Federal Energy Regulatory Commission
**Office of Energy Projects, Division of Gas-Environment & Engineering**

# ENVIRONMENTAL ASSESSMENT REPORT

**Name of Applicant:** Texas Eastern Transmission, LP (Texas Eastern)

| **Date Filed:** 10/8/2015 and amended on 3/29/2016 | **Docket Nos:** CP16-3-000 and CP16-3-001 |
|---|---|
| **Type:** Sections 7(b) and 7(c) – Abandonment and Construction of Facilities | **Cost:** $383,386,880 |

**Facilities:** The projects, known as Access South, Adair Southwest, and the Lebanon Extension Projects would include (1) construction and maintenance of approximately 15.8 miles of 36-inch-diameter pipeline at three locations in Athens, Meigs, Noble, and Monroe Counties, Ohio and 0.5 mile of 16-inch-diameter replacement pipeline within Texas Eastern's existing right-of-way in Attala County, Mississippi; (2) installation of a new 16,875 horsepower compressor unit at Texas Eastern's existing compressor station in Monroe County, Kentucky; and (3) modification of 12 existing compressor stations to allow for reverse flow capabilities in Pennsylvania, Ohio, Kentucky, Tennessee, Alabama, and Mississippi. The projects would enable Texas Eastern to transport up to an additional 622,000 dekatherms per day of natural gas on its mainline system from Uniontown, Pennsylvania to points in Ohio, Kentucky, and Mississippi.

**Environmental Impact -- Conclusions:**

___ **Categorical Exclusion**

___ **Environmental Comments Required**

_X_ **Environment Complete**

___ **Deficiency Letter Required**

___ **EA/EIS Required**

___ **No NOI Required**

___ **NOI Required**

**Environmental Considerations or Comments:**

See the attached environmental assessment.

| **Prepared by:** | **Date:** | **Approved by Branch Chief:** | **Date:** |
|---|---|---|---|
| Robert J. Kapka | 8/8/2016 | DR SKJ | 8/8/16 |



**Office of**
**Energy Projects**

**August 2016**

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**Texas Eastern Transmission, LP**

**Docket Nos. CP16-3-000**
**and CP16-3-001**

# Access South, Adair Southwest, and Lebanon Extension Projects

# Environmental Assessment

Washington, DC 20426

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## TECHNICAL ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACHP | Advisory Council on Historic Preservation |
| ACM | asbestos containing materials |
| ADEM | Alabama Department of Environmental Management |
| ADP et al. | Allegheny Defense Project, Buckeye Forest Council, Center for Biological Diversity, Freshwater Accountability Project, Heartwood, Kentucky Heartwood, and the Ohio Valley Environmental Coalition |
| AEP | American Electric Power |
| API | American Petroleum Institute |
| AQCR | air quality control region |
| ATWS | additional temporary workspace |
| BMPs | best management practices |
| CAA | Clean Air Act of 1970 |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| $CH_4$ | methane |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalents |
| Commission | Federal Energy Regulatory Commission |
| dB | decibels |
| dBA | A-weighted decibels |
| Dth/d | dekatherms per day |
| DTI | Dominion Transmission, Inc. |
| E&SCP | Erosion and Sediment Control Plan |
| EA | Environmental Assessment |
| EDR | Environmental Data Resources, Inc. |
| EI | Environmental Inspector |
| EIS | Environmental Impact Statement |
| ESA | U.S. Endangered Species Act, 1973 |
| FERC | Federal Energy Regulatory Commission |
| FERC Plan | *Upland Erosion Control, Revegetation and Maintenance Plan* |
| FERC Procedures | *Wetland and Waterbody Construction and Mitigation Procedures* |
| GHG | greenhouse gas |
| GIS | Geographic Information System |
| gpm | gallons per minute |
| GSA | Geological Survey of Alabama |
| HAP | hazardous air pollutant |
| HCA | High Consequence Area |
| hp | horsepower |
| HUC | Hydrologic Unit Code |
| KGS | Kentucky Geological Survey |

| | |
|---|---|
| kV | kilovolt |
| KYDEP | Kentucky Department for Environmental Protection |
| KYDFWR | Kentucky Department of Fish and Wildlife Resources |
| KYDNR | Kentucky Department for Natural Resources |
| $L_{dn}$ | day-night sound level in decibels |
| $L_{eq}$ | equivalent sound level in decibels |
| LWH | limited warmwater habitat |
| M&R | metering and regulating |
| MAOP | maximum allowable operating pressure |
| MBTA | Migratory Bird Treaty Act |
| MDEQ | Mississippi Department of Environmental Quality |
| MDMR | Mississippi Department of Marine Resources |
| MDWFP | Mississippi Department of Wildlife, Fisheries, and Parks |
| MP | milepost |
| MSGS | Mississippi State Geological Survey |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NGA | Natural Gas Act |
| NHPA | National Historic Preservation Act |
| NNSR | nonattainment area New Source Review |
| $NO_2$ | nitrogen dioxide |
| $N_2O$ | nitrous oxide |
| NOAA | National Oceanic and Atmospheric Administration |
| NOI | Notice of Intent to Prepare an Environmental Assessment for the Planned Access South, Adair Southwest, and Lebanon Extension Projects and Request for Comments on Environmental Issues |
| $NO_x$ | nitrogen oxides |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NSA | Noise Sensitive Area |
| NSPS | New Source Performance Standards |
| NSR | New Source Review |
| NWI | National Wetlands Inventory |
| $O_3$ | ozone |
| ODGS | Ohio Division of Geological Survey |
| ODNR | Ohio Department of Natural Resources |
| ODOT | Ohio Department of Transportation |
| OEP | Office of Energy Projects |
| OEPA | Ohio Environmental Protection Agency |
| OPS | Office of Pipeline Safety |
| PADCNR | Pennsylvania Department of Conservation and Natural Resources |

| | |
|---|---|
| PADEP | Pennsylvania Department of Environmental Protection |
| Pb | lead |
| PCB | polychlorinated biphenyl |
| PEM | palustrine emergent |
| PFBC | Pennsylvania Fish and Boat Commission |
| PFO | palustrine forested |
| PGC | Pennsylvania Game Commission |
| PHMSA | Pipeline and Hazardous Materials Safety Administration |
| PM | particulate matter |
| $PM_{10}$ | particulate matter with an aerodynamic diameter $\leq$ 10 microns |
| $PM_{2.5}$ | particulate matter with an aerodynamic diameter $\leq$ 2.5 microns |
| Projects | Access South Project, Adair Southwest Project, and Lebanon Extension Project |
| psig | pounds per square inch gauge |
| PSS | palustrine scrub-shrub |
| ROI | Region of Influence |
| SHPO | State Historic Preservation Office |
| $SO_2$ | sulfur dioxide |
| SOP | Standard Operating Procedure |
| SPCC Plan | Spill Prevention, Control, and Countermeasure Plan |
| SSA | sole source aquifer |
| Texas Eastern | Texas Eastern Transmission, LP |
| TNDEC | Tennessee Department of Environment and Conservation |
| TPY | tons per year |
| TVA | Tennessee Valley Authority |
| UK | University of Kentucky |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| USDOT | U.S. Department of Transportation |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| VOC | volatile organic compound |
| WWH | warmwater habitat |

## A. PROPOSED ACTION

### 1. Introduction

On October 8, 2015, Texas Eastern Transmission, LP (Texas Eastern), an indirect and wholly owned subsidiary of Spectra Energy Partners, LP, filed an application with the Federal Energy Regulatory Commission (FERC or Commission), pursuant to Section 7(c) of the Natural Gas Act (NGA), and Section 157 of the Commission's regulations for a Certificate of Public Convenience and Necessity (Certificate) requiring authorization for the proposed Access South Project, Adair Southwest Project, and Lebanon Extension Project (each individually a Project, and collectively, the Projects). Texas Eastern indicated that the Projects would provide incremental firm pipeline transportation service from the Appalachia area natural gas supply basins to different markets in the Midwest and Southeast. These Projects are stand-alone projects, serving different customers and market needs, that Texas Eastern is proposing to construct during the same construction season.

Texas Eastern proposes to construct new natural gas pipeline facilities and to modify existing facilities along its pipeline system. The proposed facilities include 15.8 miles of 36-inch-diameter pipeline looping[1] segments and related appurtenances in Southern Ohio, most of which would be either within or adjacent to Texas Eastern's current right-of-way. Proposed modifications to existing aboveground facilities at twelve compressor stations in Pennsylvania, Ohio, Kentucky, Tennessee, Alabama, and Mississippi would include installation of additional electric horsepower (hp), modifications necessary to allow for bidirectional flow, and meter reversals.

On March 29, 2016, Texas Eastern filed an amendment that also requests authority under Section 7(b) of the NGA to abandon about 0.5 mile of existing 6-inch-diameter pipeline, Line 10-A, and replace it with a 16-inch-diameter pipeline in Attala County, Mississippi. Included in this amendment are a new launcher/receiver within the station and a launcher/receiver at the South End Tie-In and a new meter and regulating (M&R) station.

We[2] prepared this environmental assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations for implementing NEPA (Title 40 of the Code of Federal Regulations Parts 1500-1508 [40 CFR 1500-1508]), and the Commission's implementing regulations under 18 CFR Part 380. The EA is an important and integral part of the Commission's decision on whether to issue Texas Eastern a Certificate to construct and operate the proposed facilities. The projects are discussed together as they are one project, because they all originate at the same receipt point and would be constructed within the same timeframe. Our principal purposes in preparing this EA are to:

- identify and assess potential impacts on the natural and human environment that could result from implementation of the proposed action;

[1] A pipeline loop is a segment of pipeline constructed parallel to an existing pipeline to increase capacity and connecting to existing pipeline facilities.

[2] "We," "us," and "our" refer to the environmental staff of the Office of Energy Projects (OEP).

- assess reasonable alternatives to the proposed action that would avoid or minimize adverse effects to the environment; and
- identify and recommend specific mitigation measures, as necessary, to minimize environmental impacts.

## 2. Purpose and Need

Texas Eastern's stated purpose is to create additional firm pipeline capacity necessary to deliver, in aggregate, 622,000 dekatherms per day (Dth/d) of natural gas on a long-term basis, for new incremental production from the Appalachia area natural gas supply basins to different markets in the Midwest and Southeast along the Texas Eastern system. The Projects would also provide bi-directional flow capacity to provide form transportation to Gulf Coast Markets. Specifically:

- The Access South Project would provide up to 320,000 Dth/d of capacity to transport supply from a receipt point in Uniontown, Pennsylvania, to delivery points in Texas Eastern's Access Area Zone ELA and Market Zone M1 in Attala County, Mississippi (interconnections with Gulf South Pipeline Company, LP and Southern Natural Gas Company, LLC) to serve Southeast markets.
- The Adair Southwest Project would provide up to 200,000 Dth/d of capacity to transport supply from a receipt point in Uniontown, Pennsylvania, to delivery points in Texas Eastern's Market Zone M2 in Adair County, Kentucky (interconnection with Columbia Gulf Transmission, LLC) to serve lower U.S. Midwest markets.
- The Lebanon Extension Project would provide up to 102,000 Dth/d of capacity to transport supply from a receipt point in Uniontown, Pennsylvania to delivery points in Market Zone M2 in or near Lebanon, Ohio.

Texas Eastern is proposing facilities that would provide the total capacity necessary for the fully subscribed Projects, all with the same proposed in-service date. Each of these Projects would be subscribed by different customers and would serve different market needs. Texas Eastern would make standalone contractual commitments with the customers of each Project to construct the facilities necessary to provide service under each of the Projects, as necessary.

Under Section 7(c) of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate to construct and operate them. The Commission bases its decisions on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project. Section 7(b) of the NGA specifies that no natural gas company shall abandon any portion of its facilities subject to the Commission's jurisdiction without the Commission first finding that the abandonment will not negatively affect the present or future public convenience and necessity.

## 3. Proposed Facilities

The Projects consist of the following facilities:

*New 36-inch-diameter Looping Pipeline*

- Wheelersburg to Athens Loop – 9.1 miles of pipeline from milepost (MP) 611.6 in Meigs County to MP 620.7 in Athens County, Ohio.
- Athens to Berne Loop – 4.6 miles of pipeline from MP 677.3 in Noble County to MP 681.9 in Monroe County, Ohio.
- Berne to Holbrook Loop – 2.1 miles of pipeline from MP 698.2 to MP 700.3 in Monroe County, Ohio.

*Replacement Pipeline*

- Line 10-A Replacement –Replace about 0.5 mile of existing 6-inch-diameter pipeline with 16-inch-diameter pipeline extending from the Kosciusko Compressor Station to an existing metering facility in Attala County, Mississippi. About 0.3 mile is within the Kosciusko Compressor Station and about 0.2 mile would be replaced within its existing right-of-way outside of the station.

*Modifications at Existing Compressor Stations*

Modifications at twelve existing compressor station sites would include piping modifications to accommodate bi-directional flow capability, installation of new impellers, and installation of increased capacity gas cooling systems along Texas Eastern's existing mainline. Also, 16,875 hp of additional electric motor driven compression would be added to the Tompkinsville Compressor Station.

Modifications are proposed at the following compressor stations:

- Holbrook Compressor Station in Greene County, Pennsylvania;
- Lebanon Compressor Station in Warren County, Ohio;
- Somerset Compressor Station in Perry County, Ohio;
- Berne Compressor Station in Monroe County, Ohio;
- Athens Compressor Station in Athens County, Ohio;
- Owingsville Compressor Station in Bath County, Kentucky;
- Danville Compressor Station in Lincoln County, Kentucky;
- Tompkinsville Compressor Station in Monroe County, Kentucky;
- Gladeville Compressor Station in Wilson County, Tennessee;
- Barton Compressor Station in Colbert County, Alabama;
- Egypt Compressor Station in Monroe County, Mississippi; and
- Kosciusko Compressor Station in Attala County, Mississippi.

In addition, Texas Eastern proposes to install a filter separator at the Kosciusko Compressor Station to maintain gas quality for flow in the reverse direction. Table A-1 provides additional details regarding the proposed modification work at existing compressor stations.

*Other New Aboveground Facilities*

- Athens Launcher/Receiver – install a launcher/receiver and a 36-inch valve at MP 620.7 in Athens County, Ohio. The launcher/receiver would be removed from the Wheelersburg Removal Site in Meigs County, Ohio, and it would be relocated to this location. These facilities would be installed within the fenced boundary of the Athens Compressor Station.
- Berne Launcher/Receiver – install a launcher/receiver and a 36-inch valve at MP 681.9 in Monroe County, Ohio. The launcher/receiver would be removed from the Athens Removal Site in Noble County, Ohio, and it would be relocated to this location within the fenced boundary of the Berne Compressor Station.
- Line 15 Tie-In West – install a new launcher/receiver, a 36-inch valve and one 30-inch valve at MP 698.2 in Monroe County, Ohio. The launcher/receiver would be installed partially within the existing Line 15 permanent easement and partially within the new pipeline loop permanent easement. The 36-inch and 30-inch valves would be installed within the existing Line 15 permanent easement.
- Line 15 Tie-In East – install a new launcher/receiver facility that can accept a portable launcher/receiver barrel, a 36-inch valve, and one 30-inch valve at MP 700.3 in Monroe County, Ohio. The launcher/receiver would be installed partially within the existing Line 15 permanent easement and partially within the new pipeline loop permanent easement. The 36-inch and 30-inch valves would be installed within the existing Line 15 permanent easement.
- North End Kosciusko Station Tie-In – install a new launcher/receiver, one 30-inch valve, three 20-inch valves, two 16-inch valves, and a filter separator within the Kosciusko Compressor Station in Attala County, Mississippi.
- South End Tie-In – install new launcher/receiver and station regulator skid in Attala County, Mississippi. These facilities would be partially within the Line 10-A permanent easement; additional easement would be necessary and the site would be fenced and graveled. A new permanent access road would be required.

The general location of the Projects' facilities is shown in figure A-1, and U. S. Geographical Survey (USGS) 7.5-minute topographic quadrangle maps are included in appendix A.

**Figure A-1: Access South / Adair Southwest / Lebanon Extension Projects Project Overview Map**

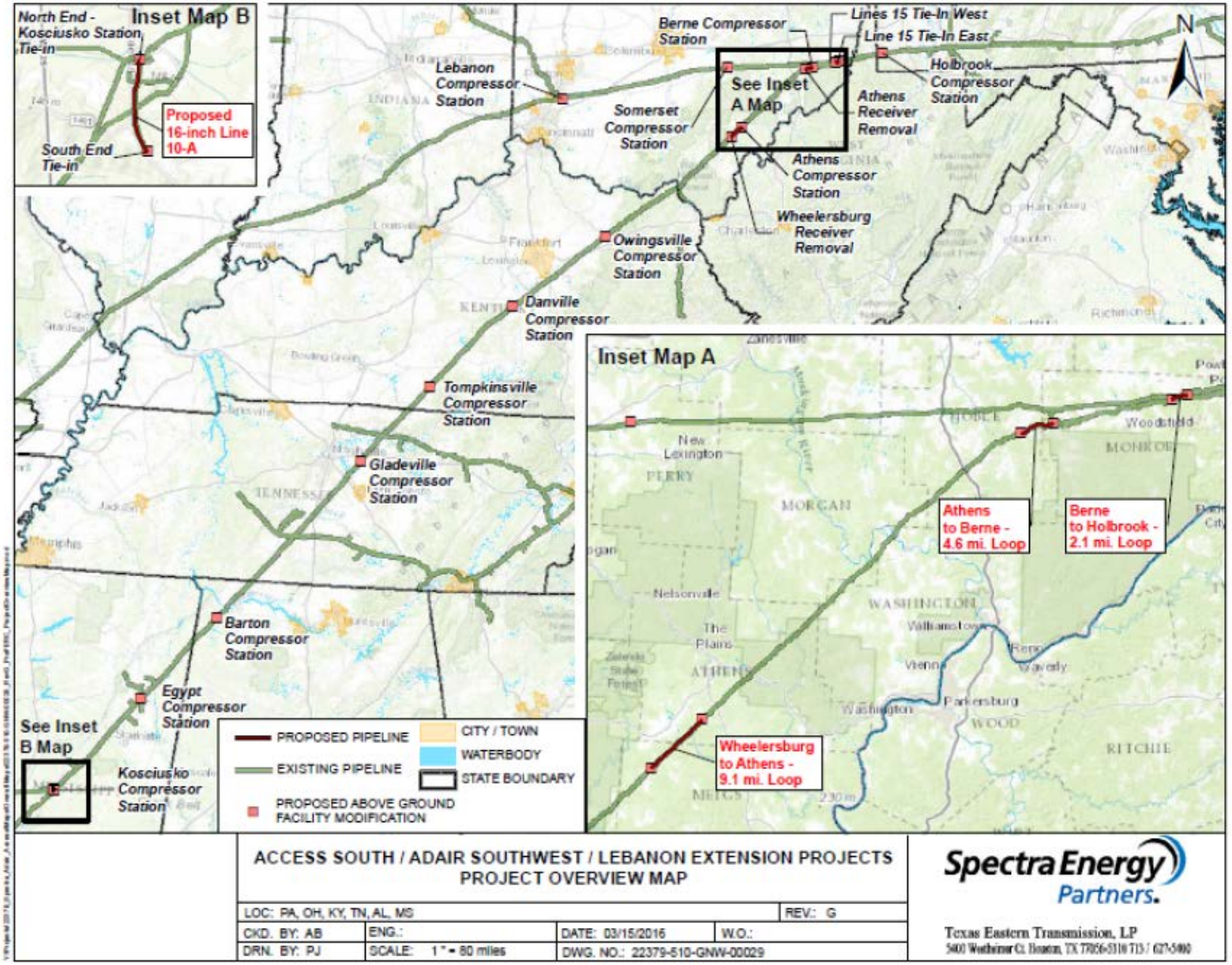

**Table A-1**
**Proposed Modifications at Existing Texas Eastern Compressor Stations**

| Facility Name | Location |
|---|---|
| **Holbrook Compressor Station**<br>➢ Existing Units to be Modified<br>o Units EN 1 - 2, and 6: 1,350 hp Cooper Bessemer reciprocating compressors<br>o Units EN 8-12: 1,350 hp C-B reciprocating compressors<br>o Units EN 14 - 17: 2,000 hp Ingersoll Rand reciprocating compressors<br>o Units TBC 1: 13,330 hp Solar centrifugal compressors<br>➢ Modifications<br>o Station piping modifications to provide for bi-directional flow capabilities | Greene County, PA |
| **Lebanon Compressor Station**<br>➢ Modifications<br>o Piping modifications to allow reversal on an existing M&R | Warren County, OH |
| **Somerset Compressor Station**<br>➢ Existing Unit to be Modified<br>o Unit TBC: 10,600 hp Solar turbine compressor<br>➢ Modifications<br>o Station piping modifications to provide for bi-directional flow capabilities of Unit TBC only.<br>o Turbine upgrade to 15 parts per million volume nitrogen oxides (NOx)<br>o Installation of Gas Release Measurement<br>o Installation of fuel gas heater for Solar Mars 100 | Perry County, OH |
| **Berne Compressor Station**<br>➢ Existing Units to be Modified<br>o Unit 7: 15,000 hp Westinghouse electric motor driven Delaval centrifugal compressor<br>➢ Modifications<br>o New impeller installation on existing 15,000 hp compressor , Unit 7<br>o Installation of Launcher/Receiver and associated piping | Monroe County, OH |
| **Athens Compressor Station**<br>➢ Existing Units to be Modified<br>o Units TBC 1-4: 13,330 GE frame III turbines driving Clark compressors<br>➢ Modifications<br>o Station piping modifications to provide for bi-directional flow capabilities<br>o Dry Gas Seal conversion on 3 out of 4 Clark compressors. Retirement of existing seal system.<br>o Electric start conversion on 4 out of 4 GE Frame 3 turbines. Retirement of gas expansion starters.<br>o Installation of Launcher/Receiver and associated piping | Athens County, OH |
| **Owingsville Compressor Station**<br>➢ Existing Unit<br>o Units TBC 1 - 4: 8,000 hp Clark centrifugal compressors<br>o Unit TBC 5: 18,500 hp Clark centrifugal compressor<br>➢ Modifications<br>o Station piping modifications to add gas cooling capacity<br>o Impeller change outs on all 5 existing compressors<br>o Installation of dry gas seals and Continuous Emissions Monitoring System (CEMS) on Unit TBC 5 | Bath County, KY |

| Facility Name | Location |
|---|---|
| **Danville Compressor Station**<br>➢ Existing Unit<br>o Units EN 1 – 7: 1,760 hp Clark reciprocating compressors<br>o Units EN 8 - 10: 2,050 hp Clark reciprocating compressors<br>o Units TBC 1 and 2: 8,000 hp Clark centrifugal compressors<br>o Unit TBC 3: 18,500 hp Clark centrifugal compressor<br>➢ Modifications<br>o Station piping modifications to provide for bi-directional flow capabilities<br>o Station piping modifications to add gas cooling capacity<br>o Clean-burn capability for three reciprocating units, EN 8-10<br>o Installation of selective catalytic reduction for NOx emissions reductions, oxidation catalyst for carbon monoxide (CO) and volatile organic compounds (VOC) emissions reductions, and dry gas seals on the two Frame 3 compressors, Units TBC 1 and 2<br>o Installation of oxidation catalyst for CO and VOC emissions reductions and replacement of regenerator on Frame 5 compressor, Unit TBC 3 | Lincoln County, KY |
| **Tompkinsville Compressor Station**<br>➢ Existing Unit<br>o Units 1 and 2: 15,000 hp Westinghouse electric motor driven Delaval centrifugal compressors<br>➢ Modifications<br>o Installation of one new 16,875 hp electric compression unit<br>o Station piping modifications to add gas cooling capacity | Monroe County, KY |
| **Gladeville Compressor Station**<br>➢ Existing Unit<br>o Units ELC 1 and 2: 2,500 hp Allis Chalmers electric motor driven Delaval centrifugal compressors<br>o Units ELC 3 and 4: 2,500 hp Westinghouse electric motor driven Delaval centrifugal compressors<br>o Units ELC 5 and 6: 2,500 hp Elliott electric motor driven Delaval centrifugal compressors<br>o Unit ELC 7: 15,000 hp Westinghouse electric motor driven Delaval centrifugal compressor<br>o Unit TBC 1: 15,000 hp GE turbine motor driven Delaval centrifugal compressor<br>➢ Modifications<br>o Station piping modifications to provide for bi-directional flow capabilities | Wilson County, TN |
| **Barton Compressor Station**<br>➢ Existing Unit<br>o Units ELC 1 - 4: 3,000 hp Louis Allis electric motor driven Delaval centrifugal compressors<br>o Unit ELC 5: 3,000 hp Elliot electric motor driven Delaval centrifugal compressor<br>o Units ELC 6 and 7: 20,000 hp Westinghouse electric motor driven Delaval centrifugal compressors<br>o Unit TBC 8: 19,800 hp Delaval centrifugal compressors<br>➢ Modifications<br>o Station piping modifications to add gas cooling capacity<br>o New impeller installation | Colbert County, AL |
| **Egypt Compressor Station**<br>➢ Existing Unit<br>o Units ELC 1 -3: 6,500 hp Westinghouse electric motor driven Delaval | Monroe County, MS |

| Facility Name | Location |
|---|---|
| centrifugal compressors<br>➢ Modifications<br>o New impeller installation | |
| **Kosciusko Compressor Station**<br>➢ Modifications<br>o Piping modifications to allow reversal on existing M&R<br>o Installation of a new filter separator<br>o Installation of launcher/receiver<br>o Replacement of about 0.5 mile of Line 10-A with 16-inch-diameter pipeline | Attala County, MS |

## 4. Public Review and Comment

On March 13, 2015, Texas Eastern filed a request to use our pre-filing process, and the FERC approved Texas Eastern's request on March 31, 2015. We established a pre-filing docket number (PF15-17-000) to place information relevant to the Projects into the public record. The pre-filing process was designed to allow stakeholders, including the public to have input into a proposed natural gas transmission project before an application was filed with the Commission. As part of the pre-filing process, Texas Eastern undertook several public outreach efforts, including open houses, mailing Projects information to potentially affected landowners, and conducting meetings with elected and agency officials.

On August 11, 2015, during the pre-filing process, we issued a *Notice of Intent to Prepare an Environmental Assessment for the Planned Access South, Adair Southwest, and Lebanon Extension Projects and Request for Comments on Environmental Issues* (NOI). The NOI was mailed to federal, state, and local government representatives and agencies; elected officials; Native American tribes; potentially affected landowners and other interested individuals and groups; and newspapers and libraries in the Projects' areas.

In response to the NOI, the Commission received environmental comments from the Ohio Department of Natural Resources (ODNR), the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (USACE), a landowner, and combined comments from the Allegheny Defense Project, Buckeye Forest Council, Center for Biological Diversity, Freshwater Accountability Project, Heartwood, Kentucky Heartwood, and the Ohio Valley Environmental Coalition (ADP et al.). The primary issues raised by the commentors included location of pipeline on an affected landowner's property; federally listed threatened and endangered species; state-listed endangered species; migratory birds; permitting requirements; minimization and avoidance of impacts on streams and wetlands; direct, indirect, and cumulative project impacts; connected actions; and preparation of a programmatic environmental impact statement (EIS).

On May 17, 2016, the Commission issued a *Supplemental Notice of Intent to Prepare an Environmental Assessment for the Proposed Access South, Adair Southwest, and the Lebanon Extension Projects and Request for Comments on Environmental Issues* (Supplemental NOI). The Supplemental NOI was sent to landowners within 0.5 mile of the compressor stations who had not been included in Texas Eastern's original landowner list. In response to the Supplemental NOI, the USFWS, Region 3, stated that it had no comments on the Projects.

Comments are addressed in the applicable sections of this EA, with the exception of certain comments summarized below.

The landowner that commented during pre-filing is no longer affected by the Projects, as the loop formally crossing his property was shortened.

ADP et al. commented that direct project impacts result from a general lack of follow-through regarding the implementation of mitigation measures, which are intended to reduce impacts on waterbodies, wetlands, and landowners. Unforeseen events may and do occur during construction. FERC requires that project sponsors implement an environmental inspection program and self-report such incidents as well as landowner-identified issues in their construction status reports and the resolutions to such issues. These reports which can be found on FERC's elibrary, are reviewed by FERC staff which conducts follow-up investigations as warrented. In addition, FERC staff also conducts periodic inspections during construction and restoration to ensure compliance with FERC Orders and to ensure restoration is successful. Other agencies also have oversight to ensure compliance with the various permits required to construct pipeline projects. FERC also operates a Helpline where landowners or the public may call to report issues on a pipeline.

ADP et al. also commented that FERC must consider the indirect effects of Marcellus and Utica shale gas drilling that is both causally related to and a reasonably foreseeable consequence of the Projects. ADP et al. asserts that there is a clear causal connection between the Projects and development in the formations. ADP et al. also commented that gas drilling in the Marcellus and Utica shale formations is reasonably foreseeable. We find no sufficient causal link between the proposed Projects and additional development of shale resources to warrant analysis of such development as an indirect impact of the proposed Projects. The application states that the general source area of gas is the Appalachia area natural gas supply basins; however, a causal relationship would only exist if the proposed pipeline would transport new production from a specified production area and that production would not occur in the absence of the pipeline. We cannot estimate how much of the Projects' volume would come from current/existing shale gas production and how much, if any, would be new production "attributable" to the Projects. We can only speculate about the specific details, including the timing, location, and number of additional production activities that may or may not occur. Many production facilities have already been permitted and/or constructed in the region, creating a network through which natural gas may flow along various pathways to local users or the interstate pipeline system. Texas Eastern would receive any additional production through its interconnection with other natural gas pipelines. These interconnecting pipeline systems span multiple states with shale, as well as conventional, gas formations. Therefore, we conclude that the proposed pipeline would not cause the predictable development of gas reserves in the Marcellus and Utica shale formations and the impacts of such development activities directly attributable to the Projects are not reasonably foreseeable. Accordingly, this EA does not address Marcellus and Utica shale development as an indirect impact of the Projects. However, cumulative impacts are addressed in this EA, which includes energy development projects identified within the region of influence for resources affected by the Projects.

ADP et al. recommended that the FERC develop a programmatic EIS to better inform the public about the true nature and scope of natural gas projects that are expanding the takeaway capacity from the Marcellus and Utica shale formations. Shale gas drilling is not under FERC's

jurisdiction. There is no Commission program or policy to promote additional gas development or production in shale formations. Therefore, a programmatic action does not exist for us to analyze in this NEPA document.

## 5. Construction Procedures

The Projects would be designed, constructed, operated, and maintained in accordance with applicable requirements defined by the Commission's Siting and Maintenance Requirements in 18 CFR 380.15; U.S. Department of Transportation (USDOT) regulations in 49 CFR 192 – Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards; and other applicable federal and state safety regulations; and the Projects specific permit conditions.

The Erosion and Sediment Control Plan (E&SCP) Texas Eastern has prepared for the Projects has been developed to be consistent with FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan), and FERC's *Wetland and Waterbody Construction and Mitigation Measures* (FERC Procedures).[3] No deviations to the current FERC Plan have been requested by Texas Eastern. Texas Eastern has requested deviations from the FERC Procedures for the setbacks for additional temporary workspace (ATWS) due to construction limitations such as steep slopes and road crossings at wetlands and waterbodies that we have reviewed and find acceptable (See appendix B for specific locations and justifications). Texas Eastern would also implement its Spill Prevention, Control, and Countermeasure Plan (SPCC Plan).

If the pipeline replacement or tie-ins include removal of existing pipe that has coal tar or asphalt pipe coating, Texas Eastern would either assume the pipe coating contains asbestos or test the pipe in accordance with the requirements in Texas Eastern's Health and Safety Manual. Any pipe with asbestos coating or assumed asbestos coating shall be transported, stored, and disposed of in accordance with Texas Eastern's environmental Standard Operating Procedure (SOP) for the disposal/storage and requirements for asbestos containing material (ACM), the SOP for removal of ACM, the Employee Safety and Health Manual Section, and the engineering document "Presumed ACM Pipe Handling Plan."

The pipelines would generally be installed using standard construction techniques, including: clearing and grading, trench excavation, blasting (where required), stringing and bending, welding and inspection/repair, coating inspection and repair, lowering-in, tie-ins, backfilling, cleaning, hydrostatic testing, and restoration and revegetation. Site-specific conditions, such as waterbody and wetland crossings, shallow bedrock, active agriculture, and road crossings, may require special construction methods as described below.

### 5.1 General Pipeline Construction Procedures

Texas Eastern would begin construction with a survey crew demarcating the pipeline centerline and construction work area along the right-of-way. Survey crews would also stake foreign line crossings, locations of approved access roads, and wetland boundaries and other environmentally sensitive areas. Prior to construction, the state "One Call" system would be

[3] Our Plan and Procedures may be found at n the FERC website at http://www.ferc.gov/industries/gas/enviro/plan.pdf and http://www.ferc.gov/industries/gas/enviro/procedures.pdf.

contacted to mark underground utilities that may intersect, or be in close proximity to, the proposed pipeline.

During the survey staking process, areas of concern may arise with the location of workspace or other issues as the contractor makes a final review of the ground. Texas Eastern would be required to file a variance request for any changes to facility locations or workspace, for our review and approval.

**Clearing Operations**

Texas Eastern anticipates clearing trees in February 2017 and March 2017 to avoid direct impacts or protected bat species and to minimize impacts on migratory birds, as recommended by the USFWS. Trees would be hand-felled within the right-of-way and left in place until the spring, when the downed trees would be removed from the right-of-way. Erosion control devices would be installed, as needed, to address any inadvertent earth disturbance. Disturbed areas would be mulched or otherwise stabilized and monitored during the time period between tree felling and tree removal.

Unless grading is required for safety reasons, wetland vegetation would be cut off at ground level, leaving existing root systems intact, and the aboveground vegetation removed from the wetlands for chipping or disposal. In uplands, tree stumps and rootstock would be left in the temporary workspace wherever possible to encourage natural revegetation. Stumps would be removed from the right-of-way to approved disposal locations or made available to landowners upon request. Timber would be removed from the right-of-way to approved locations and sold for lumber, burned, or chipped on the right-of-way. Brush and tree limbs would be either burned on the right-of-way in accordance with applicable local regulations or chipped. Wood chips would be sold as fuel or other marketable products, spread in approved locations on the right-of-way, used as mulch, or transported off site for proper disposal.

**Right-of-Way and Temporary Construction Workspace Grading**

The entire width of the construction right-of-way, including the temporary construction workspace, would be rough graded as necessary to allow for safe passage of equipment and to prepare a work surface for pipeline installation activities. Temporary erosion and sedimentation controls typically consist of mulch, silt fence, hay bales, or combinations of these measures.

In agricultural and residential areas, topsoil would be stripped and stockpiled separately from the subsoil during grading. The mixing of topsoil with subsoil would be minimized by using topsoil segregation construction methods in wetlands (except when standing water or saturated soils are present). Rock would be removed from all actively cultivated or rotated agricultural land.

**Trench Excavation**

A trench would be excavated to the proper depth to allow for the burial of the pipe by a backhoe or ditching machine. In general, the trench would be deep enough (approximately 7 feet) to provide a minimum of 3 feet of cover over the pipeline which exceeds the requirement of 49 CFR 192 of the USDOT regulations. Additional cover of 5 feet is required as part of Texas Eastern's specification for road crossings. Texas Eastern would increase cover in certain

agricultural areas based on consultation with the landowner and type of cropland crossed. During trenching, the excavated material would be placed next to the trench.

**Blasting**

Texas Eastern anticipates that blasting may be required along segments of the pipeline. Blasting mats or soil cover would be used as necessary to prevent the scattering of loose rock. All blasting would be conducted during daylight hours and would not begin until notifications had been conducted. Texas Eastern would comply with all federal, state, and local regulations applying to blasting and blast vibration limits with regard to structures and underground utilities.

**Stringing, Bending, and Welding**

Once the trench is excavated, the pipe segments would be hauled by tractor-trailer, generally in 40-foot lengths, from the pipeyard onto the right-of-way. The pipe would be off-loaded from trucks and placed next to the trench using a sideboom tractor. Pipe joints are typically lined up end-to-end to allow for welding into continuous lengths known as strings.

Once the sections of pipe have been placed on the right-of-way, the pipe is bent as necessary so the pipe fits the horizontal and vertical contours of the excavated trench.

All welding would be performed in accordance with American Petroleum Institute (API) Standard No. 1104 and Texas Eastern specifications. The pipe would be welded into long strings to minimize the number of welds that have to be made in the trench (tie-in welds).

After welding, each weld would be inspected to ensure its structural integrity, consistent with 49 CFR 192 of the USDOT's regulations. Welds that do not meet the requirements established by the API Standard 1104 and Texas Eastern's specifications would be marked for repair or replacement. All repaired and replaced welds would be re-inspected to ensure proper repair and integrity.

**Lowering-In and Backfill**

After a pipe string has been coated to prevent corrosion and inspected, the trench would be prepared for the installation of the pipeline. The trench would be cleared of loose rock and debris. If water exists in the trench, the water would be pumped out into a well-vegetated upland area and/or into an approved filter with the exception of wetland areas where the "push pull" installation may be required. In sandy soils, the trench would be shaped to support the pipe. In areas where the trench contains bedrock, an approved foam or sand bedding would be placed on the bottom of the trench, and/or pads made of sandbags and/or clay would be placed at regular intervals along the trench bottom to support the pipe. The lowering-in crew would place the pipeline in the trench, typically using sideboom tractors. Once the sections of pipe are lowered-in, the tie-in crew would make the final welds in the trench.

All suitable material excavated during trenching would be replaced in the trench. In areas where excavated material is unsuitable for backfilling, additional select fill may be required. If the soil is rocky, the pipe would be padded with relatively rock-free material placed immediately around the pipe. This material may be obtained from commercial borrow areas in the region. Where suitable, the subsoil may be mechanically screened to produce suitable padding material. Topsoil would not be used as padding material. Once the pipe is padded, the trench would then be backfilled with suitable excavated subsoil material. The top of the trench

may be slightly crowned to compensate for settling except for paved areas, where standard compaction methods would be employed. The topsoil would then be spread across the graded construction right-of-way where applicable. The soil would be inspected for compaction, and scarified as necessary.

**Cleaning and Hydrostatic Testing**

Once the pipeline tie-ins are completed, it would be internally cleaned with devices referred to as pipeline pigs. After cleaning, the pipeline would be pressure tested with water in accordance with USDOT regulations and Texas Eastern's requirements to ensure its integrity for the intended service and operating pressures. The water would be obtained from surface water sources crossed by the pipeline and/or municipal supply lines as described in section B.2.3. Additional drying pig runs would be made, if necessary, to remove any residual water from the pipeline.

**Restoration and Revegetation**

The cleanup crew would complete restoration and revegetation of the construction right-of-way and ATWS. Weather and soil conditions permitting, Texas Eastern would complete final cleanup (including final grading) and installation of permanent erosion control measures within twenty days after the trench is backfilled. These restoration activities would be completed in residential areas within 10 days of backfilling. In conjunction with backfilling operations, any woody material and construction debris would be removed from the right-of-way. The right-of-way would be final-graded to prepare for restoration. Permanent slope breakers or diversion berms would be constructed and maintained in accordance with the FERC Plan. Fences and stone walls would be restored or repaired as necessary.

Revegetation would be completed in accordance with permit requirements and seeding mixes, rates, and dates approved by or obtained from the local soil conservation authority or other duly authorized agency and in accordance with the Projects' E&SCP. The right-of-way would be seeded within 6 working days following final grading, weather and soil conditions permitting. Alternative seed mixes specifically requested by the landowner or required by agencies may be used. Any soil disturbance that occurs outside the permanent seeding season or any bare soil left unstabilized by vegetation would be mulched in accordance with the FERC Plan and the Projects' E&SCP.

## 5.2 Waterbody Construction Methods

Texas Eastern proposes to cross waterbodies using either the open-cut or dry crossing methods.

Except where reasonable alternative access is available, temporary construction equipment crossings would be installed across all waterbodies to gain access along the right-of-way for construction operations. Equipment crossings would be installed after clearing to minimize streambed disturbance and downstream siltation. Only the equipment necessary to construct the crossing and install the pipe would be allowed to work in the waterbody. After clearing activities, construction equipment would cross waterbodies on bridges consisting of one of the following devices:

- clean rock fill and culverts;
- equipment pads, wooden mats, and/or culverts; or
- flexi-float or portable bridge.

To facilitate pipeline construction across waterbodies, ATWS may be needed adjacent to the waterbody to assemble and fabricate the length of pipe necessary to complete the crossing. This work area would be sited at least 50 feet away from the stream banks except where adjacent upland consists of cultivated or rotated agricultural lands and other disturbed areas, topographic and other site-specific conditions permitting. If construction limitations, such as topographic conditions (steep slopes) and road crossing requirements, do not permit a 50-foot setback, then these areas would be located at least 10 feet away from the water's edge. In these cases, Texas Eastern is proposing alternative measures to the FERC Procedures. Appendix B identifies the locations where ATWS waterbody setback alternative measures are required and provides the justification for each such alternative measure request. We have reviewed these justifications and find them acceptable.

Vegetation would not be cleared between the ATWS area and the waterbody. The work area would be limited in size to the minimum area necessary to safely construct the waterbody crossing and accommodate any stockpile of excavated material from the trench and the prefabricated pipeline crossing section.

**Open Cut Crossing Method**

The open-cut crossing method would be utilized for streams that are dry or display no perceptible flow at the time of crossing. The open-cut crossing method would involve excavation of the pipeline trench across the waterbody, installation of the pipeline, and backfilling of the trench. Excavation and backfilling of the trench would be accomplished using backhoes or other excavation equipment working from the banks of the waterbody. Trench spoil would be stored at least 10 feet from the banks (topographic conditions permitting). A section of pipe long enough to span the entire crossing would typically be fabricated on one bank and pulled across the bottom to the opposite bank or carried into place and settled into the trench. The trench would then be backfilled and the bottom of the stream and banks restored and stabilized. Sediment barriers, such as silt fencing, staked straw bales, or trench plugs would be installed to prevent spoil and sediment-laden water from entering the waterbody from adjacent upland areas.

**Dry Crossing Methods**

Texas Eastern is proposing to cross all streams with perceptible flow using a dry crossing method where feasible. Dry crossing methods would involve installation of a flume pipe(s) and/or dam and pump prior to trenching to divert the stream flow over the construction area and allow trenching of the stream crossing in drier conditions isolated from the stream flow. Spoil removed during the trenching would be stored away from the water's edge and protected by sediment containment structures. Pipe strings would be fabricated on one bank and either pulled across the stream bottom to the opposite bank, floated across the isolated portion of the stream, or carried into place and lowered into the trench. Where these methods are employed, ATWS areas would be required for assembly of the pipe strings and spoil storage areas.

**Horizontal Bore**

Although not proposed in Texas Eastern's application, Texas Eastern continues to evaluate use of the bore method to cross high-quality streams, wetlands, and other sensitive areas. Horizontal boring is typically used to install the pipeline beneath highways and other paved roadways. In a few instances, waterbodies are present immediately adjacent to existing roadways, flowing within a culvert beneath a roadway, or have state designations of significance. A horizontal bore could be used to install the pipeline beneath both the stream and roadway, beneath existing culverts or below the stream as required by agency requirements. Once the bore is completed, the pipeline section would be welded to the boring pipe and pulled into place and the boring pipe removed. Any voids between the pipeline and the subsoil would be filled with grout (a sand-cement mix) to prevent settlement of the roadway surface. This method allows the road or railroad to remain in service while the installation process takes place and eliminates the potential for trench settlement.

