Water Resources	No impacts	Direct, permanent, adverse impacts on 38 feet of one intermittent stream and both temporary and permanent, direct, adverse impacts from replacement of culverts. Minor, adverse impacts on wetlands and groundwater.
Utilities and Infrastructure	No impacts	Direct, adverse impacts from upgrading the on-site powerlines and developing water supply and sanitary sewer on-site.
Biological Resources	No impacts	**Potentially significant,** direct impacts on the endangered running buffalo clover and threatened small whorled pogonia. Direct and indirect, adverse impacts on deciduous hardwood forest, successional old field vegetation, and other threatened and endangered animal species in the project area.
Cumulative Impacts	No impacts	No significant adverse cumulative impacts in conjunction with past, present, and reasonably foreseeable future projects are anticipated.

Note: Direct impacts are those that are caused by a proposed action and occur at the same time and place; indirect impacts occur later in time or are farther removed in distance but are still reasonably foreseeable.

3 Affected Environment

This chapter describes the environment that may be affected by the implementation of the No Action and Proposed Action Alternatives. This EIS addresses the following aspects of the environment:

- Noise and vibration
- Water resources
- Geology, topography, and soils
- Utilities and infrastructure
- Biological resources

The extent of the study area varies with the aspect of the environment considered. For most impact topics, it consists of the project area and its surroundings, but a larger area is considered for water resources and noise and vibration because of the potential for impacts to occur outside the project area.

The potential impacts of the No Action and Proposed Action Alternatives on the environment described in this chapter are analyzed in **Chapter 4**.

3.1 Noise and Vibration

3.1.1 Introduction

3.1.1.1 Noise Fundamentals

Noise is undesirable sound that causes interference and disturbance. Sound is caused by vibrations traveling through a medium, such as air or water, which are sensed by the ear. The perception and evaluation of sound involves three basic physical characteristics: intensity (the acoustic energy, which is expressed in decibels [dB]); frequency (the number of cycles per second the air vibrates, expressed in Hertz [Hz]); and duration (the length of time a sound can be detected).

The loudest sounds that the human ear can comfortably detect have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. Therefore, dB, which represents the intensity of sound or noise level, is a logarithmic unit. Further, because the human ear cannot perceive all frequencies (or pitches) equally, noise measurements are generally adjusted (or weighted) to better match human hearing by filtering out very low and very high frequencies. This adjusted unit is known as the A-weighted decibel, or dBA.

Because of the logarithmic nature of the dB scale, noise levels do not add up linearly. This means that two loud noises together, such as a garbage truck (100 dBA) and a lawn mower (95 dBA), result in a combined noise that is only slightly louder than the louder of the two component noises, in this case 101.2 dBA (not 195 dBA). Changes in noise levels of less than 3 dB are generally not perceived. A 10-dB change is generally perceived as a doubling (or halving) of the noise level.

Because noise consists of vibrations that can be slowed down or absorbed by the media they travel through, noise levels decrease with distance from the source and are reduced by barriers, both artificial (e.g., sound walls) and natural (e.g., densely forested areas, hills). Conversely, noise can be amplified or can travel farther by bouncing off certain hard surfaces (echo).

Table 3-1 shows examples of common noise levels and provides an indication of how they are typically perceived.

TABLE 3-1. TYPICAL SOUND LEVELS

Noise Level (dBA)	Typical Source	Subjective Impression
10	Threshold of hearing	
20–50	Rustling leaves, whisper, refrigerator humming	Extremely to very quiet
50–60	Traffic in suburban areas, large transformer at 100 feet, normal speech at 10 feet	Quiet
60–70	Air conditioner at 100 feet, gas lawn mower at 65 feet	Moderately loud
70–80	Busy roadway at 50 to 100 feet, traffic in downtown area, vacuum cleaner	Loud
80–90	Passing freight train at 30 feet, leaf blower at 5 feet, garbage disposal	Very loud
90–100	Gas lawn mower at 3 feet, wood chipper shredding trees, chain saw cutting trees at 10 feet	Very loud
100–110	Jackhammer at 3 feet	Uncomfortably loud
110–120	Turbo-fan aircraft at take-off power at 200 feet, indoor rock concert	Uncomfortably loud
120	Air raid siren at 50 feet	Threshold of pain

Source: CDC (2018a)

3.1.1.2 Noise Regulations

Federal, state, and local laws, regulations, and guidelines provide the noise and vibration regulatory environment for the project. Noise and vibration regulations are generally separated into construction and operational periods, with each phase having its own defined thresholds.

There are no local vibration or noise regulations for this facility because it is not a mining facility. Noise and vibration guidelines for blasting are provided in the state's mining regulations and by the Department of Interior Office of Surface Mining Reclamation and Enforcement (OSMRE). Those regulations are discussed here to provide context for the facility operation.

Similarly, construction noise and vibration limits are not provided at the state or local level; in lieu of regulations at the state and local level, the Federal Transit Administration (FTA) provides guidelines for construction noise and vibration for the purposes of this analysis.

Blasting Noise and Vibration Regulations

As noted above, there are no applicable operational thresholds for this facility. To provide a measurable context, this analysis uses OSMRE threshold limits for ground-borne vibrations and peak overpressure (airblast) from blasting at mines (30 CFR 816.66: Use of Explosives: Blasting Signs, Warnings, and Access Control). The regulation provides ground-borne vibration thresholds in peak particle velocity (PPV) values and airblast limits, set in linear decibels (dBL) on a flat response. The dBL is used because portions of a given blast event's sound pressure levels are at frequencies at or below frequencies (e.g., Hz) that are audible, and the dBL does not weight sound pressure levels like the dBA does. Allowable ground-borne vibration levels are limited to 1.25 inches per second (in/sec) PPV at 0 to 300 feet, 1.00 in/sec PPV at distances of 301 to 5,000 feet, and 0.75 in/sec PPV at distances of 5,001 feet or more. Allowable airblasts are limited to 129 dBL at 6 Hz or lower and 133 dBL at 2 Hz or lower. Annoyance is subjective, but studies have shown annoyance to be less likely if received airblast levels are kept below 120 dBL at sensitive structures or locations. West Virginia does not promulgate construction noise and vibration limits applicable to the construction or operation of the proposed project. The state's regulations on blast vibration and overpressure for mining are consistent with OSMRE.

Construction Noise and Vibration Guidelines

FTA provides general construction (i.e., non-blasting) guidelines that can be useful for situations where federal, state, and local noise and vibration limits are not provided. While these are not regulated limits specifically applicable to this project area, adherence to these guideline limits can be considered a "best practice" in situations where no construction noise limits exist, such as is the case for the project. The FTA noise criteria for 8-hour noise exposure during daytime is 90 dBL for industrial construction (FTA 2006). FTA guidelines for vibration during construction are based on damage criteria for what it has determined to be classified as Category 3 structures, which are non-engineered timber and masonry buildings. Residences near the project are assumed to be Category 3 uses, which have a PPV limit of 0.2 in/sec. West Virginia's mining regulations are less restrictive than what FTA recommends; therefore, compliance with the FTA guidelines ensures compliance with the state's limit.

3.1.2 Existing Noise and Vibration Conditions

3.1.2.1 Ambient Noise and Vibration

Noise and vibration levels were monitored in the project area and at the project's site boundary at three locations to establish the existing noise and vibration conditions (**Figure 3-1**). Sound levels were measured for 24-hour periods at three locations with spot vibration measurements of approximately 10 to 20 minutes duration.

Sound levels were collected in 1-hour and 1-second intervals beginning the morning of June 6, 2018, and concluding the morning of June 7, 2018. **Table 3-2** summarizes the measured sound levels by daytime and nighttime, including the dBA broadband equivalent sound level (L_{eq}). Hourly L_{eq} values were used to calculate the day-night average sound level (L_{dn}), which includes a 10 dB penalty for nighttime sound levels. All of the monitored sound and vibration levels, including the equipment used and methodology, are provided in Appendix E: Noise and Vibration Technical Report. Total noise levels (i.e., 52 dBA L_{dn}) at Measurement Location-1 are highest because of its proximity to roadway traffic. Vibration levels were also collected at each measurement location. Vibration levels were highest at Measurement Location-1 because of its proximity to roadway traffic vehicle pass-by events. **Table 3-2** also provides the average monitored vibration levels.

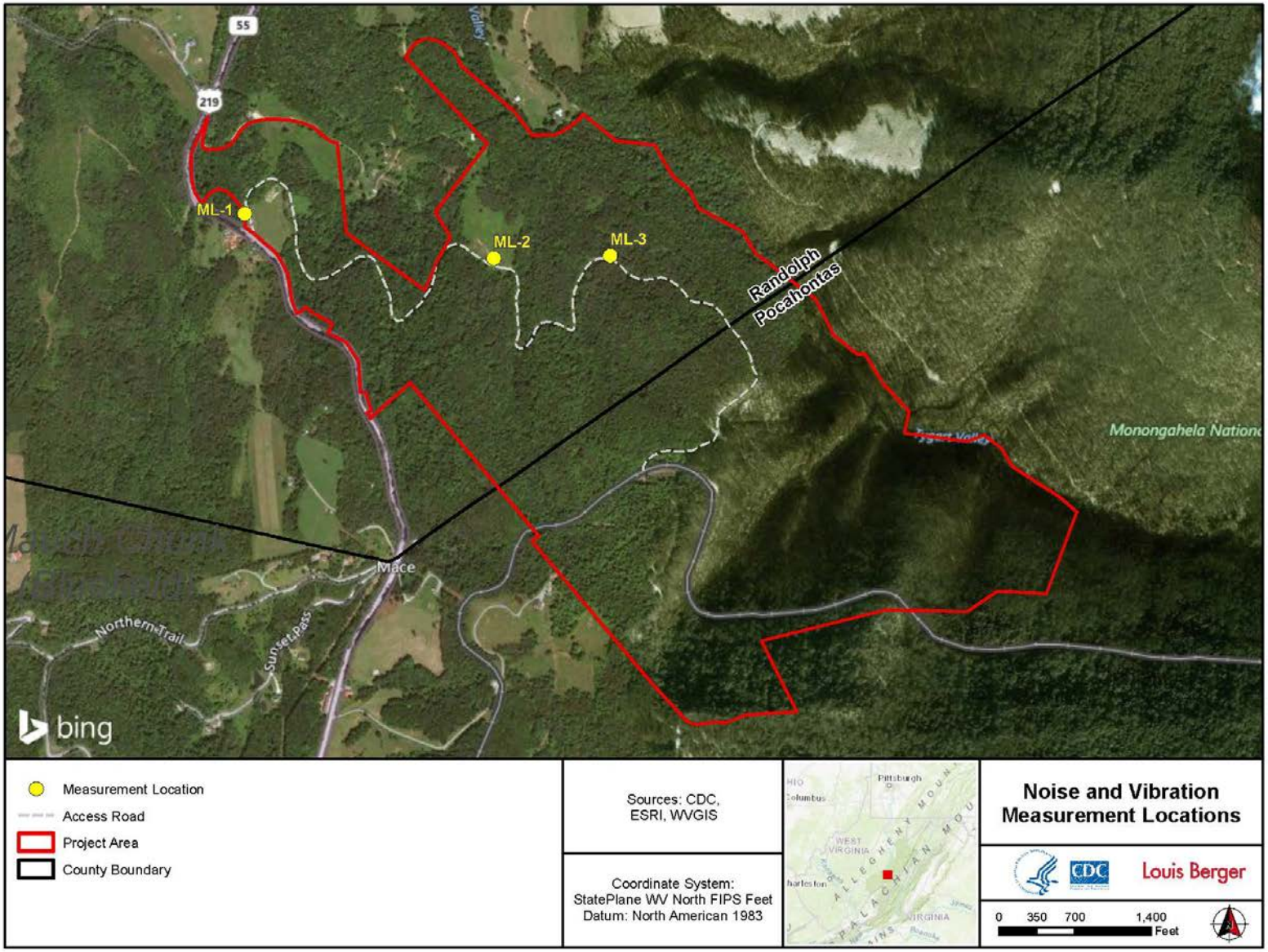


Figure 3-1. Noise and Vibration Measurement Locations

TABLE 3-2. MONITORED SOUND AND VIBRATION LEVELS

Measurement Location	Sound Levels (dBA)			Vibration Levels Average PPV (in/sec)
	Daytime L_{eq}	Nighttime L_{eq}	Total L_{dn}	
1	47	44	52	0.0035
2	47	41	49	0.0034
3	42	35	43	0.0006

3.1.2.2 Sensitive Receptors

The project would be located inside the National Radio Quiet Zone (NRQZ). While the NRQZ is not a noise or vibration regulation, it is noted here to present the heightened sensitivity associated with infrastructure projects, such as this one, located in this area of West Virginia. The NRQZ was established by the Federal Communications Commission in 1958 to minimize possible harmful interference with the National Radio Astronomy Observatory in Green Bank, West Virginia, and the radio receiving facilities for the U.S. Navy in Sugar Grove, West Virginia. Within the NRQZ, it is illegal to operate, or cause to be operated, any electrical equipment that causes harmful interference with the reception of radio waves. While the NRQZ does not apply to "noise" per se, it is noted here for the purposes of indicating the higher sensitivity of the facility to outside influences. Sound waves and vibrations would not interfere with the measurement and observance of radio waves, although vibration could affect vibration-sensitive equipment.

The closest noise and vibration sensitive structures to the project area are located approximately 1,200 feet away from the center of the project area. Sensitive receptors adjacent to the project area are all private residences.

The West Virginia Central Railroad, which runs through the Site, is also considered a sensitive receptor. The railroad track is currently inactive but is planned for reactivation within a five-year planning horizon. Potential impacts on the railroad from vibrations are analyzed to ensure the integrity of the rails and supporting infrastructure would not be adversely affected.

The Atlantic Coast Pipeline, discussed in the cumulative impacts section (**Chapter 5**), will be located approximately 3.5 miles from the site, once constructed. During the public scoping period, members of the public noted the pipeline as a potential sensitive receptor, so potential impacts on the pipeline have been included in the analysis.

3.2 Geology, Topography, and Soils

3.2.1 Introduction

The following sections describe the regional geologic framework for West Virginia and the geology local to the Site. Additional discussions characterize the local topography and soils, including their suitability for development. The site-specific geological information was derived from observations made during geotechnical test drilling during 2017 and 2018 (EarthTech, Inc. 2018).

3.2.2 Geology

The project area is located on the border of two physiographic provinces, including one subprovince. The Appalachian Plateau physiographic province and Allegheny Mountain Section subprovince are to the west. The Allegheny Mountain Section is characterized by a series of rugged, high plains located on the western side of the Appalachian Highlands mountain range that extends along the entire east coast of the United States. The eastern portion of the project area is within the Valley and Ridge physiographic province, which is characterized by the long north-northeasterly ridges of the Appalachian Mountains separated by fertile valleys. The rocks near the project area are a combination of the stratigraphic characteristics of these provinces, including the severely eroded, westward-tilting plateau of sedimentary strata of the Appalachian Plateau and the tightly folded and faulted rocks of the Valley and Ridge physiographic province (WVGES 2017).

The bedrock across most of the state consists of sedimentary rocks, which were deposited during geologic periods when shallow marine seas covered the state or during a series of mountain-building events. Marine and non-marine depositions during this era include limestones, shales, siltstones, sandstones, terrigenous red beds (red-colored marine-deposited sedimentary beds), clastics (pieces of older broken rocks cemented in a fine grain matrix), carbonates, and coal (WVGES 2017). The development of the Appalachian Mountains resulted in the deformation (mostly folding and thrust faulting) and erosion of the existing sedimentary rocks and intrusion of igneous dikes. Following the mountain-building, the area has been geologically quiet with only the accumulation of alluvium from weathering and erosional processes. The alluvial deposits generally consist of an assortment of sand, gravel, silt, and clay. Locally, the bedrock is composed primarily of the sedimentary strata that were deposited in shallow marine seas and later folded during the mountain-building episode (WVGES 2017).

The project area is located near the mapped extents of various anticlines, or folds that slope downward from a common crest. The rocks, which are composed of green sandstones and shales, are often characterized as flagstones and alluvium along the Tygart Valley River. The folds tend to follow a northeasterly-southwesterly trend, which align with the structural grain of the physiographic province (USDA NRCS 2001). The formations present at the project area, from oldest to youngest, are the Pocono Formation (Lower Mississippian Period), the Greenbrier Limestone (Middle Mississippian Period), and the Hinton Formation and Bluestone, Princeton Formation of the Mauch Chunk Group (Upper Mississippian Period) (**Figure 3-2**) (WVGES 2017).