## 5.3 Wetland Construction Methods

Construction across wetlands would be performed in accordance with the FERC Procedures and the Projects' E&SCP, unless an alternative measure is approved. Specialized construction methods are designed to minimize the extent and time that equipment operates in wetland areas. Most of the wetlands that would be crossed by the pipeline loops are small and have only seasonally saturated soils. When wetland soils are inundated or saturated to the surface, the pipeline trench would be excavated across the wetland by equipment supported on wooden swamp mats to minimize the disturbance to wetland soils. In wetlands that have firm substrates, and are unsaturated (and not frozen), the top 12 inches of wetland soil over the trench line would be segregated and stockpiled separate from subsoil. Trench spoils would be temporarily piled in a ridge along the pipeline trench. Gaps in the spoil piles would be left at appropriate intervals to provide for natural circulation or drainage of water. The trench would not be excavated until the pipe is ready to be lowered in accordance with the FERC Procedures.

ATWS may be needed adjacent to specific wetlands to facilitate the pipeline crossing. These work areas would be located at least 50 feet away from the wetland edge, except where adjacent upland consists of cultivated or rotated agricultural lands or other disturbed areas. The size of ATWS required at wetland crossings is based on the wetland size, water content of wetland soils (or presence of standing water), and other construction constraints. No vegetation would be cleared between the ATWS and the wetland. The work area would be limited to the minimum size necessary to safely construct the wetland crossing. If construction limitations, such as topographic conditions (steep slopes) and road crossing requirements do not permit a 50-foot setback, these areas would be sited at least 10 feet away from the wetland. In these cases, Texas Eastern is requesting alternative measure to the FERC Procedures as listed in appendix B and which we find acceptable.

## 5.4 Active Agricultural Land

Based on review of aerial-based mapping and field surveys, portions of the Projects' routes would cross areas of agricultural crop land. Texas Eastern would work with landowners as necessary to utilize appropriate construction procedures for agricultural areas. In general, topsoil would be segregated in actively cultivated or rotated agricultural lands, hayfields, and managed pasturelands. In these areas, topsoil would be stripped and placed separate from

subsoil during grading activities in accordance with the FERC Plan. The size, density and distribution of rock left in restored areas should be similar to adjacent areas not disturbed by construction, unless otherwise approved in writing by the landowner. Any drain tiles would be located, monitored for damage and repaired to original or better condition, as needed. The depth of the pipeline would be adjusted as needed to prevent interference with the proper function of drain tile systems. Water flow in any affected irrigation systems would be maintained, unless shutoff is coordinated with affected parties. Soil compaction would be treated, as necessary, in conjunction with the FERC Plan.

### 5.5 Road Crossings

Constructing the Projects across public and private roadways, using either conventional open-cut or other road bore methods, would be based on site conditions and road opening permit requirements. Roadway opening permits would be obtained from applicable state and local agencies. Permit conditions would ultimately dictate the day-to-day construction activities at road crossings.

Construction would be scheduled for work within roadways and specific crossings to avoid commuter traffic and school bus schedules to the greatest extent practical. Appropriate traffic management and signage would be set up, and necessary safety measures would be developed in compliance with applicable permits for work in the public roadway. Texas Eastern would make arrangements with local officials to have traffic safety personnel on hand during periods of construction. Provisions would be made for detours or otherwise to permit traffic flow.

Crossings of private roadways would be coordinated with residents to minimize access impacts. In those areas where the excavation of a longer length of trench would not pose a safety problem, the pipeline would be installed using the standard open trench method. Open trenches would either be fenced or covered with steel plates during all non-working hours. Steel plates would be kept on site at each crossing so that a temporary platform can be made across the trench as required (e.g., emergency vehicles).

All roadway surfaces would be restored to the specifications of the local Department of Public Works or the Ohio Department of Transportation (ODOT) as outlined in the road opening permit requirements. Roadway markings and striping would be added as necessary.

### 5.6 Rock Removal and Blasting

Based on field reconnaissance and review of soils and geologic maps of the Projects' areas, shallow bedrock (less than 5 feet from the surface) would be encountered at many locations along the Projects' alignment. Texas Eastern has identified the ATWS required in these locations.

Rock encountered during trenching would be removed using one of the following techniques. The technique selected is dependent on the relative hardness, fracture susceptibility, and expected volume of the material. Techniques include:

- conventional excavation with a backhoe;
- ripping with a dozer followed by backhoe excavation;

- hammering with a pointed backhoe attachment followed by backhoe excavation;
- blasting followed by backhoe excavation; or
- blasting surface rock prior to excavation.

Texas Eastern would consult with landowners to identify any wells that may be at risk due to blasting activity. In areas where blasting would be required, Texas Eastern would conduct pre- and post-construction testing of any wells within 150 feet of construction workspaces and nearby structures, as applicable and with landowner permission. Pre- and post-construction groundwater well monitoring would include well yield.

Large rock not suitable for use as backfill material would be dispersed in upland areas of the right-of-way and may be windrowed with landowner approval. Otherwise, in site-specific instances, the excess rock would be transported off-site and disposed of in an appropriate manner at an approved gravel operation, landfill, or recycling facility.

## 5.7 Aboveground Facilities

The Projects' aboveground facilities would be constructed in compliance with the same federal regulations and guidelines as the pipeline facilities, and in accordance with the specific requirements of applicable federal and state approvals. The construction and restoration methods and procedures in the FERC Plan and Procedures and Projects' E&SCP would be followed, as applicable, for the aboveground facilities.

**Compressor Station Modifications**

The general construction procedures consist of clearing and grading the site, excavation, installation of the piping, installation of the structures and machinery, start-up, testing, and final clean up and stabilization of the site. Acoustic insulation may be installed on some of the piping for noise control.

Workspace would be limited to previously disturbed areas at existing compressor station sites; therefore, no tree clearing is anticipated to construct the existing facility modifications. Existing access roads would be utilized to access the compressor station facilities. The sites would be graded, as necessary, to stockpile topsoil for use during site restoration and provide level work surfaces. Installation of erosion and sedimentation controls would begin concurrently with site grading.

As major parts of the piping are completed, each would be hydrostatically tested to ensure its integrity. Test water would be trucked to the site for testing and would be discharged to the storm water management system at each site. Dewatering would be performed with proper erosion and sedimentation controls as set forth in the FERC Plan and Procedures and the Projects' E&SCP.

If the proposed pipe modifications at the compressor stations include removal of existing pipe that has coal tar or asphalt pipe coating, Texas Eastern would either assume the pipe coating contains asbestos or would test the pipe in accordance with the requirements in Texas Eastern's Health and Safety Manual and SOP as previously discussed.

Texas Eastern conducted asbestos surveys at all of the compressor stations in 2005 to 2006. Several of the buildings have transit siding and/or roof panels. Other potential ACM

includes insulation, floor tiles, gaskets, caulk, and mastic. If there is the potential for ACM to be disturbed, Texas Eastern would obtain the necessary state or local permits and make required notifications. Asbestos management procedures outlined in the SOP for removal of ACM would be followed.

Clean up and stabilization of the station yard would be an ongoing process throughout construction. Sections of the yard would be final graded, fertilized, seeded, and mulched as work is completed and as provided in the FERC Plan and Procedures and the Projects' E&SCP. Permanent erosion controls would be installed on a similar basis.

**Other Aboveground Facilities**

Valve sites and launcher/receivers are small components of previously described pipeline or other larger aboveground facility construction, and are addressed accordingly.

### 6. Construction Schedule, Workforce, and Environmental Training

Construction of all proposed Projects facilities, including the Wheelersburg to Athens Loop, the Athens to Berne Loop, the Berne to Holbrook Loop, the other new aboveground facilities, and the modifications at existing compressor station sites is currently scheduled to occur from February 2017 to November 2017. The three pipeline loops, and associated new aboveground facilities would be constructed in one spread, which would require approximately 350 workers. The modifications at existing compressor stations would be constructed with approximately 605 additional contract personnel.

Environmental training would be given to Texas Eastern's personnel and to contractor personnel whose activities may impact the environment during pipeline and compressor station construction. Training would include the FERC Plan and Procedures, job-specific permit conditions, company policies, cultural resource procedures, threatened and endangered species restrictions, the Projects' E&SCP, the SPCC Plan, and any other pertinent information related to the job. As outlined in the Texas Eastern's E&SCP, at least one Environmental Inspector (EI) would be assigned to each construction spread during active construction or restoration.

### 7. Operation and Maintenance Procedures

Texas Eastern would operate and maintain the newly constructed pipeline facilities in the same manner as it currently operates and maintains its existing system. The pipeline would be patrolled on a routine basis to perform both emergency and routine maintenance.

During periodic pipeline and right-of-way patrols, all permanent erosion control devices installed during construction would be inspected to ensure that they are functioning properly. Evidence of post-construction soil erosion or sedimentation on the pipeline right-of-way or at a compressor station would be identified and remediated. In addition, attention would be given to performance of water control devices such as diversions, condition of banks at stream and river crossings, health of shrubs and other vegetation planted during construction, and any other conditions that could endanger the pipeline or cause erosion. Corrective measures would be performed as needed in accordance with the Projects' E&SCP.

## 8. Land Requirements

Construction of the Projects' pipeline facilities would affect approximately 283.7 acres of land, including pipeline construction rights-of-way, ATWS, pipeyards and contractor wareyards, temporary access roads and permanent access roads. Texas Eastern is proposing a 100-foot-wide construction right-of-way for the pipeline in uplands which partially overlaps Texas Eastern's existing right-of-way where the loop is adjacent to the existing facilities for about 25 feet. Within wetlands, the construction right-of-way would be reduced to 75 feet wide. The construction working-side of the right-of-way would be 65 feet (40 feet in wetlands) and the non-working side of the construction right-of-way would be 35 feet. Approximately 96.8 acres of land would be permanently impacted as a result of the Projects, including a 50-foot-wide permanent right-of-way and permanent access roads that would be maintained in an herbaceous or developed state for the operational life of the Projects. Of the 96.8 acres of permanent easement for the loops, 41.8 acres overlaps Texas Eastern's existing right-of-way, since the construction right-of-way would overlap Texas Eastern's existing right-of-way for 25 feet where they are adjacent and for an additional 10 feet in areas where topsoil would be segregated.

In some locations, ATWS would be needed in addition to the 100-foot-wide construction right-of-way to manage site conditions such as at existing pipeline crossovers, wetland and waterbody crossings, steep side slopes, shallow depth to bedrock, topsoil segregation, road crossings, parking areas, disposal of excess blast rock, storage of construction materials, and spread begin, end, and move-arounds. The location of each ATWS and the site-specific justifications are provided in appendix C.

Modifications of the aboveground facilities associated with the Projects would affect approximately 338.1 acres of previously disturbed land, and would permanently use 0.36 acre of new easement for the South End Tie-In. Launcher/receiver facilities and valves would be installed along the proposed pipeline within the permanent operational right-of-way in areas disturbed by pipeline construction and at proposed aboveground facilities in areas disturbed by construction of the facility. Table A-2 summarizes the land requirements for the proposed pipeline facilities. Table A-3 summarizes the land requirements for the proposed modification of the existing aboveground facilities.

**Table A-2**
**Summary of Land Requirements for Pipeline Facilities**

| Facility a/ | Approximate Length/No. of Sites | Temporary Workspace for Construction (acres) | Permanent Easement for Construction and Operation (acres) | | Total Workspace for Construction (acres) |
|---|---|---|---|---|---|
| | | | Existing b/ | New | |
| Wheelersburg to Athens Loop | 9.1 miles | 71.8 c/ | 24.7 | 30.0 | 126.5 |
| Athens to Berne Loop | 4.6 miles | 42.0 c/ | 12.2 | 15.5 | 69.7 |
| Berne to Holbrook Loop | 2.1 miles | 26.0 c/ | 4.9 | 8.1 | 39.0 |
| 16-inch Line 10-A | 0.2 mile d/ | 0.9 c/ | 0.0 | 0.9 | 1.8 |
| Access Roads | 13 | 7.5 | 0.0 e/ | 0.5 f/ | 7.9 |
| Contractor Wareyards/Pipeyards | 3 | 38.8 | 0.0 | 0.0 | 38.8 |

| Facility a/ | Approximate Length/No. of Sites | Temporary Workspace for Construction (acres) | Permanent Easement for Construction and Operation (acres) | | Total Workspace for Construction (acres) |
|---|---|---|---|---|---|
| | | | Existing b/ | New | |
| TOTAL | - | 187.0 | 41.8 | 55.0 | 283.7 |

a/ Land requirements for valves and launcher/receivers are within the land requirements for the pipeline segments.
b/ Includes existing permanent easement within limits of construction.
c/ Includes temporary right-of-way and ATWS.
d/ Includes only the portion of the Line 10-A workspace that extends outside of the Kosciusko Compressor Station.
e/ Includes existing road footprints.
f/ Includes new permanent road footprints.

## Table A-3
## Land Requirements for Aboveground Facilities a/

| Facility Name | MP b/ | Land Affected During Construction (acres) c/ | New Land Affected Permanently For Operations d/ (acres) |
|---|---|---|---|
| **Compressor Station Modifications** | | | |
| Holbrook Compressor Station | 730.5 | 29.1 | 0 |
| Lebanon Compressor Station | 784.1 | 53.2 | 0 |
| Somerset Compressor Station | 890.2 | 18.9 | 0 |
| Berne Compressor Station | 681.5 | 19.6 | 0 |
| Athens Compressor Station | 620.7 | 21.0 | 0 |
| Owingsville Compressor Station | 502.1 | 28.6 | 0 |
| Danville Compressor Station | 427.5 | 26.1 | 0 |
| Tompkinsville Compressor Station | 352.0 | 28.3 | 0 |
| Gladeville Compressor Station | 287.2 | 45.8 | 0 |
| Barton Compressor Station | 150.9 | 16.3 | 0 |
| Egypt Compressor Station | 79.7 | 16.5 | 0 |
| Kosciusko Compressor Station | 0.0 | 34.7 | 0 |
| **New M&R Stations** | | | |
| South End Tie-In | 0.0 | 0.36 | 0.36 |
| **Project Totals** | --- | **338.1** | **0.36** |

a/ This table does not include launcher/receivers or valves that would be constructed since the land requirements for these facilities are within the land requirements for the pipeline or aboveground facilities shown in tables A-2 and A-3. The land affected for modifications at existing compressor stations is within property currently owned by Texas Eastern and in areas previously disturbed by construction or ongoing operations.
b/ Texas Eastern MP rounded to the nearest tenth.
c/ Acreage includes land that would also be permanently affected by operations and maintenance.
d/ Acreage includes all areas inside perimeter fencing or where vegetation is maintained outside perimeter fencing such as suction/discharge piping, but does not include land affected by construction of the Projects.

To the extent feasible, existing public and private road crossings along the various pipeline loop segments would be used as the primary means of accessing the right-of-way. In addition to the access available by use of existing public roads, Texas Eastern would utilize thirteen access roads, measuring a total length of 2.6 miles, for use during construction of the Projects. Of these access roads, 10 are existing roads and roads that require extension, and 3 are new proposed access roads. Three access roads are proposed for use in relation to the Berne to Holbrook Loop in Monroe County, Ohio, three access roads are proposed for use in relation to the Athens to Berne Loop in Noble and Monroe counties, Ohio, and six access roads are proposed for use in relation to the Wheelersburg to Athens Loop in Athens and Meigs Counties, Ohio.

Of the 13 proposed access roads, 10 would be temporary access roads, and three would be permanent access roads. The proposed permanent access roads would be maintained for access on the Wheelersburg to Athens Loop, and the Athens to Berne Loop. Temporary access roads would be restored in accordance with landowner agreements. Landowner permission would be obtained for all proposed permanent access roads. Approximately 7.4 acres of land would be temporarily affected by temporary access road construction, and an additional 0.5 acre would be permanently impacted by permanent access roads. Proposed access roads are identified in table A-4.

**Table A-4**
**Summary of New or Modified Access Roads**

| Facility, Location | Total Number | Total New | Total Existing b/ | Use (Permanent or Temporary) | Land Area Affected by access roads (acres) | |
|---|---|---|---|---|---|---|
| | | | | | Temporary c/, d/ | Permanent c/, d/ |
| **Wheelersburg to Athens Loop** | | | | | | |
| Meigs County, OH | 2 | 0 | 2 | 2 Temporary | 2.1 | 0 |
| Athens County, OH | 4 | 1 | 3 | 4 Temporary | 1.7 | 0 |
| **Athens to Berne Loop** | | | | | | |
| Noble County, OH | 3 | 0 | 3 | 1 Permanent<br>2 Temporary | 1.2 | 0.1 |
| Monroe County, OH | 0 | 0 | 0 | N/A | 0 | 0 |
| **Berne to Holbrook Loop** | | | | | | |
| Monroe County, OH | 3 | 1 | 2 | 1 Permanent<br>2 Temporary | 2.4 | 0.3 |
| **South End Tie-In** | | | | | | |
| Attala County, MS | 1 | 1 | **0** | 1 Permanent | **0** | 0.1 |
| **Project Totals d/** | **13** | **3** | **10** | **3 Permanent**<br>**10 Temporary** | **7.4** | **0.5** |

a/ This table does not include existing public roads or access roads for the existing compressor station modifications because no improvements to these access roads would be required.
b/ Existing roads include farm roads, two track roads, gravel roads, and driveways, and existing roads that require extension. New roads

do not have any existing travel footprint.
c/ Acreage is rounded to the nearest tenth which may result in small rounding differences when adding or subtracting various pipeline segments.
d/ Minor discrepancies in totals are due to rounding differences.
N/A = Not applicable

## 9. Non-Jurisdictional Facilities

Occasionally, projects have associated facilities that are constructed in support of the project, but do not come under the jurisdiction of the FERC. Such non-jurisdictional facilities are often constructed upstream or downstream of the jurisdictional facilities for the purpose of delivering, receiving, or using the proposed gas volumes or may include utilities necessary for aboveground facility operation. Texas Eastern has not identified any non-jurisdictional facilities associated with the Projects.

## 10. Permits and Approvals

Texas Eastern would obtain all needed permits and licenses for the pipeline and aboveground facilities. The environmental permits and approvals, administering agencies, and status are presented in table A-5. Texas Eastern would be required to obtain and adhere to all applicable permits regardless of whether they appear in the table or not.

**Table A-5**
**Environmental Permits, Approvals, and Consultations**

| Agency | Permit/Approval | Status |
|---|---|---|
| **FEDERAL** | | |
| Federal Energy Regulatory Commission | Section 7(c) Certificate of Public Convenience and Necessity | Application submitted October 8, 2015 and amended March 29, 2016. |
| U.S. Army Corps of Engineers – Huntington and Pittsburgh Districts | Section 404 Nationwide Permit(s) | Submitted November 5, 2015; anticipated permit receipt September 2016. |
| U.S. Fish and Wildlife Service – Region 3 | Section 7 Endangered Species Act (ESA), the Bald and Golden Eagle Protection Act (BGEPA), and Migratory Bird Treaty Act (MBTA) Consultation | Consultation initiated November 2, 2015. Consultation for forested impacts in Ohio is ongoing. |
| U.S. Fish and Wildlife Service – Alabama Field Office | Section 7 ESA, BGEPA, and MBTA Consultation and Clearance | Consultation initiated March 24, 2015; clearance received April 2, 2015. |
| U.S. Fish and Wildlife Service – Kentucky Field Office | Section 7 ESA, BGEPA, and MBTA Consultation and Clearance | Consultation initiated March 24, 2015; ESA clearance received April 29, 2015. BGEPA and MBTA clearance received February 23, 2016. |
| U.S. Fish and Wildlife Service – Mississippi Field Office | Section 7 ESA, BGEPA, and MBTA Consultation and Clearance | Consultation initiated March 24, 2015; response received April 3, 2015; follow-up consultation letter submittal on October 23, 2015; ESA clearance for compressor stations received October 25, 2015. Follow-up consultation letter regarding BGEPA, |

| Agency | Permit/Approval | Status |
|---|---|---|
| | | MBTA, and ESA for Line 10-A submitted on March 18, 2016. ESA and MBTA clearance received April 11, 2016. |
| U.S. Fish and Wildlife Service – Ohio Field Office | Section 7 ESA, BGEPA, and MBTA Consultation and Clearance | Consultation initiated April 1, 2015; response received April 9, 2015; follow-up consultation letter submitted October 26, 2015; ESA clearance received November 3, 2015. BGEPA and MBTA consultations are ongoing. |
| U.S. Fish and Wildlife Service – Pennsylvania Field Office | Section 7 ESA, BGEPA, and MBTA Consultation and Clearance | Consultation initiated March 24, 2015; response received June 2, 2015; follow-up consultation letter submitted October 23, 2015; ESA clearance received December 14, 2015. BGEPA, and MBTA clearance received March 14, 2016. |
| U.S. Fish and Wildlife Service – Tennessee Field Office | Section 7 ESA, BGEPA, and MBTA Consultation and Clearance | Consultation initiated March 24, 2015; Clearance received May 13, 2015. BGEPA, and MBTA clearance received March 9, 2016. |
| **STATE (Alabama)** | | |
| Alabama Department of Conservation and Natural Resources | Threatened and Endangered (T&E) Species Consultation | Consultation initiated March 24, 2015; Follow-up consultation letter submitted October 23, 2015; Clearance received December 1, 2015. |
| Alabama Division of Wild Life and Freshwater Fisheries | T&E Species Consultation | Consultation initiated March 24, 2015; clearance received May 12, 2015. |
| Alabama State Historic Preservation Office | Section 106 Consultation | Consultation initiated September 29, 2015. Clearance received October 28, 2015. |
| Alabama Department of Environmental Management, Air Division | Barton Compressor Station Air Permit / Insignificant Activities Determination | Application submitted August 28, 2015; approval received September 21, 2015. |
| Alabama Department of Environmental Management | (NPDES) Hydrostatic Test Discharge Permit | Anticipated application submittal date September 2016; anticipated permit receipt October 2016. |
| **STATE (Kentucky)** | | |
| Kentucky Department of Fish and Wildlife Resources | T&E Species Consultation | Consultation initiated April 1, 2015; Follow-up consultation letter submitted October 23, 2015; clearance received November 2, 2015. |

| Agency | Permit/Approval | Status |
|---|---|---|
| Kentucky Heritage Council State Historic Preservation Office | Section 106 Consultation | Consultation initiated September 29, 2015. Clearance received October 9, 2015. |
| Kentucky Department for Environmental Protection | Owingsville Compressor Station Air Permit, Off Permit Notification | Application submitted September 15, 2015; permit received June 20, 2016. |
| Kentucky Department for Environmental Protection | Danville Compressor Station Air Permit, Title V permit significant revision | Application submitted April 5, 2016; anticipated permit receipt December 30, 2016. |
| Kentucky Department for Environmental Protection | Tompkinsville Compressor Station Air Permit, minor source permit revision | Application submitted for electric compressor Novemeber 23, 2015 Application for emergency generator sunmitted March 23, 2016; permit received June 6, 2016. |
| **STATE (Mississippi)** | | |
| Mississippi Department of Marine Resources | T&E Species Consultation | Consultation initiated March 24, 2015; clearance received March 31, 2015. |
| Mississippi Department of Wildlife, Fisheries and Parks | T&E Species Consultation | Consultation initiated March 31, 2015; follow-up consultation letter submitted October 23, 2015; clearance for stations received November 11, 2015. Consultation letter for Line 10-A submitted March 18, 2016 and clearance received April 20, 2016. |
| Mississippi Department of Archives and History State Historic Preservation Office | Section 106 Consultation | Consultation initiated September 29, 2015. Clearance for stations received November 2, 2015. Follow-up consultation initiated March 21, 2016 for Line 10-A. Clearance received April 20, 2016. |
| Mississippi Department of Environmental Quality | NPDES Hydrostatic Test Discharge Permit | Application submittal September 2016. Anticipated receipt October 2016. |
| **STATE (Ohio)** | | |
| Ohio Department of Natural Resources | T&E Species Consultation | Consultation initiated April 1, 2015; response received May 19, 2015; follow-up consultation letter submitted October 26, 2015; clearance received November 6, 2015. |
| Ohio Historic Preservation Office | Section 106 Cultural Resources Consultation | Consultation initiated May 5, 2015; follow-up consultation letter and Phase I report submitted October 16, 2015. Consultation is ongoing. |

| Agency | Permit/Approval | Status |
|---|---|---|
| Ohio Environmental Protection Agency | Section 401 Water Quality Certification | Application submitted November 16, 2015; anticipated permit receipt August 2016. |
| Ohio Environmental Protection Agency | NPDES Hydrostatic Test Discharge | Anticipated application submittal September 2016; anticipated permit receipt November 2016. |
| Ohio Environmental Protection Agency | NPDES General Permit for Stormwater Discharges from Small and Large Construction Activities (contractor yards) | Anticipated application submittal September 2016; anticipated permit receipt November 2016. |
| Ohio Environmental Protection Agency | Lebanon Compressor Station Air Permit, Permit to Install | Application submitted October 22, 2015; permit received November 25, 2015. |
| Ohio Environmental Protection Agency | Somerset Compressor Station Air Permit, Permit to Install | Application submitted January 29, 2016; anticipated permit receipt Noverber 2016. |
| Ohio Environmental Protection Agency | Berne Compressor Station Air Permit, Permit to Install | Application submitted September 15, 2015; anticipated permit receipt September 2016. |
| Ohio Environmental Protection Agency | Athens Compressor Station Air Permit, Permit to Install | Application submittal January 29, 2016; anticipated permit receipt November 2016. |
| **STATE (Pennsylvania)** | | |
| Pennsylvania Department of Conservation and Natural Resources | T&E Species Consultation | Consultation initiated March 24, 2015; clearance received April 3, 2015. |
| Pennsylvania Fish and Boat Commission | T&E Species Consultation | Consultation initiated March 24, 2015; clearance received April 16, 2015. |
| Pennsyvlania Game Commission | T&E Species Consultation | Consultation initiated March 24, 2015; follow-up consultation letter submitted October 23, 2015; clearance received November 4, 2015. |
| Pennsylvania Historical and Museum Commission | Section 106 Consultation | Consultation initiated September 29, 2015. Clearance received February 11, 2016. |
| Pennsylvania Department of Environmental Protection | Holbrook Compressor Station Air Permit, Plan Approval | Application submitted October 4, 2015; anticipated permit receipt October 2016. |
| Greene County Conservation District | Erosion and Sediment Control General Permit | Anticipated application submittal September 2016; anticipated permit receipt December 2016. |
| **STATE (Tennessee)** | | |
| Tennessee Department of Environment | T&E Species Consultation | Consultation initiated March |

| Agency | Permit/Approval | Status |
|---|---|---|
| and Conservation<br>Division of Natural Resources | | 24, 2015; clearance received April 14, 2015. |
| Tennessee Wildlife Resource Agency | T&E Species Consultation | Consultation initiated March 31, 2015; follow-up consultation letter submitted October 23, 2015; clearance received December 11, 2015. |
| Tennessee Historical Commission<br>State Historic Preservation Office | Section 106 Consultation | Consultation initiated September 29, 2015. Clearance received October 7, 2015. |
| Tennessee Department of Environment and Conservation, Division of Air Pollution Control | Gladeville Compressor Station Air Permit / Insignificant Activities Determination | Exemption request submitted August 28, 2015; response approving received September 2, 2015. |
| Tennessee Department of Environment and Conservation | Stormwater Construction Permit | Anticipated application submittal September 2016; anticipated permit receipt October 2016. |
| Tennessee Department of Environment and Conservation | NPDES Hydrostatic Test Discharge Permit | Anticipated application submittal September 2016; anticipated permit receipt October 2016. |

## B. ENVIRONMENTAL ANALYSIS

Construction of the Projects would have temporary short-term and long-term, or permanent impacts. As discussed throughout this EA, temporary impacts are defined as occurring only during the construction phase. Short-term impacts are defined as lasting between 1 and 3 years. Long-term impacts are defined as lasting 3 years or more. Permanent impacts are defined as lasting throughout the life of the Projects.

### 1. Geology and Soils

The following summarizes the physiography, topography, and geology of the Projects' pipeline facilities and existing compressor stations, and identifies and characterizes the soil series and map units with the Projects' areas.

### 1.1 Geology

**Physiography**

The Projects' areas within Ohio and Pennsylvania, including the proposed pipelines and existing compressor stations, lie within the Interior Plains and Appalachian Highlands physiographic divisions. The Ohio Division of Geological Survey (ODGS) further divides the areas of the Projects into the provinces of Central Lowland, Glaciated Allegheny Plateaus, and the Allegheny Plateaus (unglaciated). The Glaciated Allegheny Plateau is that portion of the Allegheny Plateau that was covered by the last glaciation. As a result, this area of the Allegheny Plateau has lower relief and more gentle slopes than the relatively rugged Allegheny Plateau.

The Holbrook Compressor Station is located within the Waynesburg Hills Section of Pennsylvania. This region consists of narrow valleys and narrow hilltops, with local relief approximately 600 to 1,000 feet. The slopes can be highly susceptible to landslides (Pennsylvania Department of Conservation and Natural Resources [PADCNR], 2015).

The Wheelersburg to Athens Loop, Athens to Berne Loop, Athens Compressor Station, Berne Compressor Station, Athens Launcher/Receiver site, Berne Launcher/Receiver site, Wheelersburg Receiver Removal site, and Athens Receiver Removal site would be within the Marietta Plateau region of the Allegheny Plateau in Ohio, which is characterized by highly dissected plateau with high relief (generally 350 feet, to 600 feet near Ohio River) with mostly fine-grained rocks. The Marietta Plateau is prone to landslides and is commonly underlain by red shales and soils.

The Berne to Holbrook Loop, the Line 15 Tie-In West site, and the Line 15 Tie-In East site would be located in Marietta Plateau and the Little Switzerland Plateau sub-district of Ohio. The Little Switzerland Plateau is a highly dissected plateau with high relief (approximately 450 feet, to 750 feet along Ohio River). The area is underlain chiefly by fine-grained sedimentary rocks. Streams in the region tend to be high gradient with rock bottoms. The Little Switzerland Plateau is prone to landslides and flash flooding.

The Somerset Compressor Station in Perry County, Ohio is located within the Muskingum-Pittsburg Plateau, which is characterized by moderately high to high relief (approximately 300 to 600 feet) hills with outwash deposits in some of the larger stream valleys (ODGS, 1998).

The Lebanon Compressor Station is within the Till Plains section of the Central Lowland Province, which is characterized by gently rolling hills. The Lebanon Compressor Station is located within the Southern Ohio Loamy Till Plain region which is characterized by end and recessional moraines with moderate relief (approximately 200') and loamy till surface. Streams in the region tend to be steep valley large streams, with valleys filled with outwash deposits that alternate between broad floodplains and narrows (ODGS, 1998).

The compressor stations in Kentucky and Tennessee are located in regions of the Interior Low Plateaus physiographic province. The Owingsville and Danville compressor stations are within the Bluegrass physiographic region of Kentucky. The inner Bluegrass Region is characterized by rolling hills and rich, fertile soils. These rolling hills were created by the weathering of thick to massive limestone, which also produces sink holes, springs, caves, and fertile soils. The outer Bluegrass Region is characterized by deep valleys, with very little flat land due to bedrock within the area consisting of thin to thick Ordovician limestones interbedded with shales. The shales are susceptible to physical weathering, resulting in hilly topography with shallow slopes in areas underlain by shale, and steep topography in areas underlain primarily by limestone (Kentucky Geological Survey [KGS], 2012).

The Tompkinsville Compressor Station is within the Mississippian Plateau or Pennyroyal physiographic region of Kentucky. This region is underlain by thick to massive limestone that is susceptible to chemical weathering, and is characterized by several thousand sinkholes, sinking streams, streamless valleys, springs, and cavern, dominated by karst terrain. This region includes the Mammoth Cave-Flint Ridge cave system, which is the longest in the world (KGS, 2012).

The Gladeville Compressor Station is located within the Nashville, or Central, Basin physiographic region of Tennessee. The area has a relatively flat to gently rolling topography that is dominated by grasslands and agriculture outside of urban areas (Etnier and Starnes, 1993).

The compressor stations in Alabama and Mississippi and the replacement pipeline are within regions of the Coastal Plain physiographic province. The Barton Compressor Station is located within the East Coast Gulf Coastal Plain section, within the Coastal Plain province. This region contains a pattern of relief features and landforms that differ significantly from those of adjacent sections. These features include flat, low lying areas, contrasted by rounded and eroding hills, topographic features known as cuestas and flatwoods, and floodplains of various rivers (Encyclopedia of Alabama, 2013).

The Egypt Compressor Station is within the Tombigbee Hills or Tennessee River Hills physiographic region of Mississippi. The area consists of rugged topography and high relief, with steep hills reaching 650 feet and streams flowing through narrow, deep ravines. Toward the south of the region the topography flattens out, with low rolling hills and lower gradient streams (Mississippi State Geological Survey [MSGS], 1920).

The Kosciusko Compressor Station is within the Blackland Prairies or Blackbelt physiographic region of Mississippi. The topography within this region is relatively flat, consisting or open prairies with scattered forest. Low sloping areas exist in small percentages, and there are no regions of rugged topography (MSGS, 1920).

**Topography**

The topography of the area of the Projects' pipeline facilities, including the launcher/receiver sites, is rugged, with steep hillsides and moderate to high relief. The most rugged areas of the Projects are within the Little Switzerland Plateau, where relief can reach up to 750 feet but averages approximately 300 feet. Based on a review of USGS 7.5-minute series topographic quadrangle maps elevations in the Projects' areas range from approximately 640 to 1,300 feet. The drainage patterns along the Projects' pipeline routes are dendritic (branched similar to a tree). Larger streams generally flow to the east, toward the Ohio River. Streams in the area of the Projects' pipeline facilities are set in narrow, V-shaped valleys. The topography of the various compressor station locations is relatively flat, with some areas adjacent to the station infrastructure containing hillslopes. General relief elevation within the compressor stations is minimal.

**Surficial Geology**

Mapped surficial geological deposits in Ohio are limited to the glaciated portions of the state with some glaciofluvial and glaciolacustrine deposits beyond the ice margin. Thus, mapped surficial geology along the Projects' pipeline facilities is limited to the deposits recorded beyond the ice margin. The ODGS Glacial Map of Ohio appears to depict the Wheelersburg to Athens Loop near the edge and possibly intersecting an area of a deposition derived from Pre-Illinoian glaciolacustrine clay and silt carried into the valleys of unglaciated southeastern Ohio by glacial meltwaters. In addition, similar deposits are shown to potentially cross the Athens Compressor Station and the southwestern portion of the Athens to Berne Loop, while the Berne Compressor Station and Berne to Holbrook Loop appear to be lacking glacial outwash or meltwater deposition and are generally mapped with the colluvium surficial geology that dominates the

unglaciated southeast portion of Ohio. The ODGS Shaded Drift-Thickness Map of Ohio appears to indicate approximate depths of glaciolacustrine deposition to range between 21 and 80 feet (ODGS, 2005).

The surficial deposits mapped near the Holbrook Compressor Station area include residuum, colluvium, and alluvium, specifically residuum and landslides that are typical in the southwest portion of Pennsylvania. Mapped surficial geological information in Kentucky and Tennessee is limited to soil descriptions and alluvial deposits near streams due to the relative depth of bedrock. Based on topographic maps, these compressor stations are not located within valleys or floodplains of any streams. The depths to bedrock for the soils surrounding the Danville, Tompkinsville, Owingsville, and Gladeville compressor stations range from 6 to 8 feet. The Egypt Compressor Station area within Mississippi consists of surficial deposits consisting of sand, clay or mud, and quartzite. The surficial deposits near the Kosciusko Compressor Station area in Mississippi consist of sand, clay or mud, and quartzite and the Mooreville chalk, consisting of carbonate, and clay or mud.

**Mineral Resources**

***Pipeline Facilities***

In general, mineral resources within the Projects' pipeline facility portions in Ohio consist of coal, oil, natural gas, limestone, and clay. Within Ohio, the Projects' pipeline routes are surrounded by dozens of former surface and underground coal mines. Underground mining may be room-and-pillar mining or longwall mining.

Former surface coal mines are present in the surrounding areas along the Projects' proposed pipeline facilities on Ohio. Based on field reconnaissance and aerial photography review, there are no surface mines in operation that cross the Projects' pipeline facilities. No active or planned coal extraction projects that cross the Projects' pipeline facilities have been identified. One active underground coal mine was mapped approximately 0.6 mile from the Berne to Holbrook Loop.

There are 51 oil and gas wells mapped within 1,000 feet of the Projects' proposed pipeline facilities, and production and gathering facilities are currently being permitted and installed on an ever-changing basis in Ohio. According to the state oil and gas well databases in Ohio, no existing wells appear to be within the proposed construction work space of the Projects. Three oil and gas wells were identified at distances within 200 feet from the Projects' pipeline facilities.

There are no active non-fuel mineral resource operations in close proximity to the Projects' areas (UK 2015, USGS 2009, TNDEC 2015a, GSA 2007, USGS 2011).

Because there are no active underground mines and no existing wells within the proposed Projects' construction workspaces, we find that construction and operation of the Projects' pipeline facilities would not adversely affect the development of mineral resources in the region.

***Compressor Stations***

The Holbrook Compressor Station is in Green County, Pennsylvania, in the southwestern part of the state. Based on field reconnaissance and aerial photography review, there are no surface mines in operation that cross the Holbrook Compressor Station, although an underground

mining permit boundary extends across the station site (Pennsylvania Department of Environmental Protection [PADEP], 2015). For deep-mined coal, mining beneath the compressor station and pipelines creates a hazard, and basically removes that resource from exploitation during the life of the Projects. However, the proposed Projects' modifications lie within the footprint of the existing compressor station and would only result in modifications of existing infrastructure that has been in place and in service for many years. Therefore, the proposed modifications would have no impact on any mining activities.

Within Ohio, former surface coal mines are present in the surrounding areas along the Projects' routes. Based on aerial photography, there are no surface mines in operation within or adjacent to the compressor stations in Ohio. According to an ODGS Ohio oil and gas well database, one well was identified within the Lebanon Compressor Station property boundary. This well was identified with an unknown status and is on land owned by Texas Eastern. This well is not within the construction footprint for the Lebanon Compressor Station for these Projects. Two dry and plugged wells were identified within the Berne Compressor Station. These two wells appear to be historic and were identified as plugged in the 1940s. No existing wells appear to be located within the remaining existing compressor stations within Ohio. There are several known oil and gas wells within 1,000 feet of the Projects in Ohio, and production and gathering facilities are currently being permitted and installed on an ever-changing basis in Ohio. Texas Eastern is aligning the Projects' facilities to avoid conflicting with any existing well locations.

No Projects areas within Kentucky are in close proximity to coal operations (Kentucky Energy and Environment Cabinet, 2014). There are a number of wells near the Tompkinsville Compressor Station in Kentucky (University of Kentucky [UK], 2015); one is within 0.25 mile. There are no oil and gas wells within 0.25 mile of the Danville or Owingsville compressor stations in Kentucky (UK, 2015).

Currently, there are no active coal mining operations within the State of Tennessee. There are no Project areas in close proximity to coal operations. There are no oil and gas wells within close proximity to the Project areas in the state (Tennessee Department of Environment and Conservation [TNDEC], 2015a).

There are no Project areas within Alabama that are in close proximity to coal operations (Encyclopedia of Alabama, 2015). The Barton Compressor Station in Alabama is in Colbert County. According to the Geological Survey of Alabama (GSA), there are no active oil and gas wells within 0.25 mile of this compressor station (GSA State Oil and Gas Board, 2015).

No Project areas within Mississippi are in close proximity to coal operations. There are no wells within 0.25 mile of the Egypt and Kosciusko Compressor Stations (Mississippi State Oil and Gas Board [MSOGB], 2015).

There are no active non-fuel mineral resource operations in close proximity to the Project areas (UK 2015, USGS 2009, TNDEC 2015a, GSA 2007, USGS 2011).

Because there are no active or abandoned surface or underground mines and no existing wells within the proposed Projects' construction workspaces, and the proposed compressor station modifications would only result in modifications of existing infrastructure that has been in place and in service for many years, we find that the proposed modification of the Projects' existing compressor stations would not adversely affect the development of mineral resources near the Projects' facilities.

### 1.1.1 Geologic Hazards

**Seismic Risk**

A seismic disturbance is any earth movement (natural or manmade) that is caused by a momentary disturbance of the elastic equilibrium of a portion of the earth. The USGS and State of Ohio have developed national/state maps of earthquakes and earthquake shaking hazards to quantify seismic hazards in a region (USGS, 2014). The USGS Earthquake Hazards Program data identify the potential seismic hazard in the area of the Projects' facilities and shows a 2-percent probability of experiencing peak acceleration value of 4 to 12 percent in 50 years. Acceleration values can range from 2 percent gravity (weak shaking) to 160 percent gravity (strong shaking). There are no active faults in proximity to the Projects' facilities. We do not anticipate any impacts due to seismic risk at any of the locations of the Projects' facilities.

**Soil Liquefaction**

Soil liquefaction is the process by which stress exerted on soil during an earthquake can cause it to flow in liquid form. For liquefaction to occur, a relatively shallow water table, rapid strong ground motion, and non-cohesive soils all must be present (University of Washington, 2000). No active faults exist near the Projects' facilities to cause rapid strong ground movement. Because there is a low probability of soil liquefaction in the Projects' regions, we conclude that the risk of damage to the proposed facilities from soil liquefaction is insignificant.

**Landslides**

According to the Landslide Overview Map of the Conterminous United States (Radbruch-Hall et al., 1982), low landslide incidence indicates there is less than 1.5 percent of the area that experiences landslides. High landslide incidence means there is more than a 15 percent of the area that experiences landslides. The Landslide Overview Map indicates that the Wheelersburg to Athens Loop is in an area where the landslide incidence is low; however, the susceptibility is high in areas of steep terrain. The Athens to Berne Loop and the Berne to Holbrook Loop are in areas where the landslide susceptibility and incidence is high. Additionally, the region's history of extensive strip and underground mining may also make sections of the Projects more susceptible to landslides.

Topographic relief within the existing compressor stations areas is relatively flat. All work at the existing compressor stations is planned to take place within the fence line of the existing, developed compressor station sites in areas that have been previously disturbed by construction and on-going operations. Due to the relatively flat topography and limited excavation required at the existing compressor stations, landslides are not anticipated to be a significant concern.

Prior to construction of the Projects, personnel would be trained for the management of potential landslides. During the Projects' Environmental Training Program, the contractor's field supervisory personnel and Texas Eastern's supervisory personnel including the Chief Inspector, Craft Inspectors, and the EIs, would be trained on the potential for landslides to occur during construction. The training would also provide the appropriate protocol for work stoppage if a landslide occurs and a communication plan to alert the appropriate company and contractor supervisors.

During construction, measures would be implemented to minimize potential risks from landslides and soil erosion, especially in the areas of steep slopes which would be encountered in multiple locations. Where steep side slopes are encountered along the pipeline alignment, the upslope side of the construction right-of-way would be cut during grading and used to fill the downslope side of the right-of-way, thereby providing a safe and level surface on which to operate heavy equipment. Construction along hillsides may require ATWS downslope to accommodate the storage of excavated material. During grade restoration, the spoil would be placed back in the grade cut, compacted to restore original contours, and reseeded. Once grade and drainage patterns have been reestablished, permanent erosion controls (e.g., slope breakers) would be installed as needed. These activities would minimize the potential for man-induced landslides and erosion in the Projects' areas. Mitigative and remedial measures would be implemented, as needed, to ensure slope stabilization and minimize the risk of landslides. For example, slope breakers constructed of materials such as sand bags would be installed on slopes with elevated erosion potential. The Projects' E&SCP describes field procedures associated with use of slope breakers to direct excess water off the construction right-of-way, temporary and permanent trench plugs to prevent water from channeling along the pipeline, matting, rip rap, and other erosion control measures. With the implementation of the proposed mitigative measures, we conclude that the risk of damage to the proposed facilities from landslides is minimal.

**Karst**

Karstic terrain is formed by the solution of carbonate rock (e.g., limestone, dolostone, and marble) by percolating acidic rainwater and groundwater, often along fractures, joints, and bedding planes. It is characterized by cavern openings, closed depressions, and sinking streams, and can sometimes lead to engineering problems due to surface subsidence.

Greene County, Pennsylvania generally does not consist of lithology consistent with karst materials. The Projects' compressor stations and pipeline facilities were not mapped in areas of known karst features by the ODGS; therefore, karst is not expected to be widespread along the Projects' facilities in Ohio.

Conditions conducive of karst terrain have been identified in throughout the Commonwealth of Kentucky. A large area mapped as karst terrain exists approximately 5.5 miles to the north of the Danville Compressor Station within Lincoln County. Another large area mapped as karst terrain exists approximately 5.8 miles to the north of the Tompkinsville Compressor Station within Monroe County, while a smaller karst area exists approximately 4.5 miles to the west. These areas all consist of exposed carbonate containing fissures, tubes, and caves over 1,000 feet long. Sinkhole data show several sinkholes in close proximity to the Tompkinsville Compressor Station, including a sinkhole mapped 158 feet from the station boundary (USGS, 2004).

The geologic setting for Wilson County, Tennessee is contiguous with karst terrain, consisting of dominant limestone of Ordovician age. The entire Wilson County, as well as neighboring counties, is mapped as a large karst terrain region. This terrain consists of exposed carbonate rock, with fissures, tubes, and caves over 1,000 feet long. Data show that sinkholes are probable within this region (USGS, 2004).

The geologic setting for Colbert County, Alabama is consistent with karst topography, including areas mapped as limestone and dolomite. A large mapped region of karst topography exists approximately 3.5 miles to the north of the Barton Compressor Station, and a smaller mapped region exists approximately 4.7 miles to the south. These areas both consist of exposed carbonate containing fissures, tubes, and caves over 1,000 feet long. Sinkhole data do not exist within close proximity to the Projects' areas, and do not appear to correlate with these nearby karst areas (USGS, 2004).

The closest area mapped as karst terrain to the proposed Kosciusko Compressor Station within Attala County, Mississippi is approximately 10 miles to the northwest. This area is relatively small and consists of pseudokarst in unconsolidated material, with fissures and voids present to a depth of 50 feet. The geologic setting for Monroe County dominantly consists of limestone, consistent with karst terrain. The Egypt Compressor Station is located within a large, north to south spanning karst terrain area. This terrain incudes exposed carbonate rock, with fissures, tubes, and caves generally absent, and where present are less than 50 feet long. Data show that sinkholes are probable within this region (USGS, 2004).

Mitigative and remedial measures would be implemented, as needed, to minimize the risk of subsidence. Construction of the Projects would be in accordance with USDOT standards within or adjacent to existing facilities, Texas Eastern would conduct regular inspections of its facilities, and if evidence of subsidence is noticed in the future, Texas Eastern would implement additional monitoring and corrective action. Based on the karst terrain and the implementation of monitoring and the proposed mitigative measures, we conclude that the risk of damage to the proposed facilities from sinkholes is minimal.

**Mine Subsidence**

The ODGS maintains a large database of abandoned underground mines; however, it does not include potentially thousands of small mines that were in operation before laws regulating the reporting of such practices had been enacted (ODGS, 2012). According to the ODGS database, an abandoned underground coal mining operation is mapped crossing the Wheelersburg to Athens Loop corridor near MP 611.7. No abandoned underground mining operations were mapped crossing the Projects' areas for the Berne to Holbrook or Athens to Berne Loops. One abandoned and one active underground coal mine were mapped approximately 0.3 and 0.6 mile from the Berne to Holbrook Loop, respectively. Texas Eastern would implement the same measures if mine subsidence is observed along the loops as the sinkhole mitigative and remedial measures. Based on the limited amount of known mining under Project facilities and the implementation of monitoring and the proposed mitigative measures, we conclude that the risk of damage to the proposed facilities from mine subsidence is minimal.

**Flash Flooding**

As required, aboveground facilities and pipeline stream crossings would be designed to preclude impacts from high velocity flows, largely by controlling erosion, per the Projects' E&SCP. Measures would be implemented to provide the necessary equipment to handle waterbody flow increases during pipeline installation activities such as having additional pumps on stand-by for dam-and-pump crossings or appropriately sized flumes to handle storm flows for flume crossings. In addition, equipment crossings would be designed to handle higher flow

volumes that could be anticipated from storm events and flooding situations. After construction is completed, each crossing would be periodically inspected for signs of erosion and remediated, as necessary.

Designated Federal Emergency Management Agency (FEMA) flood plains along the Projects' loops are restricted to larger stream valleys. A portion of the Owingsville Compressor Station is within the 100-year floodplain of the Licking River. The Kosciusko Compressor Station in Attala County, Mississippi, is adjacent to both the Little Conahoma River and the 100-year floodplain. A small portion of the compressor station property falls within the 100-year floodplain. The Holbrook Compressor Station in Greene County, Pennsylvania, also partially falls into the 100-year flood plain of North Fork Dunkard Fork. The proposed Projects' pipelines and remaining compressor stations are not within FEMA-mapped floodplain areas. Because the compressor facilities are existing, we do not anticipate any new impacts on floodplains nor any increased risks from flooding.

We conclude that construction and operation of the Projects would not result in any significant impact on geologic resources in the Projects' areas, nor do we anticipate any impacts from geologic hazards.

## 1.2 Soils

Soil associations and soil series and map unit descriptions that occur within the Projects' areas were identified using the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Surveys for Greene County in Pennsylvania; Athens, Meigs, Noble, Monroe, Warren, and Perry counties in Ohio; Bath, Monroe, and Lincoln counties in Kentucky; Wilson County in Tennessee, Colbert County in Alabama; and Attala and Monroe counties in Mississippi; (USDA, 2015a). Important attributes of the soil map units that would be crossed by the Projects include erosion potential, fertility, and drainage characteristics.

### 1.2.1 Soil Characteristics

Soil types along the Projects' routes were assessed to identify severe erosion potential soils, high compaction potential soils, poor revegetation potential soils, poorly drained or very poorly drained soils, and excessively drained soils. These specific soil attributes were selected based on the attributes' potential to cause construction limitations or hazards. Table B-1 identifies the amount of soils, in acres or miles, with important attributes within the Projects' areas.

Construction activities that could affect soils include clearing and grading, trenching, backfilling, and restoration along the pipeline right-of-way and at aboveground facility sites. Potential impacts on soils could include compaction, erosion, mixing of topsoil and subsoil, and a decrease in soil productivity. Texas Eastern would implement the measures identified in Texas Eastern's E&SCP to limit impacts on soil resources, and for restoration in agricultural and residential areas, including topsoil segregation, backfilling practices, and reseeding.

In areas of rocky soils or shallow depth to bedrock, Texas Eastern would remove excess stone or rock from surface soils such that the rock content would be no higher than that within adjacent, similar soils in accordance with Texas Eastern's E&SCP and the FERC Plan.

None of the soils present in the proposed Projects' areas indicate that significant construction limitations or hazards are likely to occur.

**Table B-1**
**Summary of Important Soil Attributes Associated With the Projects' Facilities**

| Facility | Unit of Impact | Prime/ Local/ Unique Farmland | Hydric | Compaction Prone b/ | Highly Erodible | | Shallow to Bedrock d/ |
|---|---|---|---|---|---|---|---|
| | | | | | Water | Wind c/ | |
| Pipeline Facilities a/ | Mile | 8.1 | 0.9 | 0.1 | 3.7 | 0.1 | 9.0 |
| Compressor Stations | Acre | 234.6 | 73.7 | 9.1 | 28.4 | 25.2 | 111.4 |
| Launcher/Receiver and Valve Sites | Acre | 1.3 | 1.2 | 0.0 | < 0.1 | 0.0 | 0.5 |
| South End Tie-In | Acre | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Permanent Access Roads | Mile | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Temporary Access Roads | Mile | 1.2 | 0.2 | 0.0 | 0.6 | 0.0 | 1.5 |
| Pipeyards and Contractor Wareyards | Acre | 21.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.1 |

a/ Mileage of pipeline facilities is based on length crossed by the proposed centerline.
b/ Compact prone soils include those ranked as high, or those soils with very poorly drained and poorly drained drainage classes.
c/ Includes soils in Wind Erodibility Groups one through three.
d/ Includes lithic and paralithic materials.
Source: USDA, 2015a

## Prime/Local/Unique Farmland

Prime farmland soils are defined by the USDA as having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and are available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods (USDA, 2015b).

The USDA also identifies unique farmland and farmland of statewide agricultural importance. Unique farmland areas are identified as soils that support specific high-valued foods, but these soils require proper management. Farmland of statewide importance soils are valuable for crop production, but typically require more management and have lower yields than prime farmland soils (USDA, 2015b).

Texas Eastern would work with landowners in the areas with prime and statewide or local important farmland to ensure that proper restoration of impacted agricultural area is implemented, including topsoil segregation, stone removal, soil de-compaction, and reseeding in compliance with specifications. Texas Eastern would also work with landowners to arrange for proper fencing of the work areas, locations for livestock to cross the right-of-way, and if necessary, alternate grazing areas for livestock. Prime farmlands and farmlands of statewide and local importance occurring within the right-of-way would be returned to pre-construction uses following construction and therefore would not be permanently affected by the Projects. Table B-1 contains a summary of the prime farmland soils associated with the Projects' facilities.

Approximately 0.8 mile of prime farmland soils, 0.8 mile of prime farmland if protected from flooding soils, and approximately 6.3 miles of soils designated as local importance would

be crossed by the Projects' pipeline facilities. Approximately 133.4 acres of prime farmland, 41.1 acres of prime farmland if drained or protected from flooding soils, 27.6 acres of soils designated as local importance, and 35.9 acres of area designated as having statewide importance are mapped at the compressor stations; however, these areas are already permanently out of agricultural production, and there are no additional impacts related to the Projects. Approximately 1.3 acres of prime farmland soils (if protected from flooding) would be impacted by the proposed launcher/receiver and valve sites. No soils with statewide designation would be impacted by permanent access roads. Approximately 1 mile of farmlands of local importance, 0.2 mile of prime farmland soils, and 0.1 mile of prime farmland if protected from flooding soils would be impacted by temporary access roads. Approximately 5.6 acres of area designated as prime farmland and approximately 15.4 acres of area designated as farmland of local importance would be within the contractor wareyards.

Texas Eastern would segregate topsoil as described in the Projects' E&SCP, to ensure continued productivity of these farmlands as well as USDA designated farmland soils. Measures for maintaining soil fertility in active agricultural lands temporarily impacted by trenching and backfilling activities (described in detail in the Projects' E&SCP) that may be used are summarized as follows:

- The entire topsoil layer, up to a maximum depth of 12 inches, would be segregated during grading and stockpiled then reapplied over the area of disturbance as the surficial soil layer. Topsoil segregation would maintain surface horizons with higher organic matter content.
- Rock fragments excavated from the subsoil or derived from blasted bedrock would be backfilled only to the top of the natural bedrock profile. Excess rock fragments would be disposed of in an approved manner (as described in the Projects' E&SCP) that would not interfere with agricultural activities and would not be incorporated into topsoil layers. Final topsoil layers would be similar in rock fragment content to adjacent soils.
- The topsoil and subsoil would be tested for compaction at regular intervals in agricultural lands. The topsoil of severely compacted areas would be plowed, or a cover crop such as alfalfa would be planted and subsequently plowed to decrease bulk density and improve soil structure.
- If drain tiles are encountered in agricultural lands, flow would be maintained in the drainage systems during construction. Drain tile systems would be probed beyond the trenchline to determine if damage has occurred beyond the area of excavation. Any damage to or temporary manipulation of any drain tile systems would be repaired by Texas Eastern's construction contractor to a level of function that meets original condition.

If irrigation systems are encountered in agricultural lands, flow would be maintained during construction to the extent possible, and any damage would be repaired.

With the implementation of the mitigation measures outlined in Texas Eastern's E&SCP, we find that construction and operation of the Projects would not result in significant impacts on prime farmlands and agricultural land.

**Hydric Soils**

Hydric soils are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

Construction impacts include mixing of soils from rutting and compaction from heavy equipment operated under saturated conditions, and compaction against underlying rock fragments in lower horizons. The upper horizons of hydric soils may contain large amounts of organic material making them especially fertile for agriculture. Such soils are susceptible to rapid decomposition from exposure to air during construction and restoration.

The proposed pipeline facilities would only cross isolated areas of hydric soils. Less than 0.1 percent (0.02 mile) of the soils that would be crossed by the pipeline loops are considered hydric. The compressor stations only include isolated areas of hydric soils. Approximately 21.6 percent (73.7 acres) of the soils within the existing compressor stations are considered hydric. Approximately 0.2 mile within the proposed temporary access roads are considered hydric. High groundwater levels associated with hydric soils could create a buoyancy hazard for the pipeline. Special construction methods such as concrete coating of pipe and other weighting methods would be used as necessary to overcome potential buoyancy hazards during operation of the pipeline.

Texas Eastern would minimize rutting of hydric soils by implementing the measures in its E&SCP, and we find that construction and operation of the Projects would not result in significant impacts from compaction and rutting of soils.

**Compaction Prone Soils**

Soil structure and compaction can inhibit a particular soil type's ability to hold water and the ability for vegetation to root. Soils that are poorly drained and very poorly drained have a high compaction value, soils that are somewhat poorly drained to moderately well-drained have a moderate compaction value, and soils that are well-drained to excessively drained soils have low compaction values. The majority of the soils within the Projects' areas are classified as moderately well-drained to excessively well-drained (typically upland soils). Thus, damage to soil structure or soil compaction is not expected in the majority of upland soils within the Projects' areas. Areas with higher potential of compaction are typically poorly drained soils at lower elevations (these soils are typically considered hydric and are indicative of wetlands).

Due to extended periods of saturation, poorly-drained soils are prone to compaction and structural damage if disturbed. The Projects' E&SCP provides detailed descriptions of wetland and waterbody crossing techniques designed to minimize damage to saturated soils, as well as other soils that may be vulnerable to such damage when wet. To the extent practicable, Texas Eastern would avoid construction during periods of heavy rainfall, snowmelt, or unusual soil saturation. Topsoil would be segregated as required in wetlands, residential areas, and agricultural fields and later returned as the surficial layer, as previously described. Timber equipment mats would be used to minimize rutting and compaction within saturated wetland soils. Grading to restore natural site contours and repair rutted areas would be completed prior to final revegetation seeding and mulching, which would initiate natural restoration of soil structure and bulk density. Agricultural land would be tested for compaction and treated by plowing topsoil layers or other means, as needed. Given these measures, we conclude that soil structure and compaction should not be adversely affected by Project-related activities.

**Highly Erodible Soils**

Soil erosion is the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity. These soils have the potential to erode during rain events, periods of surface water runoff, and wind transport (USDA, 2015b). The process may be accelerated by human activity that disturbs the soil, such as construction, removal of vegetation, tillage, over-grazing, or timber harvesting. Soil susceptibility to erosion is determined by physical and environmental characteristics such as texture and structure, topography and slope, surface roughness, vegetation cover, and wind or rainfall intensity.

Clearing, grading, and movement of heavy equipment could increase erosion and result in transport of eroded sediments into wetlands and waterbodies. Texas Eastern would use Best Management Practice (BMPs), included in the Projects' E&SCP. Texas Eastern would install and maintain erosion and sedimentation controls within and at the limits of the Project workspaces. Temporary erosion controls include hay bales, and silt fence immediately following land clearing, or before clearing in sensitive areas. Texas Eastern may install permanent erosion control devices such as slope breakers to minimize erosion during the Projects' construction. Following construction, Texas Eastern would restore original surface contours and plant of recommended vegetation seed mixes to stabilize workspace areas following initial restoration. We do not anticipate that the construction and operation of the Projects would result in any significant impacts from erosion and sedimentation.

Approximately 3.7 miles of the pipeline would cross soils considered to have high potential for water erosion. Approximately 28.4 acres of the existing compressor stations are located within the soil areas considered to have high potential for water erosion. Less than 0.1 acre within the proposed launcher/receiver and valve sites are located within soil areas designated to have high potential for water erosion. There would be no temporary impacts on soil areas designated to have high potential for water erosion caused by launcher/receiver and valve site related activities. No soils crossed by the proposed permanent access roads have high potential to be eroded by water processes. Approximately 0.6 mile of soils crossed by the proposed temporary access roads have a high potential to be eroded by water processes.

No soils crossed by the proposed pipeline have high wind erosion potential. Approximately 28.5 acres of the compressor stations are located within soil areas considered to have high wind erosion potential. No soils located within the proposed launcher/receiver and valve sites are designated to have high wind erosion potential. No soils crossed by the proposed permanent access roads or temporary access roads are designated to have high wind erosion potential. No soils located within the three contractor wareyards are designated to have high wind erosion potential.

With the implementation of the BMPs described in Texas Eastern's E&SCP, we find that construction and operation of the Projects would not result in significant soil erosion impacts.

**Shallow to Bedrock Soils**

The majority of the soils that would be crossed by the proposed Projects are composed of greater than 15 percent shale fragments within the subsoil. Shallow soils to be crossed by the Projects' pipeline facilities are typically underlain by shale bedrock (Ohio Department of Natural Resources [ODNR], 2015a). Shale bedrock is considered to be paralithic material and may be

rippable but also may require heavy powered machinery or blasting to rip and break the underlying bedrock (USDA, 1993).

Depth to bedrock is less than 60 inches along approximately 9.0 miles of the pipeline. This is less than typical trench depth of 7 to 10 feet. In addition, depth to bedrock may vary in disturbed soils like Udorthents and Urban Lands soils where soils may have been removed. As a result, mechanized bedrock ripping and blasting would likely be required for trench excavation.

Excavation activities would generate considerable volumes of rock fragments that could impact productivity of agricultural lands if not properly handled. Incorporation of rock fragments into the topsoil at the location of the existing compressor stations is not a risk to post-construction soil productivity because these areas are very deep and consist of industrial land uses. Since excavation would not occur along the access roads or at the contractor wareyards, introduction of rock into the topsoil is not a potential threat to soil productivity.

Texas Eastern would implement several measures to prevent incorporation of rock fragments into the topsoil along agricultural land crossed by the Projects. These measures include segregation and protection of topsoil along the trenchline, rock backfill in agricultural lands only to the top of bedrock, and disposal of excess rock fragments in an approved manner so as to not incorporate rock fragments into topsoil layers or otherwise interfere with agricultural activities. By implementing these mitigation measures, we find that construction and operation of the Projects would not result in significant introduction of rock into the topsoil.

**Poor Revegetation Potential Soils**

Soil characteristics are favorable in most areas of the Projects for successful revegetation. Only a very small percentage of area found within the Projects' areas were determined to have a low revegetation potential. Several measures designed to maximize revegetation success in all construction areas are described in the Projects' E&SCP. Standard revegetation measures include fertilizer and pH amendments (except in wetlands), seedbed preparation, use of a proven seed mix, consideration of seasonal constraints, and mulch application. Where necessary, erosion control fabric or matting would be used on steep slopes to ensure that these soils are successfully revegetated.

In accordance with the FERC Plan, Texas Eastern would monitor all disturbed areas to determine the revegetation success of the Projects for two growing seasons. Areas where vegetation cover has not met the revegetation success criteria would be corrected to ensure the right-of-way conditions are similar to the surrounding undisturbed areas.

With adherence to protocols outlined in the Projects' E&SCP and past successes with existing right-of-way facilities in this local region, we conclude that any problems with re-establishment of vegetation are anticipated to be minimal and temporary.

### 1.2.2 Soil Contamination

Soil contamination along the proposed segments may result from at least two sources: hazardous material or fuel spills during construction and/or pre-existing contaminated areas encountered during construction. Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. Texas Eastern has prepared an SPCC Plan that specifies cleanup procedures in the event of soil contamination from spills or

leaks of fuels, lubricants, coolants, or solvents during construction. Texas Eastern and its contractors would use the SPCC Plan to minimize accidental spills of materials that may contaminate soils, and to ensure that inadvertent spills of fuels, lubricants, or solvents are contained, cleaned up, reported, and disposed of as quickly as possible and in an appropriate manner.

A review of state, tribal, and federal databases and files did not identify contaminated soils along the proposed pipeline rights-of-way for the Projects.

Three of the Projects' compressor stations (Tompkinsville, Danville, and Lebanon) that are within company owned property were listed in Environmental Data Resources, Inc. (EDR) reports as having the potential to contain contaminated soils. However, Texas Eastern entered into a Consent Decree with the U.S. Environmental Protection Agency (USEPA) on October 1, 1989, that required Texas Eastern to assess soil and groundwater at numerous sites, such as compressor stations, mainline valves, and pig launcher/receivers, and remediate polychlorinated biphenyl (PCB)-contaminated soils to achieve specific cleanup levels. Texas Eastern successfully completed all requirements of the Consent Decree. All twelve existing facility modifications were assessed and portions remediated for PCBs, as required.

Although not anticipated, if contaminated or suspect soils are identified as a result of construction activities, work in the area of the suspected contamination would be halted as necessary until the type and extent of the contamination is determined. The type and extent of contamination would determine the appropriate mitigation for these areas and would be conducted in accordance with applicable state and federal regulations. We conclude that the potential for significant contaminated soil impacts is unlikely.

## 2. Water Resources and Wetlands

### 2.1 Groundwater Resources

**State and U.S. Aquifers**

The Projects' pipeline facilities would cross consolidated sedimentary and alluvial aquifers (USGS, 1995). No designated sole source aquifers are within the Projects' areas (USEPA, 2015a).

Within Ohio, the Projects would cross three types of consolidated aquifers and one alluvial aquifer: Pennsylvanian Allegheny and Pottsville Groups Undivided Aquifer, Pennsylvanian Undivided Aquifer and Franklin Ground Moraine Consolidated Aquifers, and Raccoon Creek Alluvial Aquifer (Ohio Environmental Protection Agency [OEPA], 2015a and ODNR, 2014). Within Pennsylvania the Projects would cross one consolidated aquifer: Waynesburg Formation. Within Tennessee the Projects would cross the Ordovician Carbonate Rock Aquifer. Within Kentucky the Projects would cross three aquifers: Mississippian Sandstone and Carbonate Rock Aquifer, Silurian-Devonian Carbonate Rock Aquifer, and Southeastern Coastal Plain Semi-Consolidated Sand Aquifer. Within Alabama the Projects would cross two aquifers: Southeastern Coastal Plain Semi-Consolidated Sand Aquifer, and Mississippian Sandstone and Carbonate Rock Aquifer. Within Mississippi the Projects would cross two aquifers: Black Warrior River Unconsolidated Aquifer, and Mississippi Embayment Semi-Consolidated Sand Aquifer. Table B-2 includes information regarding aquifer types,

milepost ranges, thickness, and yield in gallons per minute (gpm). We do not anticipate any significant impacts on aquifers from the construction and operation of the Projects.

**Table B-2**
**State and U.S. Aquifers Crossed by the Proposed Projects**

| Enter MP a/ | Exit MP a/ | Crossing Length (mile) | Aquifer Name b/ | Aquifer Type | Thickness (feet) | Yield (gpm) |
|---|---|---|---|---|---|---|
| ***Pipeline Facilities*** | | | | | | |
| **Wheelersburg to Athens Loop** | | | | | | |
| 611.6 c/ | 613.7 | 2.0 | Pap | Consolidated | ~ 100 | 0-5 |
| 612.1 | 613.3 | 1.2 | Raccoon Creek Alluvial Aquifer | Unconsolidated | 25 - 100 | 0-5 |
| 613.5 | 614.1 | 0.6 | Pu | Consolidated | ~ 100 | 0-5 |
| 614.2 | 615.6 | 1.4 | Pap | Consolidated | ~ 100 | 0-5 |
| 614.6 | 614.7 | 0.1 | Raccoon Creek Alluvial Aquifer | Unconsolidated | 25 - 100 | 0-5 |
| 615 | 615.1 | 0.1 | Raccoon Creek Alluvial Aquifer | Unconsolidated | 25 - 100 | 0-5 |
| 615.7 | 615.9 | 0.2 | Pu | Consolidated | ~ 100 | 0-5 |
| 616 | 616.7 | 0.7 | Raccoon Creek Alluvial Aquifer | Unconsolidated | 25 - 100 | 0-5 |
| 616 | 616.8 | 0.8 | Pap | Consolidated | ~ 100 | 0-5 |
| 616.6 | 620.6 | 4.0 | Pu | Consolidated | > 100 | 0-5 |
| 617.2 | 617.3 | 0.1 | Pap | Consolidated | ~ | 0-5 |
| 618.2 | 618.3 | 0.1 | Raccoon Creek Alluvial Aquifer | Unconsolidated | 25 - 100 | 0-5 |
| **Athens to Berne Loop** | | | | | | |
| 677.3 d/ | 681.9 | 4.5 | Pu | Consolidated | > 100 ft. | 0-5 |
| **Berne to Holbrook Loop** | | | | | | |
| 698.2 e/, f/ | 698.3 | 0.1 | Pu | Consolidated | > 100 ft. | 0-5 |
| 699.1 | 699.2 | 0.1 | Pu | Consolidated | >100 ft. | 0-5 |
| 699.9 | 700.0 | 0.1 | Pu | Consolidated | >100 ft. | 0-5 |
| **Line 10-A (outside the compressor station)** | | | | | | |

| Enter MP a/ | Exit MP a/ | Crossing Length (mile) | Aquifer Name b/ | Aquifer Type | Thickness (feet) | Yield (gpm) |
|---|---|---|---|---|---|---|
| 0 | 0.2 | 0.2 | Mississippi Embayment j/ | Semi-Consolidated Sand | 2,000 | <2,000 |
| ***Aboveground Facilities*** | | | | | | |
| **Holbrook Compressor Station** | | | | | | |
| N/A | N/A | N/A | PPw | Consolidated | 80 – 200 | 5-60 |
| **Lebanon Compressor Station** | | | | | | |
| N/A | N/A | N/A | Franklin Ground Moraine | Consolidated/Unconsolidated | 40 - 50 | 5-25 |
| **Somerset Compressor Station** | | | | | | |
| N/A | N/A | N/A | Pap | Consolidated | ~ 100 | 0-5 |
| **Berne Compressor Station g/** | | | | | | |
| N/A | N/A | N/A | Pu | Consolidated | > 100 ft. | 0-5 |
| **Athens Compressor Station h/** | | | | | | |
| N/A | N/A | N/A | Pu | Consolidated | > 100 | 0-5 |
| **Owingsville Compressor Station** | | | | | | |
| N/A | N/A | N/A | Mississippian i/ | Sandstone and Carbonate Rock | 100-600 | 2-50 |
| N/A | N/A | N/A | Silurian-Devonian i/ | Carbonate Rock | 300 - 400 | 5-15 |
| **Danville Compressor Station** | | | | | | |
| N/A | N/A | N/A | Mississippian i/ | Sandstone and Carbonate Rock | 100-600 | 2-50 |
| **Tompkinsville Compressor Station** | | | | | | |
| N/A | N/A | N/A | Southeastern Coastal Plain i/ | Semi-Consolidated Sand | 50-200 | 50 |
| N/A | N/A | N/A | Mississippian i/ | Sandstone and Carbonate Rock | 100-600 | 2-50 |
| **Gladeville Compressor Station** | | | | | | |
| N/A | N/A | N/A | Ordovician i/ | Carbonate Rock | 200-500 | 2-20 |

| Enter MP a/ | Exit MP a/ | Crossing Length (mile) | Aquifer Name b/ | Aquifer Type | Thickness (feet) | Yield (gpm) |
|---|---|---|---|---|---|---|
| **Barton Compressor Station** | | | | | | |
| N/A | N/A | N/A | Southeastern Coastal Plain i/ | Semi-Consolidated Sand | 50-200 | 50 |
| N/A | N/A | N/A | Mississippian i/ | Sandstone and Carbonate Rock | 100-600 | 2-50 |
| **Egypt Compressor Station** | | | | | | |
| N/A | N/A | N/A | Black Warrior River i/ | Unconsolidated | 1,000 | <100 |
| **Kosciusko Compressor Station** | | | | | | |
| N/A | N/A | N/A | Mississippi Embayment i/ | Semi-Consolidated Sand | 2,000 | <2,000 |
| **South End Tie-In** | | | | | | |
| N/A | N/A | N/A | Mississippi Embayment i/ | Semi-Consolidated Sand | 2,000 | <2,000 |

a/ Texas Eastern Access South, Adair Southwest, and Lebanon Extension Projects MP enter and exit for each aquifer crossing.
b/ State aquifer names include: Pennsylvanian Allegheny and Pottsville Groups Undivided Aquifer (Pap), Pennsylvanian Dunkard Group Aquifer (Pd), Pennsylvanian Undivided Aquifer (Pu), Waynesburg Formation (PPw), Franklin Ground Moraine ,and Raccoon Creek Alluvial Aquifer. U.S. aquifers include Mississippian, Silurian-Devonian, Southeastern Coastal Plain, Ordovician, Black Warrior River, and Mississippi Embayment.
c/ Includes the Wheelersburg Receiver Removal site
d/ Includes the Athens Receiver Removal site
e/ Includes the Line 15 Tie-In West site
f/ Includes the Line 15 Tie-In East site
g/ Includes Berne Launcher/Receiver
h/ Includes Athens Launcher/Receiver
i/ U.S. Aquifer
N/A = Not applicable

## Public and Private Water Supply Wells and Springs

The Projects' facilities would not cross any state-designated wells or associated groundwater protection areas for public supply wells. Information regarding private supply wells within 150 feet of the Projects construction workspace is provided in table B-3.

**Table B-3**
**Private Water Supply Wells within 150 Feet of Construction Workspace**

| State | County | Township | Type | Milepost a/ | Distance from Proposed Pipeline (feet) | Distance from Construction Work Area (feet) |
|---|---|---|---|---|---|---|
| ***Pipeline Facilities*** | | | | | | |
| **Wheelersburg to Athens Loop** | | | | | | |
| OH | Meigs | Columbia | Private | 612.7 | 52 | 87 |
| OH | Meigs | Scipio | Private | 615.8 | 88 | 1 |
| OH | Athens | Alexander | Private | 619.8 | 88 | 54 |
| OH | Athens | Alexander | Private | 619.8 | 91 | 57 |
| OH | Athens | Alexander | Private | 619.8 | 94 | 60 |
| OH | Athens | Alexander | Private | 619.8 | 97 | 63 |
| **Athens to Berne Loop** | | | | | | |
| OH | Noble | Stock | Private | 677.8 | 118 | 31 |
| **Contractor Yard 3 (Landefeld)** | | | | | | |
| OH | Monroe | Center | Private | N/A | N/A | 0 |
| ***Aboveground Facilities*** | | | | | | |
| **Berne Compressor Station** | | | | | | |
| OH | Monroe | Sunsbury | Private | N/A | N/A | 0 |
| **Egypt Compressor Station** | | | | | | |
| MS | Monroe | Franklin | Private | N/A | N/A | 150 |
| | | | Private | N/A | N/A | 0 |
| | | | Private | N/A | N/A | 0 |
| **Kosciusko Compressor Station** | | | | | | |
| MS | Attala | Carthage | Private | N/A | N/A | 13 |
| | | | Private | N/A | N/A | 132 |
| | | | Private | N/A | N/A | 120 |
| | | | Private | N/A | N/A | 55 |

a/ Texas Eastern Access South, Adair Southwest, and Lebanon Extension Projects MP.
N/A = Not applicable.

**Contaminated Groundwater**

No sites with documented hazardous materials, spills, or contamination were identified along the pipeline portions of the Projects. As discussed in EA section 1.2.2, Projects' compressor stations were listed in the EDR reports as having the potential to contain contaminated soils. However, all twelve existing compressor stations where facility modifications are proposed were assessed and portions remediated for PCBs.

**General Impacts and Mitigation**

Construction activities that could affect groundwater include clearing of vegetation, grading, trench excavation, dewatering of the trench and bore pits, soil mixing and compaction, fuel handling, and blasting. Impacts could include changes in the volume and rate of groundwater infiltration, groundwater contamination, and alteration of groundwater flow and well yields. Clearing and grading of the right-of-way and construction workspaces would remove vegetation that could act as a filter for groundwater recharge. Each of these possible impacts is short-term and temporary; a long-term impact on groundwater resources is not anticipated as a result of these Projects.

In accordance with Texas Eastern's E&SCP, vegetation would only be cleared where necessary and areas would be allowed to revegetate once construction was complete. Excavation would typically occur at depths 3 to 10 feet, shallower than the aquifers in the Projects' area, and this is not expected to impact groundwater resources.

Dewatering of the pipeline trench may be required in areas with a high water table or after a heavy rain. Removal of the water from the trench may result in a temporary fluctuation in local groundwater levels. Trench dewatering activities are usually completed in a few days within a particular location; therefore, impacts are expected to be temporary. All trench water would be discharged into well-vegetated upland areas or properly constructed dewatering structures to allow the water to infiltrate back into the ground, thereby minimizing any long-term impacts on the water table.

Texas Eastern did not identify an documented hazardous materials, spills, or contamination within one mile of the proposed loops and replacement pipeline. It is unlikely that any contamination would be encountered. If contaminated groundwater is identified along the Projects' routes, Texas Eastern would develop a Contamination Contingency Plan (CCP) in accordance with all federal, state, and local regulations which would be incorporated as part of the Projects' E&SCP. If applicable, the plan would be submitted to the appropriate federal, state, and local regulatory agencies for review and approval. If, and as necessary, Texas Eastern would implement a CCP and obtain coverage under the USEPA Remediation General Permit for discharge of treated groundwater.

Potential spills or leaks of hazardous liquids, resulting from the refueling of construction vehicles or storage of fuel, oil, and other fluids during construction, could contaminate groundwater. Texas Eastern's SPCC Plan for construction addresses preventative measures to be used to minimize the potential impacts of a hazardous material spill on groundwater resources. Spill reporting requirements would be conducted in accordance with all federal, state, and local regulations.

Texas Eastern would develop its Stormwater Pollution Prevention Plan based on the Projects' E&SCP. Permit documentation and the Projects' E&SCP would be incorporated into the environmental compliance book to be used by contractors and EIs working on the Projects.

The construction at each of the compressor stations would be within the limits of disturbance of the existing facilities and may include grading, additional paved surfaces, buildings, new concrete pads, and gravel surfaces. Existing stormwater management facilities would be modified, as needed, to treat the difference in stormwater runoff volume from pre- to post-construction conditions for the design storm event in accordance with federal and state requirements. Texas Eastern anticipates that new impervious and graveled surface areas required for the compressor station facilities modifications would be minor and are required only to accommodate bi-directional flow capability along Texas Eastern's existing mainline. Therefore, it is unlikely that construction and operation would result in any meaningful change in groundwater recharge outside of the compressor station limits.

Hazardous material storage at the compressor stations and associated facilities would be designed with respect to applicable engineering, safety, and environmental standards. The sites would include leak detection and spill containment structures commensurate with the quantity of materials stored and would be maintained in compliance with all applicable state and federal regulations and permits. We conclude that through implementation of Texas Eastern's E&SCP and safe handling and storage of hazardous materials, adverse impacts on groundwater resources are unlikely.

Texas Eastern would conduct pre- and post-construction monitoring of well yield and water quality, with the landowner's permission, if blasting occurs within 150 feet of any water supply wells. Blasting would be limited to the minimum depth required for trench excavation in areas with shallow bedrock, and would be performed by registered licensed blasters, in accordance with all appropriate state and local approvals, and monitored by certified blasting inspectors. During blasting Texas Eastern would monitor ground vibrations at the nearest structure or water well within 150 feet of the blast site. In the unlikely event that any water supply well is damaged as a result of the blasting, Texas Eastern would ensure that a temporary source of water is provided until the damaged water well is restored to its former capacity and quality, that a replacement source is provided, or that the landowner is fairly compensated for the damages.

Texas Eastern has not committed to offer to conduct pre-and post-construction monitoring of well yield and water quality for drinking water supply wells within 150 feet of non-blasting construction in order to verify that construction activities do not affect these wells. Therefore, we recommend that:

- **Texas Eastern should conduct, with the well-owner's permission, pre- and post-construction monitoring of well yield and water quality for all private water wells within 150 feet of construction work areas. Within 30 days of placing the facilities in service, Texas Eastern should file a report with the Secretary of the Commission (Secretary) discussing whether any complaints were received concerning well yield or water quality and how each was resolved.**

Because Texas Eastern would implement its E&SCP and SPCC Plan to minimize the potential for impacts on groundwater, and implementation of our recommendation, we conclude

that the Projects are not likely to have a significant impact on groundwater resources, including public and private well water supplies.

## 2.2 Surface Water Resources

Texas Eastern identified 78 waterbodies within the Projects' areas that would be crossed by the Projects' pipeline facilities workspaces. There are 16 intermediate streams[4], and sixty-two minor streams that would be temporarily impacted by the pipeline facilities; no major streams, ponds, or navigable waterways would be affected. There are no National Wild and Scenic River System or state Scenic Rivers System listed waters within the Projects' areas.

Four waterbodies would be crossed by temporary access roads, two of which are minor streams and two of which are intermediate streams. No waterbodies would be crossed by the proposed permanent access roads. Two streams would be crossed at the contractor yards via existing culverts; no improvements or modifications to the culverts would be required.

Modifications at the aboveground facilities are anticipated to be minor in nature and within the boundaries of the existing facilities. No waterbody crossings and no impacts on water resources are anticipated. Appendix D identifies the waterbodies that would be crossed by the Projects' pipeline facilities, including waterbody ID, stream name, milepost, flow types, FERC classification, state water quality classifications, approximate crossing width, and the proposed crossing method.

### Sensitive Surface Waters

Sensitive surface waters include waterbodies that do not meet state water quality standards or have been designated for intensified water quality management and improvement, waterbodies containing federal or state listed threatened or endangered species or critical habitat, waterbodies that support fisheries of special concern, waterbodies that are crossed less than 3 miles upstream of a potable water intake, outstanding or exceptional quality waterbodies, and waters of particular ecological significance. Other factors that provide a basis for sensitivity are location of the waterbody within a sensitive or protected watershed, steep banks, important riparian areas, or other characteristics that could contribute to high risk of erosion impacts.

#### *Impaired Surface Waters*

Impaired waterbodies are waters that do not meet the water quality criteria of their designated use. As part of state water quality assessments, Section 303(d) of the federal Clean Water Act of 1972 mandates that states must prepare a list of all waters that do not meet the water quality criteria for their designated uses, and develop for each a Total Maximum Daily Load, which establishes the maximum allowable discharge into a waterbody to better control pollutant levels.

The Projects would result in 66 waterbody crossings along stream segments listed as impaired on the Ohio Integrated Water Quality Monitoring Report 303(d) list (OEPA, 2012). The impaired waterbodies include unnamed tributaries to Sisson Run, Leading Creek and its unnamed tributaries, unnamed tributaries to Fivemile Run, unnamed tributaries to Margaret

[4] The FERC Procedures define a minor waterbody as being less than or equal to feet wide and an intermediate waterbody as being at least 100 feet wide but less than or equal to 100 feet wide at the time of crossing.

Creek, and unnamed tributaries to Biddle Creek on the Wheelersburg to Athens Loop. The impaired waterbodies on the Athens to Berne loop include unnamed tributary to East Fork Duck Creek, and Greasy Run and its unnamed tributaries. The Berne to Holbrook Loop and aboveground facilities would not cross any impaired waterbodies.

Beneficial uses identified by the 303(d) list of impaired waters of the impaired waterbodies crossed by the Projects include recreation, aquatic life, and human health. Nine waterbodies have aquatic life beneficial use designations, fifty-three waterbodies have beneficial use designations of recreation and aquatic life, and four waterbodies have beneficial use designations of aquatic life and human health.

***Endangered, Threatened, and Special Concern Species, and Fisheries of Special Concern***

The following state and federally endangered mussel species were identified by the ODNR as having the potential to occur within the Projects' areas: sheepnose, fanshell, pink mucket, and snuffbox. The Projects are within the range of the following state endangered mussels: the washboard, the butterfly, Ohio pigtoe, and the monkeyface. The Projects are also within the range of the fawnsfoot, a state threatened mussel species. The ODNR also identified the Ohio lamprey as a state endangered species that is potentially within the Projects' areas. Protected wildlife and fishery resources are discussed further in section B-3. Based on agency consultations, habitat requirements, and proposed construction activities, we have concluded that the Projects' would have no effect on steam habitats for protected aquatic species.

***Surface Water Intakes and Surface Water Protection Areas***

None of the Projects' pipeline facilities or contractor yards are within 3 miles of any identified surface water intakes or surface water protection areas. One surface water protection area and three surface water intakes were identified within 3 miles of the aboveground facilities.

The Somerset Compressor Station in Perry County, Ohio is located approximately 0.0 mile, 0.1 mile, and 0.6 mile from the Somerset Village Surface Water Intake, the Somerset Lake Intake, and the Lake St. Joseph Intake, respectively. Texas Eastern has engaged with the Village of Somerset regarding potential impacts on the Somerset Reservoir as requested by the OEPA. Texas Eastern would provide the village with copies of its E&SCP and add the reservoir to the SPCC Plan "Emergency Contacts" Section, and contact the village one month prior to construction as requested by the village. The Kosciusko Compressor Station in Attala County, Mississippi is approximately 2.3 miles from the protection area of the Conehoma Water Association.

**Waterbody Crossings Methods, General Impacts, and Mitigation**

All of the waterbody crossings along the Projects' route are minor and intermediate crossings consisting of small perennial, intermittent, and ephemeral streams. Texas Eastern would adhere to the waterbody construction procedures described in EA section A.5.2 and within the Projects' E&SCP. Texas Eastern has requested deviations for the setbacks for ATWS due to construction limitations such as steep slopes and road crossings at waterbodies (see appendix B for specific locations and justifications). We have reviewed these and find them acceptable.

Pipeline construction across streams or adjacent to surface waters can result in temporary and long-term adverse environmental impacts if not properly completed. However, proper

construction techniques and timing can ensure that any such impacts are both temporary and minor. The primary impact associated with in-stream trenching is a temporary increase in turbidity and the resulting sedimentation that may occur downstream. Surface runoff and erosion from the cleared right-of-way can also increase in-stream sedimentation during construction. Other potentially deleterious impacts include accidental hazardous material spills resulting from refueling/maintaining construction equipment, fuel storage, or equipment failure in or near a waterbody, and could have immediate effects on aquatic resources and contaminate the waterbody downstream of the release point.

Long-term impacts on water quality can result from alteration of stream banks and removal of riparian vegetation. If not stabilized and revegetated properly, soil erosion associated with surface runoff and stream bank sloughing can result in the deposition of large quantities of sediment into the waterbody. Prolonged periods of exposure to high levels of suspended solids have been linked to fish egg and fry mortality and degradation of spawning habitat from the infiltration of sediments within the interstitial spaces of streambed gravel. The removal of riparian vegetation tends to increase light penetration into the waterbody, possibly increasing water temperature.

All streams that would be crossed by the Projects are considered minor or intermediate streams. It is likely that many of the minor waterbodies would be dry (depending on season) and would not support aquatic habitats at the time of construction. For sites with flowing water, temporary construction-related impacts include increased levels of turbidity and sedimentation associated with installation and removal of the flume or the dam and pump structures as well as the initial flush of stream water across the restored stream bed.

Minor long-term impacts associated with pipeline operations and maintenance would largely be restricted to periodic clearing of vegetation within the permanent right-of-way at waterbody crossings. These maintenance activities would be consistent with the FERC Procedures, which have been fully integrated into the Projects' E&SCP.

To minimize impacts at waterbody crossings during construction, operation, and maintenance, Texas Eastern would construct the Projects in accordance with its E&SCP and with all federal and state regulations and permit requirements.

To minimize the potential for sedimentation of waterbodies caused by erosion from the adjacent landscape, trench spoil that is excavated from streambeds and banks would be placed at least 10 feet from the top of the waterbody bank. Erosion control devices, such as silt fences and straw/hay bales, would be placed at the downslope edges of the spoil piles to prevent sediment from entering the waterbody. Once the pipeline is placed in the trench, the temporarily-stored spoil material would be placed back in the trench, and the stream banks and streambed would be restored as close to their pre-construction contours as feasible. Stream banks and riparian areas would then be revegetated in accordance with the Projects' E&SCP and any applicable agency requirements.