Other than the northernmost part of the project area, the remaining northern half of the property is largely underlain by the Greenbrier Limestone (**Figure 3-3**). The Greenbrier Limestone is a marine limestone interbedded with marine and non-marine red and grey shale and minor sandstone. Near the project area, the limestone's distinguishing characteristics are described as soft, oolitic (sphere-like), and susceptible to weathering and erosion. Generally, because of its susceptibility, the Greenbrier Limestone forms karst terrain. Karst terrain is characterized by numerous caves, crevices, cavities (voids), fractured rock, disappearing streams, sinkholes, and springs. Karst features are well developed in the Greenbrier Limestone because it is sandy and fossiliferous rather than having an interlocking crystalline texture. Fracture openings in the limestone aquifer generally are enlarged from long-standing dissolution of the carbonate rock (Kozar and Brown 1995). Rock coring completed at the site indicates the Greenbrier Limestone is encountered beginning at approximately 20 feet below ground surface and extends to depths between 220 and 720 feet below ground surface. In some cases, the top of the Greenbrier layer is much deeper (EarthTech, Inc. 2018). Overlying the Greenbrier Limestone and outcropping in the

southern half of the site is the Mauch Chunk Group. Both formations within the group are described as being red-grey shale and sandstone with few thin limestone lenses (WVGES 2017). The Water Resources Technical Report is provided as Appendix F and includes additional information on local and regional geologic resources and maps.

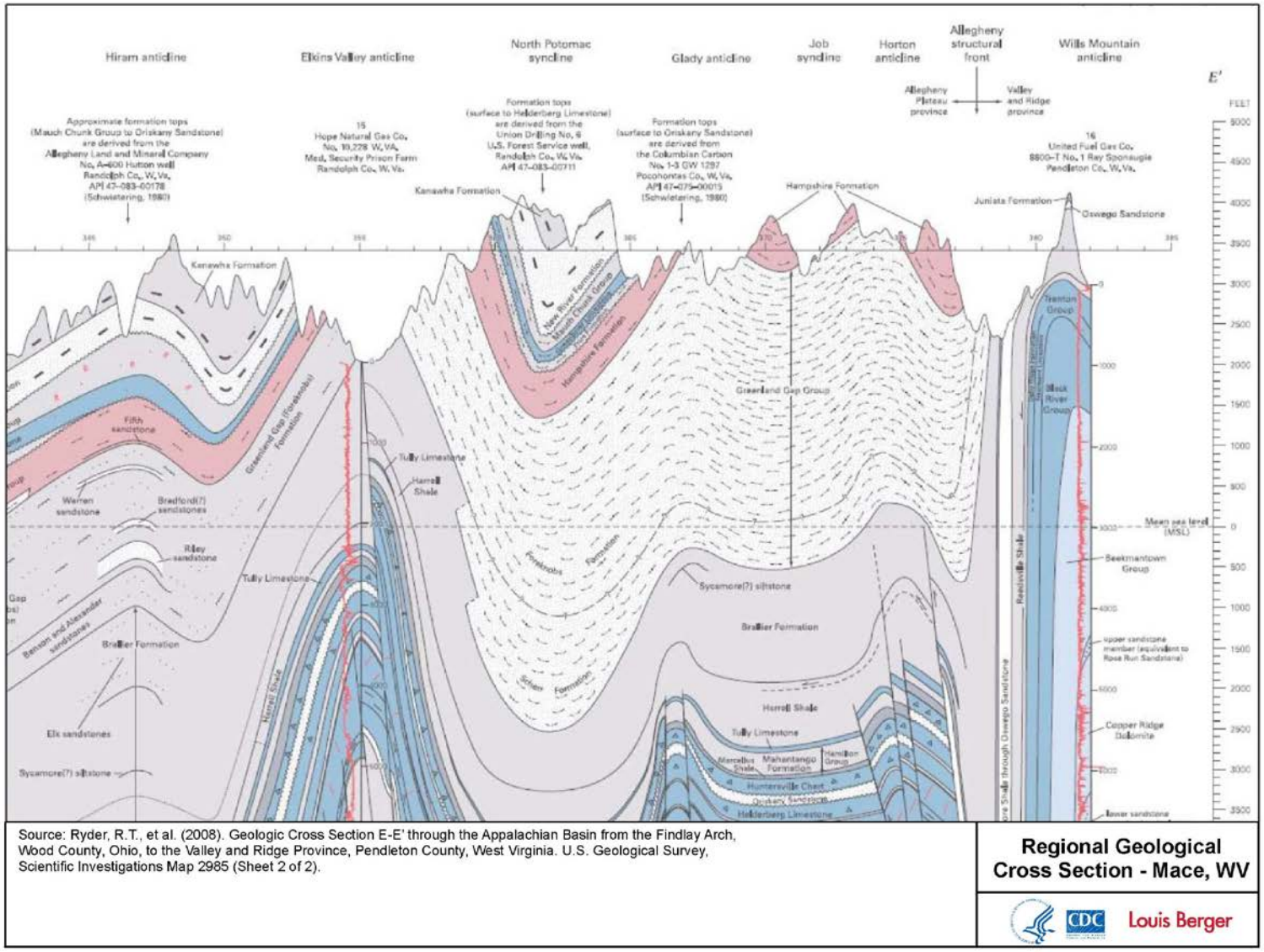
3.2.3 Topography

The project area is located in the mountainous terrain of the Tygart Valley River headwaters (see **Figure 3-4**). The southeastern corner of the project area is at an elevation of approximately 4,000 feet, with a decrease in elevation to the northwest. The overall relief of the project area is 1,100 feet. Several ridges run north-south and are interspersed with steep valleys carrying streams toward the northwest. Locally, most portions of the project area where development would occur are located on a topographic high. Surface water drainage is expected to be toward the north-northwest through tributaries and to the south and east away from the site to the headwaters reach of the Tygart Valley River.

3.2.4 Soils

Soils within the project area were identified using the U.S. Department of Agriculture (USDA) Soil Survey for Pocahontas and Randolph Counties, West Virginia. The Soil Survey indicates that the project area contains 22 soil map units, or soils grouped by their natural landscape and soil patterns (**Figure 3-5**). Overall, the soils are well drained, and the depth from the surface to the shallow water table is greater than 80 inches. None of the soils is identified as hydric on the National List of Hydric Soils, meaning that the soils are not typical of those found in wetlands. Soil slopes range from 3 percent to 70 percent with the majority having a slope of 15 percent or more. These soils are commonly found in the area.

Nine soil map units are found in the portions of the project area where disturbance for the access road widening would occur. The soils have some limitations for road development (USDA-NRCS 2018). The soils are rated as somewhat limited or very limited for unpaved roads; slope could affect the ease of excavation or grading, and frost-action or shrink-swell potential could affect the traffic-supporting capacity. Construction limitations of the soils for haul roads are rated mainly as moderate because of slope, restrictive layer, or low strength. The hazard of soil loss from unsurfaced roads is rated mainly as severe, indicating that significant erosion is expected; roads would likely require frequent maintenance; and erosion-control measures would be necessary. This soil description is supported by severe erosion of the existing access road; erosion is particularly noticeable farther east in the project area and near the railroad tracks. Four soil map units are found in the portions of the project area where development for the surface support facilities would occur. The soils in the project area have some limitations on building site development (USDA-NRCS 2018). The soils are rated as very limited, indicating they would require some special design or reclamation because of their slope or shrink-swell potential.



Source: Ryder, R.T., et al. (2008). Geologic Cross Section E-E' through the Appalachian Basin from the Findlay Arch, Wood County, Ohio, to the Valley and Ridge Province, Pendleton County, West Virginia. U.S. Geological Survey, Scientific Investigations Map 2985 (Sheet 2 of 2).

Regional Geological Cross Section - Mace, WV

CDC Louis Berger

Figure 3-2. Regional Cross Section of Geological Features

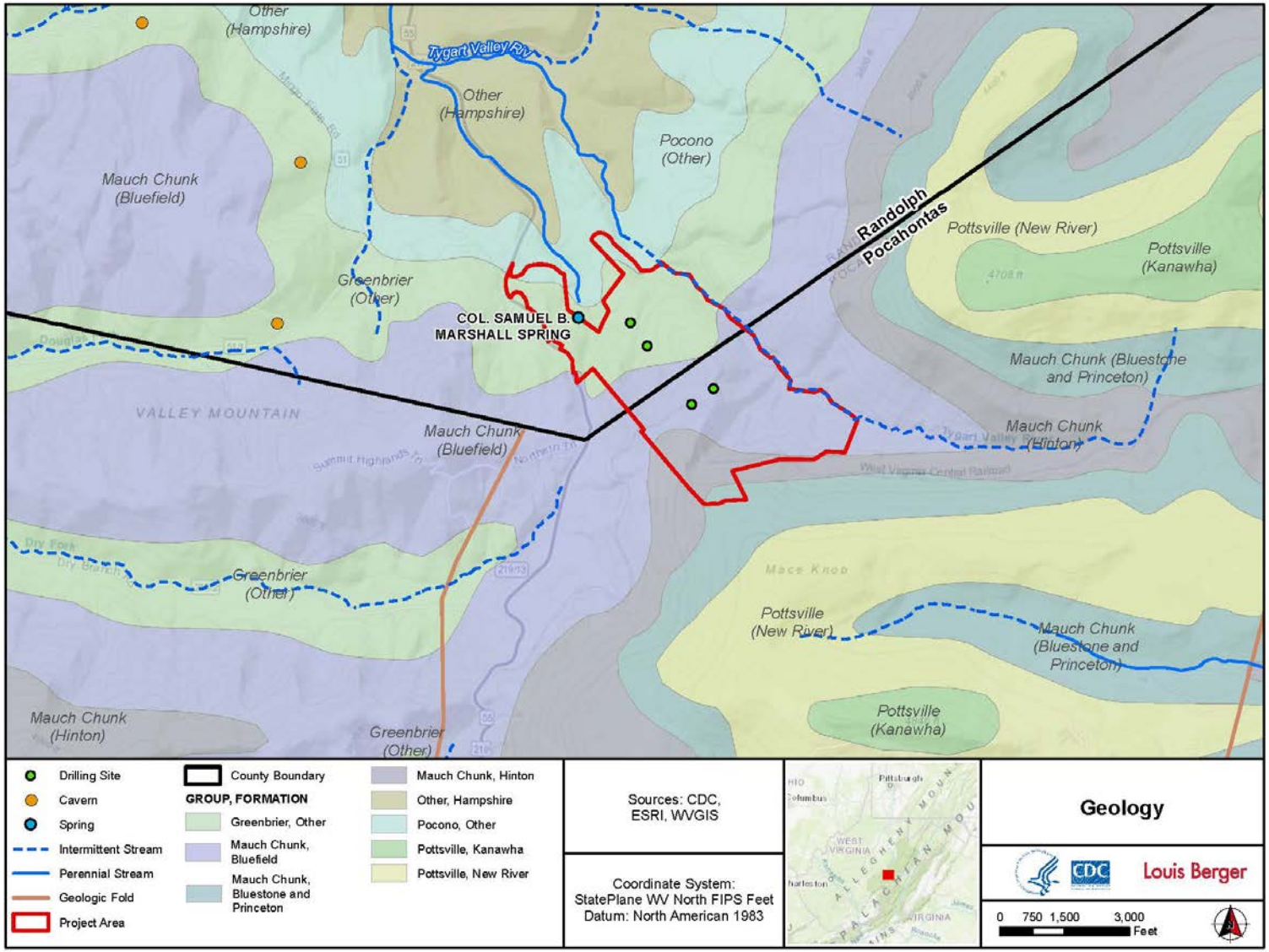


Figure 3-3. Study Area Geology

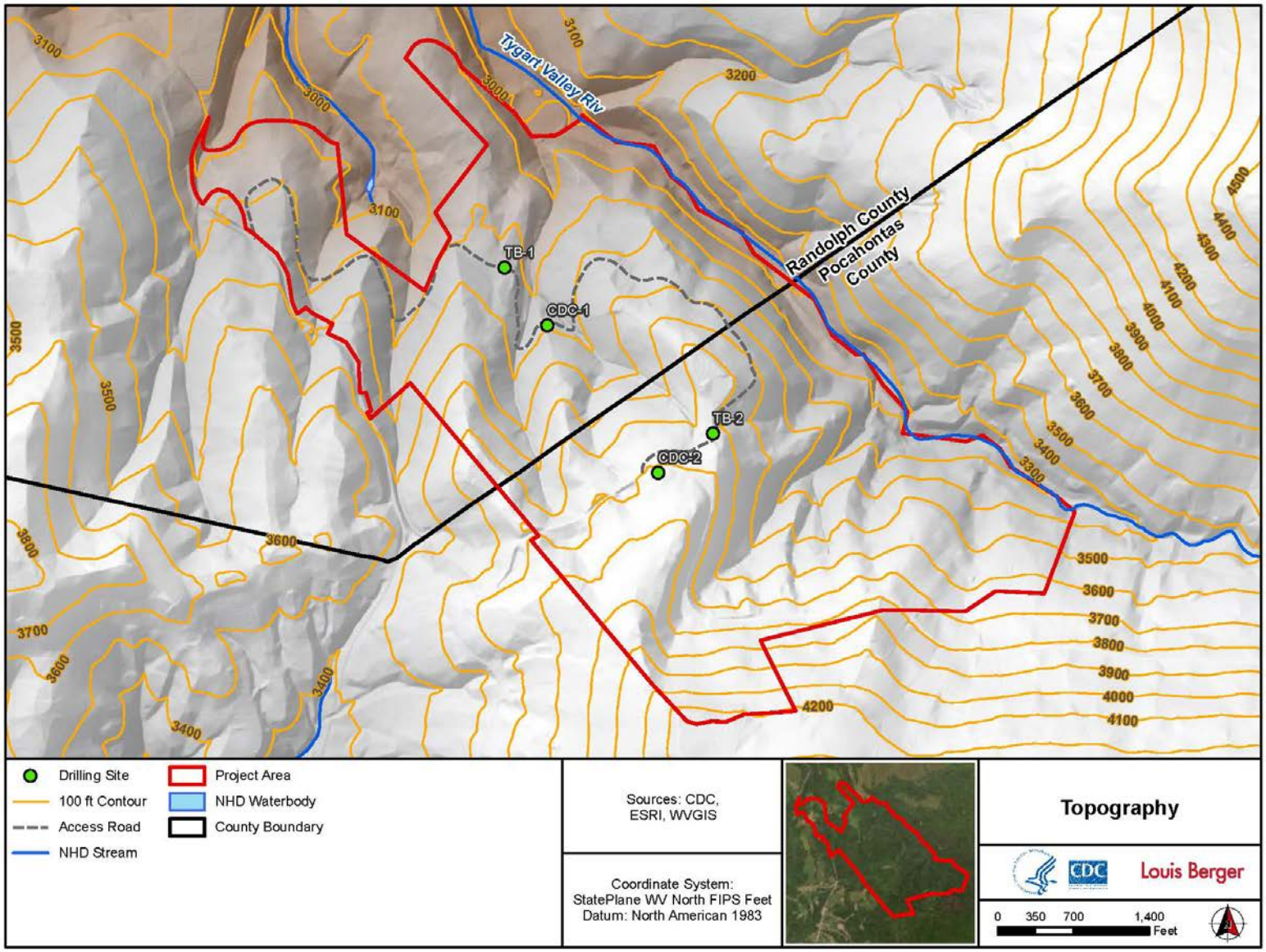


Figure 3-4. Topography

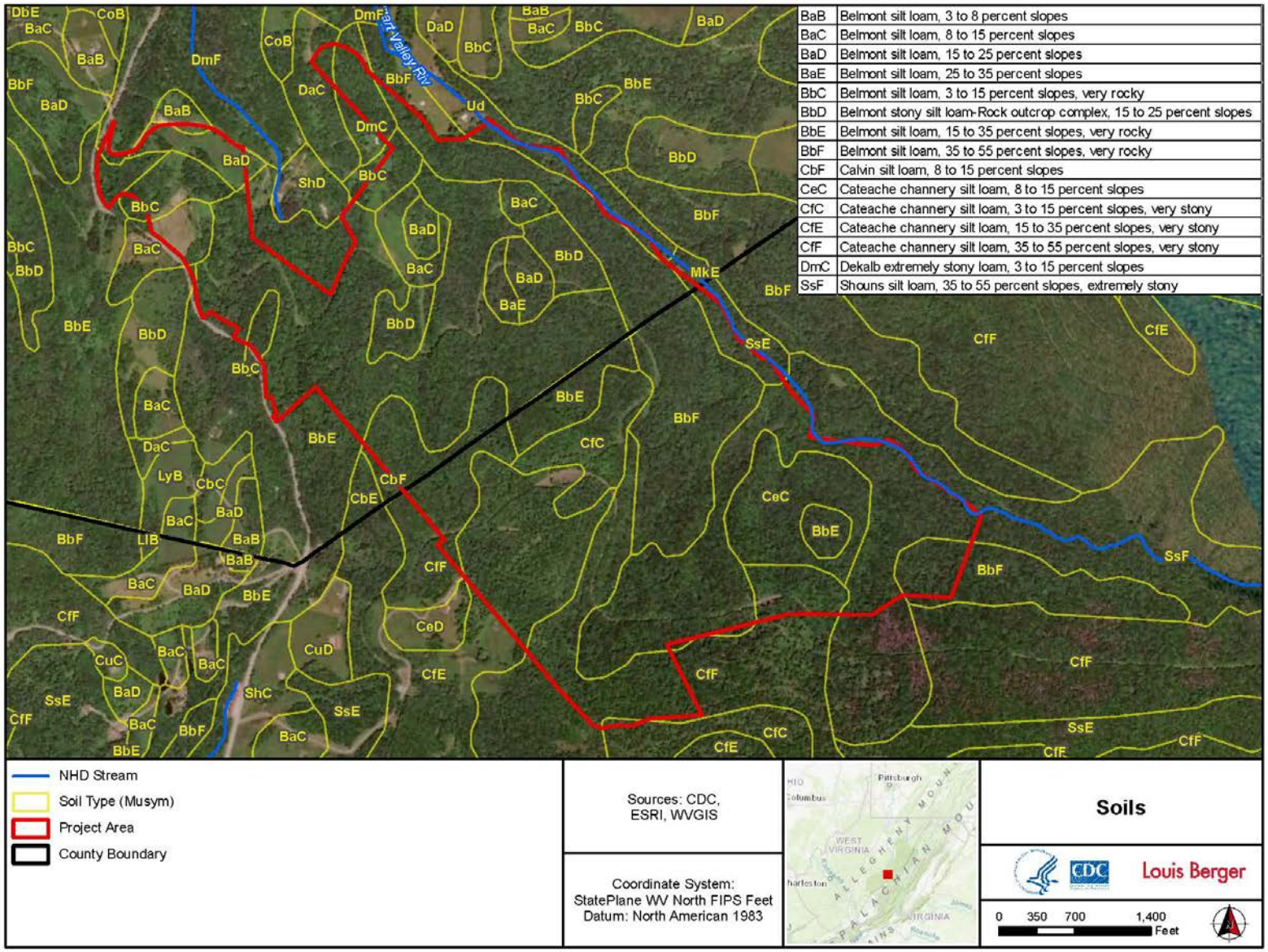


Figure 3-5. Soils

3.3 Water Resources

3.3.1 Introduction

The following sections describe the existing conditions of the water resources within the project area and specifically within the portions of the project area where development would occur. The resources include surface and groundwater, water quality for both surface and groundwater, and wetlands. The Water Resources Technical Report (Appendix F) contains additional detail on both surface and groundwater resources. A field survey was completed in June 2018 to identify wetland and surface water resources that could be present within areas of the site where potential development could occur. The June 2018 survey included approximately 38 acres of the overall 460-acre project area that was originally proposed to be disturbed. When a portion of the proposed fence line was relocated to accommodate the planned railroad reactivation, an additional 6.4 acres that would be disturbed by the relocated fence line along the north side of the railroad ROW were surveyed in November 2018. Forty-four acres of the overall 460-acre project area were surveyed.

3.3.2 Surface Water

The project area falls within the Tygart Valley watershed, which is part of the larger Monongahela River watershed, and includes surface water resources such as streams, springs, seeps, and wetlands. The Tygart Valley River runs along the northeastern border of the project area from its headwaters located several miles to the east in Pocahontas County (**Figure 3-6**). The National Hydrography Dataset indicates three other unnamed intermittent streams cross the project area (USGS 2018). In addition to the National Hydrography Dataset surface water information, a field survey of approximately 44 acres identified surface waters and wetlands present within the portions of the project area where development could occur. As demonstrated in **Figure 3-6**, the survey observed 34 linear surface water features within the project boundary, including 8 ephemeral, 5 perennial, and 20 intermittent streams, as well as 1 ditch. These linear features are typical of mountainous regions, including perennial or intermittent streams with high gradients and fast water velocity and cobble or gravel substrates (Louis Berger 2018). The survey also identified 4 wetland features. These surface water features occur mostly along the proposed access road or fence line. One stream is located adjacent to the access road and the area proposed for the surface support facilities. Ephemeral streams are also likely located in unsurveyed parts of the project area, including in the steep valleys.

Springs and seeps are areas of groundwater discharge where water from subsurface aquifers flows to the land surface. These can emerge from fractures or filter though permeable substrate. Springs typically have higher flow rates than seeps. Springs and seeps are common along drainage depressions, hillslopes, and toeslopes (Byers et al. 2007). One documented spring, the Colonel Samuel B. Marshall spring, is located just north of the access road on a hillside in the northwest portion of the project area (West Virginia Natural Resource Analysis Center 1986). However, other undocumented smaller seeps and springs are likely in and adjacent to the project area.

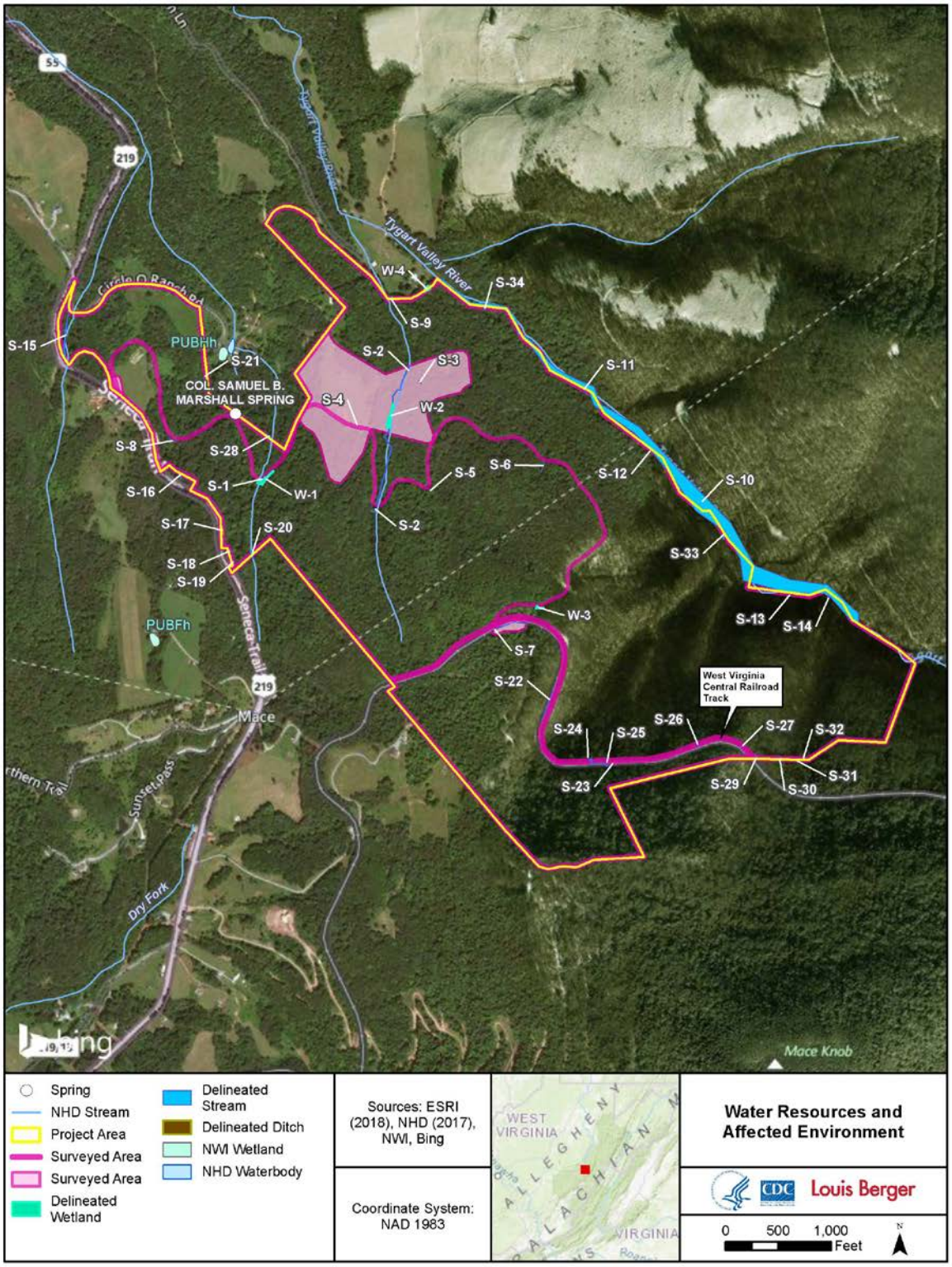


Figure 3-6. Surface Waters and Wetlands

The CWA and state water quality standards are the basis for controlling pollutants in West Virginia's water resources. The standards consist of designated beneficial uses, water quality numeric and narrative criteria, an antidegradation policy, and other general policies on implementation. The water quality standards and criteria ensure that the beneficial uses are maintained and protected. Under Section 303(d) of the CWA, the state is required to provide a list of waters that do not meet the state water quality standards; this list of impaired waters is referred to as the 303(d) list. In addition to the federal CWA, the West Virginia Requirements Governing Water Quality Standards (Title 47 Code of State Rules, Series 2) include narrative criteria stating that no wastes that cause or contribute to a condition that adversely alters the integrity of the waters of the state, including the chemical, physical, hydrologic, or biological components of aquatic ecosystems are allowed.

The Tygart Valley River was placed on West Virginia's 303(d) list for water quality impairment for most of its length because of biological impairment, algae, fecal/bacteria, iron, manganese, and pH. The reach within and adjacent to the project area is only impaired for fecal/bacteria, and the state has developed a Total Maximum Daily Load plan to address this water quality issue (WVDEP 2016a, b). The remaining surface waters in the project area are considered "high quality" waters in which the level of water quality exceeds levels necessary to support recreation, wildlife, and the propagation of fish and aquatic life.

3.3.3 Wetlands

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. This definition presents the three criteria used to identify wetlands: (1) wetland hydrology, (2), hydrophytic vegetation, and (3) hydric soils. Wetlands provide important functions and values, including storage and attenuation of floodwaters; groundwater recharge and discharge; sediment and contaminant filtration; and provision of fish, wildlife, and plant habitat.

In West Virginia, wetlands are regulated by Section 404 of the CWA; EO 11990, Protection of Wetlands; and state permits and standards. Wetlands that are considered "waters of the United States," as verified by a U.S. Army Corps of Engineers (USACE) Jurisdictional Determination, are subject to regulation under Section 404 of the CWA. Section 404 regulates the discharge of dredged or fill material into waters of the United States through various permits administered by USACE. Isolated wetlands that are not regulated by USACE are considered "waters of the state." All wetlands, including isolated wetlands, are also protected by West Virginia water quality standards, National Pollutant Discharge Elimination System (NPDES) permitting, and CWA Section 401 certification from the state.

EO 11990 requires federal agencies to consider practicable alternatives to actions that impact wetlands and to limit potential damage or loss if an action affecting a wetland cannot be avoided. Specifically, Section 1 of the executive order states that an agency is required "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." The executive order emphasizes a process of wetland avoidance, minimization, and compensation.

A wetland delineation of approximately 44 acres of the project area where development could occur identified four palustrine persistent emergent wetlands ranging in size from 0.02 to 0.09 acre, shown in **Figure 3-6** (Louis Berger 2018). These wetlands are characterized by an array of grass-like plants and

broad-leaved herbaceous emergents. Emergent wetland vegetation observed within the survey area included jewelweed (*Impatiens capensis*), soft rush (*Juncus effusus*), and sedges (*Carex* spp.). The hydrology of the identified wetlands is associated with a seasonally high water table and surface saturation. The hydroperiod of the palustrine emergent wetland systems in the survey area is classified as seasonally flooded/saturated (Cowardin et al. 1979; Federal Geographic Data Committee 2013).

The access road intersects two wetlands (W-1 and W-3), and the project area boundary fence line intersects one wetland (W-4). No wetlands are within the limit of disturbance for the surface support facilities; the closest wetland is approximately 140 feet to the east.

3.3.4 Groundwater

The regional aquifers of the Greenbrier and Mauch Chunk Groups are unconfined at shallow depths and confined at greater depths. Aquifer unit thicknesses typically range from 50 feet to 200 feet and are occasionally known to exceed 300 feet. In the northern portion of the project area, where the Greenbrier Limestone is the surficial bedrock unit or where it is overlain by thin strata, the topography is karstic and permeable. In the southern half of the project area, the Mauch Chunk Group overlies the Greenbrier. Locally, the Mauch Chunk Group is described as relatively impermeable and is not recognized as a major source of extractable groundwater (USGS 1997).

The regional aquifer systems are recharged from precipitation, baseflow, or underflow from adjacent units. According to the U.S. Geological Survey (USGS) (2001), the Monongahela River watershed has a mean annual recharge of approximately 21 inches/year. The actual recharge rate within the watershed can vary by location and depends on many factors, including surficial rock type, thickness of soil cover, soil type, vegetative cover, position with respect to valleys and mountaintops, climate, and impervious surfaces. Most of the precipitation that reaches the ground surface runs rapidly off the slopes, discharging to the nearest surface water feature. The precipitation that does infiltrate the ground surface migrates under the influence of gravity through the weathered bedrock, following a horizontal path before descending vertically along deeper fractures to the next permeable horizontal feature or unit (USGS 1997). The general flow pattern lends itself to the formation of springs and seeps, where permeable water-bearing material reaches the ground surface.

The hydraulic characteristics of the regional aquifer system are complicated by differences in hydraulic connections and water-bearing properties. Although the regional aquifers are recharged by the infiltration of water from precipitation, additional recharge into valleys by the gravitational flow of groundwater from adjacent hillsides may result in potentially higher yields in wells located in low-lying areas. The higher yields may also be augmented by the concentration of stress-relief fractures that enhance permeability and are commonly associated with regional valley floors. Generally, the productive aquifer systems are associated with sandstones and limestones because of their porosity in the form of intergranular spaces, fractures, and dissolution. Additionally, shales with an extensive, interconnected fracture system could also provide additional sources of groundwater (USDA-NRCS 2001).

The local aquifer system near the project area consists of the karstic Greenbrier Limestone and is recharged though infiltration of precipitation. Although karst features are well developed in the Greenbrier Limestone because it is sandy, fossiliferous, and characterized by dissolution of the carbonate rock, no karstic features such as caves, sinkholes, disappearing streams, or cavities were identified during site reconnaissance; however, these features may occur. As described in Section 3.3.2,

the Colonel Samuel B. Marshall spring is mapped near the northern portion of the Site (**Figure 3-6**). Limited information is available about wells and springs used for potable purposes near the project area but, in general, groundwater is not relied on for local community water supply. Two USGS wells were identified within a 1.0-mile radius, located southwest of the Site. While publicly available information indicates no wells provide community water supply, several residents near the project area noted that their individual water supply is from springs and wells. One resident adjacent to the project area noted that a spring supplying a small amount of water for domestic use is located approximately 1,500 feet west-southwest of the project area.

Generally, the highest yielding wells associated with the regional aquifers are located in the valleys. The production of karstic limestone aquifers varies depending on where the well is located. A well completed in a large solution opening could produce large volumes of water, but one that penetrates few fractures or solution openings could be almost dry (Puente, 1985). Although yields are generally adequate for domestic, farm, and small commercial supplies, concentrated groundwater withdrawal in the valleys may have negative effects on streams and wetlands. The alluvial deposits provide poor to moderate yields of relatively good quality water. Generally, their restricted thickness and aerial extent limit their potential as an exploitable water source except for spatially dispersed domestic or farming purposes. Alluvial deposits typically have relative unknown reliability during periods of drought and excessive draw down of the aquifers could dewater local perennial streams, which rely on baseflow from springs.