During construction, the open trench may, on occasion, accumulate water from either groundwater intrusion or precipitation. In such cases, the trench would be dewatered periodically to allow for proper and safe construction.

Texas Eastern has not proposed to cross any streams using the horizontal directional drill (HDD) method. This construction technique would allow the pipeline to be installed beneath a

waterbody without any direct impact. The use of the HDD method is contingent on information collected from geotechnical bores to assess and evaluate site-specific geological conditions at each proposed HDD location. If Texas Eastern later proposes to cross any waterbodies via HDD, it would develop a HDD Contingency Plan that would describe the HDD procedures and monitoring for inadvertent releases of drilling fluid, containment and cleanup procedures, and agency notifications. Such a plan would be in any request by Texas Eastern to the FERC for approval of the HDD crossing method.

Any hazardous materials, chemicals, lubricating oils, solvents, or fuels used during construction would be stored in upland areas at least 100 feet from wetlands and waterbodies as required by the Projects' E&SCP. All such materials and spills (if any) would be handled in accordance with Texas Eastern's SPCC Plan. Except where absolutely necessary and as approved by the EI, or to otherwise minimize overall impacts to the environment, there would be no refueling or lubricating of vehicles or equipment within 100 feet of a waterbody. Under no circumstances would refuse be discarded in waterbodies, trenches, or along the construction corridor. In accordance with the SPCC Plan, Texas Eastern would conduct routine inspections of tanks and storage areas to help reduce the potential for spills of hazardous materials. Texas Eastern would also implement its SPCC Plan for the removal of abandoned machinery or vehicles within the construction workspace.

Because the waterbody crossings would be completed in accordance with the construction and restoration methods described above, the Projects' E&SCP, and any site-specific measures that may be required by the USACE and OEPA, we conclude that impacts on waterbodies would be minor and temporary.

## Hydrostatic Testing

The piping associated with all of the Projects' facilities would be hydrostatically tested for structural integrity prior to being placed in service. The proposed hydrostatic test water sources, discharge locations, and approximate volumes are provided in table B-4. Texas Eastern would obtain any permits and approvals required to use proposed water sources and to discharge hydrostatic test water.

**Table B-4**
**Proposed Water Withdrawal and Discharge Locations for Hydrostatic Testing**

| Source | Withdrawal Location (MP) | Discharge Location (MP) | Approximate Volume (gallons) |
|---|---|---|---|
| ***Pipeline Facilities*** | | | |
| **Wheelersburg to Athens Loop** | | | |
| Sisson Run | 611.5 | 611.5 a/ | b/ |
| Leading Creek | 613.4 | 613.4 a/ | b/ |
| ***Facility Total*** | | | ***2,500,000*** |
| **Athens to Berne Loop** | | | |
| Trib. to Greasy Run | 678.0 | 678.0 a/ | b/ |
| Clear Fork Little Muskingum River | 681.8 | 681.8 a/ | b/ |
| ***Facility Total*** | | | ***1,265,000*** |

| Source | Withdrawal Location (MP) | Discharge Location (MP) | Approximate Volume (gallons) |
|---|---|---|---|
| ***Berne to Holbrook Loop*** | | | |
| Ackerson Run | 699.3 | 699.3 a/ | 675,000 |
| ***Facility Total*** | | | **675,000** |
| Line 10-A | | | |
| Municipal Source | N/A | Within Kosciusko Compressor Station Workspace | 37,000 |
| ***Facility Total*** | | | **37,000** |
| ***Aboveground Facilities*** | | | |
| **Athens Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 35,000 |
| **Barton Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 35,000 |
| **Berne Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 14,000 |
| **Danville Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 89,000 |
| **Gladeville Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 42,000 |
| **Holbrook Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 30,000 |
| **Owingsville Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 31,000 |
| **Somerset Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 62,000 |
| **Tompkinsville Compressor Station** | | | |
| Municipal Source | N/A | Within Compressor Station Workspace | 75,000 |
| **Projects Total** | | | **4,890,000** |

a/ Hydrostatic test water would be discharged into vegetated upland areas near the source locations. In addition, although not specifically listed, discharges may occur at test section breaks and/or at the beginning and end of the pipeline segments.

b/ Approximate volume provided is for testing of the entire associated facility. The specific volumes that would be withdrawn and discharged at each potential source would be determined by the contractor at the time of hydrostatic testing. The number and length of test sections within each facility would be based on pipe wall thickness, maximum allowable operating pressure and elevations. Based on the beginning and ending points of each test section, the appropriate source water would be selected from the above list, and the volumes from those source waters can then be calculated. Any withdrawal from any individual source would not exceed the total volume for the facility.

Environmental impacts from withdrawal and discharge of hydrostatic test water would be minimized by using the measures prescribed in the Projects' E&SCP. Texas Eastern would:

- locate hydrostatic test manifolds outside of wetlands and riparian areas;
- comply with all appropriate permit requirements;
- not withdraw from or discharge into state-designated special waters, waterbodies that provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless the relevant federal, state, and local permitting agencies grant written permission;
- screen the intake hose to prevent entrainment of fish and other aquatic life;
- maintain ambient, downstream flow rates to protect aquatic life, and provide for all designated water uses, including withdrawals by existing downstream users;
- discharge test water to a well-vegetated and stabilized area, if practical, and maintain at least a 50-foot vegetated buffer from adjacent waterbody/wetland areas. If an adequate buffer is not available, sediment barriers or similar erosion control measures must be installed; and
- regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent sedimentation and streambed scour.

Texas Eastern does not anticipate using chemicals for testing or for drying the pipeline following hydrostatic testing. If municipal water sources utilized for hydrostatic testing contain chlorine, water would be discharged in a manner consistent with the state requirements. Upon the completion of hydrostatic testing, the test water would be discharged into dewatering structures located in upland areas in accordance with the Projects' E&SCP and all applicable permits. Samples of this outflow would be collected and tested in accordance with the federal and state permit requirements. Sampling of source water would not be required.

By implementing the BMPs described above, detailed in the Project's E&SCP, and in accordance with any NPDES permit conditions, we conclude that impacts on waterbodies would be minor and temporary. We conclude that the proposed water withdrawal and discharge locations for hydrostatic testing are not likely to have a significant impact on water resources.

### 2.3 Wetland Resources

Texas Eastern identified 69 wetland crossings along the Projects' pipeline loops. Appendix E provides a list of the wetlands to be crossed, including Wetland ID, classification, milepost, crossing length, and wetland impact calculations. Of the 69 field delineated wetlands, 62 are palustrine emergent (PEM), 3 are palustrine scrub-shrub (PSS), 1 is palustrine forested (PFO), 2 are PEM/PSS wetland complexes, and 1 is a PEM/PFO wetland complex.

Construction and operation of the Projects would result in a total of 3.3 acres of temporary wetland impacts, which includes 3.0 acres of temporary impacts to PEM wetlands, 0.2 acre of temporary impacts to PSS wetland, and 0.1 acre of temporary impacts to PFO wetlands. Since hydrologic conditions during operation of the pipeline would be returned to pre-construction conditions, there would be no permanent loss of wetlands. There would, however, be a permanent conversion of 0.1 acre of forested wetland to emergent or scrub-shrub wetland as a result of vegetation maintenance of the permanent cleared right-of-way.

There are no wetland impacts associated with the Projects' proposed access roads or contractor yards, and no impacts on wetlands are anticipated at any aboveground facilities. One

National Wetlands Inventory (NWI) wetland classified as palustrine unconsolidated bottom (PUB) was identified during desktop analysis within the limit of disturbance of the proposed Gladeville Compressor Station. However, there is no evidence of inundation in aerial photographs over the last 18 years at this location.

**General Impacts and Mitigation**

Some temporary wetland impacts associated with construction of the Projects would involve the temporary removal of wetland vegetation, disturbance of wetland soils and bottoms, and, in some cases, temporary changes in wetland hydrology. There would be some changes in current wetland functions and values; however, it is important to note that following construction and restoration, the affected wetlands would continue to provide numerous ecological functions such as: sediment/toxicant retention; nutrient removal/transformation; flood attenuation; groundwater recharge/discharge; and wildlife habitat. These changes may require additional mitigation to ensure reestablishment and growth of the wetland plant communities.

Construction impacts on wetlands would be minimized by employing the wetland construction procedures and BMPs in the Projects' E&SCP. In addition, the proposed Projects' facilities are co-located with existing pipeline rights-of-way for approximately 13.6 miles, or 86 percent of the Projects' length. Therefore, large-scale clearing of forested cover types would be limited as the forested wetland impact would involve a minimal expansion of the existing right-of-way.

Construction and mitigation activities in wetlands would be conducted in accordance with the procedures and BMPs in the Projects' E&SCP and the conditions of related permits. Required practices include, wherever practical:

- a 50-foot setback for ATWS for wetlands not located in active agricultural land or other disturbed land;
- minimization of riparian clearing to the extent practicable while ensuring safe construction conditions;
- expedited construction in and around wetlands;
- confinement of stump removal to the trench-line to minimize soil disturbance (unless safety or access considerations require stump removal elsewhere);
- return of wetland bottoms and drainage patterns to their original configurations and contours to the extent practicable;
- permanent stabilization of upland areas near wetlands as soon as practicable after trench backfilling to reduce sediment run off;
- segregation of topsoil in unsaturated wetlands to preserve the native seed source (which would facilitate re-growth of herbaceous vegetation once pipeline installation is complete);
- periodic inspection of the construction corridor during and after construction; and
- post construction wetland monitoring to evaluate the progress of wetland revegetation.

Texas Eastern has requested deviations from the FERC Plan for the setbacks for ATWS due to construction limitations such as steep slopes and road crossings at some wetlands (see

appendix B for specific locations and justifications). We have reviewed these requests and find them acceptable.

In scrub-shrub wetlands, vegetation would be cut just above ground level, leaving existing root systems intact. Stumps or root systems would be removed only over the trench line (minimum 10 feet) and where the Chief Inspector or EI determines that existing conditions present a safety hazard for construction. Stumps removed from the travel lane for safety purposes may be inverted and replaced back into the removal location provided the stump base provides a safer working foundation and as approved by the EI. Treating stumps and root systems in this manner would help stabilize the travel lane, soil and promote re-sprouting by some species.

In accordance with the Projects' E&SCP, Texas Eastern would conduct post-construction maintenance and monitoring of the right-of-way in affected wetlands to assess the success of restoration and revegetation. Monitoring efforts would include documenting occurrences of exotic invasive species to compare to pre-construction conditions.

To assist with these periodic monitoring and surveillance efforts, and to comply with the USDOT Safety Standards (49 CFR 192), a 30-foot-wide corridor centered on the pipeline would routinely be cleared of woody growth greater than 15 feet in height, with a 10-foot strip centered over the pipeline being maintained in an herbaceous state. Because of this vegetation maintenance restriction within wetland areas, 20 feet of Texas Eastern's 50-foot-wide permanent right-of-way easement within wetlands would be allowed to revert to scrub-shrub and forested cover types.

Because the wetland crossings would be completed in accordance with the construction and restoration methods described above, the Projects' E&SCP, and any site-specific measures that may be required by the USACE and OEPA, we conclude that impact on wetlands would be minor and temporary.

## 3. Aquatic Resources, Vegetation, Wildlife, and Special Status Species

### 3.1 Aquatic Resources

The waterbodies that would be crossed by the proposed Projects are located within the Ohio River drainage basin (ODNR, 2015a). Most fishery resources in this part of Ohio consist of warmwater fisheries. However, there are two streams that may qualify as coldwater fisheries. Texas Eastern is consulting with the OEPA to confirm the fisheries classification of these streams. If the streams are considered coldwater fisheries, the proposed crossings would be constructed in compliance with OEPA and USACE permit conditions and within the recommended construction window of June 1 through September 1 as defined in the Projects' E&SCP. Under Ohio Water Quality Standards, certain waterbodies have been designated as having the ability to support either coldwater or warmwater fishery habitat based primarily on temperature regimes and identified water quality impairments, if applicable (OEPA, 2006). For this purpose, coldwater fishery habitats are defined as "waters in which the mean of the maximum daily temperature over a seven day period generally does not exceed 68 degrees Fahrenheit [°F] (20 degrees Celsius [°C]) and, when other ecological factors are favorable (such as habitat), are capable of supporting a year-round population of coldwater stenothermal aquatic life such as trout." Warmwater fishery habitats are defined as "waters in which the maximum

mean monthly temperature generally exceeds 68 °F (20 °C) during the summer months and are not capable of sustaining a year-round population of coldwater stenothermal aquatic life." The waters to be crossed by the Projects include waterbodies classified under the State of Ohio Water Use Quality Designations for Aquatic Life Habitat as warmwater habitat (WWH), and limited warmwater habitat (LWH) (OEPA, 2015c). There are no marine-living fish species present in this region.

**General Impacts and Mitigation**

Construction impacts on fishery resources may include direct contact by construction equipment, increased sedimentation and water turbidity, alteration or removal of aquatic habitat cover, introduction of pollutants, impingement or entrainment of fish and other biota associated with the use of water pumps at dam and pump crossings, and downstream scour associated with use of those same pumps. Fish passage during dam and pump crossings would be temporarily restricted during the installation of the new pipeline which typically takes twenty-four to forty-eight hours to complete. Fish passage would only be temporarily interrupted during the dam and pump process, and would be restored immediately after the restoration of the stream bed and banks. The short term and localized interruption of fish passage is not anticipated to dramatically affect the migration of fish within the stream systems.

Removal of trees from the edges of waterbodies at the crossing may reduce shading of the waterbody, diminish escape cover, and potentially result in locally elevated water temperatures. Elevated water temperatures can, in turn, lead to reductions in levels of dissolved oxygen, which can negatively influence habitat quality and the fish populations that occupy these habitats. Impacts resulting from tree clearing on stream banks would be minimized to the extent practicable for the pipeline loops by crossing streams and waterbodies perpendicular to the water resource boundaries and clearing only the area that is necessary to construct and operate the pipeline.

Texas Eastern proposes to cross waterbodies using a dry open-cut technique unless site-specific conditions prohibit use of this installation procedure, as discussed in section A2.2 and listed in appendix D. Successful implementation of this technique (using the flume method and/or the dam and pump method), and adherence to Texas Eastern's E&SCP would minimize temporary impacts at the crossing location itself. Texas Eastern would install sedimentation and erosion control devices at all stream crossing to minimize increases in turbidity.

Should Texas Eastern identify waterbody crossings with shallow bedrock, blasting during construction activities may be required. Potential adverse effects of blasting may include direct mortality of organisms in the immediate vicinity of the blast. Blasting can also have the same short-term adverse impacts as trenching, including reduced macroinvertebrate prey base, alteration of substrate characteristics, and loss of large woody debris and structure. Texas Eastern would use several methods to mitigate the effects of blasting on aquatic species, including delays and stemming to dampen the shockwave and removal of debris as needed so as not to interfere with downstream flow.

Hydrostatic test water withdrawals and discharges, and the use of dam and pump waterbody crossing methods could affect aquatic species by entraining small fish and larvae during withdrawal. Withdrawal intake hoses would be fitted with intake screen devices that

would eliminate the entrainment of fingerling and small fish during water withdrawal. Discharge would comply with regulatory permit conditions and would be controlled to prevent scour and sedimentation, flooding, or the introduction of foreign or toxic substances into the aquatic system.

A spill of hazardous liquids during refueling or equipment maintenance could introduce water pollutants to aquatic habitats. Generally, refueling or other handling of hazardous materials within 100 feet of wetland and waterbody resources would not be allowed. If the 100-foot setback cannot be met, these activities would be performed under the supervision of an EI in accordance with Texas Eastern's SPCC Plan. Texas Eastern would implement the procedures in its SPCC Plan in the event of an inadvertent release of hazardous materials to prevent surface water contamination and minimize potential impacts.

Once construction is complete, streambeds and banks would be quickly restored to preconstruction conditions to the fullest extent possible. Restoration, bank stabilization, and revegetation efforts would minimize the potential for erosion from the surrounding landscape. Adherence to the Projects' E&SCP would also maximize the potential for re-growth of riparian vegetation, thereby minimizing the potential for any long-term impacts associated with lack of shade and cover.

Implementation of Texas Eastern's construction, restoration, and mitigation procedures would result in only limited, short-term impacts to fishery resources, and the aquatic habitats upon which these fishery resources depend.

**Fisheries of Special Concern**

Fisheries of special concern include waterbodies those that have fisheries with important recreational value, those that support natural coldwater fisheries through natural reproduction, are included in special state fishery management regulations, or that provide habitat for federally or state-listed or candidate threatened or endangered species. Waterbodies that have significant economic value because of fish stocking programs, commercial fisheries, contain essential fish habitat, or tribal harvest, are also considered fisheries of special concern.

Consultation between Texas Eastern, the USFWS, and the ODNR did not indicate that there are any fisheries of special concern that would be crossed by the Projects. However, the agencies noted that there are streams that potentially harbor federally or state-listed species and their habitat. Threatened and endangered species are discussed in section B-3.4. Based on agency consultations, habitat requirements, and proposed construction locations, we conclude that construction would not affect any protected aquatic species or habitats.

The National Marine Fisheries Service (NMFS) designates Essential Fish Habitat, comprised of habitats essential to the long-term survival and health of fisheries. There are no waterbodies that have been identified as supporting commercial fisheries or Essential Fish Habitat within the Projects' areas (National Oceanic and Atmospheric Administration [NOAA], 2015).

## 3.2 Vegetation

The vegetation cover types potentially affected by the proposed pipeline facilities, appurtenant facilities, and existing compressor stations are described below. The appurtenant

facilities, including the Wheelersburg Receiver Removal, Athens Receiver Removal, Line 15 Tie-In West, and Line 15 Tie-In East, are described as part of the pipeline facility vegetation descriptions, as the sites are located within the proposed workspace of the pipeline loops.

The vegetation cover types within the Projects' areas are consistent with typical plant communities found in east-central and southeastern Ohio. The proposed pipeline facilities are located entirely in the Western Allegheny Plateau ecoregion (USEPA, 2015b). Forest cover currently constitutes approximately 50 to 70 percent of the land cover in this region of Ohio, with the remainder of land composed of agricultural, industrial, commercial, residential, or an early successional stage of vegetation growth (Widman et al., 2006).

Construction and operation of the Projects would affect six major cover types: Forest/Woodland, Agricultural/Cropland, Open Land/Early Successional-Upland Scrub-Shrub, Residential, Industrial/Commercial, and Open Water/Wetland/Waterbodies. Developed lands, including Residential and Industrial/Commercial are not considered major vegetation cover types, as they do not represent distinct vegetation communities.

Forest communities in this area of Ohio are described as two different types: central hardwoods-hemlock-white pine forest and transition hardwood forest. The forest in the Projects' pipeline facilities area is secondary growth. Typical of secondary growth, the forest is dense with well-developed understory in most areas. The central hardwood forest is typified by oak-hickory: the so-called central hardwoods black oak, white oak, shagbark hickory, and bitternut hickory; and associated species. The transition hardwood forest is characterized by a greater frequency of northern hardwood forest species such as American beech and sugar maple. The proposed pipeline loops cross areas that have been significantly altered by forest conversion and fragmentation. Most of the forests in this region have been converted and fragmented and only a few very small and scattered fragments of undisturbed forests still remain in Ohio, (Widman et al., 2006). There are no forests within the proposed workspaces for the modifications at existing compressor stations.

Agricultural lands that would be crossed by the Projects' pipeline facilities consist of active hayfields and cultivated lands. Typical cropland observed within the Projects' work areas includes corn. No specialty agricultural crops were observed within the Projects' work areas. There are no agricultural or croplands within the proposed workspaces for the modifications at existing compressor stations.

Open Land/Early Successional-Upland Scrub-Shrub vegetation communities in this region of Ohio are typically agricultural lands that are being maintained as open land or former agricultural or mining impacted lands that are in the process of reverting to forest land. A smaller component of this cover type is post-timber harvest regeneration. These habitats, which range from grasslands to scrub-shrub to young forests, are typified by grasses and herbs such as: timothy, orchard grass, bentgrass, plantain, red clover, goldenrods, and aster species; to shrubs like sweet fern, meadowsweet, common juniper, buckthorn, honeysuckles, and gray dogwood; to trees like black locust and red maple. There are no open land/early successional upland scrub-shrub habitats within the proposed workspace at the 12 compressor stations.

Wetlands were delineated in the field by wetland scientists along the proposed Projects' pipeline facilities route. Wetland types were assigned based on the NWI classifications as described in Cowardin et al., 1979. Palustrine and riverine classification types were identified along the Projects' areas. Wetlands that would be classified under Cowardin as riverine are

listed under waterbodies in section B-2.2; further discussion of wetland habitats is provided in section B-2.3. Wetland types identified and delineated within the Projects' areas include PFO, PSS, and PEM wetlands. In order to minimize impacts to wetland communities in and around the aboveground facilities, Texas Eastern would limit workspace to previously-disturbed areas including mowed, graveled, and paved areas.

Developed lands include residential, industrial, and commercial areas that have sparse vegetation, and include landscape lawns and common landscape trees and shrubs. Developed land is discussed in Land Use in section B-5. The proposed modifications at Texas Eastern's existing compressor stations would be limited to previously-disturbed areas within the stations' fence lines. The vegetation at the compressor stations consists of grasses and forbs, which are regularly mowed to maintain the grounds. There would be negligible impact to vegetation cover as a result of construction and operation of the aboveground facilities.

**General Impacts and Mitigation**

Construction and operation of the pipeline would result in temporary and minimal permanent impacts to the vegetation cover types in the Projects' areas. Temporary impacts would occur during construction due to vegetation clearing of existing upland forest and other vegetation cover types within the pipeline corridor and ATWS. These impacts could include loss of canopy cover, loss of individual plants, potential for spread of aggressive and/or invasive species, long recovery time for forested areas, and temporary loss of wildlife habitat. Texas Eastern has co-located the facilities within existing rights-of-way where practicable, and has minimized ATWS in forested areas to minimize the impacts on vegetation from the Projects. The cleared width within the right-of-way and temporary construction workspaces would be kept to a minimum.

Table B-5 provides the approximate acreages of forested land and open, non-forested land that would be affected during construction and operation of the Projects' pipeline facilities The Projects' pipeline facilities would temporarily impact 83.7 acres of forested land during construction and would permanently impact 56.1 acres of forested land (including forested wetlands) during operation of the pipeline facilities Following construction and restoration, Texas Eastern would allow the 27.7 acres of temporarily impacted forested land to revert to woody vegetation. The Projects would result in conversion of 56.1 acres of forested land to open land within the maintained right-of-way. By co-locating more than 86 percent of the proposed pipeline loops with its existing right-of-way, Texas Eastern would minimize forest fragmentation and visual impacts.

Clearing for construction for the pipeline facilities would not result in any permanent impacts on wetland vegetation communities located outside of the permanent right-of-way and other maintenance areas, which would be allowed to revegetate naturally following construction. Approximately 0.1 acres of forested wetland lies within the permanent right-of-way and would be permanently converted to non-forested wetland as a result of right-of-way maintenance activities. Construction-related impacts on open land, including crop and agricultural lands would be short-term and temporary as they would return to their herbaceous state within one to two growing season following construction. Impacts on wetlands are discussed in section B-2.3, and impacts on developed lands are discussed in section B-5.

Following construction, the entire pipeline right-of-way would be restored and a 50-foot-wide permanent right-of-way would be maintained by Texas Eastern. As described above, the

## Table B-5
## Vegetation Cover and Land Use Types Affected by Construction and Operation[a,b]

| Facility, County | Total Forested (acres) | | Total Open Land (acres)[c] | | Forested Upland (acres) | | Forested Wetland (acres) | | Open Land – Upland (acres) | | Open Land – Wetland (acres)[d] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Const[e] | O&M right-of-way | Const[e] | O&M right-of-way | Const[e] | O&M right-of-way | Const[e] | O&M right-of-way[f] | Const[e] | O&M right-of-way | Const[e] | O&M right-of-way |
| **Wheelersburg to Athens Loop** | | | | | | | | | | | | |
| Meigs | 24.0 | 18.2 | 17.3 | 11.0 | 24.0 | 18.2 | <0.1[g] | <0.1[g] | 5.5 | 5.9 | 0.3 | 0.8 |
| Athens | 25.0 | 18.3 | 9.0 | 7.1 | 25.0 | 18.3 | <0.1[g] | <0.1[g] | 1.5 | 3.4 | 0.4 | 0.8 |
| **Athens to Berne Loop** | | | | | | | | | | | | |
| Noble | 18.1 | 10.6 | 12.2 | 8 | 18.1 | 10.6 | 0.0 | 0.0 | 1.64 | 3.61 | 0.1 | 0.1 |
| Monroe | 6.9 | 4.3 | 5.5 | 4.4 | 6.9 | 4.3 | 0 | 0 | 0.13 | 2.51 | 0.1 | 0.2 |
| **Berne to Holbrook Loop** | | | | | | | | | | | | |
| Monroe | 9.5 | 4.6 | 19.0 | 8.6 | 9.5 | 4.6 | 0.0 | 0.0 | 5.63 | 8.4 | 0.3 | 0.2 |
| **Line 10-A** | | | | | | | | | | | | |
| Attala | 0.0 | 0.0 | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 0.0 | 0.0 |
| **South End Tie-In** | | | | | | | | | | | | |
| Attala | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 |
| **TOTAL[h]** | **83.7** | **56.1** | **63.9** | **40.4** | **83.7** | **56.0** | **<0.1[g]** | **0.1** | **15.3** | **25.1** | **1.1** | **2.2** |

Notes:
a/ This table does not include the modifications at existing compressor stations, as all workspace is proposed in previously disturbed, industrial areas.
b/ This table does not include new launcher/receivers, new valves, or new overpressure regulation installations that would be constructed since the vegetation affected by these facilities is included within the vegetation affected by the pipeline facilities except for the new South Tie-In, which is outside of an existing facility or permanent easement, and therefore is listed separately.
c/ Total Open land includes agriculture, residential, and open lands described in section B-5.
d/ Open land wetlands include PEM and PSS wetlands.
e/ Construction right-of-way includes areas that would be temporarily impacted by construction, and does not include impacts within the permanent O&M right-of-way.
f/ The O&M right-of-way wetland acreage numbers represent the total area of wetlands within permanent easements that would be impacted during construction and not necessarily the wetland area that would be regularly maintained as part of the operation of the pipeline.
g/ Value is less than 0.1 acre.
h/ Minor discrepancies in totals are due to rounding.
O&M = operations and maintenance

56.1 acres of forested land within the proposed permanent right-of-way would be maintained as open land during Projects' operations. The temporary workspace areas used during construction would be seeded and allowed to revegetate. In accordance with the FERC Plan, Texas Eastern would monitor disturbed areas to determine the post-construction revegetation success for at least two growing seasons.

Routine maintenance of the permanent right-of-way is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility during aerial patrols. In upland areas, maintenance of the permanent right-of-way would involve clearing the entire width of woody vegetation. As such, the maintained permanent right-of-way would be subjected to mowing every three years. However, to facilitate periodic corrosion surveys a 10-foot-wide strip centered on the pipeline can be mowed to maintain herbaceous growth. Texas Eastern does not apply herbicides for general right-of-way maintenance.

Because Texas Eastern would construct most of the Projects within open land where vegetation restoration timeframes would be short-term and implement restoration methods discussed above and in the Projects' E&SCP, we conclude that construction and operation of the Projects would not result in a significant impact on vegetation in the Projects' areas.

**Vegetation Communities of Special Concern**

Texas Eastern consulted with federal and state agencies in order to identify unique, sensitive, and protected vegetation, including threatened or endangered plant species and their designated communities that could be affected by the Projects' pipeline facilities. Consulted agencies include the following: USFWS, NOAA, ODNR, OEPA, Pennsylvania Fish and Boat Commission (PFBC), Pennsylvania Game Commission (PGC), Kentucky Department for Natural Resources (KYDNR), Kentucky Division of Fish and Wildlife Resources (KYDFWR), TNDEC, Tennessee Wildlife Resources Agency, Alabama Department of Environmental Management (ADEM), Alabama Division of Wildlife and Freshwater Fisheries, Mississippi Department of Marine Resources (MDMR), and Mississippi Department of Wildlife, Fisheries and Parks (MDWFP).

Consultation with the agencies has indicated that only one protected plant species may be present in areas impacted by the Projects. The USFWS in Mississippi has identified the Price's potato bean as potentially being located in the vicinity of the Mississippi facilities; however, further consultation with the USFWS in Mississippi resulted in a "no effect" determination in a letter dated April 1, 2016 for this species. We concur. Further information regarding this species, possible impacts and mitigation can be found in appendix F.

No unique habitat, such as vernal pools, wildlife refuges, important bird areas, national forests, or state or federal wildlife management areas occur within the Projects' areas.

## 3.3 Wildlife

The three dominant wildlife habitat types within the Projects' area include upland forest, early successional-upland habitat consisting of a mix of open land and scrub-shrub, and wetland habitats.

The forest habitat in the Projects' areas consists of secondary growth, with a dense forest and well-developed understory. Large wildlife species such as the white-tailed deer depend on

the resources of the forest habitat type for food and cover. Small mammals capitalize on the availability of the numerous nest cavities in the form of snags and felled logs. Small mammal species may include the opossum, gray squirrel, southern flying squirrel, white-footed mouse, eastern chipmunk, and raccoon. The abundant small mammal population in this forest habitat type provides prey for coyote, owls, and hawks. Reptiles and amphibians also thrive in the forest habitat taking advantage of cover provided by undergrowth and downed timber. Species commonly found include the eastern box turtle, garter snake, and red-backed salamander.

A large variety of songbirds, including species of neotropical migrants, use hardwood forest habitat for all or parts of their life cycle. Many neotropical migrants feed on the numerous insects occurring within the forest and the various species can use a range of different nest sites, with some species nesting on the forest floor, some in the understory vegetation, and some in the tree canopy. Some specific migrants that could be found in the forested areas near the Projects include the ovenbird, Acadian flycatcher, and wood thrush in the understory; and the scarlet tanager, red-eyed vireo, and Baltimore oriole in the canopy. The wild turkey is an important game species that utilizes the forest floor for foraging and nesting and the canopy for roosting.

Early successional habitat types along the proposed pipeline loops include upland successional scrub-shrub areas, fields and uncultivated grasslands, agricultural lands, and disturbed and/or maintained areas such as existing utility rights-of-way or other open space areas. The interspersion of habitat types that exists within the early successional habitats is attractive to numerous and varied types of wildlife. Some wildlife species capitalize on the varying habitats, using a particular type for nesting and others for both food and cover. The number of wildlife present within the upland open habitat types depends on the location, time of year, stage of vegetation development, and the nature of the adjoining habitat.

The change from one habitat type to another can create an edge effect that can be utilized by a variety and diversity of wildlife species. Examples of species that utilize edge habitat include the white-tailed deer, wild turkey, coyote, gray fox, red fox, and eastern cottontail. Reptiles and amphibians that commonly occur in early successional habitats include the eastern milksnake and the northern leopard frog.

Grassy and herbaceous habitats offer habitat for ground-nesting birds such as the meadowlark, savannah sparrow, and grasshopper sparrow. They also provide foraging areas for killdeer, song sparrow, and a large variety of other species. Bird species commonly found in forest edge habitat where upland field transitions to scrub-shrub include blue-winged warbler, chestnut-sided warbler, catbird, American goldfinch, field sparrow, eastern towhee, and northern cardinal. These areas also utilized by raptors, such as red-tailed hawks, American kestrels, and sharp-shinned hawks that feed on small mammals and birds. Raptors nest in the adjacent forest areas.

Wetlands provide food, shelter, migratory and wintering areas, and breeding areas for a variety of wildlife species. Forested wetlands are among some of the most productive wildlife habitats in Ohio. The forested wetlands that would be crossed by the proposed Projects are hardwood dominated (red maple) systems. Forested wetlands have a diverse assemblage of plant species and an abundance of food and water resources for wildlife. The plant species diversity in forested wetlands is directly related to fluctuations in the groundwater table, surface water inundation and soil moisture. The increased availability of water leads to more abundant and diverse foliage for nesting and cover by wildlife (USDA, et al., 1995).

Scrub-shrub wetland habitats are typically not as structurally diverse as forested wetlands. They contain vegetation that is characteristically low and compact. Under normal conditions, the vegetation structure is usually caused by surface water inundation being present for extended periods of time. The plant species in a scrub-shrub wetland offer excellent nesting sites for birds and provide escape cover from predators. The dominant shrub growth typically results in an abundance of food resources such as berries, seeds, and browse vegetation.

Emergent wetlands are typically characterized by grasses, sedges and rushes. They are often associated with areas containing standing water for extended periods of time. Wildlife species utilize the emergent wetland habitats for nesting, feeding, or during migration. Waterfowl and other wetland-dependent birds are the most common wildlife typically associated with emergent wetlands due to availability of food resources and availability of nesting habitat.

Some of the common mammals which utilize wetlands include mink, long-tailed weasel, raccoon, beaver, white-tailed deer, star-nosed mole, and muskrat. Many reptiles and amphibians rely on wetland habitat for foraging and breeding. Common species include ribbonsnake, eastern ratsnake, wood frog, spotted salamander, watersnake, red-spotted newt, pickerel frog, spring peeper, bullfrogs, common snapping turtle, and painted turtle.

Bird species commonly associated with wetlands include the great blue heron (which use trees for nesting), hooded merganser, swamp sparrow, gray catbird, common yellowthroat, yellow warbler, common snipe, American woodcock, marsh wren, kingfisher, red-winged blackbird, and a variety of ducks.

**General Impacts and Mitigation**

Construction and operations of the Projects' pipeline facilities would impact approximately 139.8 acres of upland forest and approximately 66.5 acres of early successional open upland habitat. Construction and operations would also affect a total of 3.3 acres of wetlands. Construction and operation activities associated with the Projects, including vegetation clearing, could affect wildlife and migratory birds. Conversion of forested habitats to early successional stages, forest fragmentation, and the increase in forest/field edge that results, could adversely affect some species by causing: (1) increased rates of nest predation, (2) increased rates of brood parasitism, (3) increased interspecific competition, (4) reductions in pairing success, and (5) reductions in nesting areas (Faaborg et al., 1995). Disturbance to wetland dependent wildlife would be similar to those described for terrestrial wildlife species. Indirect wildlife impacts associated with construction noise and increased activity should be temporary and could include abandoned reproductive efforts, displacement, and avoidance of work areas.

These existing rights-of-way are routinely maintained as part of regular facility operations to control vegetation growth, thus establishing shrub and/or open field habitat types. Many important species of resident and migratory wildlife use these existing utility corridors as preferred habitat.

Mammals that are dependent on forest interiors are relatively few in number and may not occur widely in the Projects' areas. Other mammals that could be adversely affected include those that are arboreal (e.g., several bat and squirrel species). Conversion of forested habitats may also reduce the area of habitat available for woodland reptiles and amphibians such as the eastern box turtle, spotted salamander and wood frog.

Indirect wildlife impacts associated with construction noise and increased activity should be temporary and could include abandoned reproductive efforts, displacement, and avoidance of work areas.

Construction activities within wetland habitats would temporarily affect wildlife utilizing the area. Disturbance to wetland dependent wildlife would be similar to those described for terrestrial wildlife species. The alteration and conversion of habitat would displace some species which prefer forested wetlands. Direct mortality could result during clearing and grading operations to small mammals, reptiles and amphibians that are less mobile. Habitat along stream banks and stream beds could also be disturbed. Some individuals may relocate to similar wetland and stream habitat, which exists beyond the limits of work; however a small overall reduction in carrying capacity for forest dwelling species is expected. Texas Eastern's proposed stream crossing procedures localize and minimize impacts both spatially and temporally. Direct impacts may occur on certain stream dwelling species such as dusky salamander and northern two-lined salamander.

Implementation of Texas Eastern's construction, restoration, and mitigation procedures would result in only limited, short-term impacts on stream dwelling wildlife, and the aquatic habitats upon which these species depend. Invertebrate populations would recolonize the crossing area and temporary work areas would be allowed to revert to their original condition, including re-establishment of riparian cover.

Furthermore, operation and routine maintenance of the pipeline rights-of-way and aboveground facilities, which would be restricted to clearing and mowing vegetation on the permanent right-of-way, are not expected to have any noticeable impact on aquatic wildlife in the Projects' areas.

In accordance with the FERC Plan, in the terrestrial areas along the right-of-way, vegetation maintenance would occur no more than once every three years. However, a swath centered over the pipeline up to 10 feet wide may be mowed more frequently to maintain an herbaceous cover for maintenance and inspection purposes. To avoid impacts on ground nesting birds, maintenance clearing would not be scheduled between April 15 and August 1.

Regionally, maintained utility rights-of-way can provide early successional habitats for several important game species including white-tailed deer, ruffed grouse, northern bobwhite, and wild turkey. The permanent right-of-way proposed for the Projects would vary between 30 feet and 50 feet wide. Right-of-way corridors may function as travel corridors for some generalist species and provide edge along large forested areas. Rights-of-way revegetated with herbaceous and shrub cover would provide food, cover and breeding habitat for those species that utilize open habitats. Many neotropical migrant bird species benefit from conversion of forest to early- to mid-successional cover types including the chestnut-sided warbler, yellow warbler, American redstart, veery, and indigo bunting (Gilbert, 2012).

In an effort to minimize permanent impacts on wildlife and to promote the rapid stabilization and revegetation of the disturbed areas, Texas Eastern would comply with its E&SCP providing for stabilization of impacted areas to mitigate for direct and indirect impacts on wildlife. Revegetation would be completed in accordance with permit requirements and in consultation with agency and non-agency stakeholders affected by the Projects. Seed mixtures favorable to wildlife would be used to encourage a diversity of herbaceous food and cover types along the right-of-way following construction. A combination of both summer and winter cover

would be established along the right-of-way to encourage wildlife usage throughout the year. The right-of-way would be seeded and then allowed to revegetate through natural succession.

Following construction, stabilization, and establishment of vegetation cover, temporarily disturbed areas would be left to revegetate via natural succession. Permanent loss of trees would occur within the right-of-way, which would be maintained in an early successional stage by mowing and periodic tree removal. The temporary workspaces would be allowed to naturally revegetate via natural succession. This natural revegetation process would gradually develop a stratified vegetation cover between the right-of-way and adjacent habitats.

With the implementation of Texas Eastern's E&SCP, we conclude that construction and operation of the pipeline facilities would not adversely affect the distribution or regional abundance of wildlife species given the limited amount of disturbance, the co-located nature of the Projects, and the amount and distribution of similar habitat types available in the immediate areas around the Projects.

**Migratory Birds**

Migratory birds are species that nest in the United States and Canada during the summer and then migrate to and from the tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. Migratory birds are protected under the Migratory Bird Treaty Act ([MBTA] 16 U.S.C. 703-711) and bald and golden eagles are additionally protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). The MBTA, as amended, prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. Executive Order 13186 (66 CFR 3853) was enacted in 2001 to, among other things, ensure that environmental analyses of federal actions evaluate the impacts of actions on migratory birds. Executive Order 13186 directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the USFWS. The environmental analysis should further emphasize species of concern, priority habitats, key risk factors, and that particular focus should be given to population-level impacts.

As a result, FERC and the USFWS entered into a Memorandum of Understanding that focuses on avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two agencies (FERC, 2011).

The USFWS *Birds of Conservation Concern 2008* report identifies migratory and non-migratory bird species that are priorities for conservation actions beyond those species already designated as federally threatened or endangered (USFWS, 2008). Bird species for conservation actions include non-game birds; gamebirds without hunting seasons; and Endangered Species Act (ESA) listed, candidate, proposed, and recently delisted species. The Projects within Ohio occur within the Appalachian Mountains bird conservation region (Bird Conservation Region 28). Birds of Conservation Concern that may occur in the Projects' area are listed in table B-6.

**Table B-6**
**USFWS-Designated Birds of Conservation Concern in Project Areas**

| Common Name | Scientific Name |
|---|---|
| bald eagle[1] | *Haliaeetus leucocephalus* |
| peregrine falcon[2] | *Falco peregrinus* |
| upland sandpiper | *Bartramia longicauda* |
| northern saw-whet owl[3] | *Aegolius acadicus* |
| whip-poor-will | *Antrostomus vociferus* |
| red-headed woodpecker | *Melanerpes erythrocephalus* |
| yellow-bellied sapsucker[3] | *Sphyrapicus varius* |
| olive-sided flycatcher | *Contopus cooperi* |
| loggerhead shrike | *Lanius ludovicianus* |
| black-capped chickadee[3] | *Poecile atricapillus* |
| Bewick's wren | *Thryomanes bewickii* |
| sedge wren[4] | *Cistothorus platensis* |
| wood thrush | *Hylocichla mustelina* |
| blue-winged warbler | *Vermivora cyanoptera* |
| golden-winged warbler | *Vermivora chrysoptera* |
| prairie warbler | *Setophaga discolor* |
| cerulean warbler | *Setophaga cerulea* |
| worm-eating warbler | *Helmitheros vermivorum* |
| Swainson's warbler | *Limnothlypis swainsonii* |
| Louisiana waterthrush | *Parkesia motacilla* |
| Kentucky warbler | *Geothlypis formosa* |
| Canada warbler | *Cardellina canadensis* |
| Henslow's sparrow | *Ammodramus henslowii* |
| rusty blackbird[4] | *Euphagus carolinus* |
| red crossbill[3] | *Loxia curvirostra* |

[1] De-listed from the ESA in 2007, still federally protected under the Bald and Golden Eagle Protection Act and the MBTA.

[2] De-listed from the ESA in 1999, still federally protected under the MBTA.

[3] Includes this species within the Southern Appalachian breeding population.

[4] Species is non-breeding in this conservation region (Region 28).

To address potential construction impacts on migratory birds, including forest fragmentation, loss of suitable habitat, and disturbance of nesting activities, Texas Eastern

proposes to implement conservation measures. To reduce forest fragmentation, Texas Eastern has collocated 13.6 miles (about 86 percent) of the proposed new pipeline alignment with the existing right-of-way. This would reduce the amount of impacts on wooded areas, and would maximize the use of previously disturbed areas. Texas Eastern has also proposed to implement seasonal timber cutting restrictions in order to avoid impacts on bird nesting activities; Texas Eastern anticipates clearing trees in February 2017 and March 2017 when birds would not be nesting, to minimize impacts on migratory birds.

Texas Eastern initiated migratory bird consultation with the USFWS in Pennsylvania, Ohio, Kentucky, Tennessee, Alabama, and Mississippi on March 24, 2015. According to a March 14, 2016 email, the USFWS Pennsylvania Field Office concurred with Texas Eastern's finding that impacts on migratory birds would be unlikely. In a February 23, 2016 letter, based on information provided by Texas Eastern, the USFWS Kentucky Field Office had no specific comments or recommendations regarding potential impacts on federally protected bird species for the portion of the Projects in Kentucky. Consultation for migratory birds is ongoing with Ohio, Tennessee, Alabama, and Mississippi.

If bald eagles were encountered in the Projects' areas during construction, Texas Eastern would contact USFWS to identify appropriate mitigation measures in order to comply with the *National Bald Eagle Management Guidelines*, which were issued by the USFWS in 2007. Impacts on native or migratory bird populations and their habitats would be additionally minimized during construction and operation of the Project by the implementation of USFWS recommendations. No significant long-term or population-level impacts on migratory bird species of concern are anticipated.

Texas Eastern proposes to start construction activities in February 2017 and plans to complete the Project no later than November 2017. The USFWS indicated that the nesting season for migratory birds is generally April 1- July 31 in the Project region. Based on USFWS recommendations, Texas Eastern has agreed to clear vegetation in fall and winter months to avoid impacts on nesting birds. However, if construction activities were delayed past this seasonal window, Texas Eastern would consult with the USFWS before clearing any vegetation.

Texas Eastern has minimized potential effects on migratory birds by routing through previously disturbed and cleared areas where possible. During Project operation, the FERC Plan and Procedures prohibits routine vegetation maintenance clearing from occurring between April 15 and August 1 of any year, unless otherwise approved by the USFWS, to minimize potential impacts on migratory birds. Given the seasonal clearing restriction for construction and operational maintenance, Texas Eastern's use of existing facilities and rights-of-way to reduce forest fragmentation, and the high proportion of adjacent similar habitat associated with construction of the Project facilities, we conclude that construction would not significantly affect migratory birds.