Groundwater quality near the project area is generally good with the exception of elevated iron and chloride contents. In Pocahontas County to the south of the project area, groundwater quality varies greatly across the county. Areas that have a lot of seasonal groundwater recharge tend to exhibit better groundwater quality with lower levels of dissolved metals and solids, whereas areas with low groundwater movement generally exhibit poorer water quality. Changes in groundwater quality over time are typically due to changes in the quality of water recharging the aquifer or the withdrawal-induced movement of poorer quality groundwater (WVDEP 2013). Furthermore, the Greenbrier Group aquifer can be susceptible to pollution from surface sources from the presence of surface karst features such as solution openings and sink holes that can be direct conduits to groundwater.

3.4 Utilities and Infrastructure

3.4.1 Introduction

This section describes the utility systems currently serving the Site and surrounding areas that could be affected by the Proposed Action Alternative. Utilities considered include electricity, natural gas, water supply, sanitary sewer, stormwater management, non-hazardous solid waste, and communication systems (e.g., landline telephone and data/internet). Information presented in this section is drawn from previously prepared reports and studies, publicly available information from utility providers and government agencies, and discussions with utility providers. Later sections describe the utility requirements for the Proposed Action Alternative and potential effects of meeting the new utility demands.

3.4.2 Electricity

MonPower is the electrical utility for the community. A single-phase electric line provides electricity to the project area.

3.4.3 Natural Gas

No natural gas service is available near the site or in Pocahontas County (Pocahontas County Chamber of Commerce 2018). Natural gas service is provided to portions of Randolph County by Mountaineer Gas. Mountaineer Gas's nearest line is reported to be a small diameter line in Huttonsville, West Virginia, which is approximately 22 miles from the site (Mountaineer Gas 2018). As an alternative to natural gas, propane delivery service is available to the Mace, West Virginia, area from Suburban Propane (Suburban Propane 2018).

3.4.4 Drinking Water Supply and Distribution

No public water supply serves the project area. The nearest public water line is located about 3.25 miles south of the project area on U.S. Route 219 at the intersection of West Virginia Route 66. The Pocahontas County Public Service District (PSD) owns and operates this line. Water is supplied by the Cheat Mountain Water Treatment plant in Snowshoe, West Virginia. The plant has a treatment capacity of 1.5 million gallons per day, and source water comes from Shavers Lake (PSD 2018).

3.4.5 Sanitary Sewer

No public sewer serves the project area. The nearest public sewer line is located approximately 2 miles south of the project area on U.S. Route 219 (about 1.25 miles north of the intersection of U.S. Route 219 and West Virginia Route 66). PSD owns and operates this sewer line. Wastewater is treated at a 500,000-gallon treatment plant located in Snowshoe, West Virginia (PSD 2018).

3.4.6 Stormwater Management

Little to no impermeable surfaces are currently within the project area. The existing access road is dirt or stone. Stormwater is not currently managed on-site.

3.4.7 Non-Hazardous Solid Waste

No solid waste is currently generated on-site. Pocahontas County Solid Waste Authority owns and operates the Pocahontas County landfill in Dunmore, West Virginia, approximately 30 miles from the project area. The landfill is reported to accept municipal non-hazardous solid waste and construction and demolition waste. Randolph County does not have its own landfill. Waste from Randolph County is transported to the Tucker County landfill in Davis, West Virginia, approximately 80 miles from the project area. This landfill also accepts municipal non-hazardous solid waste and construction and demolition waste.

3.4.8 Communications Systems

Fiber optic cable is not currently available at the project area. Citynet provides fiber optic cable service in Snowshoe, West Virginia, and Frontier is reported to provide phone service in the area. Cell phone service is not available at the project area and is somewhat limited throughout the area because of the requirements of the NRQZ. NRQZ coordination is required for all new or modified, permanent, fixed, licensed transmitters inside the NRQZ. The proposed site is located entirely within the NRQZ, and approximately half of the site is located in the West Virginia Radio Astronomy Zone, which covers areas within a 10-mile radius of the Green Bank Observatory. It is illegal to operate, or cause to be operated, any electrical equipment that causes harmful interference with the reception of radio waves within the

West Virginia Radio Astronomy Zone (West Virginia State Code Chapter 37A "Radio Astronomy Zoning Act"). The protection extends at varying levels up to a 10-mile radius from the telescopes on site.

3.5 Biological Resources - Vegetation and Threatened and Endangered Species

3.5.1 Introduction

This section describes existing biological resources, including vegetative communities and threatened and endangered species that are known to occur, or may occur in the project area, and could be affected by the Proposed Action Alternative. Information presented in this section is based on results of 2018 habitat surveys, correspondence with state and federal wildlife agencies, and the USFWS Information for Planning and Consultation system.

3.5.2 Vegetation

Upland portions of the project area are generally composed of undeveloped hardwood forest with some small non-forested areas dominated by grasses and other herbaceous vegetation located near the northwestern boundary. Upland vegetative communities within the project area consist of deciduous hardwood forest and successional old fields. Wetland communities are described in Section 3.3.3, *Wetlands*.

Deciduous hardwood forest communities within the project area are dominated by sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), and eastern hemlock (*Tsuga canadensis*). Other species associated with this community include American elm (*Ulmus americana*), American basswood (*Tilia americana*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), mockernut hickory (*Carya tomentosa*), pignut hickory (*Carya glabra*), tulip poplar (*Liriodendron tulipifera*), and eastern red cedar (*Juniperus virginiana*).

Successional old field communities are characterized by meadows dominated by forbs and grasses on previously cleared sites that have been allowed to revegetate. Shrubs may be present but collectively represent less than half of the community composition. In the project area, dominant species include switchgrass (*Panicum virgatum*), Japanese stilt grass (*Microstegium vimineum*), Kentucky bluegrass (*Poa pratensis*), English plantain (*Plantago lanceolata*), and common dandelion (*Taraxacum officinale*).

3.5.3 Threatened and Endangered Species

Threatened and endangered species include those listed at the federal level under the ESA. Correspondence with WVDNR has indicated that no state-listed species occur within the project area. Based on an official species list provided by the USFWS West Virginia Field Office, several threatened and endangered species may occur in the areas of potential disturbance, as shown in **Table 3-3**. These species and their likelihood of occurrence within the project area are described below. The project area does not contain USFWS-designated critical habitat for any threatened or endangered species. Field surveys completed in November 2018 identified potential habitat for all federally listed species with potential to exist in the project area.

TABLE 3-3. THREATENED AND ENDANGERED SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

Common Name	Scientific Name	Status	Likelihood of Occurrence in Project Area
Mammals			
Indiana Bat	*Myotis sodalis*	Endangered	Likely to forage in the project area and may roost in the project area. The project area contains suitable roosting trees.
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Likely to forage in the project area and may roost in the project area. The project area contains suitable roosting trees.
Amphibians			
Cheat Mountain Salamander	*Plethodon nettingi*	Threatened	Potential to occur in portions of the project area. Suitable habitat is present along the proposed fence line at elevations greater than 3,500 feet.
Plants			
Running Buffalo Clover	*Trifolium stoloniferum*	Endangered	Likely to occur in the project area. Suitable habitat is present along the railroad track, access road, and off-road vehicle trails throughout forested portions of the surveyed area.
Small Whorled Pogonia	*Isotria medeoloides*	Threatened	Potential to occur in the project area. Suitable habitat is present along the proposed fence line.

3.5.3.1 Indiana Bat and Northern Long-eared Bat

Indiana bats and northern long-eared bats have similar habitat requirements. During summer months, both species roost underneath bark or in cavities of trees and may roost individually or in colonies. Northern long-eared bats are known to roost in both live and dead trees, while Indiana bats are more selective with roosting sites, showing preference for trees that are dead or dying (USFWS 2007a). Caves and mines may also provide summer roosting sites for both species (80 FR 17974). During winter months, northern long-eared bats and Indiana bats congregate in large caves or mines known as hibernacula. Foraging habitat for both species consists of upland and riparian forests. The project area has the potential to contain caves, but no caves are present near areas of proposed disturbance. However, occupied hibernacula are located nearby and throughout the region. The project area is composed mostly of upland forests that provide suitable roosting and foraging habitat for both species. Field surveys completed in November 2018 identified 52 individual trees and one structure (a large shed) suitable for roosting. Therefore, it is likely that both Indiana bats and northern long-eared bats are at least seasonally present in the project area and may be present year-round. White-nose syndrome (WNS), a fungal disease that affected a variety of bat species in eastern North America, has contributed to population declines of both Indiana bats and northern long-eared bats. WNS has been identified in both Randolph and Pocahontas Counties and infected hibernacula have been documented in both counties (USFWS 2018).

3.5.3.2 Cheat Mountain Salamander

Cheat mountain salamander, a species endemic to West Virginia, occurs at higher elevations in the eastern part of the state (typically above 3,500 feet). This species is most closely associated with red spruce forests with ground cover composed of a liverwort called Bazzania and an abundance of leaf litter, fallen logs, and sticks. It also appears in mixed deciduous forests that include yellow birch, American beech, sugar maple, striped maple, and Eastern hemlock (USFWS 2009). This species occurs in both Pocahontas and Randolph Counties, and field surveys completed in November 2018 confirmed that suitable habitat is present within the project area. The field surveys identified four areas of suitable cheat mountain salamander habitat, all of which were along the proposed fence line boundary at elevations greater than 3,500 feet. Areas of similar suitable habitat were documented along the Tygart Valley River corridor, but they occur at elevations below 3,500 feet. Therefore, it is unlikely that the species is present at these locations.

3.5.3.3 Running Buffalo Clover

Running buffalo clover, a member of the pea family, was believed to be extinct until it was rediscovered in West Virginia in 1983 (USFWS 2007b). This species occurs in mesic habitats of partial to filtered sunlight where there is a prolonged pattern of moderate periodic disturbance, such as mowing or grazing, and is most often found in regions underlain with limestone or other calcareous bedrock. In West Virginia, running buffalo clover occurs most frequently on old logging roads, off-road vehicle trails, hawthorn thickets, grazed woodlands, railroad grades, and old fields succeeding to mesic woodlands (USFWS 2007b). This species occurs in both Pocahontas and Randolph Counties, and field surveys completed in November 2018 confirmed that suitable habitat is present within the project area, with the highest quality habitat located along the West Virginia Central Railroad track, along the access road, and along off-road vehicle trails, which are located throughout forested portions of the surveyed area. None of the off-road vehicle trails observed during the field surveys showed evidence of recent

disturbance. Suspect plants were photographed, but no specimens were collected. Positive identification of the species was not confirmed, but it is highly likely that the species is present within the project area.

3.5.3.4 Small Whorled Pogonia

Small whorled pogonia, a member or the orchid family, occurs on upland sites in mixed-deciduous forests that are generally in second- or third-growth successional stages. This species prefers sparse to moderate ground with a relatively open understory canopy. It is often found within close proximity to features that create long persisting breaks in the forest canopy (USFWS 1992). Small whorled pogonia is known to occur in Randolph County, and field surveys completed in November 2018 confirmed that suitable habitat is present in the project area along the Tygart Valley River, near the proposed fence line.

4 Environmental Consequences

This chapter analyzes the potential impacts of the No Action and Proposed Action Alternative on the aspects of the environment described in **Chapter 3** and is organized parallel to **Chapter 3**. After being analyzed, the impacts are assessed based on criteria presented in the introduction to each section. For each resource, the criteria define what would constitute an adverse impact on the resource and provide a threshold of significance for this impact. Adverse impacts that do not meet this threshold of significance are considered minor. A criterion is also provided for what would constitute a beneficial impact.

The thresholds of significance were established taking into account both context and intensity, as required by CEQ guidelines (40 CFR 1508.27). "Context" refers to the setting within which the impact will be felt. Depending on the proposed action, it can be an ecosystem, a community, a neighborhood, or a whole region. It can also refer to a specific population or interest. In general, for the analyses in this draft EIS, the context is provided by the project area, the surrounding area, nearby residents, and Randolph and Pocahontas Counties, within which the project area is located.

"Intensity" refers to the severity of the impacts in the relevant context. The same impact may be considered more severe, and therefore significant, in some contexts than in others. For instance, noise levels that are acceptable in an urban environment or during the weekday, and therefore represent a less than significant impact, may be too high—and therefore significant—in a rural environment, or in an area rich in sensitive receptors such as hospitals, schools, or churches.

For each resource, the impacts of the No Action Alternative are described first. In most cases, the No Action Alternative would amount to a continuation of existing conditions for the foreseeable future. The potential impacts of the Proposed Action Alternative are described next.

The impacts of acquiring the project area and constructing the proposed underground safety research facility are analyzed separately from those of operating the proposed consolidated campus. In general, but not always, the acquisition and construction impacts are short term or temporary (which would cease when construction is complete) and the operational phase impacts are long term or permanent (which would continue for the life of the facility).

For each resource, a conclusion follows the analysis. The conclusion briefly states the level of anticipated impact (i.e., no impact; minor, adverse impact; significant, adverse impact; beneficial impact). When appropriate, direct and indirect impacts are distinguished. Direct impacts are those that would occur at the same place and time as the proposed action; indirect impacts are those that would occur farther in time or in space but are still reasonably foreseeable.

For each resource, as applicable, a list of minimization and mitigation measures is provided at the end of the section. Mitigation measures are steps that would be taken to reduce significant or potentially significant impacts. Minimization measures are steps that may be taken to further reduce impacts.

4.1 Noise and Vibration

4.1.1 Introduction

This section assesses the potential impacts of the No Action and Proposed Action Alternatives on ambient noise levels. The following criteria were used to assess noise impacts:

- The alternative would have an adverse impact on noise or vibration if it would create a new source of noise that would temporarily or permanently noticeably increase general noise levels in the area. The impact would be minor if it would not result in a violation of the permissible levels set by local noise or vibration regulations. It would be significant if it would exceed those permissible levels.
- The alternative would have a beneficial impact if it led or could lead to a permanent reduction of ambient noise or vibration levels.

As detailed further in Appendix E, scaled distance equations are used to predict ground vibration and airblasts associated with blasting efforts. The analysis under the Proposed Action Alternative used OSMRE-prepared spreadsheet models for both ground vibration and airblast predictions. The calculation conservatively assumes a worst-case construction blasting scenario with a charge weight of 103 pounds per delay, an amount the project engineers have identified as being the high end of what would be used during construction (NIOSH 2018). For this analysis, blasts are assumed to be conducted at the surface, which also provides a worst case. As the construction progresses, blasts would be conducted deeper and deeper underground, providing more distance for vibration attenuation. As construction blasting progresses deeper into the facility, airblasts would be shielded by the intervening mine walls, making the initial blast at the surface also conservative for airblast prediction.

General construction noise and vibration were also analyzed for the Proposed Action Alternative. These analyses were conducted using procedures and guidelines identified in the FTA's *Transit Noise and Vibration Impact Assessment* (FTA 2006). For the noise analysis, the evaluations consider the construction equipment type, usage factor, ground conditions (i.e., hard surface or vegetated), and intervening barriers if applicable. General construction vibration analysis also account for types of construction equipment; however, since vibration is more of an instantaneous concern, individual events are the basis of the analysis. Therefore, the construction equipment with the highest potential for damage is the worst-case scenario.

4.1.2 No Action Alternative

Under the No Action Alternative, there would be no changes to the existing noise and vibration environment in Pocahontas and Randolph Counties. No construction would occur, and no noise or vibration impacts would occur.

4.1.3 Proposed Action Alternative

Construction noise and vibration and some operational noise would result from the new underground safety research facility. Operationally, noise and vibration would be negligible because the test activities (e.g., methane explosions, coal dust ignition) would occur well below ground and set away from noise and vibration sensitive land uses.

Airblasts associated with underground research operations would be almost completely shielded because heavy blast doors at the portal would confine most energy within the underground facility; therefore, noise associated with operations would be very low and would not damage residences. However, even if a blast occurred at the surface, noise from 100 pounds of commercial explosive-equivalents would equate to 116 dBL. This level is well below the state's limit of 133 dBL at 3 Hz, and below the OSMRE annoyance threshold of 120 dBL. Therefore, the adverse impact would be minor.

Construction noise and vibration were evaluated for the potential to exceed guidance or regulatory thresholds because these activities would occur, at least initially, at the surface. Construction of the Proposed Action Alternative would occur over a four-year period. CDC and NIOSH staff developed a tentative blast plan that includes up to a 103-pound charge weight per delay. Construction blasting at the surface using the scaled distance equations would result in 0.12 PPV in/sec at 1,200 feet, a level that is well below the state's limit of 1.00 PPV in/sec for distances of 301 to 5,000 feet, and a dBL of 117, a level that is also well below the state's limit of 133 dBL at 3 Hz and below the OSMRE annoyance threshold of 120 dBL, used here as guideline. Therefore, the impact off-site from blast-related vibration or airblasts during the construction period would be minor. A Y-shaped berm would be constructed in front of the entrance to the underground facility during construction to deflect and buffer overpressure noise upward. The berm would decrease noise, particularly for properties facing the entrance to the underground facility. As excavation moves deeper, perceptible noise and vibration at the surface would decrease. The berm would be removed and replaced with blast doors at the facility entrance for operation.