### 3.4 Special Status Species

Special status species are those species for which state or federal agencies provide an additional level of protection by law, regulation, or policy. Included in this category for the purposes of this EA are federally listed species that are protected under the ESA, federal candidate species, and those otherwise considered as special concern species by the USFWS; as well as those species that are state-listed as threatened or endangered.

## Federally Listed Species

Section 7 of the ESA ensures that any actions authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed threatened or endangered species or any of its designated critical habitat.

The FERC, as the lead federal agency that would authorize the project, is required to consult with the USFWS to determine if designated critical habitat or federally listed species could be affected by the project. Texas Eastern, acting as FERC's non-federal representative for complying with Section 7, initiated informal consultation with the USFWS Alabama, Kentucky, Mississippi, Ohio, Pennsylvania, and Tennessee Ecological Field Offices to determine the federally listed species potentially found in the project area.

Texas Eastern contacted the six USFWS field offices to obtain species information and conservation reports. Twenty-two federally listed as threatened and endangered species or species of concern were identified as potentially occurring near the projects. We have reviewed the information submitted by Texas Eastern and performed our own research. Based on our review, we believe that the proposed Projects would have no effect on 17 federally listed species because the Project would not be within the known range of the species or because the Project would not affect habitat for the species (appendix F). Therefore, these 17 species are not addressed further in this EA. The remaining five species are listed in table B-7 and discussed in this section.

### *American Burying Beetle*

The USFWS identified the American burying beetle as potentially occurring in Ohio.

Mixed forest and open land along the proposed pipeline route and open land at the compressor station site could offer habitat for the species given the wide range of habitats in which American burying beetles can be found. American burying beetles are dormant underground during the winter; however, construction during the dormant season could still affect the beetles. A November 3, 2015 technical assistance letter from the USFWS Ohio Field Office advised that adverse effects on federal species were not anticipated, but that further consultation would be required. Such consultation, including the potential need for surveys or specific mitigation measures for the American burying beetle, has not been completed. As such, we can not finalize our effects determination for this species. However, our recommendation at the end of this section would ensure that any necessary Section 7 consultation is complete prior to construction being authorized. As such, any impacts would not be significant.

**Table B-7**
**Federally Listed Species Potentially Within the Project Areas**

| Common Name | Scientific Name | Listing State | Federal Status | Determination and Comments |
|---|---|---|---|---|
| Indiana bat | *Myotis sodalis* | Ohio and Pennsylvania | endangered | *Not likely to adversely affect*. Suitable roosting habitat is present in the Projects' area. However, no abandoned mines, caves, or sinkholes that might provide suitable winter hibernacula for Indiana bat were observed during field surveys, and no caves or other suitable habitats are known to occur within the Project areas. As recommended by the USFWS, Texas Eastern has committed to felling trees in Ohio between October 1 and March 31 to avoid impacts on roosting bats. Project work in other states would not affect bat habitat. |
| American burying beetle | *Nicrophorus americanus* | Ohio | endangered | Effects determination pending. Suitable habitat may be present within the Project area in Ohio, but the need for surveys has not yet been determined. |
| Northern long-eared bat | *Myotis septentrionalis* | Ohio, Kentucky, Pennsylvania, Mississippi | threatened | *Not likely to adversely affect*. Suitable roosting habitat is present in the Projects' area. However, no abandoned mines, caves, or sinkholes that might provide suitable winter hibernacula for northern long-eared bat were observed during field surveys, and no caves or other suitable habitats are known to occur within the Project areas. Texas Eastern has committed to felling trees in Ohio between October 1 and March 31 to avoid impacts on roosting bats. Project work in other states would not affect bat habitat. |
| Eastern massasauga | *Sistrurus catenatus* | Ohio | candidate | |
| Timber rattlesnake | *Crotalus horridus horridus* | Ohio | species of concern | No adverse impact. Due to the location, the type of habitat along the pipeline loops, and the type of work proposed, these Projects are not likely to affect this species. |
| Eastern hellbender | *Cryptobranchus alleganiensis* | Ohio | species of concern | No adverse impact. No in-water work is proposed in perennial streams of sufficient size to provide suitable habitat for this species. |

***Indiana Bat***

The Indiana bat was identified by USFWS Ohio and Pennsylvania Field Offices, as well as the Ohio Department of Natural Resources (ODNR) as being potentially present within the Projects' areas. The Indiana bat can use large trees, sheds, or barns to roost in during the summer. Females use trees with sloughing bark for maternity roosting colonies. In a May 19, 2015 letter, the ODNR provided guidelines for tree removal and recommended that the projects be coordinated with the USFWS.

In a December 14, 2015 letter, the USFWS Pennsylvania Field Office stated that the proposed project would *not likely adversely affect* the Indiana bat in Pennsylvania, and that no further correspondence with that field office was necessary.

In a November 3, 2015 letter, the USFWS Ohio Field Office indicated that a field survey would be needed to evaluate the rock outcrops initially observed during wetland delineation activities along stream crossings for potential winter hibernacula (such as abandoned mines, caves, sinkholes, and rock outcrops) within the proposed construction workspace. Texas Eastern surveyed the study areas for potential winter bat hibernacula during multiple site visits between December 2014 and 2015; no potential winter hibernacula were identified.

No structures that could be used by summer roosting bats were identified within the study area; however, summer tree roosting habitat is present. The USFWS Ohio Field Office recommended that seasonal tree cutting be implemented. Accordingly, Texas Eastern has committed to felling trees between October 1 and March 31 to avoid direct impacts on roosting bats.

Some Indiana bat habitat would be cleared by the Projects. However, based on the lack of hibernacula and roosting structures in the Projects' area, and on Texas Eastern's commitment to restrict tree cutting seasonally to avoid summer habitat actively used by bats, as well as our recommendation below, we conclude that the Projects *may affect, but would not likely adversely affect* the Indiana bat.

***Northern Long-Eared Bat***

The northern long-eared bat has been identified by the USFWS Ohio and Mississippi Field Offices and the Kentucky Department of Fish and Wildlife Resources (KYDFWR) as potentially occurring in the Projects' areas. As described above for Indiana bats, Texas Eastern surveyed the Projects' areas for potential winter habitat, and no abandoned mines, caves, or sinkholes that might provide suitable winter hibernacula were observed.

An April 29, 2015 letter from the USFWS Louisville Field Office stated that the proposed Project would be unlikely to affect listed species in Kentucky.

In an April 1, 2016 letter, the USFWS Mississippi Ecological Services Field Office stated that the proposed Projects may affect the northern long-eared bat, but would not result in prohibited incidental take, pursuant to the final USFWS 4(d) rule, which provides guidance for tree removal during small utility construction projects. The letter also stated that no further consultation under the ESA was required with that office.

In a December 14, 2015 letter, the USFWS Pennsylvania Field Office determined the proposed project would *not likely adversely affect* the northern long-eared bat if no tree clearing takes place and that no further correspondence with the field office was necessary. No tree

clearing is proposed for the Projects in Pennsylvania, so we agree that no further consultation is necessary for that state.

In a November 3, 2015 letter, the USFWS Ohio Ecological Field Office stated that it does not anticipate adverse effects to any federally endangered, threatened, proposed, or candidate species. This response included the northern long-eared bat, provided that seasonal tree cutting be implemented. Texas Eastern has committed to felling trees between October 1 and March 31 to avoid direct impacts on roosting bats.

Some northern long-eared bat habitat would be cleared by the Projects. However, based on the lack of hibernacula and roosting structures in the Projects' area, and on Texas Eastern's commitment to restrict tree cutting seasonally to avoid summer habitat actively used by bats, as well as our recommendation below, we conclude that the Projects *may affect, but would not likely adversely affect* the northern long-eared bat.

***Eastern Hellbender***

The USFWS identified the eastern hellbender, a large aquatic salamander, as a species of concern potentially occurring in Ohio, especially in drainages associated with the Ohio River. Habitat is limited to cool and very clean dissolved-oxygen rich waters with gravel and bedrock substrate. No in-water work is proposed in perennial streams of sufficient size to provide suitable hellbender habitat. As such, we conclude that the Projects would not have an adverse impact on the eastern hellbender.

***Timber rattlesnake***

The USFWS identified the timber rattlesnake as a species of concern potentially occurring in Ohio, especially in upland deciduous forests in mountainous or hilly terrain. Gravid female rattlesnakes spend a great deal of time basking on open, rocky ledges; males and non-gravid females tend to prefer dense woodlands where the temperatures are cooler. This species primarily feeds on garter snakes, rodents, frogs, and small birds and mammals during the spring and summer. Timber rattlesnakes move to their den sites (which can be cracks or crevices below the frost line in multiple habitats) beginning in August and spend their winter months in underground dens in a dormant state. In a May 19, 2015 letter, the ODNR indicated that because of the location, the type of habitat along the project route, and the type of work proposed, the Texas Eastern Projects would not likely affect this species. We agree.

***Eastern Massasauga***

The project is within the Ohio range of the eastern massasauga, a federal candidate and state endangered snake species. The eastern massasauga uses a range of habitats including wet prairies, fens, and other wetlands, as well as drier upland habitat. Due to the location, the type of habitat present at the project site and within the vicinity of the project area, and the type of work proposed, this project is not likely to affect this species.

Section 7 of the ESA requires us to complete any necessary consultation with the USFWS for species that may be affected by the proposed Projects. In this case, that involves the USFWS concurring with our effects determinations for the Indiana bat and northern long-eared bat, as well as potential additional surveys and evaluation regarding the American burying beetle. Therefore, **we recommend that:**

- **Texas Eastern should not begin construction activities <u>until</u>:**

    a. **Texas Eastern files updated correspondence with the USFWS regarding the American burying beetle, including the potential need for surveys and/or species-specific mitigation measures;**
    b. **FERC staff completes any necessary Section 7 consultation with the USFWS for the American burying beetle, Indiana bat, and northern long-eared bat; and**
    c. **Texas Eastern has received written approval from the Director of the OEP that construction or use of mitigation measures may begin.**

**<u>State Listed Species</u>**

Texas Eastern conducted consultations with state agencies in the six-state Project area, and determined that 53 state-listed threatened or endangered species could be within the proposed Projects' areas. Twenty-three of these species also have federal status of some sort and are discussed above. State consultations have determined that 19 of the remaining 30 species would not be affected because of the lack of suitable habitat in the Project areas. These species are not addressed further in this EA (for species excluded from additional consideration see appendix F). Brief descriptions of the 11 remaining species, with anticipated Project impacts, are presented below.

***Eastern Spadefoot Toad***

The project is within the range of the eastern spadefoot toad, a state-listed endangered species in Ohio. These toads are found in areas of sandy soils associated with river valleys. Breeding habitats may include flooded agricultural fields or other water holding depressions. Due to the location, the type of habitat in the vicinity of the Projects, and the type of work proposed, impacts on this species would not be significant.

***Black Bear***

The project is within the range of the black bear, an Ohio state-listed endangered species. They live primarily in forested areas, and can be found throughout the United States. They are omnivores with diets that vary largely with the season and geography. Due to the mobility of black bears and their ability to avoid construction activity, the Projects are not likely to affect this species.

***Spotted Turtle***

The spotted turtle is a state threatened species in Ohio. These turtles prefer fens, bogs and marshes, but is also known to inhabit wet prairies, meadows, pond edges, wet woods, and the shallow sluggish waters of small streams and ditches. Due to the location, the type of habitat in the vicinity of the Projects, and the type of work proposed, we do not anticipate adverse impacts on this species.

***Kirtland's Snake***

The project is within the range of the Kirtland's snake, an Ohio state-listed threatened species. This secretive species prefers wet fields and meadows. Snakes present in the Project areas would likely move into nearby suitable habitat to avoid construction machinery. Although the potential exists for individual snakes to be killed, we do not believe this would result in an adverse impact on the species.

***Ohio Lamprey***

The Ohio lamprey was identified by the ODNR as potentially occurring within the Projects' areas. The species requires three distinct habitat types that are connected by free-flowing stretches of stream. Spawning adults are found in clear brooks with free-flowing water and either sand or gravel bottoms; juveniles are found in slow-moving water buried in soft substrate of medium to large streams. Non-spawning parasitic adults are found in large bodies of water with abundant populations of large fish. Ohio lampreys are only found in the Ohio River and the lower portion of its tributary streams. The proposed Projects do not cross any streams that are direct tributaries to the Ohio River. Therefore, it is unlikely that Ohio lamprey habitat is present within the Projects' areas. The ODNR stated in a November 6, 2015 email that it concurred with Texas Eastern's findings that the Ohio lamprey is not likely to be impacted by the Projects. We agree.

***Northern Harrier***

The northern harrier was identified by the ODNR as potentially occurring within the Projects' areas. A field habitat assessment was conducted in June 2015; 19 open fields were evaluated for potential northern harrier nesting habitat. No existing nesting sites or harriers were observed during the field assessment. The Projects' areas are unlikely to serve as nesting habitat due to land use and frequent disturbance, such as mowing, cultivation, and grazing. The ODNR stated in its November 6, 2015 email that the northern harrier was not likely to be impacted by the Projects. We agree.

***Butterfly, washboard, Ohio pigtoe , monkeyface, and fawnsfoot freshwater mussels***

These Ohio state-endangered mussel species live underwater, partially buried in sediment, filter feeding on organic material as it passes by in the current. Mussels require medium to large rivers with swiftly moving currents. Because these proposed Projects do not involve in-water work in streams that provide this habitat, it is unlikely that there would be any effects on these species.

**4. Cultural Resources**

Section 106 of the NHPA requires the FERC to take into account the effects of its undertakings on cultural resources listed or eligible for listing in the National Register of Historic Places (NRHP), and afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. Texas Eastern is assisting the FERC in meeting our obligations under Section 106 by providing the necessary information, analysis, and recommendations, as allowed by the ACHP's implementing regulations at 36 CFR 800.2 (a)(3).

Texas Eastern conducted a Phase I archaeological field reconnaissance of the proposed Projects' components in Ohio, and provided the resulting report to the FERC and Ohio State Historic Preservation Office (SHPO). The reconnaissance examined 939.6 acres including a 300-foot-wide study corridor for the pipeline loops, extra work spaces, access roads, compressor stations, and contractor yards. The fieldwork involved pedestrian inspection and the excavation of 1,659 shovel test units. As a result of the field reconnaissance, 1 cemetery and 15 newly-identified archaeological resources were identified. These included six prehistoric artifact scatters (33AT1042, 33MS0610, 33MS0612, 33MS0615, 33MS0616, and 33MS0617), one site with both historic and prehistoric artifacts (33MS0613), one historic artifact scatter (33MO0156), and seven isolated find spots of prehistoric lithic debitage (33AT1041, 33MO0147, 33MO0148, 33MS0611, 33MS0614, 33NO0246, and 33NO0247). In addition, two rock overhangs were observed outside the Project construction area, and were therefore not further investigated.

Of the 15 archaeological resources, 14 have been recommended as not eligible for the NRHP, due primarily to the low/isolated character of the material components encountered and absence of any evidence for intact archaeological deposits. Site 33AT1042, however, contained a sub-plowzone prehistoric deposit of 88 lithic artifacts and 20 fire-cracked rock fragments from a relatively confined site area. This resource was recommended as potentially eligible for the NRHP, and avoidance or Phase II testing was recommended. Texas Eastern has indicated the site would be fenced and avoided during construction of the Projects. The cemetery would also be fenced and avoided. In a letter dated May 5, 2016, the Ohio SHPO concurred with the recommendations in the report, but requested an avoidance plan for site 33AT1042 and the two rock overhangs. Texas Eastern provided an avoidance plan to the FERC and the SHPO, but has not yet filed the SHPO's comments on the plan. Therefore, **we recommend that:**

- **Texas Eastern should <u>not begin</u> construction of facilities and/or use of staging, storage, or temporary work areas and new or to-be-improved access roads for the Projects <u>until</u>:**

  **a. Texas Eastern files with the Secretary, the Ohio SHPO's comments on the avoidance plan for site 33AT1042 and the two rock overhangs; and**
  **b. the Director of OEP approves the plan and notifies Texas Eastern in writing that construction may proceed.**

  **All materials filed with the Commission containing <u>location, character, and ownership</u> information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: <u>"CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE."</u>**

Texas Eastern contacted the Alabama, Kentucky, Mississippi, Pennsylvania, and Tennessee SHPOs regarding the construction activities at the existing compressor stations in those states. In a letter dated October 28, 2015, the Alabama SHPO indicated the Projects would have no effect on cultural resources. In a letter dated October 9, 2015, the Kentucky SHPO indicated the Projects would not require archaeological work. In a letter dated October 22, 2015, the Mississippi SHPO indicated that no cultural resources were likely to be affected by the Projects. In a letter dated October 30, 2015, the Pennsylvania SHPO indicated that no archaeological resources would be affected, but requested additional information regarding aboveground resources and the Holbrook Compressor Station. Texas Eastern provided the

requested information to the FERC and SHPO. On February 11, 2016, the SHPO indicated the Projects would have no effect on historic properties. In a letter October 7, 2015, the Tennessee SHPO indicated there were no NRHP listed or eligible properties affected by the Projects.

Subsequently, Texas Eastern provided the FERC and Mississippi SHPO with a Phase I Cultural Resource Survey report for the Line 10-A Replacement amendment. No archaeological sites were identified, however, four historic age structures (circa 1952) associated with the existing Kosciusko Compressor Station were identified. None of these structures was recommended as eligible for the NRHP. In a letter dated April 20, 2016, the SHPO concurred with the recommendations in the report and indicated that no cultural resources were likely to be affected. We agree with the SHPO.

Texas Eastern provided an Unanticipated Discovery Plan for each state in the event any unanticipated historic properties or human remains are encountered during construction. Texas Eastern submitted these plans to the FERC and SHPOs (for their respective states). In its October 9, 2015 comments, the Kentucky SHPO found the plan sufficient. In its October 30, 2015 comments, the Pennsylvania SHPO indicated the plan would adequately accommodate unanticipated discoveries. No other comments on the plans have been received from the SHPOs to date. We have reviewed the plans and found them acceptable.

Texas Eastern contacted the following Native American tribes, providing the Projects' descriptions and mapping, and also sent follow-up letters to the tribes: Absentee-Shawnee Tribe of Oklahoma; Delaware Nation; Delaware Tribe of Indians; Eastern Band of Cherokee Indians of North Carolina; Eastern Shawnee Tribe of Oklahoma; Mississippi Band of Choctaw Indians; Onondaga Nation; Seneca-Cayuga Tribe of Oklahoma; Seneca Nation of Indians; Shawnee Tribe; St. Regis Mohawk Tribe; and Stockbridge-Munsee Band of Mohican Indians. The Delaware Tribe of Indians responded, providing consultation fee information. The tribe also recommended archaeological survey at the Berne and Holbrook Compressor Stations, and requested a copy of the reports. Texas Eastern has provided the tribe with the reports. The Seneca Nation of Indians indicated that the Project was in their area of interest and requested a copy of the Unanticipated Discovery Plan, which Texas Eastern provided. The Stockbridge-Munsee Band of the Mohicans responded that the Projects were not in their area of interest, but that they should be contacted and work halted if Native American sites were discovered during construction. No further responses have been received to date. We sent our NOI and follow-up letters to these same tribes. No responses to our NOI or letters have been received.

## 5. Land Use, Recreation, and Aesthetics

### 5.1 Land Use

The facilities required for the Projects are located primarily within the footprint of Texas Eastern's existing infrastructure, thereby minimizing impacts on landowners, communities and the environment. Proposed modifications to aboveground facilities would take place within the boundaries of the 12 existing facilities, with the exception of 3 launcher/receiver and valve sites, which would be installed within the permanent easement along the pipeline loops.

The Projects would cross six major land use types: Agricultural Land, Forest/Woodland, Residential Land, Industrial/Commercial Land, Open Land, and Open Water. No public land,

recreation or other special interest areas are within 0.25 mile of the Projects (including lands managed by federal, state, county, or local agencies, or private conservation agencies).

The Projects would require the acquisition of both temporary and permanent rights-of-way, as well as ATWS, for the construction and operation of the pipeline and associated aboveground facilities. The Projects would require a 50-foot-wide permanent right-of-way, and an approximately 50-foot-wide temporary construction workspace for a minimum 100-foot-wide construction corridor (75 feet in wetlands). In agricultural areas where full topsoil segregation would be required, as well as in other specific locations where certain conditions require additional space to maintain safe practices, an additional temporary construction workspace would be needed along the construction corridor.

Construction of the Projects, including new pipeline rights-of-way, ATWS, pipeyards and contractor wareyards, permanent access roads and temporary access roads, and new aboveground facilities, would affect approximately 621.8 acres of land, including 338.1 acres for construction of the aboveground facilities, 187.3 acres of temporary construction workspace [including temporary work space, ATWS, temporary and existing access roads, and access road work space], 96.8 acres of workspace within the permanent right-of-way, and 38.8 acres for pipeyards and contractor wareyards. Permanent impacts include the footprint of one new permanent access road and Texas Eastern's new 50-foot-wide pipeline right-of-way that would be maintained for pipeline operation. Table B-8 summarizes the percent of each land use type that would be affected by the construction and operation of the Projects.

The primary impacts on land use from the construction and operation of the proposed Projects' facilities would include clearing the pipeline right-of-way, some temporary restrictions on existing land uses during construction, and limited restrictions on future land uses along the permanent right-of-way. Following construction, the pipeline facilities would occupy lands through easements that allow for operation and maintenance of the facilities.

Texas Eastern has co-located 13.6 miles (approximately 86 percent) of the proposed loops in Ohio adjacent to existing natural gas pipeline corridors. The replacement in Mississippi would be within an existing right-of-way and compressor station. The construction right-of-way and operational right-of-way would overlap the existing right-of-way by 25 feet where the loops are adjacent to the existing pipelines. An additional 10 feet of overlap would also be used during construction in areas where topsoil would be segregated. Temporary construction impacts from the pipeline work spaces would result in a total of approximately 147.3 acres. Temporary construction impacts on land uses from new pipeline work area would

**Table B-8**
**Construction and Operation Impacts on Land Use Types in the Projects' Areas**

| Facility | County, State | Mile-post (MP) | Agricultural | | Forest / Woodland | | Residential | | Industrial / Commercial | | Open Land[a/] | | Total[b/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (mi) | (%) | (mi) | (%) | (mi) | (%) | (mi) | (%) | (mi) | (%) | (mi) |
| **Wheelersburg to Athens Loop** | Meigs County, OH | 611.6 - 616.4 | 0.7 | 15.3 | 3.0 | 62.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 22.5 | 4.8 |
| | Athens County, OH | 616.4 - 620.7 | 0.5 | 11.2 | 3.0 | 71.1 | 0.0 | 0.0 | 0.1 | 1.5 | 0.7 | 16.2 | 4.3 |
| | SUBTOTAL | | 1.2 | 13.3 | 6.0 | 66.4 | 0.0 | 0.0 | 0.1 | 0.7 | 1.8 | 19.6 | 9.1 |
| **Athens to Berne Loop** | Noble County, OH | 677.3 - 680.5 | 0.7 | 22.7 | 1.8 | 56.6 | 0.0 | 0.0 | 0.0 | 1.4 | 0.6 | 19.3 | 3.1 |
| | Monroe County, OH | 680.5 - 681.9 | 0.3 | 19.2 | 0.7 | 45.3 | 0.0 | 0.0 | 0.1 | 4.5 | 0.5 | 31.0 | 1.5 |
| | SUBTOTAL | | 1.0 | 21.6 | 2.4 | 52.9 | 0.0 | 0.0 | 0.1 | 2.4 | 1.1 | 23.1 | 4.6 |
| **Berne to Holbrook Loop** | Monroe County, OH | 698.2 - 700.3 | 0.0 | 0.0 | 0.8 | 37.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 63.0 | 2.1 |
| | SUBTOTAL | | 0.0 | 0.0 | 0.8 | 37.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 63.0 | 2.1 |
| **Line 10-A** | Attala Couny, MS | 0.0-0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 100.0 | 0.2 |
| | SUBTOTAL | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 100.0 | 0.2 |
| **South End Tie-In** | Attala Couny, MS | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | <0.1 | <0.1 | <0.1 |
| | SUBTOTAL | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | <0.1 | <0.1 | <0.1 |
| **Access Roads** | Athens County, OH | TAR 4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 100.0 | 0.1 |
| | | TAR 3 | 0.0 | 0.0 | 0.1 | 54.45 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 45.5 | 0.2 |
| | | TAR 11 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 100.0 | 0.0 | 0.0 | 0.2 |
| | | TAR 12 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 100.0 | 0.0 | 0.0 | 0.1 |
| | Meigs County, OH | TAR 1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 100.0 | 0.2 |
| | | TAR 2 | 0.0 | 0.0 | 0.4 | 83.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 16.6 | 0.4 |
| | Monroe County, OH | PAR 10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 100.0 | 0.1 |
| | | TAR 8 | 0.0 | 0.0 | 0.1 | 9.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 90.1 | 0.6 |

| Facility | County, State | Mile-post (MP) | Agricultural | | Forest / Woodland | | Residential | | Industrial / Commercial | | Open Land[a/] | | Total[b/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (mi) | (%) | (mi) | (%) | (mi) | (%) | (mi) | (%) | (mi) | (%) | (mi) |
| | | TAR 9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 100.0 | 0.2 |
| | Noble County, OH | PAR 5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 100.0 | 0.0 | 0.0 | 0.1 |
| | | TAR 6 | 0.0 | 0.0 | 0.1 | 49.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 50.6 | 0.1 |
| | | TAR 7 | 0.0 | 0.0 | 0.3 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| | Attala County, MS | PAR 13 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | <0.1 | <0.1 | <0.1 |
| | SUBTOTAL | | 0.0 | 13.8 | 0.9 | 42.7 | 0.0 | 0.0 | 0.4 | 0.9 | 1.4 | 42.7 | 2.6 |
| **TOTAL[b/]** | | | **2.2** | **11.8** | **10.1** | **54.3** | **0.0** | **0.0** | **0.5** | **2.7** | **5.8** | **31.2** | **18.4** |

a/ No major waterbodies (waterbodies greater than 100 feet wide) are located in the Projects' areas.
b/ Minor discrepancies in totals are due to rounding.
TAR – temporary access road;
PAR – permanent access road

consist of approximately 18.9 acres of agricultural, 83.4 acres of forest/woodland, 0.9 acre of industrial/commercial, and 44.1 acres of open land. In addition, approximately 95.7 acres would consist of new permanent pipeline right-of-way required as part of the Projects. Land uses permanently impacted by the new pipeline would consist of approximately 13.3 acres of agricultural, 56.1 acres of forest/woodland, 0.5 acres of industrial/commercial, and 25.6 acres of open land. No residential land would be permanently impacted by the Projects.

Approximately 38.8 total acres would be temporarily utilized as contractor yards. Of this total, land use type acreages include 0.3 acre forest/woodland, 32.5 acres industrial/commercial, and 6.1 acres of open land. Upon completion of the Projects, these areas would be allowed to revert to prior land uses or would be restored in accordance with landowner agreements. Therefore, no permanent impacts on these areas are anticipated.

All work at the existing developed compressor station sites is planned to occur within the fence line in areas that have been previously disturbed by construction and on-going operations. Additional aboveground facilities would include the installation of pig facilities and valves. The launcher/receiver and valve facilities would be installed along the proposed pipeline within the permanent right-of-way in areas disturbed by pipeline construction and at proposed aboveground facilities in areas disturbed by construction of the facility. No new land would be permanently impacted by operation of the aboveground facilities.

**Agricultural Lands**

Agricultural lands to be crossed by the Projects consist of active hay fields and cultivated lands. Typical cropland identified within the Projects' proposed work areas includes corn. No specialty agricultural crops were identified within the Projects' work areas. Agricultural land accounts for approximately 12 percent of land affected by the pipeline facilities. Approximately 18.9 acres of agricultural land would be temporarily impacted during construction of the Projects. In addition, approximately 13.3 acres of agricultural land impacted would be located within the new permanent easement.

To the extent possible, landowner access to fields and other agricultural facilities would be maintained during construction. Following construction, pipeline operation and maintenance activities would not hinder agricultural purposes within the Projects' right-of-way. Therefore, impacts on agricultural areas along the pipeline route would be limited to the construction period and the time required for vegetation regrowth after construction is completed. Landowners would be compensated for losses of production and field damages.

During pipeline construction in actively cultivated or rotated agricultural lands, hayfields and managed pasture lands, topsoil would be stripped and stockpiled separately from the subsoil during grading. In these areas storage of topsoil would require ATWS. To preserve soil fertility in agricultural land, topsoil from the pipeline trench would be excavated and stored separately. Once the trench is backfilled, the topsoil would be returned as the final surficial layer in the trench, tested for compaction, and remediated to reduce bulk density and remove any excess rock as necessary. The location of drain tiles would be identified prior to construction. Any drain tiles damaged during construction would be repaired or replaced by Texas Eastern's construction contractor. All drainage systems would remain operational during construction.

We conclude that with implementation of Texas Eastern's proposed construction methods and mitigation measures, impacts on agricultural lands would not be significant.

**Forest and Woodland**

Forest and/or woodland is defined as tree farms and/or tracts of upland or wetland forest or woodland. Forested areas to be crossed by the Projects consist of central hardwoods-hemlock-white pine forest, transition hardwood forest and one tree farm. Forest and woodland account for approximately 55 percent of the land affected by the pipeline facilities. A total of approximately 83.7 acres of forest/woodland would be cleared in the temporary workspace during construction of the Projects, and approximately 56.1 acres of forested land would be converted to new permanent easement and therefore maintained in a cleared vegetated state (open land) as part of the pipeline operation. No forested land would be cleared for installation of the aboveground facilities. Following construction and restoration, Texas Eastern would allow the 83.7 acres of temporarily impacted forested land to revert to woody vegetation or as specified in specific landowner agreements. Clearing of forested land for construction would result in long-term impacts due to the length of time required for trees to grow to maturity.

Texas Eastern's right-of-way follows an existing corridor that crosses a tree farm between MP 612.6 and MP 613.0 (approximately 0.4 mile in length). Texas Eastern intends to reduce impacts by placing the pipe along the edges of the tree farm and/or reducing the construction right-of-way; however, it is estimated that roughly 1.5 acres of the tree farm would be temporarily impacted during construction activities. In addition, approximately 1.6 acres would be converted to new permanent easement and therefore maintained in a cleared vegetated state (open land) as part of the pipeline operation. Landowners of the tree farm would be compensated for losses of production and damages.

Texas Eastern did not identify any forest lands managed for timber income that would be crossed by the Projects. If Texas Eastern discovers that the Projects impact forest lands managed for timber income, Texas Eastern stated it would provide timber appraisals and compensate landowners for losses of production and damages as determined during right-of-way negotiations.

By co-locating more than 86 percent of the proposed pipeline loops with Texas Eastern's existing right-of-way, we conclude the Projects would not have a significant impact on forest/woodlands as forest fragmentation and visual impacts would be minimized to the maximum extent feasible.

**Residential Areas**

Residential land is defined as existing developed residential areas and planned residential developments. This may include large developments, residentially zoned areas that have been developed or short segments of the route at road crossings with homes near the route alignment. This land use category typically consists of open space dominated by lawn, driveways, landscaped areas, and other uses associated with residential developments. The proposed Projects would not directly cross any residential developments; however, there are some scattered rural residential dwellings along segments of the proposed pipeline facilities.

Throughout the construction process, Texas Eastern would coordinate with property owners to minimize disruption and to maintain access to residences. Effects on existing residences adjacent to the pipeline may include noise and dust from construction and equipment and temporary visual effects from removal of vegetation and excavation of soils. Certain trees, shrubs, dense herbaceous growth, and other obstructions may be cleared or removed from the

construction right-of-way. Following completion of the construction of the Projects, properties would be fully restored in accordance with agreements between Texas Eastern and the landowner. Should damage from Texas Eastern's construction occur, Texas Eastern would provide compensation based on a market study of recent, like-zoned, local land sales conducted by a licensed real estate appraiser.

Texas Eastern has identified 24 locations with existing non-residential structures and 3 locations with inhabited residential dwellings within 50 feet of the proposed pipeline construction areas. Of this total, four sheds that lie within the proposed workspace would be removed to construct the Projects, and Texas Eastern would negotiate with landowners for compensation. Site-specific residential construction plans have been developed for three residences located within 50 feet of construction work areas on the Wheelersburg to Athens Loop (see appendix G). Special construction and restoration methods would be used at site-specific locations to minimize neighborhood disruptions and to reduce impacts during construction. The following mitigation measures would be implemented for residences located within 50 feet of construction work areas:

- Reduce the construction right-of-way width in order to maintain a minimum of 25 feet between the residence and the construction workspace for a distance of 100 feet on either side of the residence.
- Install safety fencing along the edge of the construction workspace adjacent to residences for a distance of 100 feet on either side of the residence.
- Preserve as many trees as possible on residential properties.
- Trim tree branches on the working side to allow for safe operation and passage of construction equipment. Vegetation removed would be disposed of as negotiated with the landowner.
- Restore or replace lawns and landscaping to pre-construction conditions.
- Repair as necessary wall and other structures within the construction workspace as negotiated with the landowner.
- Segregate topsoil where appropriate or as negotiated with the landowner.
- Maintain utility service during construction activities.
- Construct only during daylight hours, except where special conditions dictate.
- Clean up and backfill the area immediately after pipeline installation.
- Re-vegetate at the first seasonal opportunity.

We conclude that with Texas Eastern's proposed construction methods and mitigation, impacts on residents and landowners would be minimized to the greatest extent practicable and would not be significant.

**Industrial/Commercial Land**

Industrial or commercial area crossings identified along the Projects' proposed corridors consist of existing compressor stations and valve sites, a quarry, and existing storage yards. Industrial/commercial land accounts for approximately 3 percent of the land affected by the

pipeline facilities. A total of 362.9 acres of industrial or commercial land would be temporarily impacted during construction of the Projects. Of this total, the pipeline facilities would temporarily impact approximately 0.9 acre, the pipeline and contractor wareyards would impact 32.4 acres, and approximately 329.6 acres would be impacted by modifications at existing Texas Eastern compressor stations. The pipeline right-of-way would have a permanent impact of 0.5 acre on industrial and commercial land. No new industrial or commercial land would be permanently impacted as a result of the aboveground facilities as all work at the existing compressor stations is planned to occur within the boundaries of Texas Eastern's fence line.

Following completion, commercial/industrial land uses would be allowed to revert to their pre-construction use. Mitigation for industrial or commercial land may include avoiding hours of peak use, providing alternate access for employees and commuters, and/or using a type of boring method across roads. Should damage from Texas Eastern construction occur, compensation would be based on a market study of recent, like-zoned, local land sales conducted by a licensed real estate appraiser.

Because commercial/industrial land uses would be allowed to revert to their pre-construction uses following completion of the Projects, we conclude that impacts on industrial/commercial land would not be significant.

**Open Land**

Open land to be affected by the Projects includes pasture, open fields, utility right-of-way, herbaceous and scrub-shrub uplands, non-forested lands, and emergent and scrub-shrub wetlands. Open land accounts for approximately 31.2 percent of the land affected by the pipeline facilities. Construction of the Projects would result in approximately 63.9 acres of temporary impacts on open land. In addition to construction impacts, approximately 25.7 acres would become the new permanent easement that would be affected by the operation of the pipeline and therefore would remain as open space after construction. No open land would be developed for the aboveground facilities.

Since the pipeline corridor would be maintained as open land, there would be no permanent change in land use where the right-of-way crosses existing open land areas. Temporary impacts such as vegetation clearing would be minimized and mitigated by implementing the Texas Eastern's E&SCP and by restoring these sites to pre-construction conditions. Following construction, these open land areas would be restored and continue to function as open land. As there would be no permanent change in land use where the right-of-way would cross existing open lands, we conclude that impacts on open lands would not be significant.

## 5.2 Visual Resources

Visual impacts associated with the pipeline and aboveground facilities construction would result from clearing of vegetation, temporary soil disturbance, and the temporary presence of construction equipment and activity. The pipeline right-of-way would have a permanent visual impact once constructed. However, in locations where the pipeline easement is co-located, the proposed pipeline right-of-way would be consistent with existing conditions and have minimal visual impact for much of the route. Additional screening issues would be discussed during negotiations between Texas Eastern and individual property owners. The

proposed modifications to existing compressor stations would occur within the fence line of existing facilities, and the minor modifications would result in negligible visual impacts.

The proposed Projects would not have any visual impact on any federal or state listed visually sensitive areas, such as scenic roads, rivers, or natural landmarks, as these features are not present in the Projects' areas. We conclude that visual impacts along the Projects' pipeline route would not be significant as the majority of the Projects would be co-located within existing right-of-ways and screening would be provided as appropriate,

**6. Socioeconomics**

The proposed Projects' pipeline facilities would affect socioeconomic resources in Athens, Meigs, Monroe, and Noble Counties, Ohio. Socioeconomic conditions regarding population, economy and employment sectors, housing, land acquisition and displacement, taxes and revenues, community services, and transportation were analyzed. Most socioeconomic impacts would be short-term and localized, due primarily to the relatively short construction period when substantial numbers of workers would be active and the limited geographic scope of the Projects. Since the modifications at proposed aboveground facilities are limited to previously disturbed areas at existing compressor stations, no long-term disturbance to site-specific agricultural areas is anticipated.

Construction of the proposed pipeline and associated aboveground facilities would require a peak workforce of approximately 1,050 workers, coinciding with construction of the pipeline looping segments from May 2017 through August 2017. Construction of the proposed Projects is expected to result in local and regional short-term population growth in the general vicinity of the Projects due to a temporary influx of construction workers from outside the area. Impacts to the local population would be temporary and minimal, as these construction workers would not relocate their families to the Projects' areas due to the relatively short duration of the work. The vacant housing units, additional seasonal units, and hotels and motels, along with similar facilities in surrounding counties would be sufficient to house these workers. The communities in the vicinity of the Projects have adequate infrastructure facilities and community services to temporarily accommodate the construction work force. Based upon the relatively short amount of time construction crews would spend in the vicinity of the Projects, we conclude that local and regional populations would not result in a significant change.

Texas Eastern anticipates hiring a substantial number of local construction workers with the requisite experience for the installation of natural gas facilities. These local hires would include surveyors, welders, equipment operators, and general laborers. Approximately 15 to 35 percent of the construction workers (about 90 to 215 workers at peak) are expected to be local hires. It is currently estimated that one or two new permanent employees would be required for operation of the Projects. The Projects' construction would result in short-term, beneficial impacts in terms of increased payroll and local material purchases. Construction of the Projects would also result in increased state and local sales tax revenues associated with the purchase of some construction materials, as well as goods and services by the construction workforce. As the Projects could briefly decrease the unemployment rate as a result of hiring local workers for construction and increase demands on the local economy, we conclude that the Projects would have a short-term positive impact on the local economy.

The Projects' operation activities would result in substantial long-term benefits in annual property taxes and other revenues including ad valorem taxes, paid annually by Texas Eastern over the life of the Projects' facilities. Communities along the Projects' pipelines would experience ad valorem taxes on an annual basis. As a result of the short and long-term benefits to local and state tax revenues, we conclude the Projects would have a net positive impact on local community taxes and revenues.

Construction of the Projects would result in minor, short-term impacts on the transportation system in the Projects' areas. All public roads and railroads would be crossed using either the bore or open-cut method depending on permit conditions. Roadway opening permits would be obtained from applicable state and local agencies. Construction would be coordinated with local safety officials so as to avoid commuter traffic and school bus schedules to the greatest extent practical. To minimize traffic delays at open-cut road crossings, Texas Eastern would establish detours before beginning this road work. If no reasonable detours are feasible, at least one traffic lane of the road would be left open, except for brief periods when road closure would be required to lay the pipeline. Appropriate traffic management and signage would be set up and necessary safety measures would be developed in compliance with applicable permits for work in the public roadway. Arrangements would be made with local officials to have traffic safety personnel on hand during periods of construction. Provisions would be made for detours or otherwise to permit traffic flow.

In addition to the traffic impacts caused by the open-cut road crossings, the movement of construction equipment and materials and the daily commuting of employees may also slightly increase traffic volumes, affecting the transportation system in the Projects' areas. To minimize traffic congestion, Texas Eastern would work with its contractors to encourage construction workers to share rides to the construction right-of-way. Contractors may also provide buses to move workers.

To maintain safe conditions, Texas Eastern would direct its construction contractors to strictly enforce local weight restrictions and limitations by its vehicles and to remove any soil that is left on the road surface by the crossing of construction equipment. When necessary for equipment to cross roads, mats or other appropriate measures (e.g., sweeping) would be used to reduce deposition of mud.

We conclude that the Projects would not have a significant impact on traffic along the Projects' pipeline route as the influx of construction crews would be commuting during off peak hours. Coordination with local safety officials and established detours during road and railroad crossing would also minimize impacts to local and regional traffic flows.

### 7. Air Quality

Construction and operation of the Project could have an effect on local and regional air quality. Federal and state air quality standards have been designed to protect people and the environment from airborne pollutants. The USEPA has established National Ambient Air Quality Standards (NAAQS) for nitrogen oxides ($NO_x$), carbon monoxide (CO), ozone ($O_3$), sulfur dioxide ($SO_2$), lead (Pb), and inhalable particulate matter ($PM_{10}$ and $PM_{2.5}$). $PM_{10}$ and $PM_{2.5}$ include particles with aerodynamic diameters of 10 microns or less and 2.5 microns or less, respectively.

Greenhouse gases (GHG) are most commonly composed of carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), $O_3$, water vapor, hydrofluorocarbons, and perfluorocarbons and result from human activities, such as burning fossil fuels, as well as occurring naturally. Combustion of fossil fuels emits $CO_2$, $CH_4$, and $N_2O$, which are reported in terms of $CO_2$ equivalents ($CO_2e$) calculated based on the global warming potential of each gas.

Modifications to twelve existing compressor stations described in section A.3 would accommodate bi-directional flow capability along Texas Eastern's existing mainline system. The proposed flow reversal work is principally piping-related or involves replacement of internal compressor components. The Project would not involve any new combustion-powered compression equipment or modifications to existing compressors that would increase existing combustion emissions of $NO_x$ and CO. Changes also include adding some air pollution control devices at certain locations (i.e., CO catalyst, $NO_x$ emission controls including selective catalytic reduction systems and dry low-$NO_x$ combustor technology). The Tompkinsville Compressor Station would undergo electric upgrades to compressor station capacity, and Texas Eastern would install new launcher/receiver facilities at four locations and remove existing receivers at two locations. The Project would also include 15.8 miles of 36-inch-diameter pipeline looping segments and related appurtenances which would result in air quality impacts during construction.

Operation of the proposed new pipeline facilities would only result in minor and insignificant air emissions in compressor stations with proposed piping modifications and decreases in emissions at the Somerset and Danville Compressor Stations. The effect on air quality from the new pipeline is limited to the temporary, short-term emissions that would result from the construction of these facilities.

## Existing Air Quality

Table B-9 presents a summary of the NAAQS established as of October 2015. The Project would occur within Greene County, Pennsylvania; Athens, Monroe, Perry, Noble, Meigs and Warren Counties, Ohio; Bath, Lincoln and Monroe Counties, Kentucky; Wilson County, Tennessee; Colbert County, Alabama; and Monroe and Attala Counties, Mississippi.

**Table B-9**
**National Ambient Air Quality Standards for Criteria Pollutants**

| Pollutant | Averaging Period | NAAQS | |
|---|---|---|---|
| Sulfur Dioxide | Annual [9] | 0.03 ppm | -- |
| | 24-hour [1] | 365 μg/m$^3$ | -- |
| | 3-hour[2] | -- | 1,300 μg/m$^3$ |
| | 1-hour [1] | 0.075 ppm | -- |
| $PM_{10}$ | 24-hour [2] | 0.14 ppm | -- |
| | 24-hour [3] | 150 μg/m$^3$ | same |
| $PM_{2.5}$ | Annual [4] | 12 μg/m$^3$ | 15 μg/m$^3$ |
| | 24-hour [5] | 35 μg/m$^3$ | same |
| Nitrogen Dioxide | Annual | 0.053 ppm | same |
| | 1-hour [6] | 100 ppb | none |
| Carbon Monoxide | 8-hour [2] | 9 ppm | none |
| | 1-hour [2] | 35 ppm | none |
| Ozone | 8-hour[7,8] | 0.075 ppm | same |

| Pollutant | Averaging Period | NAAQS | |
|---|---|---|---|
| Lead | Quarterly Average [10] | 1.5μg/m$^3$ | same |
| | Rolling 3-month average [10] (2008) | 0.15μg/m$^3$ | same |

ppb = parts per billion, ppm = parts per million, μg/m$^3$ = micrograms per cubic meter

1 To attain this (2010) standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

2 Not to be exceeded more than once per year.

3 Not to be exceeded more than once per year on average over 3 years.

4 Annual mean, averaged over three years

5 To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 μg/m$^3$ (effective December 17, 2006).

6 To attain this standard, the 3-year average of the 98th percentile of the daily maximum concentrations at each monitor within an area must not exceed 0.100 ppm.

7 This $O_3$ standard became effective May 27, 2008. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average $O_3$ concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.

8 The previous $O_3$ standard was promulgated in 1997 and remained in place until USEPA revoked it when the 2008 Ozone Standard became effective July 6, 2015 (Federal Register, 80 FR 12263, March 6, 2015)

9 The 1971 Annual and 24-hour Sulfur Dioxide Standards were revoked except for non-attainment areas of the 2010 Sulfur dioxide standards and these 1971 standards remain in effect until one year after and area is designated attainment for the 2010 standards. The Muskingum River, OH Area, located in part of Morgan County is designated a Non-Attainment Area for the 2010 Sulfur Dioxide Standard.

10 Current Pb standard was assigned October 15, 2008. The 1978 Pb standard (1.5 μg/m$^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

Air Quality Control Regions (AQCR) have been established by the USEPA in accordance with Section 107 of the Clean Air Act of 1970 (CAA). The AQCRs are defined as contiguous areas considered to have relatively uniform ambient air quality, and are treated as single geographical units. The USEPA designates the attainment status of an area for each criteria pollutant based on whether an area meets the NAAQS. Areas that meet the NAAQS are termed attainment areas. Areas that do not meet the NAAQS are termed nonattainment areas. Areas for which insufficient data are available to determine attainment status are termed "unclassified areas." Areas formerly designated as nonattainment areas that have subsequently reached attainment are termed maintenance areas. We evaluated the attainment status for the counties in which the compressor stations are located. Table B-10 summarizes the Attainment Status for each of the site locations involved in the Projects.

**Table B-10**
**Summary of Attainment Statuses for Projects Sites**

| Facility Name | Location (County, State – Town) | AQCR[1] | Attainment/ Unclassifiable | Non-attainment |
|---|---|---|---|---|
| Holbrook Compressor Station | Greene, PA – Richhill Township | Southwest Pennsylvania Intrastate | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$ (see note 3), $SO_2$ | Moderate for Ozone 8-Hour 2008[2] |
| Lebanon Compressor Station | Warren, OH – Lebanon | Metropolitan Cincinnati Interstate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$ | Marginal for Ozone 8-Hour 2008[4] |
| Somerset Compressor Station | Perry, OH – Somerset | Metropolitan Columbus Intrastate Air | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, | None |

| Facility Name | Location (County, State – Town) | AQCR[1] | Attainment/ Unclassifiable | Non-attainment |
|---|---|---|---|---|
| | | Quality Control Region | $O_3$ | |
| Athens to Berne Loop, Berne to Holbrook Loop, Berne Launcher/Receiver, Line 15 Tie-In West, Line 15 Tie-In East, and Berne Compressor Station | Monroe, OH – Lewisville | Steubenville-Weirton-Wheeling Interstate Air Quality Control Region (OH-West Virginia) | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Athens to Berne Loop and Athens Receiver Removal | Noble, OH – Stock Township | Parkersburg (West Virginia) - Marietta (OH) Interstate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Wheelersburg to Athens Loop and Wheelersburg Receiver Removal | Meigs, OH – Columbia Township | Parkersburg (West Virginia)-Marietta (OH) Interstate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Wheelersburg to Athens Loop, Athens Launcher/Receiver, and Athens Compressor Station | Athens, OH – Alexander Township | Parkersburg (West Virginia)-Marietta (OH) Interstate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Owingsville Compressor Station | Bath, KY – Owingsville | Huntington (West Virginia)-Ashland (KY)-Portsmouth-Ironton (OH) Interstate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Danville Compressor Station | Lincoln, KY – Junction City | Bluegrass Intrastate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Tompkinsville Compressor Station | Monroe, KY – Tompkinsville | South Central Kentucky Intrastate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Gladeville Compressor Station | Wilson, TN – Lebanon | Middle Tennessee Intrastate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Barton Compressor Station | Colbert, AL – Cherokee | TN River Valley (AL) - | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, | None |

| Facility Name | Location (County, State – Town) | AQCR[1] | Attainment/ Unclassifiable | Non-attainment |
|---|---|---|---|---|
| | | Cumberland Mountains (TN) Interstate Air Quality Control Region | $O_3$ | |
| Egypt Compressor Station | Monroe, MS – Okolona | Northeast Mississippi Intrastate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |
| Kosciusko Compressor Station | Attala, MS – Kosciusko | Northeast Mississippi Intrastate Air Quality Control Region | CO, $NO_X$, Pb, $PM_{10}$, $PM_{2.5}$, $SO_2$, $O_3$ | None |

Source: 40 CFR 81.339
1. AQCR = Air Quality Control Region
2. For NSR purposes, all Project sites in PA are subject to moderate $O_3$ nonattainment because PA is within the Ozone Transport Region.
3. There is a part of Greene County, along the Southeastern border with Fayette County, PA that is designated nonattainment for $PM_{2.5}$ 2006 Standard (Pittsburgh-Beaver Valley, PA); however, Project activities would not occur within this nonattainment area.
4. Warren County is designated as Marginal Non-Attainment of the 8-Hr 2008 Ozone Standard as part of the Cincinnati, OH-KY-IN Non-Attainment Area.

## Permitting/Regulatory Requirements

The Project's air emissions and equipment are, and would be, subject to various other air quality requirements based on federal and state regulations. Federal air quality requirements are contained in 40 CFR Parts 50 through 99. The following sections discuss these federal and state requirements that potentially apply to the new and modified air emission sources of the Projects.

### *New Source Review Permitting*

Pre-construction air permitting programs that regulate the construction of new stationary sources of air pollution and the modification of existing stationary sources are commonly referred to as New Source Review (NSR). NSR can be divided into two categories: major NSR and minor NSR. Major NSR has two components: the Prevention of Significant Deterioration permitting program and the nonattainment area NSR (NNSR) permitting program. Major NSR requirements are established on a federal level but may be implemented by state or local permitting authorities under either a delegation agreement with the USEPA or as a State Implementation Plan program approved by the USEPA. Sources that emit less than the major NSR thresholds may need to obtain a minor NSR permit from the state or local permitting authority. NSR Requirements would not apply to any of the Projects as they are either emissions reduction projects or below NSR significance levels.

Similar to pre-construction permits, there are requirements to obtain an operating air permit based on a source's potential air emissions. The Title V permit program in 40 CFR Part 70 requires major sources of air pollutants to obtain federal operating permits. The major source thresholds under the Title V program, as defined in 40 CFR § 70.2, are 100 tons per year (TPY) of any air pollutant, 10 TPY of any single hazardous air pollutant (HAP), or 25 TPY of total

HAPs. More stringent major source thresholds apply for volatile organic compounds (VOCs) and $NO_x$ in $O_3$ nonattainment areas, namely 100 TPY VOCs in Marginal or Moderate Nonattainment areas, 50 TPY of VOCs or $NO_x$ in areas defined as serious, 25 TPY in areas defined as severe, and 10 TPY in areas classified as extreme. Sources under these thresholds may still need to obtain either a state only or synthetic minor state air operating permit.

The authority to issue Title V operating permits has been delegated to various states by USEPA. The following is a discussion of various applicable state agencies and air permitting requirements for the Projects. The air permitting requirements are being pursued with each jurisdictional authority within the context of the applicable state permitting programs.

*Alabama*

The proposed modifications at the Barton Compressor Station include the installation of a new impeller and increased cooling capacity. Texas Eastern submitted Insignificant Activities Determination to the ADEM in August 2015. In a letter dated September 21, 2015, the ADEM confirmed that no state or federal emission standards are expected to be exceeded, and that no permitting action would be required.

*Ohio*

The emissions from the proposed modification to Somerset Compressor Station including piping modifications to allow for bi-directional flow, installation of gas release measurement and an upgraded combustion turbine to allow for lower $NO_x$ emissions (15 parts per million by volume) as well as exhaust modifications (to allow for the installation of a CO catalyst on some equipment). The upgrade of an existing turbine to a lower-emitting device would require a modification to the existing permit. The remaining proposed modifications are expected to be de minimis or non-emitting.

The proposed modifications to Berne Compressor Station include the installation of a new impeller on the existing 15,000 hp compression unit and the installation of a new launcher/receiver and associated piping. These modifications are not expected to result in any changes in emissions beyond de minimis levels.

The emissions from the proposed modification to Athens Compressor Station include piping modifications to allow for bi-directional flow, installation of gas release measurement, dry gas seals and electric starts, as well as a new launcher/receiver and associated piping, are not expected to result in any changes in emissions beyond de minimis levels.

The emissions from the proposed modification to Lebanon Compressor Station include piping modifications to allow for bi-directional flow on an existing meter. These changes are not expected to result in any changes in emissions beyond de minimis levels. Changes in emissions from modifications to existing M&R stations generally are expected to be de minimis.

*Kentucky*

Modifications at the Owingsville Compressor Station include minor changes involving bi-directional flow modifications, additional gas cooling capacity, the installation of a new impeller, dry gas seals and a Continuous Emissions Monitoring System on Unit TBC 5. The proposed modifications require an Off Permit Notification to alter the Existing Owingsville

Compressor Station Air Permit with the Kentucky Department of Environmental Protection (KYDEP).

The Danville Compressor Station modifications include piping modifications to provide for bi-directional flow capabilities, emissions controls including selective catalytic reduction systems to control $NO_x$, and an Oxidation Catalyst to control CO and VOCs, additional cooling capacity, clean burn capability for several units installation of dry gas seals and additional compressor upgrades. The proposed improvements require a significant revision to the existing Danville Compressor Station Title V permit with the KYDEP.

The Tompkinsville Compressor Station modifications would include adding electric compressor capacity and piping modifications to add cooling capacity. The proposed modifications require a minor source permit revision to the existing Tompkinsville Compressor Station air permit with the KYDEP.

*Mississippi*

Modifications at the Egypt and Kosciusko compressor stations in Mississippi (new impeller installation, and piping modifications to allow for flow reversal on existing components, respectively) do not require minor modification applications with the MDEQ.

*Pennsylvania*

At the Holbrook Compressor Station, in Greene County, Pennsylvania, it is possible that a General Permit would apply to the proposed changes, which relate to modifying the suction and discharge header piping to allow seasonal bi-directional flow capabilities. Texas Eastern is submitting a Requirement for Plan Approval/Operating Permit to ask the PADEP to determine the permitting requirements associated with the proposed changes.

*Tennessee*

The only facility located in Tennessee to be modified is the Gladeville Compressor Station, where piping would be modified to allow for bi-directional flow capabilities. These modifications are not expected to result in any changes to the current operating emissions; as such the changes are considered an insignificant activity. Texas Eastern submitted a request for determination to the TNDEC in August 2016. In a letter dated September 2, 2015, the TNDEC stated that the proposed modifications at the Gladeville Compressor Station would not result in emission increases for which a permit modification would be necessary.

***Standards of Performance for New Stationary Sources***

New Source Performance Standards (NSPS) in 40 CFR 60 regulate certain emissions from specific source categories. Facilities associated with the Projects include equipment in some source categories that could be subject to NSPS requirements as discussed below.

40 CFR Part 60, Subpart JJJJ, is applicable to owners and operators of new or existing stationary spark ignition internal combustion engines that commence construction, modification, or reconstruction after June 12, 2006. The Projects include a new emergency stationary spark ignition internal compression engine greater than 500 hp. Therefore, requirements of Subpart JJJJ would apply to the proposed Projects.

Stationary combustion turbines with a heat input rate at peak load of 10 million British Thermal Units per hour or greater that commenced construction, modification (as defined in 40 CFR 60.14), or reconstruction (as defined in 40 CFR 60.15) after February 18, 2005 are regulated under Subpart KKKK. The Project would not involve the installation of any new stationary combustion turbines and any proposed modifications are below the levels of what would qualify as reconstructed as defined in 40 CFR 60.15. Therefore, the Project would not trigger the emissions limitations nor the monitoring, reporting, recordkeeping, and testing requirements under Subpart KKKK of Part 60.

40 CFR Part 60, Subpart Kb (Standards of Performance For Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984) potentially applies to storage vessels with a capacity greater than 75 cubic meters that would store volatile organic liquids. A capacity of 75 cubic meters is equal to approximately 19,813 gallons. The Project would not include the construction, reconstruction, or modification of any storage vessels containing volatile organic liquids with a capacity greater than 19,813 gallons. Therefore, NSPS Subpart Kb does not apply to proposed Project activities.

***National Emission Standards for Hazardous Air Pollutants***

The USEPA has established National Emission Standards for Hazardous Air Pollutants (NESHAP) for specific pollutants and industries in 40 CFR 61. The Projects do not include any of the specific sources for which NESHAP have been established in Part 61. Therefore, Part 61 NESHAP requirements do not apply to the Project.

***General Conformity***

General conformity regulations in 40 CFR 93, Subpart B, are designed to ensure that federal actions that occur in nonattainment and maintenance areas do not interfere with a state's ability to attain or maintain compliance with NAAQS. The Projects are considered to be a federal action, since we would be licensing, permitting, or otherwise approving portions of the Projects. The Projects activity would occur in the AQCRs listed previously in table B-10 and in the counties of Greene, Pennsylvania; Athens, Monroe, Noble, Perry, Pickaway and Warren, Ohio; Bath, Lincoln and Monroe, Kentucky; Wilson, Tennessee; Colbert, Alabama; Monroe and Attala, Mississippi. Greene County, Pennsylvania, and Warren County, Ohio, are classified as nonattainment areas for $O_3$. A general conformity analysis is not required for any of the Project's components in any of the counties in all of the states, as none are both designated as non-attainment and exceed the applicable thresholds as described in Part 93.153 for the purpose of general conformity.

**Impacts and Mitigation**

The proposed modifications to existing facilities would result in a minor and insignificant increase in operational air emissions, or in a decrease of emissions. The estimated air emissions include stationary combustion sources at the compressor stations as well as fugitive leaks and venting emissions of the above ground facilities such as valves, flanges, and control actuators and the below grade pipeline. Construction of the Project would result in temporary increases in emissions of some pollutants due to the use of equipment powered by diesel fuel or gasoline engines. Construction activities may also result in the temporary generation of fugitive dust due

to disturbance of the ground surface and other dust-generating actions. There may also be some temporary indirect emissions attributable to construction workers commuting to and from work sites during construction.

Construction activities along the pipeline right-of-way and at the compressor station sites would result in emissions of fugitive dust from vehicular traffic and soil disturbance. However, these air quality impacts would generally be temporary and localized, and are not expected to cause or significantly contribute to an exceedance of the NAAQS. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Texas Eastern would employ practices to control fugitive dust such as application of water or other commercially available dust control agents on unpaved areas subject to frequent vehicle traffic. In addition, construction equipment would be operated only on an as-needed basis.

Table B-11 provides estimates of fugitive dust emissions associated with construction activities.

**Table B-11**
**Fugitive Dust Emissions from Construction Activities (TPY)**

| Year | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|
| 2017 | 1045 | 163 |

Large earth-moving and other mobile equipment are sources of combustion-related emissions, including criteria pollutants (i.e., $NO_x$, CO, VOC, $SO_2$, and $PM_{10}$), $CO_2$ and small amounts of HAPs. Air pollutants from the construction equipment would be limited to the immediate vicinity of the construction area and would be temporary. Construction-related emission estimates would be based on a typical construction equipment list, hours of operation, and vehicle miles traveled by the construction equipment and supporting vehicles for each pipeline segment of the Projects and for work planned at aboveground facilities and contractor wareyards. The estimated air emissions from construction of the Project is expected to be transient in nature, with negligible impact on the regional air quality.

Table B-12 summarizes the estimated emissions of criteria pollutants and total HAPs from construction equipment, which includes on-site passenger vehicles, but does not include emissions associated with employee commuting to and from the construction sites.

**Table B-12**
**Construction Equipment/Vehicle Emissions of Criteria Pollutants and HAPs (TPY)**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}/PM_{2.5}$ | Total HAPs |
|---|---|---|---|---|---|---|
| 2017 | 53 | 10 | 50 | 0.17 | 3/3 | 0.72 |

Table B-13 summarizes the estimated GHG emissions from construction equipment. For the types of sources of GHG emissions associated with construction of the Projects, total CO2 emissions represent almost the near entirety of $CO_2e$ emissions, therefore $CO_2$ emissions would be used to represent $CO_2e$.

**Table B-13**
**Construction Emissions of Greenhouse Gases (TPY)**

| Year | $CO_2$ |
|---|---|
| 2017 | 18,808 |

Emissions from combustion-related construction equipment would be minimized by keeping construction equipment maintained and operated only on an as-needed basis. Fugitive dust emissions during construction would be mitigated, as necessary, by applying water and/or other commercially available dust control agents on unpaved areas subject to frequent vehicle traffic.

Based on the analysis presented above, the Project's adherence to applicable federal and state regulations, we find that the construction and operations of the Project would have no significant impact on regional air quality.

## 8. Noise

Construction and operation of the proposed Projects may affect the local noise environment. Operation of the affected compressor stations with significant modifications associated with the Projects could result in an increase in noise levels in the vicinity of the respective stations over the life of the facilities. In addition, the installation of the new pipeline segments for the Projects and other project-related construction activities would result in short-term increases in noise in the vicinity of those activities.

### 8.1.1 Existing Noise

Federal regulatory agencies typically assess noise impacts using two sound metrics: the equivalent sound level ($L_{eq}$) and the day-night sound level ($L_{dn}$). The energy of noise is measured in decibels (dB). The units presented for all sound levels in this section are decibels on the A-weighted scale (dBA), which filters noise frequencies to characterize the human ear's response to sound. Human hearing can detect a 3 dBA change with a 5 dBA change being readily noticeable. Humans perceive a 10 dBA change in noise level as a doubling or halving of noise. The $L_{eq}$ is the energy averaged sound level for a given period of time, for example hourly or a 24-hour period. An $L_{dn}$ is also time averaged, but sound levels occurring during nighttime hours (that is, 10:00 PM to 7:00 AM) incur a penalization of an additional 10 dBA to account for greater sensitivity, such as sleep disturbance, during these times. An $L_{dn}$ of 55 dBA is equivalent to a continuous $L_{eq}$ noise level of 48.6 dBA.

In 1974, the USEPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (USEPA, 1974). This publication evaluates the effects of environmental noise with respect to health and safety. The document provides information for state and local governments to use in developing their own ambient noise standards. The USEPA has determined that in order to protect the public from activity interference and annoyance outdoors in residential areas, noise levels should not exceed an $L_{dn}$ of 55 dBA. We have adopted this criterion for the operational modifications to existing compressor stations and new compressor stations proposed for the Projects.

For existing compressor stations, the sound level attributable to the compressor station, after installation of the modifications (e.g., horsepower addition and/or addition of new gas

aftercooler), should not exceed the existing sound level produced by the existing facility at any nearby Noise Sensitive Area (NSA) in which the pre-existing sound level is above a day-night average sound level (i.e., $L_{dn}$) of 55 dBA, unless such NSAs are established after facility modifications are installed. If the existing compressor station sound level contribution at any nearby NSA is equal to or lower than 55 dBA ($L_{dn}$), the sound level attributable to the existing facility, after installation of the modifications, should not exceed 55 dBA ($L_{dn}$). The operation of a new compressor station or operation of a station after modifications should not result in a perceptible increase in vibration at any nearby NSA.

We also implement the 55 dBA criterion for some construction processes, such as horizontal directional drilling; however, no such construction process is proposed for these Projects. General construction is not evaluated against the 55 dBA $L_{dn}$ criterion.

Acoustical analyses were conducted for the existing Barton, Tompkinsville, Danville, and Owingsville compressor stations as related to the proposed modifications associated with the Projects. These four compressor stations were identified as having proposed modifications that could have a noise impact at the nearby NSAs. The acoustical analyses include the current (pre-existing) station noise levels and the estimated noise contributions of the proposed modifications for the total compressor station noise contribution. The results of the previous sound surveys were utilized to establish the pre-existing sound levels at the Barton Compressor Station. The acoustical analysis of all compressor stations considers the noise that would be produced by all continuous-operating equipment that could impact the sound at nearby NSAs. The noise impact is estimated at the closest NSAs.

The four compressor stations with potential to have a noise impact at the nearby NSAs are located in Alabama and Kentucky. Within Alabama, no applicable state, county, or local noise regulations were identified as applicable for the proposed permanent facility modifications at the Barton Compressor Station in Colbert County. Within Kentucky, no applicable quantitative noise regulations were identified for any of the proposed permanent facility modifications at the Tompkinsville, Danville, and Owingsville compressor stations located in Monroe County, Lincoln County, and Bath County, respectively. Additionally, no county or local noise regulations were identified for any of the proposed permanent facility modifications.

### 8.1.2 Noise Impacts and Mitigation

**Operation**

Operation of the affected compressor stations with significant modifications associated with the Projects could result in an increase in noise levels in the vicinity of the respective stations over the life of the facilities. Table B-14 shows the modeled noise levels as a result of the Project at the Barton, Tompkinsville, Danville, and Owingsville compressor stations.

**Table B-14**
**Noise Quality Analysis for Project Compressor Stations**

| Closest NSA | Distance and Direction of NSA to Site Center | Pre-Existing $L_{dn}$ (dBA) | Est'd $L_{dn}$ of Project Modifications (dBA) | Pre-Existing $L_{dn}$ + $L_{dn}$ of Project Modifications (dBA) | Potential Change in Pre-Existing Sound Level (dB) |
|---|---|---|---|---|---|
| **Barton Compressor Station** | | | | | |
| NSA #1 | 1,000 ft. (NW) | 51.5 | 32.0 | 51.5 | 0.0 |
| NSA #2 | 1,600 ft. (ENE) | 53.1 | 38.0 | 53.1 | 0.0 |
| **Tompkinsville Compressor Station** | | | | | |
| NSA #1 | 1,030 ft. (SW) | 51.5 | 40.0 | 52.0 | 0.5 |
| NSA #2 | 980 ft. (NW) | 57.6 | 30.0 | 57.6 | 0.0 |
| **Danville Compressor Station** | | | | | |
| NSA #1 | 600 ft. (east) | 63.0 | 40.0 | 63.0 | 0.0 |
| NSA #2 | 1,310 ft. (NE) | 56.0 | 35.0 | 56.0 | 0.0 |
| NSA #3 | 1,560 ft. (west) | 55.0 | 33.0 | 55.0 | 0.0 |
| NSA #4 | 1,650 ft. (south) | 54.0 | 32.0 | 54.0 | 0.0 |
| **Owingsville Compressor Station** | | | | | |
| NSA #1 | 970 ft. (east) | 58.9 | 30.0 | 58.9 | 0.0 |
| NSA #2 | 800 ft. (ESE) | 67.2 | 35.0 | 67.2 | 0.0 |
| NSA #3 | 890 ft. (SE) | 70.3 | 37.0 | 70.3 | 0.0 |
| NSA #4 | 1,500 ft. (south) | 57.7 | 30.0 | 57.7 | 0.0 |
| NSA #5 | 780 ft. (WNW) | 60.9 | 32.0 | 60.9 | 0.0 |

If the anticipated and recommended noise-control measures for the Project modifications at the Barton, Tompkinsville, Danville, and Owingsville compressor stations are successfully implemented, the noise attributable to the station would be lower than 55 dBA ($L_{dn}$) at the nearby NSAs in which the current sound level is equal to or lower than 55 dBA ($L_{dn}$). In addition, at the nearby NSAs in which the current (pre-existing) sound level is above 55 dBA ($L_{dn}$), the station sound contribution would be approximately equal to or lower than the pre-existing sound level. In addition, the noise of a gas blowdown associated with the new compressor unit at Tompkinsville Compressor Station would be lower than 55 dBA ($L_{dn}$).

The following is a summary of noise-control measures that Texas Eastern is evaluating to be employed for new equipment at the compressor stations:

- for the new compressor unit at the Tompkinsville Compressor Station, noise-control measures would be applied to the compressor building enclosing the new motor and compressor, including the use of appropriate building materials;
- if necessary, acoustical pipe insulation for outdoor aboveground gas piping;

- low-noise LO/working oil cooler for new compressor unit at the Tompkinsville Station;
- low-noise electrical-related equipment (e.g., Switchgear Building, VFD components); and
- low-noise gas aftercooler at all compressor stations receiving a new gas aftercooler.

Texas Eastern has committed to employing these noise mitigation measures or equivalent noise mitigation measures to demonstrate compliance with the FERC's noise standard. To ensure that the noise from the compressor stations does not exceed our criterion at the nearest NSAs, **we recommend that:**

- **Texas Eastern should file a noise survey with the Secretary no later than 60 days after placing the modified Tompkinsville Compressor Station into service. If a full power load condition noise survey is not possible, Texas Eastern should provide an interim survey at the maximum possible power load and provide a full power load survey within 6 months. If the noise attributable to the operation of the Tompkinsville Compressor Station equipment under interim or full power load exceeds an $L_{dn}$ of 55 dBA at NSA #1 or exceeds the predicted noise level at NSA #2, Texas Eastern should:**
  a. **file a report on what changes are needed;**
  b. **install additional noise controls to meet the level within 1 year of the in-service date; and**
  c. **confirm compliance with this requirement by filing a second full power noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

Based on the noise analyses above and our recommendation, we conclude that operation of the Project would not have a significant impact on the noise environment in the vicinity of the compressor stations.

**Construction**

For the existing compressor stations associated with the Projects, the noise impact and noise contribution of construction-related activities is not expected to exceed the existing noise levels associated with the respective facilities. The acoustical assessment indicates that the noise from construction activities at the existing compressor station sites would only have a minimal impact on the surrounding environments.

Pipeline construction activity and associated noise levels for any new pipeline segments/sections would vary depending on the phase of construction in progress at any one time. These construction phases include site grading, clearing/grubbing, *etc.* The highest level of construction noise is assumed to occur during earth work.

Noise mitigation measures to be employed during construction include ensuring that sound muffling devices that are provided as standard equipment by the construction equipment manufacturer are kept in good working order. If needed, additional noise-abatement techniques and other measures would be implemented during the construction phase to mitigate construction-related noise disturbances at nearby NSAs. Because of the temporary nature of the

construction noise during normal installation of the pipeline along the pipeline route or at the respective Project's compressor stations and the proposed implementation of noise mitigation measures, we do not anticipate any significant noise impacts as a result of the Projects' construction activities.

### 9. Reliability and Safety

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture. Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

The pipelines associated with the project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues, prescribes the minimum standards for operating and maintaining pipeline facilities, including emergency shutdowns and safety equipment. Part 192 also requires a pipeline operator to establish a written emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

The DOT defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. For example, pipe wall thickness and pipeline design pressures; hydrostatic test pressures; maximum allowable operating pressure; inspection and testing of welds; and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Preliminary class locations for the Projects have been developed based on the relationship of the pipeline centerline to other nearby structures and manmade features. The Projects would consist of about 13.1 miles of Class 1 pipe and 3.3 miles of Class 2.

The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. Facilities associated with Texas Eastern's Projects must be designed, constructed, operated, and maintained in accordance with the DOT standards, including the provisions for written emergency plans and emergency shutdowns. Enable would continue to provide the appropriate training to local emergency service personnel.

We conclude that Texas Eastern's pipeline construction and operation would represent only a minimum increase in risk to the public.

### 10. Cumulative Impacts

In accordance with NEPA and FERC policy, we evaluated the potential for cumulative effects of the Projects. Cumulative impacts were assessed for the proposed Projects when added to other past, present, and reasonably foreseeable future actions, regardless of the agency or party undertaking such actions. Cumulative effects generally refer to impacts that are additive or synergistic in nature and result from the construction of multiple projects in the same vicinity

and time frame. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time. In general, small scale projects with minimal impacts of short duration do not significantly contribute to cumulative impacts.

This cumulative impact analysis generally follows the methodology set forth in relevant guidance from the CEQ and USEPA (CEQ 2005; USEPA 1999). Under these guidelines, inclusion of other projects in the analysis is based on identification of impacts from other projects that would result in similar effects as the proposed Projects. An action must meet the following three criteria to be included in the cumulative impacts analysis:

- impact a resource area identified as a potentially affected area by the proposed Projects;
- cause this impact to occur within all, or part of, the Projects geography; and
- cause this impact to occur within all, or part of, the time span for the proposed Projects.

The proposed Projects would affect confined corridors for construction of the loops in Ohio, on existing right-of-way, or within existing compressor stations. We identified five general categories of actions that could potentially contribute to cumulative impacts when considered with the proposed Projects. These include: 1) natural gas development (natural gas wells, processing plants, compressor stations, pipeline gathering systems and interstate pipelines); 2) electric generation and transmission projects; 3) transportation projects; 4) residential, commercial, and industrial development projects; and 5) other projects that did not fall into the other four categories. When added to other past, present and future actions, the proposed Projects may result in cumulative impacts that affect such resources as groundwater, water use for consumption, surface water, vegetation, wildlife (including federally and state protected species), cultural resources, socioeconomics, geology, soils, land use, air quality and noise.

The selection of a time period and geographic boundaries for the cumulative impacts analysis is based on the natural boundaries of resources of concern (henceforth referred to as the region of influence [ROI]) and the period of time that the proposed Projects' impacts may persist. For inclusion in the analysis, a project must impact a resource category potentially affected by the proposed Projects within a defined resource ROI. Minor projects included in the analysis consist of natural gas wells, residential development, small commercial development and small transportation projects. Major projects analyzed include large commercial, industrial, transportation, and energy development projects. Minor and major projects that are within 0.25 mile of the Projects' pipeline loops and compressor stations were included in the assessment for impacts on cultural resources and geological resources. Minor and major projects that were identified within 0.5 mile of the Projects' pipeline loops and compressor stations were included in the assessment for construction-related noise impacts. Major projects that are located within 10 miles of the Projects' pipeline loops were included in the assessment for socioeconomics. For the proposed pipeline loops, major projects that were identified within the USGS Hydrologic Unit Code (HUC)-12 watersheds were assessed for impacts on groundwater, water quality, fish and wildlife, and vegetation.

The selection of a 0.25-mile buffer is appropriate for minor projects when analyzing cultural, geological, soil, and land use resources, as most impacts on these resources are confined to areas of ground disturbance during construction. A 10-mile radius was used for socioeconomics, as the majority of socioeconomic impacts may occur outside of areas directly

impacted by construction. Because FERC requires landowner notifications within 0.5 mile of certain construction activities where noise may be an issue during construction or operation, a 0.5 mile buffer around the proposed pipeline loops and compressor stations was selected for minor and major projects when analyzing construction-related noise impacts. The Projects are not expected to increase operational noise, except for a very slight increase at the Tompkinsville Compressor Station of 0.5 decibel.

Because the proposed modifications at existing compressor stations would result in relatively minor impacts, only major projects within 1 mile of the facilities were included in the assessment to evaluate potential impacts on groundwater, water use and quality, fish and wildlife, and vegetation. To evaluate possible cumulative air quality impacts, Texas Eastern referenced recent USEPA guidance documents, which identify a 1 kilometer [km] (0.62 mile) radius of review to determine the emissions inventory and establish a "significant concentration gradient in the vicinity of the proposed sources" (USEPA 1999). Therefore, the 1 km radius is considered to be a conservative estimate for a sufficient ROI for minor permitting changes included in the scope of the Projects.

The time period in which other projects could potentially contribute to cumulative impacts associated with the proposed Projects' area was based on whether the resource category impacts are short-term, long-term, or permanent. Most of the direct impacts associated with the Projects would occur during the construction phase. However, there are some long-term operational impacts that would result from the Projects, such as the continued operation of the existing compressor stations, although construction impacts at the compressor stations are minor and no increases in emissions during operation would occur. For other, similar projects where the impacts are long-term or permanent, the temporal range was extended to include their impact contributions. Table B-15 identifies the ROI for each of the resource categories the proposed Projects would contribute direct and indirect impacts to. In general, regulatory guidance documents from the Council of Environmental Quality and USEPA, as well as the FERC's extensive experience were used to select the appropriate ROI for each resource category.

**Table B-15**
**Region of Influence for the Projects**

| Resource | ROI Boundary for Pipeline Loops | ROI Boundary for Compressor Station Modifications |
|---|---|---|
| Groundwater | Watershed boundary HUC 12 | 1 mile |
| Water Use and Quality | Watershed boundary HUC 12 | 1 mile |
| Fish, Wildlife | Watershed boundary HUC 12 | 1 mile |
| Vegetation | Watershed boundary HUC 12 | 1 mile |
| Cultural Resources | 0.25 mile | 0.25 mile |
| Socioeconomics | 10 miles | 1 mile |
| Geological Resources | 0.25 mile | 0.25 mile |
| Soils | 0.25 mile | 0.25 mile |
| Land Use | 0.25 mile | 0.25 mile |
| Air Quality | 1 km (0.6 mile) | 1 km |
| Noise | 0.5 mile | 0.5 mile |

Texas Eastern contacted county officials to request information about proposed and recently constructed residential and commercial development projects near the Projects. Recently constructed projects were defined as those constructed within the past year. We also reviewed publically available information including permits issued for oil and gas wells, transportation improvement plans, other FERC applications, and industry sources.

Table B-16 summarizes recently completed, current, and proposed minor projects identified within 0.25 mile and 0.5 mile of the Projects' workspace, major projects within 10 miles of the Projects' workspace for pipeline loops, major projects within the HUC-12 watersheds that would be crossed by the proposed pipeline loops, and projects within 1 mile of the existing compressor stations. These projects were evaluated for potential cumulative or additive impacts on resources that would also be affected by the construction and operation of the proposed Projects.

**Table B-16**
**Projects Potentially Contributing to Cumulative Impacts**

| Project | Location (County, State) | Description | Approx. Distance and Direction[1] | Closest Projects Facility and Mile Post | Anticipated Date of Construction / Project Status |
|---|---|---|---|---|---|
| Natural Gas Development | | | | | |
| Wells[2] | | | | | |
| Eclipse Resources I LP – Duane Weisend Unit | Noble County, OH | Gas wells (3) | 0.2 mile north | Athens to Berne Loop, MP 680.1 | Permits Issued 01/22/2014, 03/21/2014, and 06/02/2014 |
| Eclipse Resources Ohio LLC - Kilburn Bach Unit | Monroe County, OH | Gas well | 700 feet east | Berne Compressor Station | Permit Issued 8/10/2012 |
| Antero Resources Corporation – Dimmerling Unit | Monroe County, OH | Gas wells (3) | 720 feet north | Athens to Berne Loop, MP 681.6 | Permits Issued 9/25/2014, 12/18/14 |
| Antero Resources Corporation – Benatar Unit | Monroe County, OH | Gas wells (3) | 720 feet north | Athens to Berne Loop, MP 681.6 | Permits Issued 9/25/2014, 2/6/2015 |
| Antero Resources Corporation – Roxie Unit | Monroe County, OH | Gas wells (4) | 0.4 mile northeast | Berne Compressor Station | Permits Issued 05/29/2015 |
| Gulfport Energy Corporation – Robinette 210129 | Monroe County, OH | Gas wells (4) | 600 feet southeast | Berne to Holbrook Loop, MP 698.3 | Permit Issued 9/12/2014, 11/6/2014 |
| Natural Gas Processing Plants[2] | | | | | |
| Blue Racer Midstream, LLC Berne Natural Gas Processing Complex | Monroe County, OH | Cryogenic processing plant | 0.3 mile southeast | Berne Compressor Station | In service in June 2015. |
| Pipeline Gathering Systems[3] | | | | | |

| Project | Location (County, State) | Description | Approx. Distance and Direction[1] | Closest Projects Facility and Mile Post | Anticipated Date of Construction / Project Status |
|---|---|---|---|---|---|
| None | | | | | |
| Interstate Natural Gas Pipeline Projects[3] | | | | | |
| Columbia Pipeline Group Leach XPress (FERC Docket No. CP15-93) | Noble and Monroe Counties, OH | The proposed Leach XPress project involves construction of approximately 160-miles of natural gas pipeline and compression facilities in southeastern OH and West Virginia's northern panhandle. | 0.2 mile south | Berne to Holbrook Loop, MP 699.7 | Construction is planned to begin in November 2016, with a targeted in service date in November 2017. |
| Equitrans Ohio Valley Connector (FERC Docket No. CP15-41) | Monroe County, OH | Equitrans proposes the Ohio Valley Connector project, a 50.1-mile natural gas pipeline that extends into Monroe County, OH. A new compressor station is also proposed in Monroe County. | 5.0 miles east | Berne to Holbrook Loop, MP 700.3 | Pipeline construction began in January 2016, and was placed in-service in November 2016. |
| Texas Eastern Appalachian Lease Project (FERC Docket No. P-15-11) | Monroe County, OH | The proposed Texas Eastern Appalachian Lease Project involves construction of a 4.5 mile loop on the Texas Eastern system. The end of the Berne to Holbrook Loop terminates near the beginning of the Texas Eastern Appalachian Lease Project looping segment. Proposed facilities and existing system improvements associated with the two projects are independent of each other and designed to flow divergent gas volumes to separate markets. | 0.0 mile west | Berne to Holbrook Loop, MP 700.3 | Currently scheduled for March 2017 through October 2017. |
| Texas Eastern Ohio Pipeline Energy Network (FERC Docket No. CP14-68) | Monroe County, OH | The Ohio Pipeline Energy Network Project is a 76-mile natural gas pipeline in Columbiana, Carroll, Jefferson, Belmont, and Monroe Counties, OH and a compressor station in Belmont County. | 5.0 miles east | Berne to Holbrook Loop, MP 700.3 | Construction commenced in February 2015, with in-service dates of September-November 2015. |
| Rover Pipeline, LLC Rover Pipeline Project (FERC Docket No. CP15-93) | Noble and Monroe Counties, OH | Rover Pipeline, LLC proposes to construct the Rover Pipeline Project, a 711-mile natural gas pipeline that would connect the Marcellus and Utica shale regions to Canada. | 0.2 mile north | Berne Compressor Station | Pipeline construction is planned to begin in 4th quarter 2016, with a targeted in-service date of November 2017. |
| Compressor Station Projects[3] | | | | | |
| Dominion Transmission's | Monroe County, OH | Dominion Transmission, Inc. (DTI) constructed a new | 5.6 miles northwest | Berne to Holbrook | Construction was |

| Project | Location (County, State) | Description | Approx. Distance and Direction[1] | Closest Projects Facility and Mile Post | Anticipated Date of Construction / Project Status |
|---|---|---|---|---|---|
| Allegheny Storage Project (FERC Docket No. CP12-72) | | compressor station (Mullet Compressor Station), installed 0.5-miles of 16 inch diameter suction and 10-inch diameter discharge pipelines; and upgraded existing Mullet 1 measurement and regulation (M&R) Station. | | Loop; MP 700.3 | completed in November 2014. |
| Dominion Transmission Inc. (DTI) Clarington Project (FERC Docket No. CP14-496) | Monroe County, OH | DTI proposes to add two new units consisting of 10,000 hp to the existing Mullet Compressor Station as well as associated ancillary equipment and station piping. | 5.6 miles northwest | Berne to Holbrook Loop, MP 700.3 | Construction began in October 2015, with the commercial operation of the Mullet Compressor Station scheduled to begin in November 2016. |
| Rockies Express Pipeline LLC Zone 3 East-to-West Project (FERC Docket No. CP14-498) | Monroe County, OH | Rockies Express proposes to install over pressure protection facilities at Rockies Express's existing Clarington Interconnection Hub in Monroe County, OH to enable bidirectional flow | 5.3 miles northwest | Berne to Holbrook Loop; MP 700.3 | Construction commenced in March 2016 with a targeted in-service date of December 2016. |
| Rover Pipeline, LLC Rover Compressor Project (FERC Docket No. CP15-93) | Noble and Monroe Counties, OH | Rover Pipeline, LLC proposes to construct the Clarington Compressor Station as part of the Rover Pipeline Project. | 4.6 miles east | Berne to Holbrook Loop, MP 700.3 | Pipeline construction is planned to begin in 4th quarter 2016, with a targeted in-service date of November 2017. |
| Other Projects | | | | | |
| Electric Generation and Transmission | | | | | |
| AEP South Cladwell-Macksburg 138 kV Transmission Line3 | Noble County, OH and Washington County, Pennsylvania | AEP Ohio Transmission Company proposes to construct a 138 kilovolt (kV) transmission line that would connect the South Caldwell substation, passing through the South Olive substation, in Noble County to the Macksburg substation in Washington County. The proposed transmission line would be approximately 8 miles long and would likely run through Olive, Jackson, and Jefferson townships in Noble County and Aurelius Township in Washington County. AEP states that this | 9.8 miles, west | Athens to Berne Loop, MP 677.4 | Structure construction anticipated in late 2016 |

| Project | Location (County, State) | Description | Approx. Distance and Direction[1] | Closest Projects Facility and Mile Post | Anticipated Date of Construction / Project Status |
|---|---|---|---|---|---|
| | | project would improve service for customers, cut down on power interruptions, and speed recovery of service when outages occur. | | | |
| Red Hills – Leake Transmission Project, Southwest Mississippi Service Area | Attala County, MS | TVA would build a 34.8-mile-long 161-kV line from the existing Red Hills Substation to Central EPA's upgraded Kosciusko Substation. The line would then continue to the Leake-Singleton 161-kV Transmission Line, creating the new Red Hills-Leake 161-kV Transmission Line | 0.9 mile west | Kosciusko Compressor Station | Construction is scheduled to begin in fall 2017, and the project is scheduled to be completed in fall 2018. |
| Lebanon (Vesta Road), TN | Wilson County, TN | The project consists of 6 to 8 miles of new transmission line. The line would extend south from TVA's existing Lebanon-Murfeesboro 161,000 volt line or west from TVA's Wilson-Lebanon 161,000 volt line. TVA is considering 19 alternative routes. | 0.0 mile west | Gladeville Compressor Station | Construction and in-service 2015 |
| Transportation | | | | | |
| Guiderail Improvements (12-15-GR2 Greene) | Greene County, PA | PennDOT is currently performing guiderail repairs and replacements along Route 21. | 0.4 mile northwest | Holbrook Compressor Station | The project is currently under construction and planned for completion by June 30, 2016. |
| Residential, Commercial, and Industrial Development | | | | | |
| Maplehurst Bakeries Manufacturing Facility | Wilson County, TN | Maplehurst Bakeries, a division of Canada-based Weston Foods, would invest $102.8 million to build and equip a new 173,000 square foot manufacturing facility in Lebanon, TN. | 0.2 mile south | Gladeville Compressor Station | Expected to be operational in the first quarter of 2016. |

[1] Measured between closest location on the project and the Access South, Adair Southwest, and Lebanon Extension Projects.
[2] Considered a minor project. Radius assessed = 0.25 or 0.5 mile.
[3] Considered a major project. Radius assessed for pipeline loops = 10 miles. Radius assessed for compressor stations = 1 mile.