Construction activities would involve clearing trees, vegetation, and soils from some areas of the project site. Diesel-powered construction equipment, such as those provided in **Table 4-1**, would be used to remove and load excavated material. Construction of the access road has the highest potential to exceed the FTA guidelines at the nearest residences; the access road would be constructed within approximately 200 feet of the nearest residence. As **Table 4-1** indicates, construction noise at the nearest residences would not exceed the 80 dBA L_{eq} criteria at this distance. Construction noise would be audible off the property but would be within daytime hours and within the dBL standard for construction. The vibration analysis for construction equipment examined how close equipment would need to be located to a residence to exceed the 0.22 in/sec PPV threshold. The construction equipment with the largest vibration impact was a roller, used for development of the access road. The roller would exceed the PPV threshold at 26 feet away from a residence. The access road is located approximately 200 feet away from the nearest structure; therefore, the noise would be within appropriate construction thresholds and minor, adverse impacts are anticipated.

TABLE 4-1. CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Phase	Equipment[a]			Composite Sound Level (hourly L_{eq}) in dBA at Distance[c] Variable Distances (feet)					
	Type	Quantity	Maximum Sound Level (L_{max}) @ 50 ft[b] (dBA)	50	100	200	400	800	1200
MEM Development	Drill Rig	2	79	83	75	67	59	51	46
	LHDs	2	78						
	Truck	2	76						
MEM Bench Preparation	Dozer	2	82	82	74	66	58	50	45
	Trucks	2	76						
Access Roadway Construction	Grader	1	85	84	76	68	60	52	47
	Dozer	1	82						
	Dump Truck	1	76						
	Roller	1	80						
	Backhoe	1	78						

Source: CDC (2018a)
[a] Provided by CDC and NIOSH.
[b] Federal Highway Administration (2006)
[c] Assumes soft vegetated ground.

4.1.3.1 Sensitive Receptors

The nearest noise and vibration sensitive land uses are residences, with the closest residence located no closer than 1,200 feet. Assuming the operational test explosions are equivalent to no more than 100 pounds of explosives (i.e., methane and coal dust), vibration levels are estimated to attenuate to 0.11 in/sec PPV at 1,200 feet from the facility and would not pose a risk of damage at the residences. Specifically, the PPV from blasts during construction and operation would be imperceptible at 2,600 feet from the location of the blast within the project area.

While currently inactive, the West Virginia Central Railroad will likely be reactivated after construction of the underground safety research facility is complete. The existing railroad track is located approximately 2,100 feet from both of the proposed entrances to the underground facility, and the underground facility would be approximately 500 feet below ground in the vicinity of the railroad tracks. A conservative estimate of the impacts of the underground facility construction/development on the railroad track assumes a 103-pound coupled, confined blast directly below the railroad track (approximately 500 feet below ground) at the same time it is active. This would result in approximately 0.31 in/sec PPV at the surface in the location of the railroad track during construction activities. The *FTA Noise and Vibration Impact Assessme*nt manual (FTA 2006) notes that engineered structures have a damage criteria of 0.5 PPV in/sec. The railroad track is designed to withstand higher vibrations. During

operation, blasts would be smaller, fully contained underground, and produce fewer vibrations. Subsequently, the impacts on the railroad associated with vibration would be well below damage thresholds.

Vibration impacts at the Green Bank Observatory and radio-receiving facilities for the U.S. Navy in Sugar Grove would be 0.0003 PPV in/sec and 38 vibration decibels. FTA guidance stipulates that 42 vibration decibels are allowable without interfering with the most vibration-sensitive equipment (FTA 2006), although the equipment at the observatory may be less sensitive. CDC and NIOSH coordinated with the Green Bank Observatory, and the observatory confirmed noise or vibration resulting from construction or operation of the project would not constitute a conflicting use within the NRQZ (Green Bank Observatory 2018).

Similarly, the Atlantic Coast Pipeline, which is 3.5 miles from the project area at its closest point, would also not be disturbed by vibration from construction or operation at the proposed facility. Calculations for the Atlantic Coast Pipeline indicate that vibrations would be 0.0018 PPV in/sec at the pipeline. FTA guidance places a vibration limit of 0.12 PPV in/sec to protect the most sensitive historic structures to prevent damage, and the pipeline is engineered to be resilient to damage. Adverse impacts on sensitive receptors from noise and vibration, including nearby residences, the Green Bank Observatory, and the pipeline would therefore be negligible to minor.

4.2 Geology, Topography, and Soils

4.2.1 Introduction

This section addresses the potential impacts of the No Action and Proposed Action Alternatives on the geological resources described in **Section 3.2**. The following criteria were used to assess potential impacts on each type of resource:

- Geology: An adverse impact would be minor if the alternative required or resulted in the penetration, damage, or destruction of the geological strata or formations underlying the project area. The adverse impact would be significant if the affected strata or formations were of special significance or worth (i.e., known to contain rare fossils).
- Topography: An adverse impact would be minor if the alternative altered or destroyed existing topographic features with no or minimal effects on overall site stability, drainage, and erosion. The impact would be significant if the alternative altered or destroyed previously undisturbed and valuable or noteworthy topographic features, threatened the stability of the site, or substantially modified drainage patterns.
- Soils: An adverse impact would be minor if the alternative required the disturbance or removal of natural soils. The impact would be significant if it could or would cause severe erosion or soil contamination, or if the affected soils were particularly rare or valuable.
- A beneficial impact would occur if the alternative enhanced or improved geological resources. This would include, but would not be limited to, highlighting or making sustainable use of a valuable geological or topographical feature, or cleaning or removing contaminated soils or groundwater.

4.2.2 No Action Alternative

Under the No Action Alternative, there would be no changes to the project area and no resulting change to existing geology, topography, or soils resources, so there would be no impacts on these resources.

4.2.3 Proposed Action Alternative

4.2.3.1 Geology

Disturbance associated with the construction of the surface support facilities and road widening would directly affect geologic resources. Undisturbed geologic features within the approximately 5.5 acres proposed for development of the surface support facilities and any undisturbed resources adjacent to the access road would be damaged during excavation of approximately 362,000 tons of material. Damage to surficial geology would result in direct, long-term, adverse impacts. Installation of the boundary fence would require limited shallow disturbance during drilling or excavation for the placement and securing of the fence posts. Drilling or excavation could damage any undisturbed shallow geological features present and result in direct, long-term, adverse impacts on localized areas.

The construction of the underground safety research facility would directly affect geologic resources. Excavation of the approximately 164,000 GSF for the underground facilities would penetrate and damage the previously undisturbed Greenbrier Limestone and Mauch Chunk Group formations and remove approximately 152,000 tons of sedimentary rock, including limestone, shale, and sandstone. Appropriate design and construction of the underground facilities would prevent impacts on the geologic strata beyond the excavated area including the overlying strata. Overall impacts on geology would not be significant because strata and formations within the project area are not of special significance or worth.

4.2.3.2 Topography

Land disturbance associated with development of the surface facilities, support areas, and road widening would slightly alter the existing topography of the project area. Construction would require excavation, filling, and grading on a localized scale that would alter or destroy any existing topographic features and modify existing drainage patterns, potentially increasing erosion. Regrading and culvert installation adjacent to areas of road widening would permanently alter existing topography and drainage, especially in the steeper sections of the existing access road. Severe erosion already occurs in these locations, and regrading would reduce the erosion potential in the steeper portions of the access road. Boundary fence construction would require grading a 10-foot-wide buffer around the proposed fence line, which could temporarily affect drainage patterns or increase erosion but would likely not alter existing topographic features. The excavation and construction of the underground safety research facility would mainly occur from an existing rock outcrop to approximately 500 feet underground. Topographic impacts would be limited to the small areas surrounding the entrances/exits to the underground safety research facility and could include temporarily altering topographic conditions related to storage of rock material brought to the surface, modifying drainage patterns, and increasing erosion. Compliance with permitting requirements and implementation of BMPs such as soil and erosion controls would minimize these impacts. The Proposed Action Alternative would not alter or destroy previously undisturbed and valuable or noteworthy topographic features, threaten the stability of the site, or substantially modify drainage patterns; therefore, adverse impacts would not be significant.

4.2.3.3 Soils

Land disturbance associated with development of the surface facilities and support areas, road widening, and installation of the boundary fence would directly affect 14.2 acres of soils. Construction activities and the use of staging areas would temporarily disturb, expose, compact, and modify the structure of soils during earth-moving activities, including excavating, grading, leveling, and filling. Disturbance would temporarily expose soils and potentially increase soil erosion from stormwater runoff. The use of fill material would modify the soil composition; however, most of the fill material would be generated from on-site excavation. Compaction would directly affect soils by altering soil structure, increasing root penetration resistance, and decreasing soil porosity and would indirectly reduce water infiltration, increase runoff, and potentially displace soils. The soils underlying the proposed surface support facilities and road widening have some limitations such as high erodibility, slope, shrink-swell potential, restrictive layer, and low strength that would require soil modifications and improvements to provide necessary support, which would disrupt the soil structure over the long term. Compliance with West Virginia's sediment and erosion control requirements for construction, obtaining necessary and applicable permits, and implementing state-approved erosion and sediment control BMPs would minimize sediment loading and any short-term, adverse impacts. Temporarily disturbed soils would be stabilized through revegetation or other means following completion of construction to prevent erosion. Paving or adding impervious surface following construction would permanently disturb soils within the facility footprints and small parking area, resulting in direct, long-term, adverse impacts. However, the majority of the disturbed area would be permeable surface, and the disturbed soils are not particularly rare or valuable.

The excavation for and construction of the underground safety research facility would not affect soils over the long term. Other than minimal surface construction surrounding the entrances/exits to the underground safety research facility, construction activities would occur from an existing rock outcrop to approximately 500 feet underground. During construction of the underground safety research facility, there could be temporary, adverse impacts on soils from the use of equipment on the surface and associated handling and storage of spoil, waste, and debris. Compliance with permitting requirements and implementation of BMPs would minimize adverse impacts on soils, resulting in localized short-term, adverse impacts. Overall adverse impacts on soils would not be significant because there would be no potential for severe erosion or soil contamination, and the affected soils are not rare.

4.3 Water Resources

4.3.1 Introduction

This section addresses the potential impacts of the No Action and Proposed Action Alternatives on the water resources described in **Section 3.3**. The following criteria were used to assess potential impacts on each type of resource:

- Surface Water: A minor, adverse impact would occur if the alternative resulted in chemical, physical, or biological effects on surface waters that were undetectable or detectable but small and localized. The adverse impact would be significant if the chemical, physical, or biological effects on water resources were detectable, have observable consequences on a regional scale, would be frequently altered from desired conditions, and/or would exceed water quality standards or criteria.

- Wetlands: A minor, adverse impact would occur if the alternative resulted in perceptible wetland disturbance that was small and localized in terms of area and in the nature of the impact; however, the overall viability of the wetland would not be affected. The impact would be significant if the alternative altered or destroyed a large amount of wetland area and/or the wetland functions were substantially altered.
- Groundwater: A minor, adverse impact would occur if the alternative required substantial withdrawals of groundwater without threatening the aquifer's ability to recharge or resulted in chemical, physical, or biological effects on groundwater that were undetectable or detectable but small and localized. The impact would be significant if required withdrawals threatened the sustainability of the aquifer, or if the alternative would or could introduce contamination in groundwater; have detectable chemical, physical, or biological effects on groundwater resources; have observable consequences on a regional scale; would be frequently altered from the desired conditions; and/or would exceed water quality standards or criteria.
- A beneficial impact would occur if the alternative enhanced or improved water resources. This would include, but would not be limited to, eliminating a source of disturbance or pollution to water resources, enhancing or restoring a surface water or wetland, or cleaning or improving contaminated waters or wetlands.

4.3.2 No Action Alternative

Under the No Action Alternative, there would be no changes to the project area and no resulting change to existing surface water, wetlands, or groundwater resources, so there would be no impacts on these resources.

4.3.3 Proposed Action Alternative

4.3.3.1 Surface Water

Construction activities in the project area including land disturbance, clearing, grading, and adding impervious surface for surface facilities and support areas (e.g., parking, road widening, and a fence line buffer) could result in potential impacts on surface water resources. Structures for the surface support facilities would be placed in the large open field located in the northern part of the project area (**Figure 4-1**). Additional land disturbance would be required for the two entrances/exits to the underground facility, which would be located adjacent to the proposed surface facilities and east of the open field. One intermittent stream (S-4) is located in the southeastern portion of the field near the proposed parking area for the surface facilities (**Figure 4-2**). Although measures to avoid or minimize disturbance to this stream segment would be determined during the design phase of the project, this analysis assumes it would not be possible to avoid the stream during construction and that the entire stream would be affected.

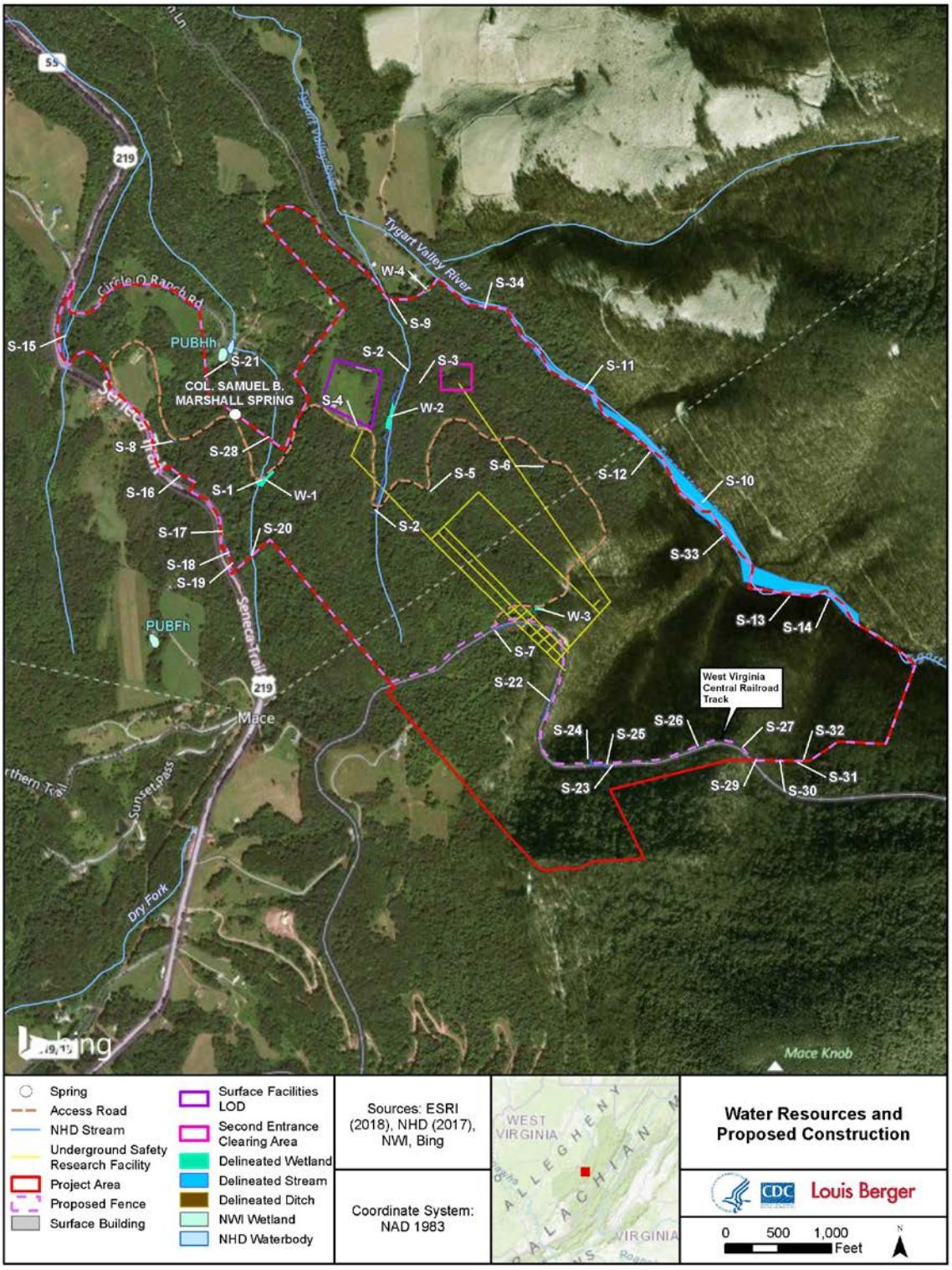


Figure 4-1. Delineated Surface Waters and Wetlands and the Proposed Action Alternative

Figure 4-2. Water Resources in the Vicinity of Proposed Surface Facilities

Construction of the surface facilities and support areas (e.g., parking, road widening, and a fence line buffer) would involve clearing 14.2 acres of vegetation (including 9.95 acres of forested land and 4.25 acres of successional old field), grading, and excavation. These activities would disturb soil and increase the potential for erosion and the transport of sediment into surrounding surface waters via overland stormwater runoff, which could result in temporary, adverse impacts on surface waters during construction. Approximately 5.5 acres of aboveground disturbance would be required to develop the surface support facilities. Additional temporary, indirect, adverse impacts could result from the operation of construction equipment, which would increase the potential for accidental leaks or spills of fuel, lubricants, or other materials that could contaminate nearby surface water. Implementation of erosion and sediment control practices in accordance with the West Virginia erosion and sediment control manual (WVDEP 2016c) would minimize or avoid these impacts. After construction is completed, there would be a slight increase in impervious surfaces of approximately 1 acre; however, the majority of the disturbed area would be permeable. Impervious surfaces would include a small parking area and the footprints of two support buildings. This increase could result in long-term, adverse impacts from increased stormwater runoff, although implementation of stormwater BMPs would avoid or minimize impacts from stormwater on surface water resources.