## 10.1 Description of Projects

### Gas Wells

The USGS conducted a recent analysis of Marcellus Shale natural gas extraction and found that development creates "potentially serious patterns of disturbance on the landscape" (USGS 2012). The combined effects of natural gas well development create landscape changes due to earth disturbance for construction of roads, drilling pads, and installation of gathering lines. Changes in land use and land cover can result in increased erosion, sedimentation and habitat fragmentation. On average, between 4 and 5 million gallons of water are used during the drilling and development phase of each natural gas production well (Mielke et al., 2010).

A desktop study was conducted to identify existing, planned, or operational natural gas wells within 0.25 mile of the proposed Projects when analyzing impacts on cultural and geological resources and within 0.5 mile of the proposed Projects when assessing construction-related noise impacts. Eighteen natural gas wells were identified within 0.5 mile of the proposed Projects in Noble and Monroe Counties, Ohio (ODGS, 2015).

- Eclipse Resources received permits for three wells for its Duane Weisend Units in January 2014, March 2014, and June 2014. These wells are approximately 0.2 mile north of MP 680.1 on the Athens to Berne Loop.
- The Antero Resources Corporation obtained permits for six wells for its Benatar and Dimmerling Units in September 2014, December 2014, and February 2015. These wells are approximately 720 feet north of MP 681.6 on the Athens to Berne Loop.
- The Antero Resources Corporation also obtained permits for four additional wells for its Roxie Units in May 2015. These wells are located approximately 0.4 mile northeast of the Berne Compressor Station at the terminus of the Athens to Berne Loop.
- Eclipse Resources received a permit for its Bach Unit in August 2012. This well is approximately 700 feet east of the Berne Compressor Station.
- Gulfport Energy Corporation received permits for its four Robinette 210129 wells in September and November 2014. These wells are approximately 600 feet southeast of MP 698.3 on the Berne to Holbrook Loop.

**Natural Gas Processing Plants**

A cryogenic processing plant was recently constructed near the Berne Compressor Station in Monroe County, Ohio. Cyrogenic processing plants extract liquids from natural gas, which purifies the methane gas stream and produces natural gas liquids including ethane, propane, butane, isobutene, and pentane. The plant was constructed at the Blue Racer Midstream, LLC Berne Natural Gas Processing Complex, and it was placed in service in June 2015 (Blue Racer Midstream, 2015).

**Pipeline Gathering Systems**

No proposed, under construction, or completed pipeline gathering systems were found within 10 miles of the proposed Projects pipeline loops, within HUC-12 watersheds that would be crossed by the proposed pipeline loops, or within 1 mile of the compressor stations.

**Interstate Natural Gas Pipeline Projects**

Within the Projects' ROI, there are five interstate natural gas pipelines projects that are either proposed (and thus currently under FERC review), recently authorized by FERC and currently under construction, or have been completed within the last year. These projects include the Columbia Pipeline Group Leach XPress Project (FERC Docket No. CP15-93), Equitrans Ohio Valley Connector Project (FERC Docket No. CP15-41), Texas Eastern Appalachian Lease Project (FERC Docket No. PF15-11), Texas Eastern Ohio Pipeline Network Project (FERC Docket No. CP14-68), and Energy Transfer Partners Rover Pipeline Project (FERC Docket No. CP15-93). A description of these projects is provided in table B-16, and additional details

regarding each project can be obtained via the eLibrary docket search function at www.ferc.gov by utilizing the above given FERC docket numbers.

- The proposed Columbia Pipeline Group Leach XPress Project involves construction of approximately 160 miles of natural gas pipeline and compression facilities in southeastern Ohio and West Virginia's northern panhandle. The proposed pipeline would generally parallel the Projects' Berne to Holbrook Loop approximately 0.2 mile to the south. Construction is planned to begin in November 2016, with a targeted in service date in November 2017 (Columbia Gas Transmission, 2015).
- Equitrans has received FERC authorization for the Ohio Valley Connector project, a 50.1-mile-long natural gas pipeline that extends into Monroe County, Ohio. A new compressor station is under construction in Monroe County. It is located approximately 5.0 miles east of the Berne to Holbrook Loop terminus. Pipeline Construction began in January 2016, with a targeted in-service date of November 2016 (Equitrans, LP, 2014).
- The proposed Texas Eastern Appalachian Lease Project involves construction of a 4.5-mile-long loop on the Texas Eastern system. The end of the Berne to Holbrook Loop terminates near the beginning of the Texas Eastern Appalachian Lease Project looping segment. Proposed facilities and existing system improvements associated with the two projects are independent of each other and designed to flow divergent gas volumes to separate markets. Construction is anticipated from March 2017 to October 2017 (Texas Eastern, LP, 2015).
- Texas Eastern's Ohio Pipeline Energy Network Project is a recently completed 76-mile-long natural gas pipeline in Columbiana, Carroll, Jefferson, Belmont, and Monroe Counties, Ohio and a compressor station in Belmont County. It is approximately 5.0 miles east of the Berne to Holbrook Loop terminus. Construction commenced in February 2015, with in-service dates September through November 2015 (Texas Eastern, LP, 2014).
- Rover Pipeline Project, LLC proposes to construct the Rover Pipeline Project, a 711-mile-long natural gas pipeline that would connect the Marcellus and Utica shale regions to Canada. The proposed pipeline would parallel the Berne to Holbrook Loop. Pipeline construction is planned to begin the 4$^{th}$ quarter of 2016, with a targeted in-service date of November 2017 (Rover Pipeline, LLC, 2015).

**Compressor Station Projects**

Four compressor stations that would be constructed or modified were identified within the Projects' ROI.

- Dominion Transmission, Inc. constructed a new compressor station (Mullett Compressor Station), installed 0.5 mile of 16-inch-diameter suction and 10-inch-diameter discharge pipelines; and upgraded the existing Mullet 1 measurement and regulation (M&R) Station. The Mullett Compressor Station is about 5.6 miles from the Berne to Holbrook Loop eastern terminus. Construction is complete, and the station is expected to be operational in November 2016 (DTI, 2014).
- Dominion Transmission, Inc. proposes to add two new units consisting of 10,000 hp to the existing Mullet Compressor Station (described above) as well as associated ancillary equipment and station piping. Installation of the new compressor units began in October

2015, with the commercial operation of the Mullet Station scheduled to begin in November 2016 (DTI, 2015).

- Rockies Express proposes to install overpressure protection facilities at its existing Clarington Interconnection Hub in Monroe County to enable bidirectional flow. The Clarington Interconnection Hub is about 5.3 miles from the Berne to Holbrook Loop eastern terminus. Construction commenced in March 2016. The project would be placed into service in December 2016 (Rockies Express, 2015).
- Rover Pipeline, LLC proposes to construct the Clarington Compressor Station as part of the Rover Pipeline Project. This new compressor station would be approximately 4.6 miles east of the Berne to Holbrook Loop eastern terminus. Construction is expected to begin in the 4th quarter of 2016 and is expected to be in service in December 2017.

**Electric Generation and Transmission**

There are three electric transmission projects within 10 miles of the proposed construction workspace, within the HUC-12 watershed that would be crossed by the Projects' pipeline loops, or within 1 mile of the compressor stations that are either proposed, under construction, or have been completed within the last year. These projects include the American Electric Power (AEP) South Cladwell-Macksburg 138 kV Transmission Line, the Red Hills – Leake Transmission Project, and the Lebanon (Vesta Road), Tennessee Project.

- AEP Ohio Transmission Company proposes to construct a 138 kV transmission line that would be approximately 8 miles long and would likely run through Olive, Jackson, and Jefferson townships in Noble County and Aurelius Township in Washington County. The proposed transmission line is sited approximately 9.8 miles from MP 677.4 on the Athens to Berne Loop. Structure construction is anticipated in late 2016 (Ohio Power Siting Board, 2015).
- Tennessee Valley Authority (TVA) would build a 34.8-mile-long 161-kV line from the existing Red Hills Substation to Central EPA's upgraded Kosciusko Substation. The line would then continue to the Leake-Singleton 161-kV Transmission Line, creating the new Red Hills-Leake 161-kV Transmission Line. The project is sited within 0.9 mile of the Kosciusko Compressor Station. Construction is scheduled to begin in fall 2017, and the project is scheduled to be complete in fall 2018 (TVA, 2015).
- The Lebanon (Vesta Road), Tennessee Project consists of 6 to 8 miles of new transmission line. The line would extend south from TVA's existing Lebanon-Murfeesboro 161,000 volt line or west from TVA's Wilson-Lebanon 161,000 volt line. The transmission line project terminates at Texas Eastern's Gladeville Station. Projects construction and in-service occurred in 2015.

**Transportation**

Minor transportation projects included road resurfacing, bridge repairs, culvert replacements, and other localized projects (PennDOT, 2015a & 2015b), Ohio (ODOT, 2015), Kentucky (KTC, 2014a-c), Tennessee (TDOT, 2015), AL (ALDOT, 2015), and Mississippi (MDOT, 2015). During a desktop study, one guiderail repair project was identified 0.4 mile northwest of the Holbrook Compressor Station in Greene County, Pennsylvania. The project is

currently under construction and planned for completion summer of 2016. Modifications at Texas Eastern's existing compressor station sites are currently scheduled to occur from February 2017 to November 2017.

**Residential, Commercial, and Industrial Development**

Maplehurst Bakeries is building a new 173,000 square foot manufacturing facility in Lebanon, Tennessee. This facility is located approximately 0.2 mile south of the Gladeville Compressor Station. The facility opened in the first quarter of 2016. The potential environmental impacts of construction and operation of this manufacturing facility were considered for each ROI in the analysis described in section B.9.2.

### 10.2 Potential Cumulative Impact on Resources within the Projects' Areas

As Project impacts on geology and soils would highly localized and limited primarily to the Project footprint during the period of construction, cumulative impacts on geology and soils would only occur if other projects are constructed at the same time and place as the proposed facilities. Therefore, the region of influence for cumulative impacts on geology and soils is the footprint of the proposed Projects and a buffer area (0.25 mi). There are three ways that the Projects, in addition to other projects in the region of influence, may have cumulative impacts on geology and soils resources: (1) they may affect existing mineral resources, such as mines, quarries, or oil and gas wells; (2) they may be subject to natural geological hazards; or (3) they may result in soil erosion or compaction.

Oil and gas wells are present near the footprint of some components of the Projects. no impacts to mines would occur. The general geologic setting of the Projects may pose potential erosion and landslide hazards as a result of steep slopes in some areas disturbed by the Projects and may be subject to increased erosion and landslide hazards. Construction in close proximity could result in a cumulative increase in the number of landslides that occur in the region of influence. Only the Gladeville Compressor Station has other projects (Vesta Road Power Project and Maplehurst Bakery) within 0.25 mile, but these projects have been completed and disturbance would have completed. Three other FERC jurisdiction pipeline projects, Rover, Leach XPress, and Appalachian Lease Projects would be within 0.25 mile of the Berne to Holbrook Loop and Berne Compressor Station, and these projects would also using best management practices in the FERC Plan to reduce slope failure and erosion. No impacts on mines would occur, as no mining is currently proposed near the Projects.

Texas Eastern would implement mitigation measures that would reduce the potential for slope failure and minimize impacts associated with erosion in areas of high landslide potential. In addition, the FERC and other federally regulated projects would employ best management practices to limit effects on soils and to aid in reestablishing vegetation after construction; Texas Eastern would minimize incremental impacts on soils through implementation of the Projects' E&SCP. Therefore, we conclude that cumulative impacts on geology and soils from the Project in consideration with the Vesta Road Power Project; bakery; gas well development; and Rover, Leach XPress; and Appalachian Lease Projects would be minor.

Because impacts on surface waters and wetlands can result in downstream contamination or turbidity, the region of influence for cumulative impacts on water resources and wetlands includes each HUC-12 subwatershed crossed by the loops. Hydrologic units define the source

area that contributes surface water to a specified outlet point, and they are delineated based on surface water flow along natural hydrologic breaks. HUC-12 subwatersheds typically define the drainage area upstream of tributaries to major rivers, and range from 10,000 to 40,000 acres in size. The Projects, in addition to other projects in the ROI (all projects listed in Table B-16), may have cumulative impacts on water resources and wetlands including changes in groundwater recharge; impacts on surface and groundwater quality; sedimentation and increased turbidity due to erosion or construction within surface waters; and temporary and permanent impacts on wetlands. Construction of the proposed Projects would result in temporary and minor impacts on groundwater and surface water resources. Temporary and minor impacts on PEM and PSS wetlands would occur. Impacts on PFO wetlands would be long-term within the temporary construction right-of-way. Permanent impacts on PFO wetlands would include conversion to PEM wetlands within the maintained portion of the permanent right-of-way.

Regulation of hydraulic fracturing has increased due to public concern over its potential impacts on groundwater; specifically, the potential migration of oil and the use of chemicals in the fracturing fluid. States are responsible for regulation of water use associated with hydraulic fracturing; requirements include measures for the protection of water quality and well casing standards. Drilling companies must also disclose the chemical additives used in hydraulic fracturing fluid for wells. Researchers at collaborating universities conducted an analysis of 64 groundwater wells over the Marcellus Shale in northeastern Pennsylvania to detect organic chemicals used during hydraulic fracturing during drilling activities. Although trace levels of certain chemicals were encountered, those levels were below the EPA's maximum contaminant levels. In addition, further review of the data indicated that the presence of these chemicals is likely from surface routes (such as accidental spills) rather than subsurface routes (chemicals rising from fractured rock) (Drollette et al. 2015). Similarly, the Susquehanna River Basin Commission (SRBC) monitored water quality at 59 stations in northeastern Pennsylvania and southern New York to document water quality in small, headwater streams with the potential to be affected by hydraulic fracturing by testing macroinvertebrate biotic integrity, a common indicator of the biological health of streams. The SRBC found neither a correlation between biotic integrity and well pad density within the associated watershed, nor between biotic integrity and distance between to the nearest well pad (SRBC 2015). Because drilling activities are subject to state regulations to protect water quality, and given recent water quality studies, we anticipate that ongoing and drilling projects near the Athens to Berne Loop, Berne to Holbrook Loop and Berne Compressor Station, when combined with the proposed projects in Table B-16, would not contribute to significant cumulative impacts on groundwater.

Many of the projects identified in table B-16 are located within the same subwatersheds that would be crossed by the loops, some of these would result in direct and indirect impacts on wetlands and waterbodies during construction and operation. Therefore, the Projects, when considered with other projects in the vicinity, would result in cumulative impacts on water resources and wetlands. However, impacts on surface waters associated with the Project would be temporary, including sedimentation from construction areas. Construction within the existing compressor stations would not impact streams and wetlands. Because the proposed Projects and other projects would be required to comply with any mitigation requirements and permit conditions in its CWA Section 404 and 401 permits for any permanent wetland impacts, as applicable, and the incremental impacts of the Projects would be temporary and minor, we conclude that cumulative impacts would not be significant.

Direct effects on vegetation would occur from vegetation clearing and changes in land use within the immediate footprint of the proposed Project; indirect effects would occur from the potential spread of invasive species and changes in interior forest habitat from fragmentation. Similarly, direct effects on smaller wildlife would occur within the construction footprint of a given project; indirect effects would be more likely to occur on larger or more mobile species that could readily leave the Project area and move into adjacent, suitable habitat.

Previous activities in the Projects area in the vicinity of the proposed loops in Ohio have resulted in significant impacts on forest cover, fragmentation, and composition. The Western Allegheny Plateau ecoregion was dominated by unfragmented forest in pre-colonial times. During the late eighteenth and early nineteenth centuries, regional clearing for logging activities and agriculture resulted in significant impacts on forest cover resulting in forest loss and fragmentation (Robertson and Rosenberg 2003). Following these losses, forests have undergone secondary succession and revegetation and the total area of forest in the Project area has increased (Robertson and Rosenberg 2003); forests now represent 30 percent of the land in Ohio (Widmann et al. 2009). Periodic timber harvesting is ongoing in the region surrounding the loops where tree clearing would occur, and the forests in the Project area are young because of the periodic harvesting of timber. Riiters et al. (2002) found that most forest in the contemporaneous United States is fragmented. The areas around the Project loops consist of a mix or forests, open agricultural areas, residential areas, and roads.

Cumulative impacts, such as those on vegetation cover types and wildlife habitat, are additive. Many wildlife species depend on mature contiguous tracts of forest to sustain their migratory and reproduction cycles. These species include songbirds and terrestrial mammals that require large tracts of forest to support their home ranges. Texas Eastern would minimize impacts on vegetation and wildlife habitat by collocating the loops with its existing rights-of-way where practicable and by implementing the measures in its E&SCP. Other proposed construction would occur within existing compressor station facilities or on existing maintained rights-of-way that would have minimal impacts on vegetation and wildlife. Additionally, similar habitats are located adjacent to and in the vicinity of construction activities along the loops that are expected to be sufficient to support wildlife displaced during construction. The temporary work areas that are currently forested would be allowed to revert to forest after construction.

All the projects listed in Table B-16 would likely have vegetation clearing associated with their construction within the HUC 12 watersheds impacted by Texas Eastern's Projects. The other FERC projects would use the best management practices in the FERC Plan to stabilize and revegetate disturbed areas. The other project would also have requirements to stabilize disturbed areas after construction. We anticipate that Texas Eastern's Projects because it minimizes forest fragmentation and clearing, and when combined with the projects in Table B-16, would not contribute to significant cumulative impacts on vegetation.

Temporary impacts on fisheries may occur at proposed stream crossings throughout the loop portions of the Projects. Impacts on fishery resources that would be crossed by the proposed Projects would be minimized by adhering to the waterbody crossing measures in the E&SCP. No long-term impacts on aquatic resources are anticipated.

Cumulative impacts on federally and state listed threatened and endangered species and federal species of concern could occur if those projects list in Table B-16 were to affect the same habitats as the Projects, especially where tree clearing would occur for the loops in Ohio.

However, the ESA consultation process includes a consideration of the current status of affected species, and cumulative impacts would be minimized. Mitigation measures would be implemented to minimize the potential for erosion, revegetate disturbed areas, or otherwise increase the stabilize site conditions. We conclude that the cumulative impacts on vegetation and wildlife resources, including threatened and endangered species, would not be significant based on the addition of the Project's impacts on these resources, when combined with the projects in Table B-16, would not contribute to significant cumulative impacts on federally and state listed threated and endangered species and federal species of concern.

Past disturbances to cultural resources in the Projects' areas are typically related to accidental disturbances, intentional destruction or vandalism, lack of awareness of the historic value, and construction and maintenance operations associated with mining, existing roads, railroads, utility lines, and electrical transmission line rights-of-way.

Federally regulated projects would include mitigation measures designed to avoid or minimize additional direct impacts on cultural resources. Non-federal actions would need to comply with any procedures and mitigation measures required by the states. Texas Eastern would avoid the one potentially NRHP-eligible cultural resource site identified. In addition, Texas Eastern has developed Project-specific plans to address unanticipated discoveries of cultural resources and human remains in the event they are discovered during construction. Therefore, we conclude that the Projects would not contribute to cumulative impacts on cultural resources.

Where the pipeline loops would be collocated within Texas Eastern rights-of-way, most land uses, except forests, as previously discussed, would be allowed to revert to pre-construction uses following construction. The collocation of the loops would also minimize that amount of temporary and operational right-of-way needed for the Projects. Some land uses would be restricted or prohibited on the new permanent pipeline right-of-way, such as construction of aboveground structures for the loops. There would be no change in land use at the existing compressor stations or for the replacement pipeline and therefore the proposed compressor station construction would not contribute to cumulative impacts on land use. The construction work areas for the loops and replacement pipeline would be restored, as near as possible, to pre-construction contours and revegetated. We conclude that once revegetation is complete, there would be no significant cumulative alteration of the landscape in the region, when combined with those projects in Table B-16 located in Ohio.

The Projects and the projects listed in table B-16 would generate temporary construction jobs. Many of the workers may reside locally. Most of the other projects would occur in about the same time-frame as construction of Berne Compressor Station, Athens to Berne Loop, and Berne to Holbrook Loop. The influx of non-local laborers could represent a temporary increase in population in the Projects' areas (assuming half the construction workers are non-local); however, the existing local infrastructure and housing availability in the Projects' areas is expected to be sufficient to provide for the needs of non-local workers. Taxes generated from operation of the Projects would result in an annual tax revenue increase. Permanent employment would also slightly increase as a result of the operation of these projects. We conclude that there would be positive cumulative economic benefits from these projects.

The cumulative impact on air quality from construction of the Projects and other projects would depend on the type of construction activities that are taking place at the same time and

how close in proximity the construction activities are occurring. Construction of the projects listed in Table B-16 are either: i) already complete; ii) would occur in phases over many years (such as the highway projects); or iii) would occur at varying distances from the Projects. Gas well construction and drilling is highly localized and construction of the loops within 1 km of the wells would only occur for a short duration. For those projects listed in Table B-16 within 1 km and that would be constructed during the same timeframe as the Berne to Holbrook Loop and Berne Compressor Station (Leach Express, Rover, and Appalachian Lease Projects) would likely only be constructing for a short duration simultaneously, if at all, within 1 km from each other. Because construction activities for the Access South, Adair Southwest, and Lebanon Extension Projects, along with the drilling of natural gas wells and construction of Leach Express, Rover, and Appalachian Lease Projects, would be localized, temporary, and of short duration in a particular area, we conclude that the cumulative effect of construction activities are not expected to result in significant air quality impacts.

Operation of the other projects listed in table B-16 would have air emissions associated with them; however, the other sources of air emissions from operation of these recent or planned projects are or would be controlled in accordance with state and federal air pollution laws and regulations. As described in section B.7, the air emissions anticipated as a result of the proposed compressor station modifications would be minor or result in a decrease in air emissions. As a result, we conclude that there would not be any significant cumulative air quality impacts due to operation of the Projects in conjunction with the other projects listed in table B-16.

Climate change is the change in climate over time, whether due to natural variability or as a result of human activity. Climate change occurs on a global scale and cannot be represented by single annual events or individual anomalies. For example, a single large flood or particularly hot summer is not an indication of climate change. However, unusually frequent or severe flooding, or several consecutive years of abnormally hot summers over a large region may be indicative of climate change. The construction emissions of GHGs associated with the Projects are provided in section B.7; and no significant increase of operational emissions would occur resulting from construction of the Projects. However, the emissions from the Projects would increase the atmospheric concentration of GHGs. In combination with past and future emissions from all other sources, GHG emissions from the Projects would incrementally contribute to climate change. Climate impacts are not attributable to any single action. Currently, there is no standard methodology to determine how the proposed Projects' relatively small incremental contribution to GHGs would translate into physical effects on the global environment.

Construction activities also have the potential to produce an increase in noise levels. Cumulative impacts from construction noise from the Access South, Adair Southwest, and Lebanon Extension Projects and the other projects listed in table B-16 depends on the type of construction activities that are taking place and how close in proximity the construction activities are occurring. Cumulative construction noise impacts are mostly likely to occur when two or more projects are being constructed simultaneously within 0.5 mile of each other. Pipeline construction occurs at any one location for a short duration at it is unlikely that one or more of the projects would construct in the same area at the same time for more than a short period. Overlapping noise may occur during drilling of the gas wells listed in Table B-16 and during construction of Leach Express, Rover, and Appalachian Lease Projects if the Berne to Holbrook Loop and Berne Compressor Station are constructed at the same time within 0.5 mile from each other. Because the noise generated by construction activities would be temporary and localized,

we conclude that noise from construction activities for the Projects along with the other projects are not expected to result in significant cumulative noise impacts.

Because the proposed modifications at the compressor stations and installation of additional compression at the Tompkinsville Compressor Station would not result in a significant increase in noise at nearby NSAs, we conclude that the Project would not have a significant cumulative noise impact during operation.

We conclude that impacts associated with the Projects would be relatively minor, and we are recommending additional measures to further reduce the environmental impacts associated with the Project. The impacts from other existing and proposed projects or general activities within the region of influence are also expected to be temporary and minor. Therefore, we anticipate that the proposed Projects would contribute to a negligible to cumulative impact when the effects of the Projects are added to past, present, and reasonably foreseeable projects in the region of influence.

## C. ALTERNATIVES

In accordance with NEPA and Commission policy, we evaluated alternatives to the Projects to determine whether they would be reasonable and environmentally preferable to the proposed action. The primary objective in evaluating alternatives for facility siting was to avoid, minimize, and if necessary, mitigate adverse effects while satisfying the Projects' objective. Four principal types of alternatives were evaluated. These alternatives include: no-action alternative, existing transportation system alternative, pipeline route alternatives, and aboveground facility alternatives. Information used to evaluate alternatives projects includes data provided by Texas Eastern, publically available data, comments and suggestions from regulatory agencies, and the public. The evaluation criteria used for developing and review alternatives were:

- technical and economic feasibility and practicality;
- significant environmental benefits over the proposed action; and
- ability to meet the Project's purpose.

Each alternative was considered to the point where it was clear that the alternative was not reasonable, would result in environmental impacts that would be greater than those of the proposed Project, or that could not meet the Project objective.

It should be recognized that the routing of the currently proposed route reflects modifications to the originally proposed Projects that Texas Eastern incorporated during the pre-filing and application review based on discussions with landowners and project engineers; the goal of which was to reduce or eliminate engineering and constructability concerns and/or avoid or minimize conflicts with existing land uses. These route variations were incorporated into the proposed Project route and are considered part of the proposed Project. Their associated environmental consequences were included in our environmental analysis in section B.

In addition to those adopted route variations, minor alignment shifts may be required prior to and during construction to accommodate currently unforeseeable site-specific constraints related to engineering, landowner, and environmental concerns. These would be subject to review and approval by the FERC as part of the FERC variance approval process.

### 1. No-Action Alternative

If the Commission would deny Texas Eastern's application, the Projects would not be built and the environmental impacts identified in this EA would not occur. However, this alternative would not meet the purpose and need requirements for the Projects. Texas Eastern would not meet the needs of the Projects' shippers, and would not supply natural gas to meet the market needs in the Midwest and Southeast by expanding connections of Texas Eastern's mainline system to new Appalachian gas supplies. As a result, the objectives of the Projects would not be met and the benefits would not be realized. The no-action alternative would constrain the economic and environmental benefits associated with greater supply diversity and competition in the Midwest and Southeast. Under the no-action alternative, other natural gas transmission companies might propose to construct similar facilities to meet the demand for new service. Additionally, customers could seek out alternative energy sources. Such actions could result in impacts similar to or greater that the proposed Projects, and might not meet the Projects'

purpose and need within the proposed time frames. Therefore, we have concluded that the no-action alternative would not satisfy the objectives of the Projects, and we do not recommend it.

### 2. Existing Transportation System Alternatives

System alternatives are alternatives to the proposed action that would use other existing, modified, or proposed pipeline systems to meet the purpose and need of the Projects. Although comparable or more extensive modifications or additions to an existing or proposed pipeline system may be required, implementation of a system modification would make it unnecessary to construct all or part of the proposed Projects. Although these modifications or additions could result in environmental impacts, the impacts may be less, similar to, or greater than that associated with construction of the proposed Projects. The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with construction and operation of the Projects could be avoided or reduced by using another pipeline system, while still meeting the objectives of the Projects.

Texas Eastern considered the use of other existing natural gas systems in the region. The Access South Project (Wheelersburg to Athens Loop) would provide transport supply from an existing receipt point in Uniontown, Pennsylvania, to delivery points in Texas Eastern's Access Area Zone ELA and Market Zone M1 in Attala County, Mississippi (interconnections with Gulf South Pipeline Company, LP and Southern Natural Gas Company, LLC) to serve Southeast U.S. markets. We did not identify and reasonable alternatives to the Wheelersburg to Athens Loop. The proposed looping makes use of existing right-of-way and pipeline facilities and allows the existing downstream compressors to operate within the current horsepower and discharge temperature limits. Without looping, a new compressor unit and gas cooling facilities would be required at a higher cost than the proposed looping, potential additional emissions, and increased noise from the operation of additional compression. The Wheelersburg to Athens Loop also completes an existing partial loop of the Texas Eastern system Line 25 into the Athens Compressor Station and allows for the existing units at Wheelersburg to compress to a discharge pressure near the maximum allowable operating pressure of the station. There are no abandoned facilities and associated right-of-way along the proposed Wheelersburg to Athens Loop that Texas Eastern could utilize for the Projects.

The Adair Southwest Project (Athens to Berne Loop) would provide transport supply from a receipt point in Uniontown West, Pennsylvania, to delivery points in Texas Eastern's Market Zone M2 in Adair County, Kentucky (interconnection with Columbia Gulf Transmission, LLC) to serve lower U.S. Midwest markets. We did not identify and reasonable alternatives to the Athens to Berne Loop. The proposed looping makes use of existing right-of-way and pipeline facilities and allows the existing downstream compressors to operate within the current horsepower and discharge temperature limits. Without looping, a new compressor unit of approximately 13,000 horsepower and gas cooling facilities would be required at a projected higher cost than the proposed looping, potential additional emissions, and increased noise from the operation of additional compression. There are no abandoned facilities and associated right-of-way along the proposed Athens to Berne Loop that Texas Eastern could utilize for the Projects.

The Lebanon Extension Project (Berne to Holbrook) would provide transport supply from receipt point(s) in Pennsylvania and/or Ohio to delivery points in Market Zone M2 in or near Lebanon, Ohio. We did not identify and reasonable alternatives to the Berne to Holbrook

Loop because the looping allows the downstream compressor units to operate within its existing horsepower and discharge temperature limits while compressing incremental volumes associated with the Projects. The proposed looping allows for the design suction pressure at the Berne Compressor Station to remain above 765 pounds per square inch gauge (psig) to maintain operational parameters considered for the Texas Eastern system in this region. There are no abandoned facilities and associated right-of-way along the proposed Berne to Holbrook Loop that Texas Eastern could utilize for the Projects.

The proximity of the Texas Eastern system to shippers' production, along with the access Texas Eastern's system has to Midwest and Southeast U.S. markets, create a path for this production that requires no greenfield construction to bring this production to the existing Texas Eastern system and existing delivery points. Other existing pipeline systems operating in the Projects' areas would require substantially greater expansions in excess of the facilities proposed for the Projects to fulfill the need to utilize a single transportation system. The looping would overlap existing right-of-way and utilize existing pipeline facilities, and as such, minimizes environmental impacts. Therefore, we do not recommend any system alternatives.

### 3. Pipeline Route Alternatives

Installation of loops or extension of existing pipelines are the most effective ways to achieve an incremental increase in pipeline capacity while limiting impacts to area landowners and environmental resources. The proposed new loop pipelines would be constructed within or adjacent to existing rights-of-way of Texas Eastern's existing pipeline system. The majority of the new right-of-way would overlap the existing pipeline right-of-way for about 13.6 miles, reducing the amount of new permanent right-of-way needed by approximately the same amount. The right-of-way for the loops would overlap by 25 feet with an additional 10 feet of overlap where topsoil would be segregated. Similarly, by siting the new pipeline sections adjacent to the maintained existing right-of-way, the amount of new clearing and other environmental impacts would be reduced and concentrated in a smaller, previously disturbed area. Because the new pipeline would be adjacent to existing lines for most of their lengths, overall disturbance associated with the new facilities would be minimized. In four locations, the loops deviate from the existing right-of-way are from MP 613.2 to 614.0 and MP 620.0 to 620.2 on the Wheelersburg to Athens Loop, from MP 681.5 to 681.9 on the Athens to Berne Loop, and MP 698.2 to 698.9 on the Berne to Holbrook Loop. These were designed to avoid or minimize impacts on sensitive resources, address landowner concerns, or resolve engineering or constructability constraints, and we did not receive any comments suggesting alternative routing for these.

### 4. Aboveground Facility Alternatives

Texas Eastern would modify existing aboveground facilities to allow for increased capacity and bi-directional flow capability. Alternate aboveground sites would require construction of new pipeline and aboveground facilities resulting in greater overall Projects impacts. Therefore, alternate aboveground sites were not evaluated for the Projects.

Texas Eastern's decision on which stations to utilize for bi-directional compression capability was based on the requirement to sustain sufficient pipeline pressure, while ensuring the lowest emissions possible in order to transport the contracted Projects' capacity. Each

facility along the system route was evaluated separately in order to derive the optimum system design, which is reflected in the proposed facility modifications.

No alternatives were considered for the Line 15 Tie-In West and Line 15 Tie-In East because the valves and launchers/receivers must be installed where the proposed pipeline loop ties into Texas Eastern's existing pipeline system, and the proposed locations are designed to properly inspect and operate the proposed looping segment.

Alternatives to installing facilities at the existing compressor stations for bi-directional flow were not considered, as these facilities utilize the existing compressor station locations and existing facilities and having minimal environmental impact.

Alternatives considered to the proposed additional compressor facilities for the Tompkinsville Compressor Station were looping pipeline upstream of the station to mitigate the need for additional compression. However, over 18 miles of looping pipeline would have been required, which would result in significantly greater environmental impact, making the proposed addition of compression the environmentally preferable alternative.

In conclusion, we have determined that Texas Eastern's proposed pipeline looping and facility modifications are the preferred alternative to meet the Projects' objectives.

## D. STAFF CONCLUSIONS AND RECOMMENDATIONS

We conclude that approval of the Access South, Adair Southwest, and the Lebanon Extension Projects would not constitute a major federal action significantly affecting the quality of the human environment. This finding is based on the above environmental analysis, Texas Eastern's application and supplements, and implementation of Texas Eastern's proposed and our recommended mitigation measures. We recommend that the Commission Order contain a finding of no significant impact and that the following mitigation measures be included as conditions of any Certificate the Commission may issue.

1. Texas Eastern shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Order. Texas Eastern must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;
    b. justify each modification relative to site-specific conditions;
    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
    d. receive approval in writing from the Director of the OEP **before using that modification**.

2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Projects and abandonment activities. This authority shall allow:

    a. the modification of conditions of the Order; and
    b. the design and implementation of any additional measures deemed necessary (including stop-work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from Project construction and operation.

3. **Prior to any construction,** Texas Eastern shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel will be informed of the EIs' authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EA, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction or abandonment,** Texas Eastern shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

Texas Eastern's exercise of eminent domain authority granted under NGA Section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Texas Eastern's right of eminent domain granted under NGA Section 7(h) does not authorize it to increase the size of its natural gas pipelines or aboveground facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Texas Eastern shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, laydown yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

   This requirement does not apply to extra workspace allowed by the Plan, and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;
   b. implementation of endangered, threatened, or special concern species mitigation measures;
   c. recommendations by state regulatory authorities; and
   d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the Certificate and before construction or abandonment** begins, Texas Eastern shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP. Texas Eastern must file revisions to the plan as schedules change. The plan shall identify:

   a. how Texas Eastern will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EA, and required by the Order;
   b. how Texas Eastern will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;
   c. the number of EIs assigned, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;

d. company personnel, including EIs and contractors, who will receive copies of the appropriate material;
e. the location and dates of the environmental compliance training and instructions Texas Eastern will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change);
f. the company personnel and specific portion of Texas Eastern's organization having responsibility for compliance;
g. the procedures (including use of contract penalties) Texas Eastern will follow if noncompliance occurs; and
h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:

(1) completion of all required surveys and reports;
(2) the environmental compliance training of onsite personnel;
(3) the start of construction; and
(4) the start and completion of restoration.

7. Texas Eastern shall employ at least one EI per construction spread. The EIs shall be:

a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;
b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;
c. empowered to order the correction of acts that violate the environmental conditions of the Order, and any other authorizing document;
d. a full-time position, separate from all other activity inspectors;
e. responsible for documenting compliance with the environmental conditions of that Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Texas Eastern shall file updated status reports with the Secretary on a **biweekly basis until all construction and restoration activities are complete.** On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on Texas Eastern's efforts to obtain the necessary federal authorizations;
b. the construction status of the Project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;
c. a listing of all problems encountered and each instance of noncompliance observed by the EI during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

d. a description of the corrective actions implemented in response to all instances of noncompliance, and their cost;
e. the effectiveness of all corrective actions implemented;
f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and
g. copies of any correspondence received by Texas Eastern from other federal, state, or local permitting agencies concerning instances of noncompliance, and Texas Eastern's response.

9. **Prior to receiving written authorization from the Director of OEP to commence construction of any Projects facilities**, Texas Eastern shall file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

10. Texas Eastern must receive written authorization from the Director of OEP **before commencing service on the Projects.** Such authorization will only be granted following a determination that rehabilitation and restoration of the right-of-way and other areas affected by the project are proceeding satisfactorily.

11. **Within 30 days of placing the authorized facilities in service,** Texas Eastern shall file an affirmative statement with the Secretary, certified by a senior company official:

    a. that the facilities have been constructed and installed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or
    b. identifying which of the Certificate conditions Texas Eastern has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

12. Texas Eastern shall conduct, with the well-owner's permission, pre- and post-construction monitoring of well yield and water quality for all private water wells within 150 feet of construction work areas. **Within 30 days** of placing the facilities in service, Texas Eastern shall file a report with the Secretary discussing whether any complaints were received concerning well yield or water quality and how each was resolved.

13. Texas Eastern shall not begin construction activities **until**:

    a. Texas Eastern files updated correspondence with the USFWS regarding the American burying beetle, including the potential need for surveys and/or species-specific mitigation measures;
    b. FERC staff completes any necessary Section 7 consultation with the USFWS for the American burying beetle, Indiana bat, and northern long-eared bat; and
    c. Texas Eastern has received written approval from the Director of the OEP that construction or use of mitigation measures may begin.

14. Texas Eastern shall **not begin** construction of facilities and/or use of staging, storage, or temporary work areas and new or to-be-improved access roads for the Projects **until**:

    a. Texas Eastern files with the Secretary, the Ohio SHPO's comments on the avoidance plan for site 33AT1042 and the two rock overhangs; and
    b. the Director of OEP approves the plan and notifies Texas Eastern in writing that construction may proceed.