Although every practicable effort would be made to avoid the stream at the southern edge of the field during design, this analysis assumes that the construction would result in the loss of the intermittent stream, and impacts would be long term and adverse. If avoidance is not possible, the 38-foot-long intermittent stream would be filled for the construction of the surface facilities, and impacts on the streambed would be permanent, unavoidable, and adverse. Compensatory mitigation may be required (i.e., creation, restoration, or enhancement) to offset the affected stream length; replace lost functions and values; and minimize long-term, adverse impacts. Compensatory mitigation would be determined during the permitting process.

The access road would be widened and resurfaced from the property entrance to the abandoned railroad. Road widening would require clearing, grading, and soil disturbance that would increase the potential for erosion and sedimentation of surrounding surface waters, resulting in short-term, adverse impacts. Several intermittent streams would be crossed during road widening, which would require the placement of longer culverts. During culvert placement, the streambed and banks would be temporarily disturbed, which would increase turbidity and result in short-term, adverse impacts. These impacts would be minimized through the implementation of instream sediment and erosion controls. Impacts on streams would be minimal, permanent, direct, and adverse because the new culverts would be larger and would replace a small amount of stream area at each culvert. Appropriate culvert sizing and placement would prevent erosion and adverse impacts on stream hydrology, resulting in no long-term impacts.

The installation of a fence around the property boundary would require clearing and grading a 10-foot-wide buffer around the proposed fence line, which crosses multiple intermittent, ephemeral, and perennial streams, and one ditch (i.e., a federally non-jurisdictional surface water). Construction activities would remove vegetation and disturb the ground surface within the riparian areas of multiple intermittent streams, but would not directly affect them. Where the property boundary is also adjacent to the Tygart Valley River, it is assumed the boundary fence would be installed outside the riparian area of this resource to limit potential impacts. Similar to other ground-disturbing activities, construction of the boundary fence could temporarily result in adverse impacts from discharge of stormwater runoff

and associated sediment and pollutant loading until vegetation has been reestablished. Construction and erosion and sediment control practices would be used, and applicable guidelines for vegetative buffers would be followed adjacent to streams.

The excavation for and construction of a new underground safety research facility is not anticipated to affect the quality of surface water resources over the long term. Except for some minimal surface construction surrounding the entrances/exits to the research facility, as discussed above, construction activities would occur from an existing rock outcrop to approximately 500 feet underground. During construction of the underground safety research facility, impacts on surface water quality could be temporary and adverse from sediments or other pollutants discharged during excavation; use of equipment; and associated handling and storage of spoil, waste, and debris. These temporary impacts, including mitigation measures, are described under the groundwater analysis.

Several federal and state permits may be required, depending on the final design of the proposed alternative, including a USACE CWA Section 404 permit for the loss of approximately 38 linear feet of streambed and for discharge of dredged or fill material, and a Section 401 Water Quality Certification administered by the state. All permitting activities would occur during the design phase. If USACE considers the waters non-jurisdictional, a WVDEP State Waters Permit may also need to be submitted. A WVDNR Stream Activity Application may be required for construction activities that occur within the normal high water mark of affected streams. Construction would disturb more than 1 acre of land; therefore, the project would require an NPDES Construction Stormwater General Permit. Compliance under this permit would require development of a stormwater pollution prevention plan (SWPPP) and groundwater protection plan (GPP), as well as implementation of stormwater BMPs to prevent water quality impacts. Adherence to the water quality regulations and permitting requirements, and implementation of management plans, an SWPPP, and BMPs that reduce stormwater runoff and associated erosion, pollution, and sedimentation would minimize and prevent any indirect pollutant loading to surface waters, resulting in short-term, adverse impacts on surface waters.

BMPs and measures to minimize and control sediment and erosion include the use of silt fences, check dams, sediment traps and basins, vegetated buffer strips, temporary seeding and mulching, erosion control fabric, temporary diversions, inlet/outlet protection, and riprap. Following construction, temporarily disturbed areas would be revegetated or stabilized using seeding and mulching, planting, or sodding. Other practices include diverting stormwater runoff away from disturbed areas and, where feasible, preserving topsoil and minimizing soil compaction and disturbance on steep slopes. If construction must occur on steep slopes, such as along the existing access road, steep slope construction guidelines would be followed.

While construction of the Proposed Action Alternative would result in the loss of 38 linear feet of an intermittent stream, overall impacts on surface waters would not have observable consequences on a regional scale and would not be frequently altered from desired conditions. The Proposed Action Alternative would not result in the exceedance of water quality standards or criteria.

4.3.3.2 Wetlands

No wetlands are located within the areas proposed for construction of surface structures or the underground safety research facility; therefore, there would be no direct impacts on wetlands. The closest wetland is a palustrine emergent wetland located approximately 160 feet east of the surface support facilities. Construction would involve clearing 14.2 acres of vegetation and grading activities.

These activities would disturb soil and increase the potential for erosion and the transport of sediment into the wetland via overland stormwater runoff, possibly resulting in temporary, indirect, adverse impacts, although the use of sediment and erosion control BMPs would minimize or prevent these impacts.

Widening the access road from the project area entrance to the railroad would result in both short- and long-term, adverse impacts on two wetlands (W-1 and W-3). In addition to soil compaction and disturbance to the area surrounding the road, widening would require clearing, grading, filling, and covering portions of the wetlands, resulting in direct, long-term, adverse impacts. Wetland functions would be degraded. Temporarily disturbed wetland areas would be restored to their original, pre-construction contours and revegetated. However, permanent, unavoidable, adverse impacts on less than 0.001 acre of wetlands would occur from road widening. This permanent loss of wetlands may require compensatory mitigation (i.e., creation, restoration, or enhancement) to offset the affected wetland acreage, replace lost functions and values, and minimize long-term, adverse impacts.

The installation of a fence around the property boundary would require clearing and grading a 10-foot-wide buffer around the proposed fence line. One wetland (W-4) is located close to the fence line on the northern part of the property, but it would be avoided during construction. Vegetation clearing and the use of heavy equipment during construction would result in soil disturbance, compaction, and potential erosion and sedimentation of the wetland, which could result in indirect, temporary, adverse impacts.

Additional temporary, adverse impacts could result from water quality issues from accidental leaks or spills of fuel, lubricants, or other materials from the operation of construction equipment. If construction cannot avoid wetlands, a federal CWA Section 404 permit for discharge of dredged or fill material and a Section 401 Water Quality Certification administered by the state would be required. As noted in Section 4.3.3.1, an NPDES permit may be also required. Compliance with this permit would require development of an SWPPP and GPP, as well as implementation of stormwater BMPs to prevent water quality impacts. However, adherence to the water quality regulations and permitting requirements, and implementation of management plans, an SWPPP, and BMPs would minimize indirect pollutant loading to the wetlands.

Because of the location of the wetlands, the depth of the construction of the underground safety research facility, and the topography of the site, it is unlikely that groundwater in the vicinity of the underground activities provides the primary hydrology sources for wetlands in the project area.

Although 0.001 acre of wetlands would be permanently lost, overall impacts on wetlands would be minor because large amounts of wetland area and/or the wetland functions would not substantially altered.

4.3.3.3 Groundwater

Construction for surface structures, road widening, and a fence line buffer would require land disturbance, clearing, grading, and adding impervious surface, resulting in potential short-term, adverse impacts on groundwater resources such as wells, springs, and other local groundwater sources from alterations to groundwater recharge and potential contamination by sediment and other pollutants.

Tunneling activities and detonations associated with the construction of the underground safety research facility could result in impacts on groundwater resources, including wells, springs, and other local groundwater sources by altering the current groundwater flow. Any impacts on groundwater

resources would be short term during the construction period or long term from the installation of a new underground structure within the karst topography. Borings in two locations at the proposed underground safety research facility confirm the top of the Greenbrier Limestone begins between 320 and 470 feet below the surface, depending on the elevation of the boring. The average thickness of the Greenbrier Limestone is 477.5 feet. The height and width of the underground facility would be small compared to the overall thickness of the limestone. Given the topography of the site, the depth of nearby wells, and the overall thickness of the Greenbrier Limestone, the presence of the underground safety research facility is not anticipated to noticeably alter the flow pattern or volume of groundwater.

Excavation and construction of the underground safety research facility would likely require dewatering. Groundwater from dewatering activities would be pumped to areas that would be contained without any adverse effects on receiving waters or to a sediment-trapping device prior to release to existing streams at rates that would not cause downstream erosion. No effluent would be discharged without acquiring the necessary state and/or local permits. A water management system would be implemented for both construction and operation. The system would include a series of pumps to collect water in lower development elevations that would pump water to an aboveground collection pond. The collection pond would include an oil/water separator to remove potential contaminants that could enter the water from tanks or equipment leaks.

In addition to collecting and treating all water, project specifications would include strict controls regarding types of allowable explosives to prevent loss of nitrates or ammonia to groundwater. Construction contract provisions would require the use of fixed-cartridge explosives to prevent spillage that could occur with the use of bulk explosives. Contractors would also be required to keep spill clean-up kits on-site so spills of hydraulic fluid, oil, or other contaminants from drilling or excavation equipment could be immediately contained and cleaned up in place.

The collection pond would allow for water monitoring and treatment, if needed, and would permit sediments to settle from the water. Prior to discharging the water back on-site, the pond would be sampled to ensure no contaminates remain. The collection pond would be lined to prevent seepage into subsoils. Some water inflows may collect in the underground openings; however, the impacts would likely be localized and would not affect water at off-site wells. Treated water would also be returned to the local groundwater, so impacts on groundwater quantity and quality would be minor.

A GPP would be prepared and implemented as part of the construction stormwater permit to provide practices and procedures to prevent groundwater and soil contamination. While dewatering could modify aquifer hydraulics by acting as a sink for local groundwater or potentially cause sinkholes to develop at the surface, these impacts would be short term.

Several wells or springs providing residential water have been noted near the project area, and CDC anticipates using on-site wells to provide potable water for the surface buildings and research facility. The facility could also use water from the Colonel Samuel B. Marshall spring, which is located close to the proposed surface facilities. The research facility would recycle water, so water use would be minimal, based on previous operations at the LLEM, resulting in minor to no impacts on groundwater use. Given the topography and depth of the proposed underground construction in relation to the known well locations, as described above, it is unlikely that the placement of the underground safety research facility would alter the groundwater flow to the extent springs or wells would no longer receive sufficient groundwater.

4.4 Utilities and Infrastructure

4.4.1 Introduction

This section analyzes the potential impacts of the No Action and the Proposed Action Alternatives on utilities and infrastructure as described in **Section 3.4**, including electricity, natural gas, drinking water supply and distribution, sanitary wastewater, stormwater management, non-hazardous solid waste disposal, and communication systems.

For the purposes of the impact analysis, adverse impacts on utility services would occur if:

- Implementation of the alternative would require the relocation of or upgrade to existing utility and infrastructure systems. These impacts would be minor if the required work would be limited to the project area and its immediate surroundings and not likely to create lengthy or repeated service disruptions. Adverse impacts would be significant if the required work would be extensive and lead to prolonged or repeated service outages for other utility customers.
- The alternative would lead to an increase in demand for utilities or on infrastructure systems. The impact would be minor if it would not exceed existing capacities and would be accommodated or absorbed without upgrades or expansion. The impact would be significant if the increased demand would exceed the supply or existing capacity of utility providers or infrastructure systems and require major upgrades or extensions.
- The alternative would have a beneficial impact if it would result in or support an improvement of current utility and infrastructure systems on the project area or the surrounding area.

4.4.2 No Action Alternative

Under the No Action Alternative, there would be no changes to the existing utility systems in the area. No construction would occur, no new utility demands would be created, and local utility providers would not be affected.

4.4.3 Proposed Action Alternative

4.4.3.1 Electricity

At the LLEM, electricity was provided to both surface and underground facilities. Electricity was used mainly for lighting, powering computers, cooling the office, and operating equipment in the mine. It was also used for ventilation and periodic dehumidification of the mine. The new facility would operate Monday through Friday for approximately 10 hours per day. CDC/NIOSH estimates that approximately 6,000 GSF of office space would be constructed at the new site, requiring 78.8 kilowatts of electricity to operate. The storage space would be approximately 11,000 GSF and would require 27.5 kilowatts to operate, and the underground safety research facility would occupy approximately 164,000 GSF and require 407.5 kilowatts to operate. Three-phase electrical service would be required to meet the demands of the new facility (CDC 2018b).

MonPower has sufficient available capacity to serve new customers in the area of the Proposed Action Alternative. Serving the Site would require upgrading approximately 3 miles of single-phase overhead power lines to three-phase, starting near MonPower's Linwood Substation on Snowshoe Drive (MonPower 2018). The three-phase power line would likely be installed on existing poles within existing ROWs. The details of the line upgrades would be determined during the design phase of the project.

MonPower would be able to provide power for construction and operation of the Proposed Action Alternative without any adverse impacts on its system or other customers. There would be no significant adverse impacts.

4.4.3.2 Natural Gas

At the LLEM, natural gas was used mainly for heating. Natural gas is not available near the project area, so electric heat or propane could be used as an alternative energy source for heating. Only the office building would be heated.

If CDC uses propane as the energy source for heat, propane suppliers in the area could periodically deliver sufficient propane gas to heat the 6,000-square foot (SF) building without any adverse impacts on local propane supplies.

4.4.3.3 Drinking Water Supply

At the LLEM, on-site well water was used to provide water to the buildings and the experimental mine. One 10,000-gallon tank and a second 8,000-gallon tank were used to store water on-site. Well pumping records or other water use records for LLEM have not been identified.

The fire suppression facility also used well water during its fire suppression experiments, but this water was recycled. Water from the fire suppression facility drained to a 2,500-gallon buried tank. The water was pumped through a series of filters and into a 5,000-gallon aboveground storage tank where it passed through an oil/water separator into another 5,000-gallon aboveground storage tank and was stored for reuse. Once a year the water was pumped into a tank truck for off-site disposal.

Public water is not available near the project area; therefore, an on-site water supply would be required. On-site water supply options include drilling a well, developing or using an existing on-site spring, and/or capturing and storing rainwater from the 6,000 SF office building roof. Water conserving measures, such as use of low-flow toilets and showers and automatic faucets, could be incorporated into the design of the new facility to reduce overall demand for water. Furthermore, separate piping schemes could be used to allow different water sources to be used for different purposes. Construction of any on-site water supply system would require a permit from the West Virginia Department of Health and Human Resources.

Impacts on water resources from consumption of groundwater or surface water at the site are expected to be minor. Water for the fire suppression facility would be recycled. Water demands are expected to be similar to the demands of two residential households. This level of demand would have a minor impact on water resources, given that there would be no other water demands on the 400+ acre parcel.

4.4.3.4 Sanitary Sewer

At the LLEM, domestic sewage was disposed of via an on-site sewage treatment system that consisted of an aeration septic system. Treated water was discharged to surface water under NPDES Permit No. PA0091049. The permit lists a flow limit of 350 gallons per day (monthly average).

Sanitary sewer service is not available near the project area; therefore, an on-site wastewater treatment system would be required. An aerated septic system, similar to the one used at the LLEM, could possibly be used. Past records show that this type of system performed properly with the wastewater from the facility. Numerous designs of aerated septic systems and other on-site treatment options

(e.g., recirculating sand filters) are available. The systems have varying operation, maintenance, power requirements, and treatment levels, which would be compared when choosing a system.

Further investigation would be completed during design to determine the disposal method (subsurface discharge or to a surface water) that would have the least impact on local water quality. Systems with the least environmental impact would be preferred and pursued. Reuse of a portion of the effluent for grey water flushing of the toilets would also be considered. Construction of a wastewater treatment system with a subsurface discharge would require a permit through the West Virginia Department of Health and Human Resources, Public Health Sanitation Division. A treatment system with a surface water discharge would require a WVDEP NPDES permit.

Long-term, adverse impacts on groundwater quality (if subsurface disposal is used) or on surface water quality (if discharge to a surface water is used) are expected to be minor. The treatment system would be designed to meet or exceed all water quality permit requirements, and impacts would not be significant.

4.4.3.5 Stormwater Management

Construction activities in the project area, including land disturbance, clearing, grading, adding impervious surface for surface structures, and road widening could result in potential impacts on stormwater runoff. Temporary, adverse impacts on stormwater during construction would be minimized by implementing BMPs and measures to minimize and control sediment and erosion. These measures include the use of silt fences, check dams, sediment traps and basins, vegetated buffer strips, temporary seeding and mulching, erosion control fabric, temporary diversions, inlet/outlet protection, and riprap.

Up to 5.5 acres of the project area could be converted from pervious to impervious surface under the Proposed Action Alternative, which would increase stormwater runoff in the project area. Long-term impacts on stormwater could be minimized by incorporating BMPs designed to infiltrate, evapotranspirate, and capture and use stormwater as opposed to methods that move stormwater off developed areas as quickly as possible. Collecting and using rainwater from the roofs of the proposed buildings would be an efficient way of reducing stormwater runoff and the need for water simultaneously.

Impacts of stormwater on water resources and associated permitting requirements are discussed in detail under Section 4.3, Water Resources.

4.4.3.6 Non-Hazardous Solid Waste

Waste generated by the LLEM included municipal solid waste and waste from research activities. A 30-ton capacity waste disposal unit stored waste for off-site disposal. Waste was removed from the unit two to three times a year by a private waste contractor. Burnt debris, generated by the fire suppression research, was sampled by CDC/NIOSH personnel and was taken off-site for disposal. The Proposed Action Alternative is expected to generate similar amounts and types of solid waste that would require proper off-site disposal. Landfills serving Pocahontas and Randolph Counties accept municipal solid waste and construction and demolition waste and have the capacity to serve new customers. To reduce solid waste generation, CDC/NIOSH would implement a recycling program. The solid waste generated at the facility is not expected to have any adverse impacts on solid waste disposal facilities in the region.

4.4.3.7 Communication Systems

The LLEM used fiber optic cable for communication and data transfer needs. Fiber optic cable was used in the control room, and it extended underground to parts of the experimental mine. The Proposed Action Alternative is expected to have similar fiber optic cable needs. The nearest existing fiber optic cable connection point is located approximately 3 miles south of the project area at the intersection of Route 219/55 and Route 66. CityNet maintains the connection and has confirmed it is feasible to install a fiber optic connection at the project area. Installation of the line would use existing utility poles and would not require additional ground disturbance. On-site, it is assumed the cable would follow the existing access road (CityNet 2018).

4.5 Biological Resources

4.5.1 Introduction

This section addresses the potential impacts of the No Action and Proposed Action Alternatives on the biological resources described in Section 3.5. The following criteria were used to assess potential impacts on each type of resource:

- Vegetation: The alternative would have an adverse impact on vegetation if it would result in permanent loss or conversion of vegetative communities. The adverse impact would be significant if the permanent loss or conversion of vegetation resulted in noticeable changes to vegetative community structure or function over the long term.
- Threatened and Endangered Species: The alternative would have an adverse impact on threatened and endangered species if it disturbed or displaced any federally listed threatened or endangered species or there was a noticeable decrease in the suitability of habitat for any listed species in the project area. The adverse impact would be significant if it would result in the take of any federally listed threatened or endangered species, as defined under the ESA. In the case of plants, which are not protected from take under the ESA, the adverse impact would be significant if it would result in population-level loss of a species.

4.5.2 No Action Alternative

Under the no-action alternative, there would be no changes to the project area and no resulting change to existing biological resources, including vegetation and threatened and endangered species. Therefore, there would be no impacts on these resources.

4.5.3 Proposed Action Alternative

4.5.3.1 Vegetation

Under the Proposed Action Alternative, vegetation clearing and tree removal would be required to accommodate surface facilities and support areas. Development of these features would require the removal of approximately 5.5 acres of vegetation, consisting of approximately 1.25 acres of deciduous hardwood forest and approximately 4.25 acres of successional old field habitat.

Development of the underground safety research facility would require vegetation clearing and tree removal only at the entrance/exit locations. The main entrance would be located adjacent to the surface facilities and would not require additional vegetation clearing and tree removal. The secondary

entrance/exit, located to the east of the surface facilities would require approximately 1.4 acres of additional vegetation clearing and tree removal, consisting entirely of deciduous hardwood forest.

Placing a chain link fence around the perimeter of the facility and widening the existing access road would require additional vegetation clearing and tree removal totaling 7.3 acres. Total vegetation clearing tree/removal for each specific feature that would occur under the Proposed Action Alternative is shown in **Table 4-2**.

TABLE 4-2. VEGETATION TREE/REMOVAL UNDER THE PROPOSED ACTION ALTERNATIVE.

Feature	Deciduous Hardwood Forest Removal (acres)	Successional Old Field Removal (acres)	Total Vegetation Removal (acres)
Surface facilities and support areas, including main entrance/exit	1.25	4.25	5.5
Secondary entrance/exit	1.4	-	1.4
Fence	6.4	-	6.4
Widening of access road	0.9	-	0.9
Total	**9.95**	**4.25**	**14.2**

Under the Proposed Action Alternative, vegetation clearing and tree removal would result in the loss of approximately 14.2 acres of deciduous hardwood forest and successional old field communities, resulting in long-term, adverse impacts on vegetation. All tree removal would be conducted in accordance with U.S. Forest Service standards. Some currently forested areas would be allowed to revegetate, but trees would not be allowed to re-grow. Adverse impacts on vegetation would not be significant because the loss and conversion of vegetation would not result in noticeable changes to vegetative community structure or function over the long term, and the majority of the approximately 460-acre site would remain undisturbed.

4.5.3.2 Threatened and Endangered Species

Indiana Bat

Indiana bats are likely to be at least seasonally present in the project area and could be affected under the Proposed Action Alternative. Field surveys completed in November 2018 confirmed that suitable roosting habitat (numerous trees and one structure) is present within the project area. Aboveground noise and the presence of equipment and crews during project construction could result in temporary disturbances to Indiana bats, potentially disrupting foraging or roosting. Removal of trees for the development of surface facilities, access road widening, and fence construction would result in a slight reduction in upland forest habitat suitable for foraging or roosting. This slight loss of forested habitat would not likely have noticeable impacts on Indiana bats because of the large amount of surrounding undeveloped forest on and adjacent to the project area that would remain undisturbed. To avoid significant adverse impacts, tree removal would be conducted between November 15 and March 31, when Indiana bats are in hibernation.

The project area in the vicinity of any proposed construction does not contain caves; however, occupied hibernacula are located nearby and throughout the region. Blasting associated with mines could adversely affect hibernating bats (WVDEP 2006). If occupied hibernacula were located immediately adjacent to the project area, adverse impacts on hibernating Indiana bats could occur during project operation. It has been demonstrated that hibernating bats can withstand vibration levels of 0.06 to 0.20 in/sec without adverse impacts (WVDEP 2006). As discussed under Section 4.1.3, the anticipated vibration levels associated with both construction and operation would be under the 0.20 threshold at a distance of 1200 feet; therefore, the Proposed Action Alternative would not have significant adverse impacts on hibernating Indiana bats.

To avoid further significant adverse impacts on Indiana bats, CDC will prepare a habitat conservation plan, which will be submitted to USFWS prior to the release of the final EIS.

Northern Long-eared Bat

USFWS published a final 4(d) rule that accompanied the final listing for the northern long-eared bats on January 14, 2016 (81 FR 1900). The take prohibitions of the final 4(d) rule apply to areas in an identified WNS zone, which represents all counties that contain or are located within 150 miles of documented cases of WNS or documented presence of the fungus that causes WNS. For all areas of the country outside the WNS zone, the final 4(d) rule does not include any take prohibitions. In the WNS zone, the final 4(d) rule prohibits incidental take of northern long-eared bats occurring: (1) in known hibernacula, (2) as a result of removing a known occupied maternity roost tree or removing trees within 150 feet of a known occupied maternity roost tree during the pup season from June 1 through July 31, or (3) as a result of removing trees from within 0.25 mile of a hibernaculum at any time of year. The proposed project is located within the WNS zone (USFWS 2018).

Because of the habitat overlap and similarities in the biology of northern long-eared bats and Indiana bats, impacts on northern-long eared bats under the Proposed Action Alternative would be the same as those described for Indiana bats. Tree removal would be conducted between November 15 and March 31, when bats are in hibernation. The project area in the vicinity of proposed construction does not contain caves; however, occupied hibernacula are located nearby and throughout the region. If trees were removed within 0.25 mile of hibernacula, adverse impacts would occur. As noted above, blasting associated with mines could adversely affect hibernating bats (WVDEP 2006). However, the vibration levels associated with the Proposed Action Alternative would be under the threshold for adverse impacts; therefore, impacts would not be significant.

Cheat Mountain Salamander

Field surveys completed in November 2018 confirmed that suitable habitat for cheat mountain salamander that could be potentially disturbed occurs within approximately 1 acre of the project area. Within the 1 acre, approximately 0.25 acre of the disturbed area contains highly suitable habitat. Removal of vegetation along the fence line, especially along the railroad ROW, could result in loss, degradation, or fragmentation of suitable cheat mountain salamander habitat, resulting in adverse impacts on this species. Given the small amount of highly suitable habitat that could be removed, impacts are not anticipated to be significant.

Prior to the release of the Final EIS, CDC will complete a Biological Assessment for the cheat mountain salamander and submit it to USFWS. In accordance with USFWS guidance, CDC is required to determine

whether its actions may affect listed or proposed species and designated and proposed critical habitat. If a “may affect, likely to adversely affect” determination is made, CDC will coordinate with USFWS to develop measures to avoid and minimize potential adverse impacts on cheat mountain salamander. An update on continued Section 7 consultation with USFWS will be provided in the Final EIS and Record of Decision.

Running Buffalo Clover

Field surveys completed in November 2018 identified numerous areas of suitable running buffalo clover habitat within the project area, with the highest quality habitat located along the West Virginia Central Railroad track, the access road, and the off-road vehicle trails located throughout forested portions of the project area. Under the Proposed Action Alternative, vegetation clearing associated with construction of the fence and widening of the access road would result in adverse impacts on this species due to loss of habitat or destruction of individuals or populations, if present. Positive identification of the species was not confirmed during field surveys, but it is highly likely that the species is present within the project area. Adverse impacts could be significant if entire populations are eliminated.

CDC completed a habitat assessment for running buffalo clover and submitted a summary of findings to the USFWS West Virginia Field Office. If USFWS concurs with the findings of the habitat assessment, which indicate the presence of suitable running buffalo clover habitat within the project area, species surveys will be conducted from May 1 to September 30 to determine presence or absence of the plant species on-site. If running buffalo clover were present in areas where surface disturbance would occur, CDC would further coordinate with USFWS to develop measures to avoid and minimize potential impacts.

Although federally listed plants are not protected from take under the ESA, Section 7 of the ESA requires federal agencies to use their legal authorities to promote the conservation purposes of the ESA and to consult with USFWS, as appropriate, to ensure that effects of actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species.

Small Whorled Pogonia

Field surveys completed in November 2018 confirmed that suitable habitat for small whorled pogonia is present in the project area along the Tygart Valley River, near the proposed fence line. Under the Proposed Action Alternative, vegetative clearing associated with construction of the fence would result in adverse impacts on this species due to loss of habitat or destruction of individuals or populations, if present. Because previously documented populations of small whorled pogonia in West Virginia are small (generally fewer than 20 stems per population) (USFWS 2008), entire populations could be eliminated if they occur within the area of proposed disturbance. However, individual plants could be relocated if they occur within the area of proposed disturbance to avoid significant, adverse impacts on this species.

CDC completed a habitat assessment for the small whorled pogonia and will submit a summary of findings to the USFWS West Virginia Field Office. If USFWS concurs with the findings of the habitat assessment, which indicate the presence of suitable small whorled pogonia habitat, species surveys will be conducted from May 1 to September 30 to determine presence or absence of the plant species

on-site. If the small whorled pogonia were present in areas where surface disturbance would occur, CDC would further consult with USFWS to develop measures to avoid and minimize potential impacts.

4.6 Relationship between Local, Short-term Uses of the Environment and Maintenance and Enhancement of Long-term Productivity

NEPA regulations (40 CFR 1502.16) require an EIS to consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. Special attention should be given to impacts that narrow the range of beneficial uses of the environment or pose a long-term risk to human health or safety.

Under the No Action Alternative, GSA and CDC would not acquire the site and develop the underground facility and would be unable to continue underground safety research. Because the site would not be acquired and subsequently developed, no short-term impacts to the site are expected, and the long-term productivity of the site's resources would continue as they are.

Under the Proposed Action Alternative, the activities associated with the construction and operation of the underground research facility would result in a number of impacts that would alter long-term uses of resources despite mitigation measures and BMPs that would offset the level of the impacts. Blasting into bedrock and excavating soils to construct the facility; filling wetlands and intermittent streambeds; and changing habitat in areas where federally listed species may be found are all impacts that would affect resources and the uses of those resources in the long term.

Short-term uses of the environment associated with the Proposed Action Alternative include changes to the physical environment and energy and utility use during the construction of facilities. Construction would involve short-term increases in fugitive emissions and construction-generated noise and vibration, and would increase the use of fossil fuels to provide power to equipment.

4.7 Irretrievable and Irreversible Commitment of Resources

NEPA regulations (40 CFR 1502.16) require an EIS to address the irreversible and irretrievable commitment of resources caused by the alternatives. An irreversible commitment of resources is defined as the loss of future options. The term applies primarily to the effects of using nonrenewable resources (such as minerals or cultural resources) or resources that are renewable only over long periods (such as soil productivity). It could also apply to the loss of an experience as an indirect effect of a "permanent" change in the nature or character of the land. An irretrievable commitment of resources is defined as the loss of production, harvest, or use of natural resources; irretrievable resource commitments may or may not be irreversible. The following identifies commitments of resources that are either irreversible or irretrievable.

Under the No Action Alternative, no facility would be constructed, and the government would not acquire the site. As a result, there would be no irretrievable or irreversible impacts.

Under the Proposed Action Alternative, because the land used for construction of the surface facility could be converted to another use at a future date, these effects could be characterized as retrievable. However, the level of restoration effort needed would be intensive and costly, habitat in the disturbed areas would not be the same, and some of the impacts would be irreversible. For example, wetland and stream impacts resulting from construction of the surface facility and placement of new culverts to facilitate widening of the access road are likely not reversible even if the fill is removed or the road is

narrowed again. Restored wetland and stream habitats could have different plant species composition, hydrology, and/or different soil characteristics depending on how restoration was attempted.

Under the Proposed Action Alternative, irreversible or irretrievable commitments include the loss of geologic resources through excavation; the loss of 9.95 acres of deciduous hardwood forest and 4.25 acres of successional old field habitat; filling the 38-foot-long ephemeral stream segment at the edge of the surface facilities; impacts on individual specimens of special-status plant species; and stream and wetland changes related to widening the road and placing culverts. Mitigation would be required for the loss of some resources but would not fully offset impacts. The construction of the underground facility would result in an irreversible impact on subsurface geology because material would be permanently removed. Changes to the field and edge habitats where the two listed plant species are likely to be found could be considered an irreversible resource commitment if construction activities permanently alter the resource such that the site can no longer support these special-status species, although additional habitat would remain on the property and individual plants would be relocated. It is likely that impacts on listed animal species would not be irretrievable or irreversible because mitigation and construction restrictions would avoid such impacts.

In addition to natural resources, impacts on historic resources such as archaeological sites and cultural landscapes could be considered an irretrievable resource commitment if construction activities permanently alter or destroy the resource or the resource is completely lost. Impacts on these resources are not expected but would be mitigated through various mitigation measures required by the WV SHPO. However, the impact would be irretrievable unless the known resources are completely recovered prior to construction activities.

4.8 Unavoidable Adverse Impacts

Under the No Action Alternative, no facility would be developed, so the site would remain the same. There would be no unavoidable adverse impacts, except that NIOSH would continue to have limited ability to conduct underground safety research.

Under the Proposed Action Alternative, there would be unavoidable adverse impacts on water resources in the form of stream and wetland filling and disturbance related to developing the surface facilities and placing new culverts in the widened road. There would be impacts on geological resources because the research facility would occupy approximately 164,000 GSF underground and require approximately 362,000 tons of material, including 152,000 tons of limestone, be removed to construct the facility. Habitat suitable for the federally listed plant and animal species, and potentially individual plants themselves, would be disturbed, and habitat acreage would be reduced by the development of the surface facilities, although mitigation measures would ensure that the impacts on these species are minimal. There would also be short- and long-term, localized noise and vibrations from construction blasting and facility operation.

4.9 Mitigation Measures

Several mitigation measures are proposed for each resource to minimize or avoid adverse impacts.

4.9.1 Noise and Vibration

- Place a Y-shaped berm in front of the facility portal during construction of the underground facilities to deflect noise upward and reduce the distance that blasts can be heard.

- Use blast doors at the portal during operation to minimize noise and vibration at the surface.

4.9.2 Geology, Topography, and Soils

- Use sediment and erosion control plans and BMPs in accordance with West Virginia requirements; pay particular attention to using BMPs that stabilize highly erodible soils and steep slopes.
- Revegetate cleared areas around the proposed fence line to stabilize soils and prevent erosion and sedimentation.

4.9.3 Water Resources

- Implement mitigation measures in accordance with any necessary wetland and stream permits, such as Section 404 permits, related to fill or instream work to install new culverts. Mitigation could include creation, restoration, or enhancement of wetlands or streams.
- Comply with all erosion and sediment control requirements to minimize impacts on water quality.
- Use stormwater management BMPs to manage water quantity and water quality after construction.
- Install a water management system that includes a series of pumps to collect water in lower development elevations and pump it to a collection pond aboveground. The collection pond would include an oil/water separator to remove potential contaminants that could enter the water from tanks or equipment leaks.
- Require contractors to use fixed-cartridge explosives that prevent spillage that could occur with the use of bulk explosives. Contractors would also be required to keep spill clean-up kits on-site so spills of hydraulic fluid, oil, or other contaminants from drilling or excavation equipment can be immediately contained and cleaned up in place.
- Revegetate cleared areas around the proposed fence line to stabilize soils and prevent erosion and sedimentation that could result in water quality impacts.

4.9.4 Utilities and Infrastructure

- No mitigation measures are proposed.

4.9.5 Biological Resources

- Prepare a habitat conservation plan for the Indiana bat.
- Conduct tree removal activities between November 15 and March 31, when the bats are in hibernation.
- Develop specific mitigation measures for the federally listed plant and animal species in consultation with USFWS and include them in the final EIS.

5 Cumulative Impacts of the Proposed Action

5.1 Introduction

NEPA requires federal agencies to consider the cumulative environmental effect of their proposed actions. CEQ regulates implementation of NEPA and defines three types of effects: direct, indirect, and cumulative.

> "Direct impacts are caused by the action and occur at the same time and place (40 CFR 1508.8)." Examples of direct impacts include displacement resulting from the acquisition of a right-of-way or the fill placed in wetlands to construct a roadway improvement. The uncertainty associated with assessing direct impacts is very low relative to indirect and cumulative impacts.
>
> "Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8)."
>
> "Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7)."

This section analyzes the potential cumulative impacts of the proposed action and other past, present, and reasonably foreseeable future actions.

Cumulative impacts may result from individually minor but collectively significant actions occurring in the same area and over the same period. A cumulative impacts analysis must identify and define the scope of other actions and their spatial or temporal overlap with a proposed action. CEQ advises that an agency should relate the scope of its cumulative impact analysis to the magnitude of the environmental impacts of the proposed action. Therefore, the analysis of cumulative impacts involves defining the scope of other actions and their interrelationship with the proposed action. Because cumulative impacts may be accrued over time and/or in conjunction with other pre-existing conditions from other activities in the geographic scope, pre-existing impacts should also be considered.

This section describes (1) the methodology for the cumulative impact analysis; (2) the past, present, or reasonably foreseeable projects considered in the analysis; and (3) the cumulative impacts from past, present, or reasonably foreseeable activities along with the proposed action's incremental contribution to those impacts. As documented in **Chapter 4** of this Draft EIS, the No Action Alternative would have no impacts because it would maintain existing conditions on the project area for the foreseeable future. Therefore, it has no potential to generate cumulative impacts and is not considered further in this section.

5.2 Methodology

5.2.1 Scope of the Cumulative Impact Analysis

Cumulative impacts occur when multiple past, present, and reasonably foreseeable future actions have affected or may affect in a meaningfully measurable way the same resources a proposed action is anticipated to affect. Therefore, the cumulative impact analysis considers projects whose known or anticipated impacts are or would be generally similar in nature and scale to those of the proposed acquisition and campus development action considered in this Draft EIS.

Similarly, cumulative impacts occur within the area where, and over the time when, the impacts of the proposed action would be felt (the region of influence). Depending on the proposed action and the resource considered, this area can be local, regional, or global. In the case of the proposed action considered in this Draft EIS, most impacts would be felt locally (i.e., within the project area and neighboring communities).

5.2.2 Information Sources

Relevant past, present, and reasonably foreseeable future actions were identified by researching publicly available information sources, including state and local government agencies and news outlets, and contacting Snowshoe Mountain Resort, because impacts from actions in these areas could contribute to cumulative impacts in the area potentially affected by the proposed action.

5.2.3 Impact Analysis

For each resource considered in this Draft EIS, the collective impacts of the past, present, and reasonably foreseeable future projects identified through the method described in **Section 5.2.2** were characterized, and the incremental contribution of the Proposed Action Alternative to those collective impacts was assessed to establish whether the proposed action would have meaningful cumulative impacts. In general, the focus is on long-term operational impacts. Construction phase impacts are considered only when they would be permanent and could accumulate over time or if construction of multiple projects would occur in the same timeframe or geographic area.

5.3 Past, Present, and Reasonably Foreseeable Future Projects

In the search for past, present, and reasonably foreseeable projects that might have cumulative impacts associated with the Proposed Action Alternative, two projects, the Atlantic Coast Pipeline and the West Virginia Central Railroad reactivation, were identified.

The Atlantic Coast Pipeline is an underground pipeline, currently under construction, that will transmit supplies of natural gas from West Virginia to communities in Virginia and North Carolina. The 600-mile pipeline will extend from near Benson, West Virginia, south and south-east through the state, crossing into Virginia near Frost, West Virginia. The pipeline will pass approximately 3.5 miles to the west of the project area. Construction of the pipeline has started, and the section closest to the project site is under construction in 2018.

The West Virginia Central Railroad traverses the southern portion of the project area. The railroad line is inactive but the State Rail Authority as part of the West Virginia Department of Transportation plans to reactivate the line within five years. The State purchased the West Virginia Central Railroad from CSX in 1997, and the railroad is operated by Durbin and Greenbrier Valley Railroad. The State is restoring

out-of-service sections of the line, which includes the section of track located within the project area. The line connects with the Appalachian & Ohio Railroad at Tygart Junction. The line could carry both freight and passenger service. Durbin and Greenbrier Valley Railroad currently runs passenger excursions on the line between Elkins and Spruce, West Virginia, where the railroad joins the Cass Historic Railroad. Spruce is approximately 13 miles from the project area. Restoration of the line would include rehabilitation of track and supporting infrastructure such as bridges that require substantial work.

5.4 Assessment of Cumulative Impacts

The cumulative analysis evaluates the incremental impacts of the Proposed Action Alternative in conjunction with the potential impacts of the past, present, and reasonably foreseeable future projects considered in **Section 5.3**. A qualitative assessment of those projects' impacts was developed using publicly available information, professional judgment, and desktop analyses.

Because minimal impacts are expected or because there are no cumulative actions that would contribute impacts to a resource, utilities and infrastructure are assumed not to have cumulative impacts and are therefore not discussed.

5.4.1 Noise and Vibration

5.4.1.1 Past, Present, and Reasonably Foreseeable Future Projects

The reactivation of the West Virginia Central Railroad could include both freight and passenger travel and would require restoring out-of-service stations. It would also likely require structural rehabilitation along the entire railroad ROW. Noise and vibration impacts would occur within the project area from construction associated with reactivation activities and during operation. These impacts would occur over a larger area because of the length of track in the region, and they would occur entirely at the surface level. Assuming the use of the historical steam engine that the company uses for similar train lines, noise from passenger rail is estimated to be 47 dBA at the track and an increase of 0.4 dB over existing conditions in the vicinity of the surface facilities. A diesel engine would produce less noise in both locations. Vibrations 500 feet away from the track would be approximately 62 vibration decibels, assuming the train would travel at 30 miles an hour on jointed track. This level is below the impact threshold of 83 vibration decibels, so no vibration impacts are anticipated from train operation.

5.4.1.2 Incremental Impacts of the Proposed Action

The Proposed Action Alternative would contribute noise and vibration impacts, but the impact on off-site areas and sensitive receptors from blast-related vibration or airblasts during the construction period would be minor and well below state and OSMRE annoyance thresholds used as guidance. It is unlikely the construction period of the facility and the railroad would occur concurrently; however, if they did, there would be a noticeable increase in noise levels within the project area over current conditions. Increased noise levels would cease once the construction period for both projects is complete. Operation of the underground facility would contribute minor noise and vibration impacts in conjunction with the operation of the railroad. Noise and vibration from operation of the railroad would occur at the surface, while impacts from the facility would be contained underground. No significant cumulative impacts are anticipated.

5.4.2 Geology, Soils, and Topography

5.4.2.1 Past, Present and Reasonably Foreseeable Future Projects

The Atlantic Coast Pipeline route is located near the project area. The pipeline would pass through the same karst terrain that is present on the project area; therefore, similar short- and long-term impacts on geologic features could occur as a result of construction activities. Construction could cause erosion in the limestone and divert groundwater, which could affect groundwater supply at springs and seeps. An assessment, construction, monitoring, and mitigation plan is in place that is designed to help prevent irreversible impacts on groundwater resources and karst features. Long-term impacts on soil and topography would be minimal because the pipeline would be underground, the construction site would be revegetated, and soils would be stabilized once construction is complete.

The reactivation of the West Virginia Central Railroad would not result in any expansion to the existing ROW along its route, including the area that passes through the project area. No subsurface or top-down construction is anticipated as part of the rehabilitation of track or station areas. Minor regrading may occur during track and station rehabilitation/improvement, but any changes to the overall topography would be negligible. Construction activities associated with track and station improvements have the potential to disturb soils from removal and replacement of equipment and from the ingress/egress of construction vehicles to areas along the railroad ROW. The potential for increased soil erosion also exists during construction, but applicable erosion and sediment controls would be used during construction to minimize impacts on soils and topography.

5.4.2.2 Incremental Impacts of the Proposed Action

The Proposed Action Alternative would contribute to impacts on geology, topography, and soils. Approximately 152, 000 tons of sedimentary rock would be excavated, but appropriate design and construction practices would prevent impacts beyond the excavated area or overlying strata. The Proposed Action Alternative would not alter or destroy previously undisturbed and valuable or noteworthy topographic features, threaten the stability of the site, or substantially modify drainage patterns. Overall, adverse impacts on soils would not be significant because there would be no potential for severe erosion or soil contamination, and the affected soils are not rare or valuable. No significant cumulative impacts are anticipated.

5.4.3 Water Resources

5.4.3.1 Past, Present and Reasonably Foreseeable Future Projects

The Atlantic Coast Pipeline passes through the Monongahela River watershed as well as through adjacent watersheds. The pipeline will result in adverse impacts on surface water and wetlands, although these impacts will be minimized with directional drilling and mitigation for any work that disturbs or alters surface waters and riparian areas. The pipeline route passes through the same karst terrain as the project area; therefore, it has the potential for similar short and long-term impacts on groundwater as a result of underground construction. Construction could cause erosion in the limestone and divert groundwater, which could affect groundwater supply at springs and seeps. An assessment, construction, monitoring, and mitigation plan is in place that is designed to help prevent irreversible impacts on groundwater resources and karst features.

The reactivated West Virginia Central Railroad would operate within the existing ROW. As part of the construction for rehabilitation of the track and supporting infrastructure, there may be impacts on the

six ephemeral streams that were identified in the area during the November 2018 survey of the revised fence line alignment that originate at culverts under the railroad tracks. If the culverts were impacted, the streams may experience adverse impacts and/or diversion. Measures to minimize impacts would likely be required as part of construction permits and may include maintaining appropriate stormwater management controls during construction to minimize the potential for sediment, petroleum or chemical spills, or migration to streams. Specific water resources-related surveys have not been conducted within the railroad ROW areas outside the project area, but the existing ROW is already disturbed and constructed; therefore, impacts on existing water resources are anticipated to be minor.

5.4.3.2 Incremental Impacts of the Proposed Action

The Proposed Action Alternative would contribute to adverse impacts on the area's surface and groundwater. New culverts would be placed where the existing access road crosses steams, and erosion could be greater than usual given the soils and slopes, which could increase sedimentation in adjacent streams and waterbodies. The fence would cross several streams, and riparian habitat would be removed during fence installation, which would temporarily affect the streams and increase the risk of erosion and sedimentation. Riparian habitat would be reestablished after the installation is complete. While construction of the Proposed Action Alternative would result in the loss of 38 linear feet of an intermittent stream, overall impacts on surface waters would not have observable consequences on a regional scale and would not be frequently altered from desired conditions. The Proposed Action Alternative would not result in the exceedance of water quality standards or criteria. No significant adverse cumulative impacts are anticipated.

5.4.4 Biological Resources

5.4.4.1 Past, Present and Reasonably Foreseeable Future Projects

The Atlantic Coast Pipeline will clear and disturb vegetation over the length of the pipeline and would have long-term impacts on more than 4,000 acres of vegetation. Federally listed species identified in the project area could occur along the pipeline route. The pipeline has undergone environmental review and has refined the route to avoid impacts on sensitive species. The EIS for the project found that five listed species may be adversely affected, including the Indiana and northern long-eared bats and running buffalo clover. These impacts would be minimized through consultation with USFWS and use of appropriate minimization and mitigation measures, including implementation of an invasive plant species management plan.

Track and associated infrastructure would be rehabilitated as part of the reactivation of the West Virginia Central Railroad. Rehabilitation would include clearing along the railroad track and within many portions of the ROW. Suitable habitat for cheat mountain salamander exists along certain portions of the railroad ROW based on the November 2018 surveys. Habitat for the small whorled pogonia exists in three areas along the ROW where canopy breaks occur in mid to downslope areas that contain decaying logs, sticks, and leaf litter. The railroad ROW contains many areas that provide suitable habitat for running buffalo clover, and there are four areas identified as exceptional habitat, according to 2018 field surveys. Clearing and vegetation removal as part of the railroad rehabilitation could result in impacts on suitable, potentially occupied habitat for cheat mountain salamander, small whorled pogonia and running buffalo clover. Although potential habitat for bat species exists in the vicinity of the railroad track, it is unlikely that large-scale tree clearing/removal would be necessary as part of the infrastructure improvements because the ROW was already cleared of trees. In the event tree removal

is proposed, the West Virginia Central Railroad will consult with USFWS to determine appropriate minimization methods.

5.4.4.2 Incremental Impacts of the Proposed Action

The Proposed Action Alternative would contribute adverse impacts on biological resources, including removing trees and other vegetation to accommodate surface facilities, fencing, and road widening. Adverse impacts on vegetation would not be significant because the loss and conversion of vegetation would not result in noticeable changes to vegetative community structure or function over the long term, and the majority of the approximately 460-acre site would remain undisturbed. The Proposed Action Alternative would not result in significant adverse impacts on federally listed species, including Indiana bat, and northern long-eared bat, and cheat mountain salamander, small-whorled pogonia, and running buffalo clover because appropriate measures would be developed and implemented in consultation with USFWS to avoid or minimize adverse impacts. No significant adverse cumulative impacts are anticipated.

5.5 Conclusion

The Proposed Action Alternative would make incremental contributions to the impacts of past, present, and reasonably foreseeable future projects in the region. These contributions would be small and would not cause any thresholds of significance to be reached.

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