    All materials filed with the Commission containing **location, character, and ownership** information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: **"CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE."**

15. Texas Eastern shall file a noise survey with the Secretary **no later than 60 days** after placing the Tompkinsville Compressor Station into service. If a full power load condition noise survey is not possible, Texas Eastern shall provide an interim survey at the maximum possible power load and provide a full power load survey **within 6 months**. If the noise attributable to the operation of the Tompkinsville Compressor Station equipment under interim or full power load exceeds an $L_{dn}$ of 55 dBA at NSA #1 or exceeds the predicted noise level at NSA #2, Texas Eastern shall:

    a. file a report on what changes are needed;
    b. install additional noise controls to meet the level within 1 year of the in-service date; and
    c. confirm compliance with this requirement by filing a second full power noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

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# Appendix A
# USGS 7.5-minute Topographic Quadrangle Maps of Pipeline Route and Facilities


**ACCESS SOUTH/ ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECTS**
**WHEELERSBURG TO ATHENS LOOP**
**MEIGS COUNTY, OHIO**

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|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 1 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |


**ACCESS SOUTH/ ADAIR SOUTHWEST/**
**LEBANON EXTENSION PROJECTS**
**WHEELERSBURG TO ATHENS LOOP**
**MEIGS COUNTY, OHIO**

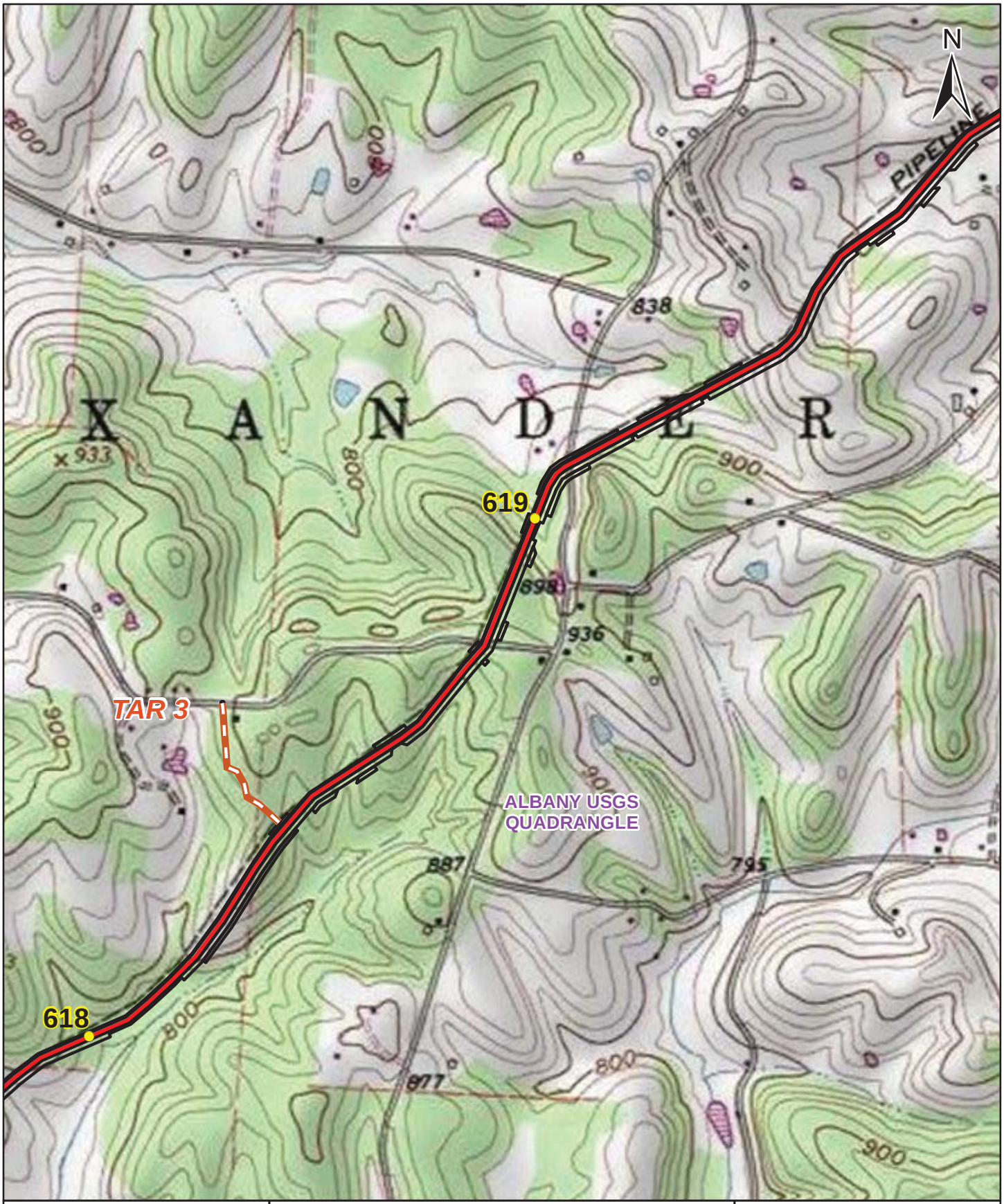
| DATE: 09/28/15 | DWG. NO.: 22379-510-RMP-00058 | SHEET: 2 OF 12 | SCALE: 1 " = 1,000 ' | REV.: A |
|---|---|---|---|---|


**ACCESS SOUTH/ ADAIR SOUTHWEST/**
**LEBANON EXTENSION PROJECTS**
**WHEELERSBURG TO ATHENS LOOP**
**MEIGS AND ATHENS COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 3 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |

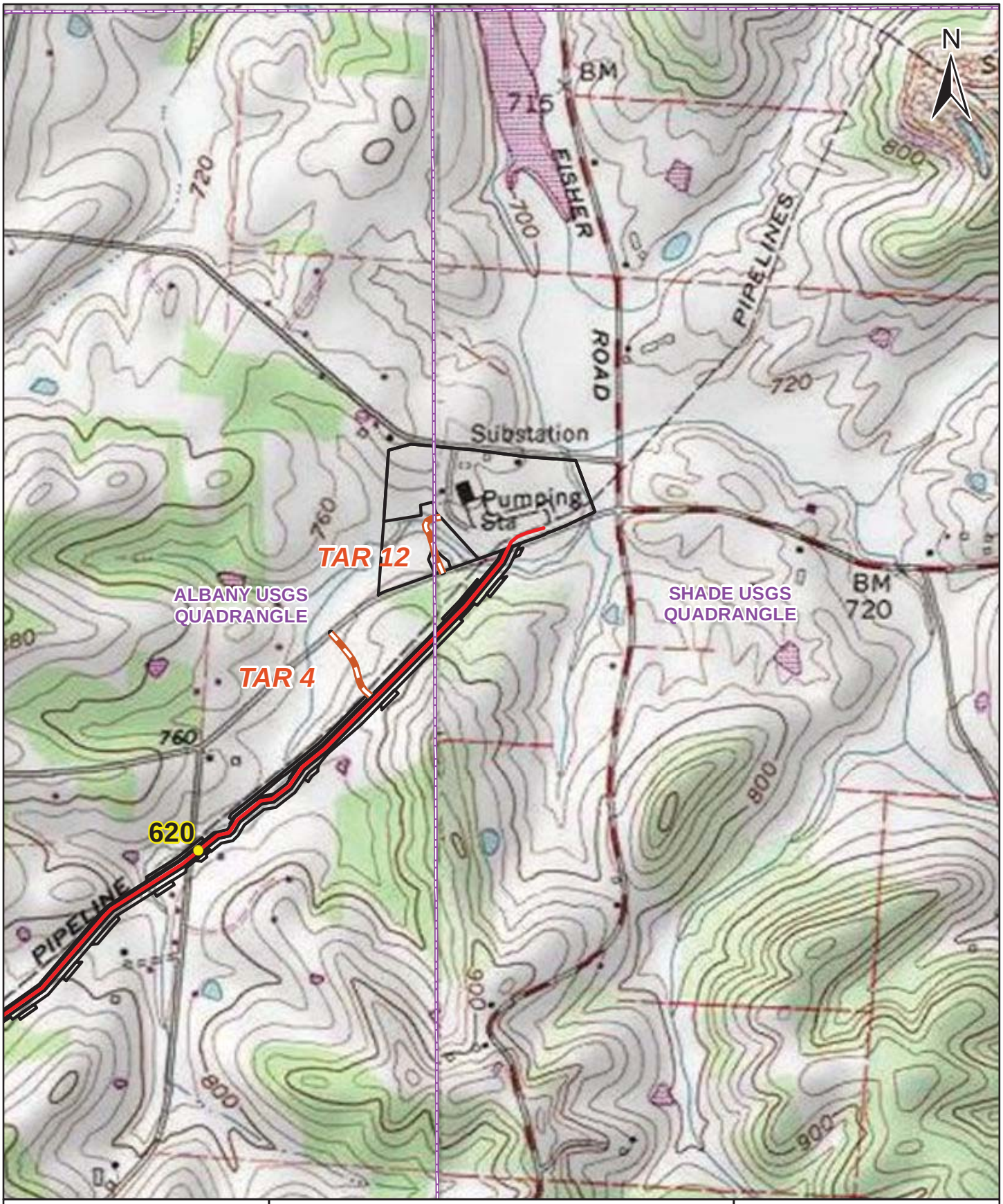

**ACCESS SOUTH/ ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECTS**
**WHEELERSBURG TO ATHENS LOOP**
**MEIGS AND ATHENS COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 4 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |



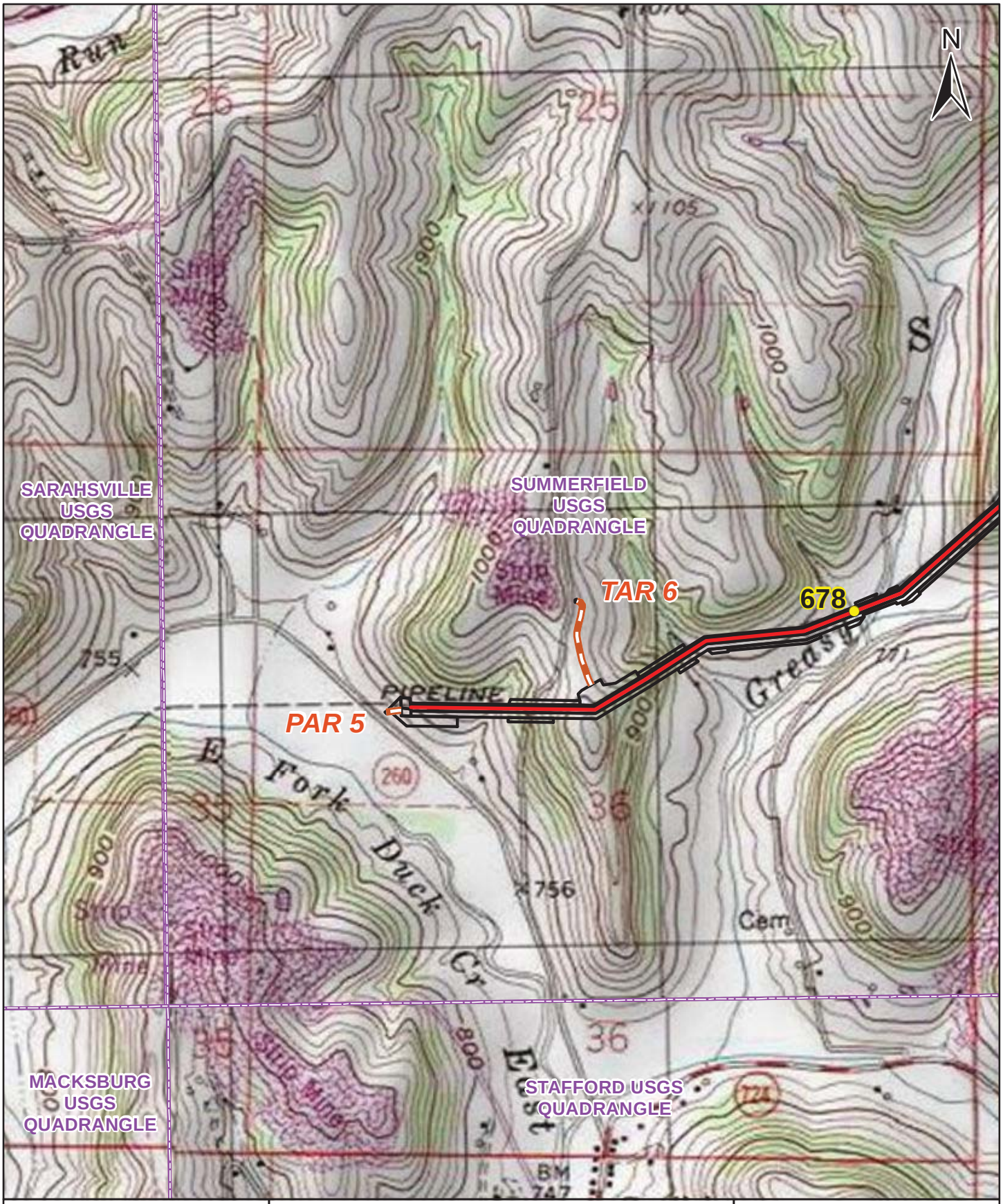

**ACCESS SOUTH/ ADAIR SOUTHWEST/**
**LEBANON EXTENSION PROJECTS**
**WHEELERSBURG TO ATHENS LOOP**
**ATHENS COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 5 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |




**ACCESS SOUTH/ ADAIR SOUTHWEST/**
**LEBANON EXTENSION PROJECTS**
**WHEELERSBURG TO ATHENS LOOP**
**ATHENS COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 6 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |




**ACCESS SOUTH/ ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECTS**
**ATHENS TO BERNE LOOP**
**NOBLE COUNTY, OHIO**

| DATE: 09/28/15 | DWG. NO.: 22379-510-RMP-00058 | SHEET: 7 OF 12 | SCALE: 1 " = 1,000 ' | REV.: A |
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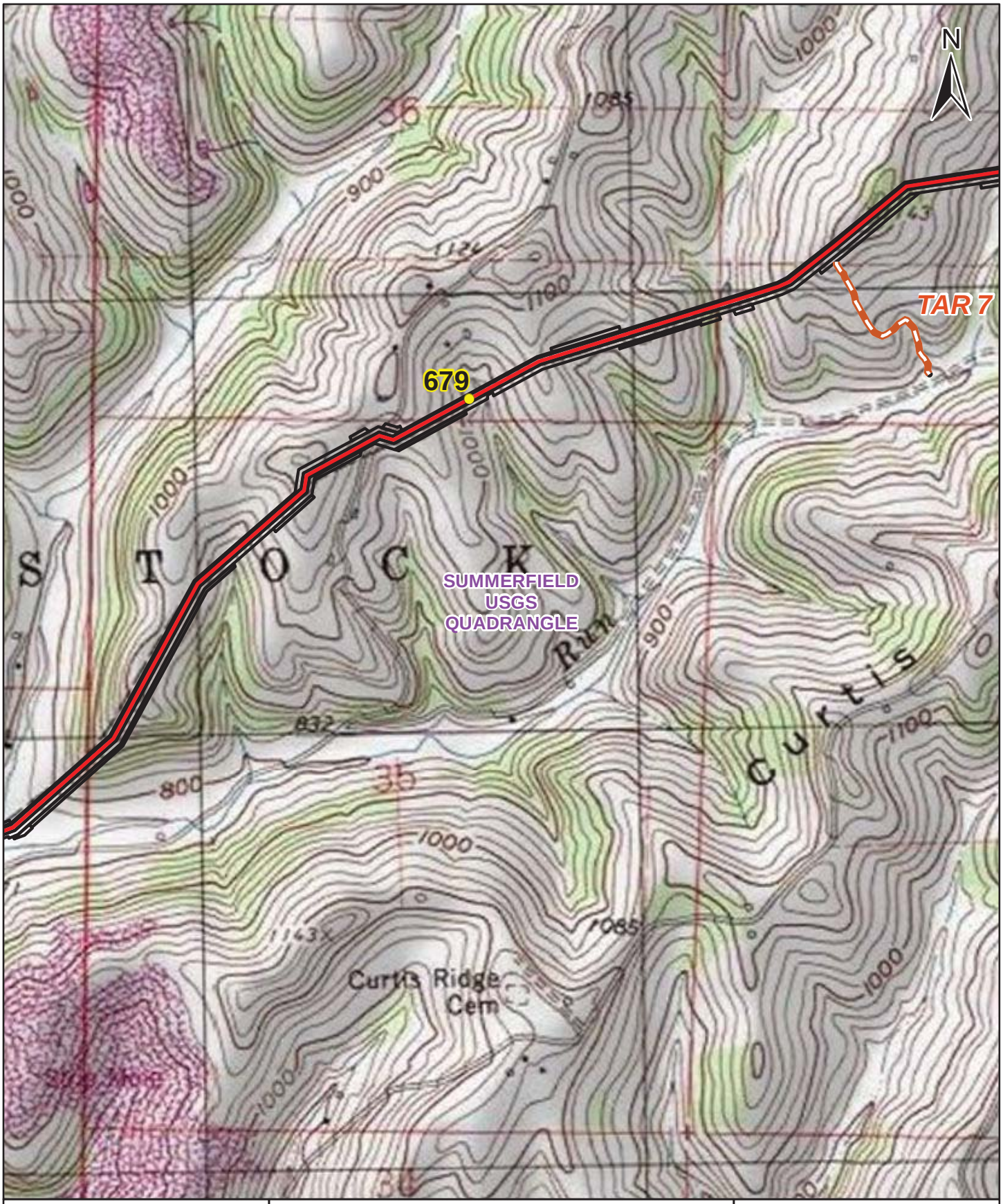
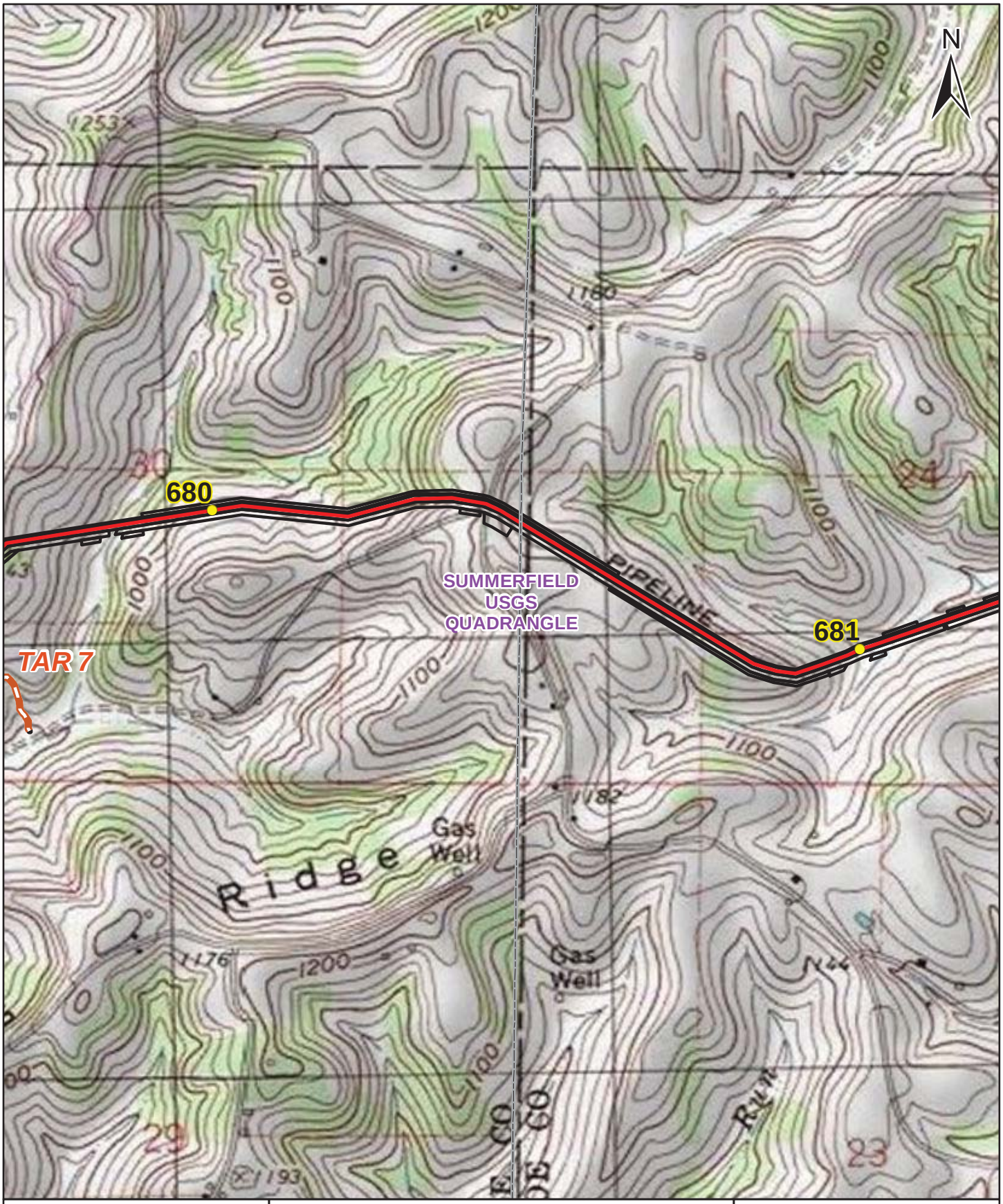


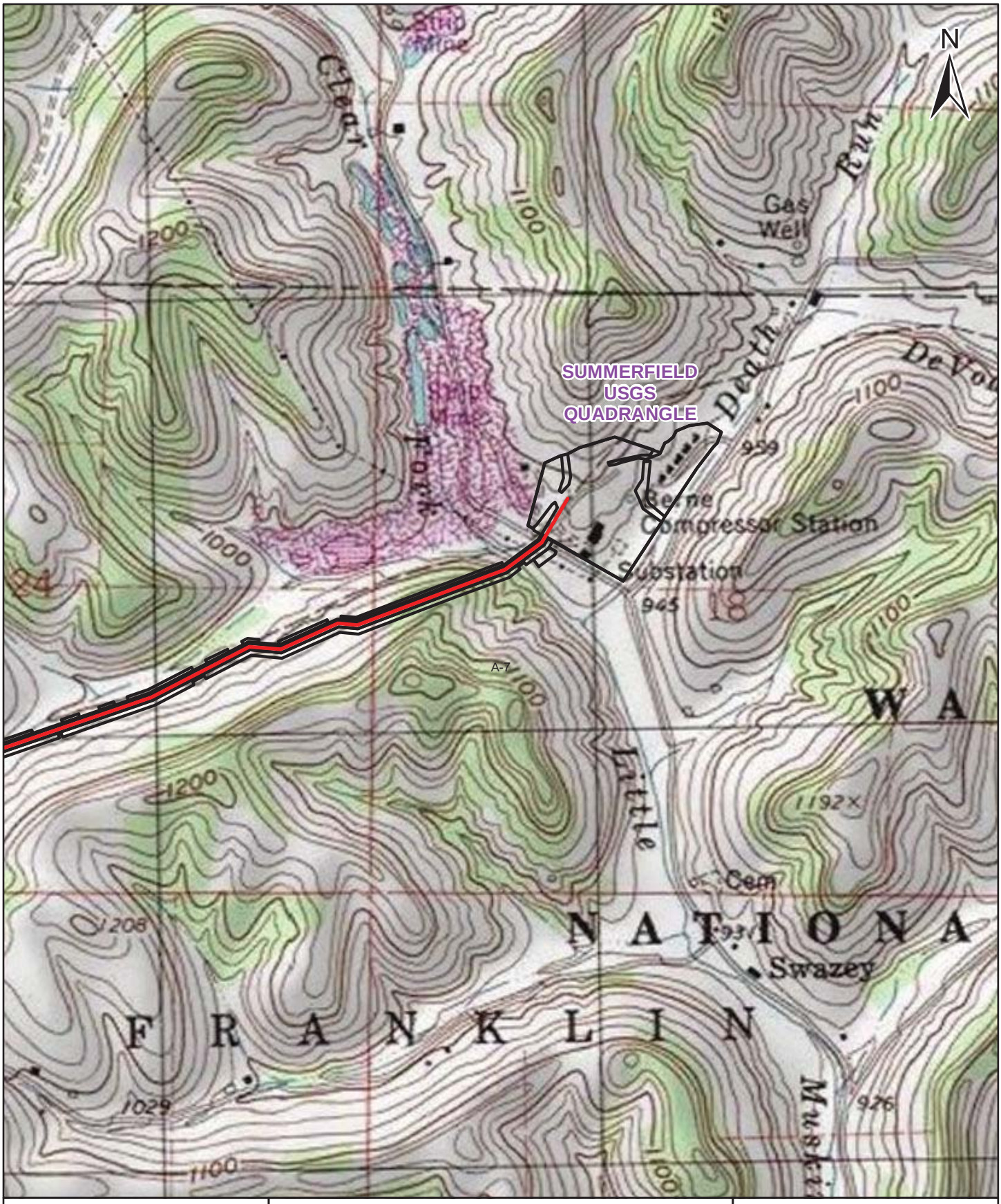

**ACCESS SOUTH/ ADAIR SOUTHWEST/**
**LEBANON EXTENSION PROJECTS**
**ATHENS TO BERNE LOOP**
**NOBLE COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 8 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |



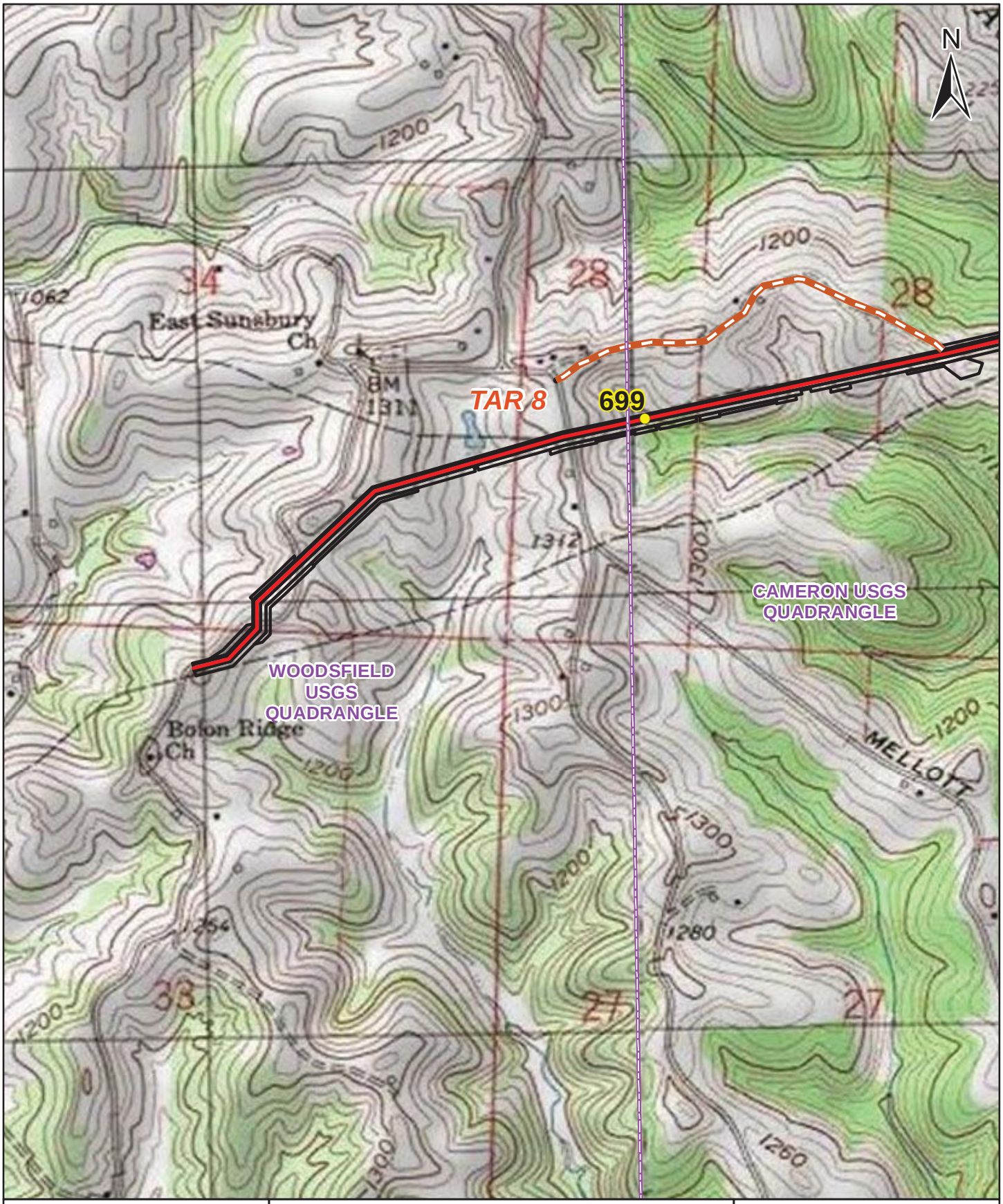

**ACCESS SOUTH/ ADAIR SOUTHWEST/**
**LEBANON EXTENSION PROJECTS**
**ATHENS TO BERNE LOOP**
**NOBLE AND MONROE COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 9 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |



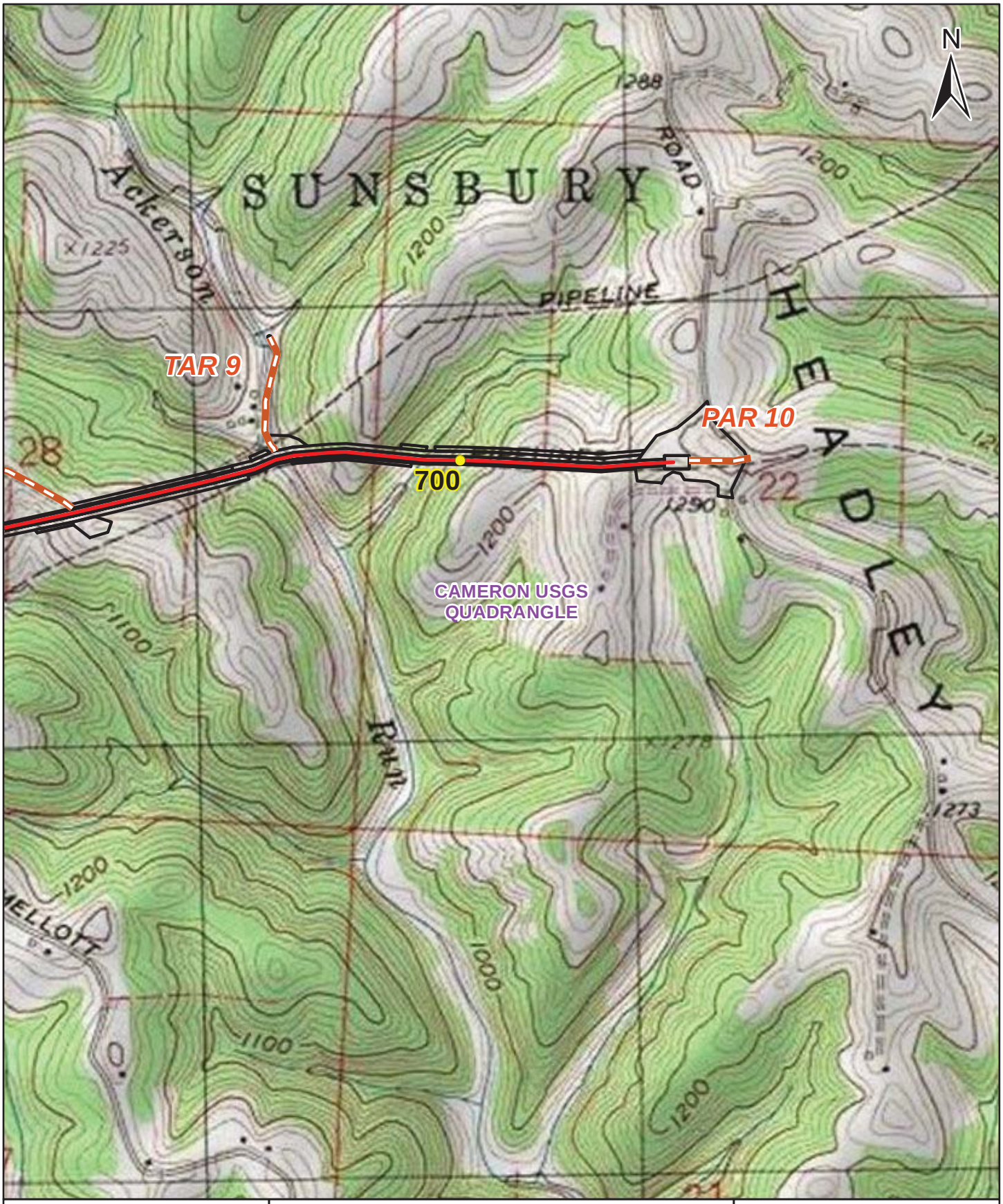

**ACCESS SOUTH/ ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECTS**
**ATHENS TO BERNE LOOP**
**MONROE COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 10 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |




**ACCESS SOUTH/ ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECTS**
**BERNE TO HOLBROOK LOOP**
**MONROE COUNTY, OHIO**

| | | | | |
|---|---|---|---|---|
| **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 11 OF 12 | **SCALE:** 1 " = 1,000 ' | **REV.:** A |

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|---|---|---|---|---|
| | **ACCESS SOUTH/ ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECTS BERNE TO HOLBROOK LOOP MONROE COUNTY, OHIO** | | | |
| | **DATE:** 09/28/15 | **DWG. NO.:** 22379-510-RMP-00058 | **SHEET:** 12 OF 12 | **SCALE:** 1 " = 1,000 ' **REV.:** A |


**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**HOLBROOK COMPRESSOR STATION**
**GREENE COUNTY, PENNSYLVANIA**

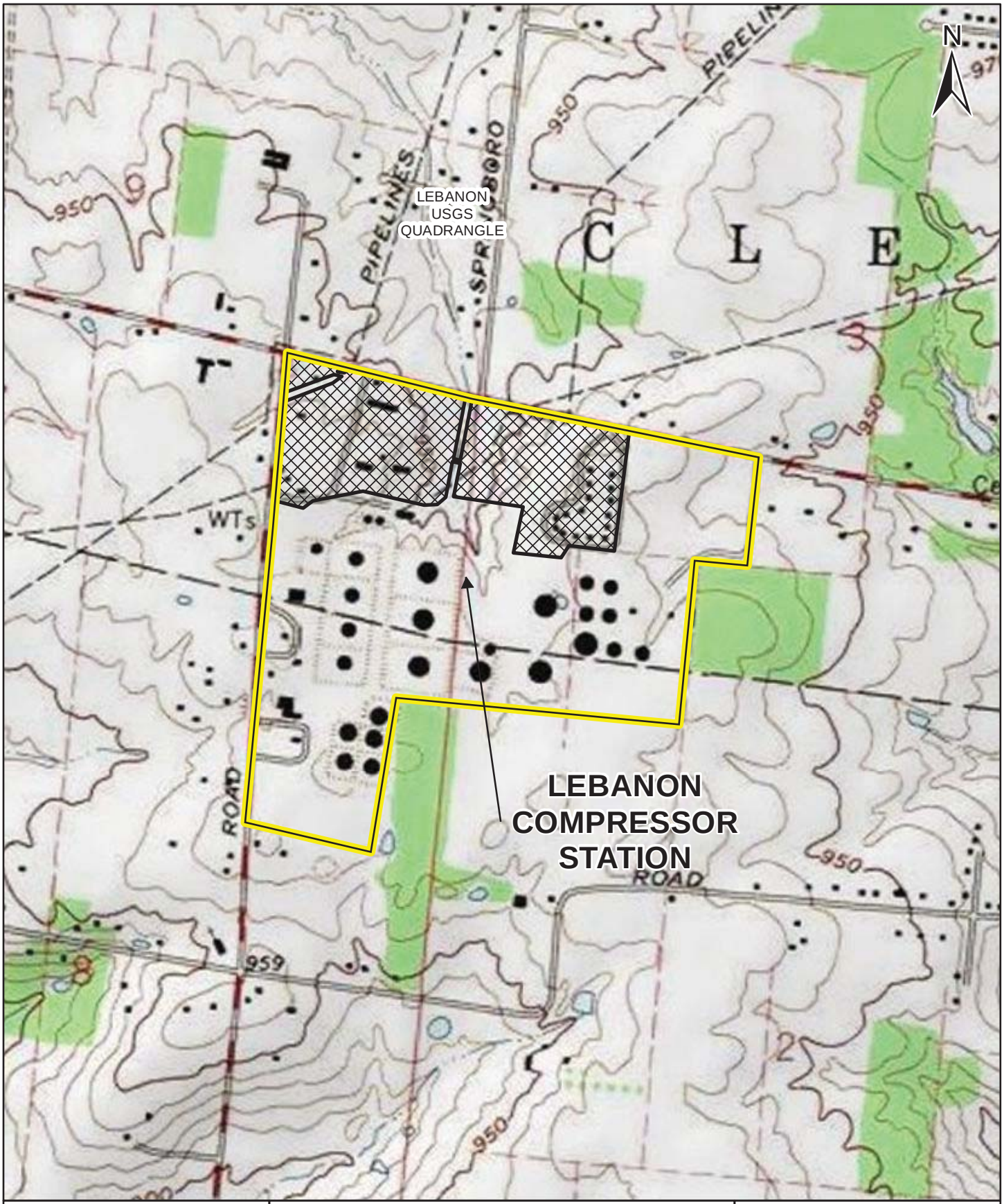
| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 1 of 19 |
|---|---|---|

**Legend**
Existing Site
Proposed Workspace

SCALE: 1" = 1,000'

REV: E

Y:\Projects\22379_Spectra_Adair_Access\Working\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd

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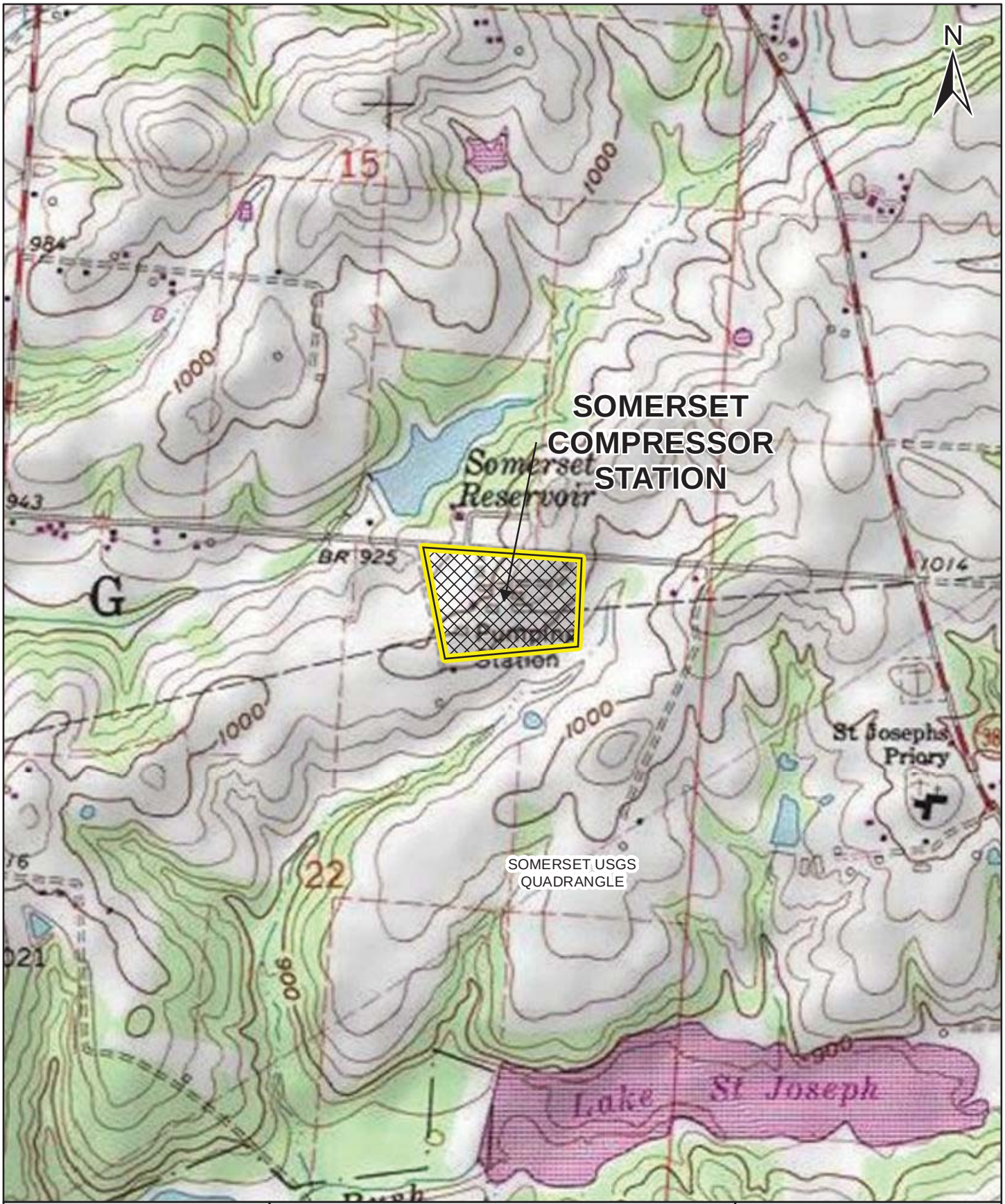
**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**LEBANON COMPRESSOR STATION**
**WARREN COUNTY, OHIO**

Legend
Existing Site
Proposed Workspace

DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 2 of 19

SCALE: 1" = 1,000'

REV: E




**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**SOMERSET COMPRESSOR STATION**
**PERRY COUNTY, OHIO**

Legend: Existing Site; Proposed Workspace

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 3 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

Y:\Projects\22379_Spectra_Adair_Access\Working\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd


**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**BERNE COMPRESSOR STATION**
**MONROE COUNTY, OHIO**

Legend: Existing Site; Proposed Workspace

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 4 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

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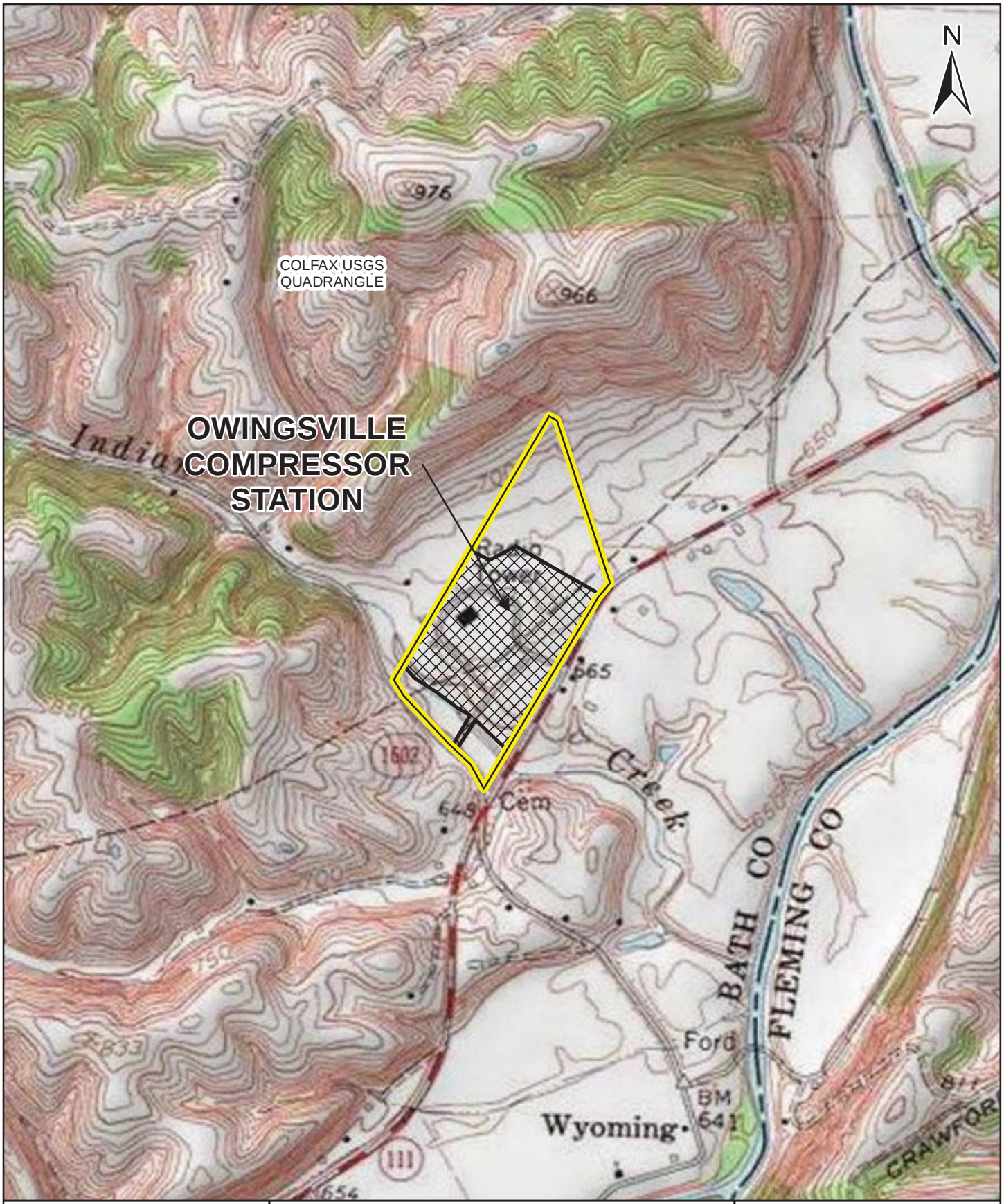
**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**ATHENS COMPRESSOR STATION**
**ATHENS COUNTY, OHIO**

DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 5 of 19

**Legend**
Existing Site
Proposed Workspace

SCALE: 1" = 1,000' | REV: E

Y:\Projects\22379_Spectra_Adair_Access\Working\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd




**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**OWINGSVILLE COMPRESSOR STATION**
**BATH COUNTY, KENTUCKY**

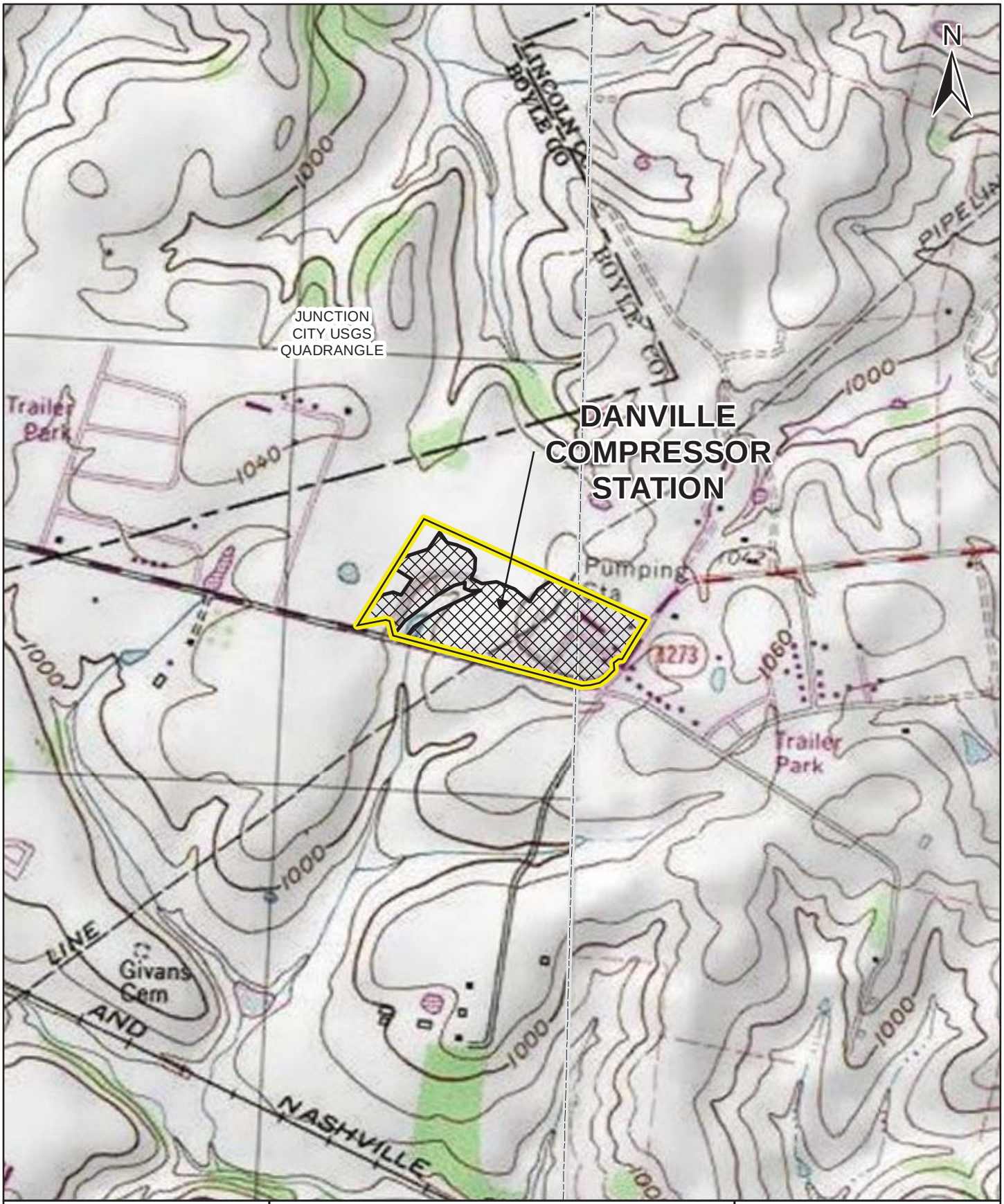
| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 6 of 19 |
|---|---|---|

**Legend**
Existing Site
Proposed Workspace

SCALE: 1" = 1,000'

REV: E

Y:\Projects\22379_Spectra_Adair_Access\Working\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd



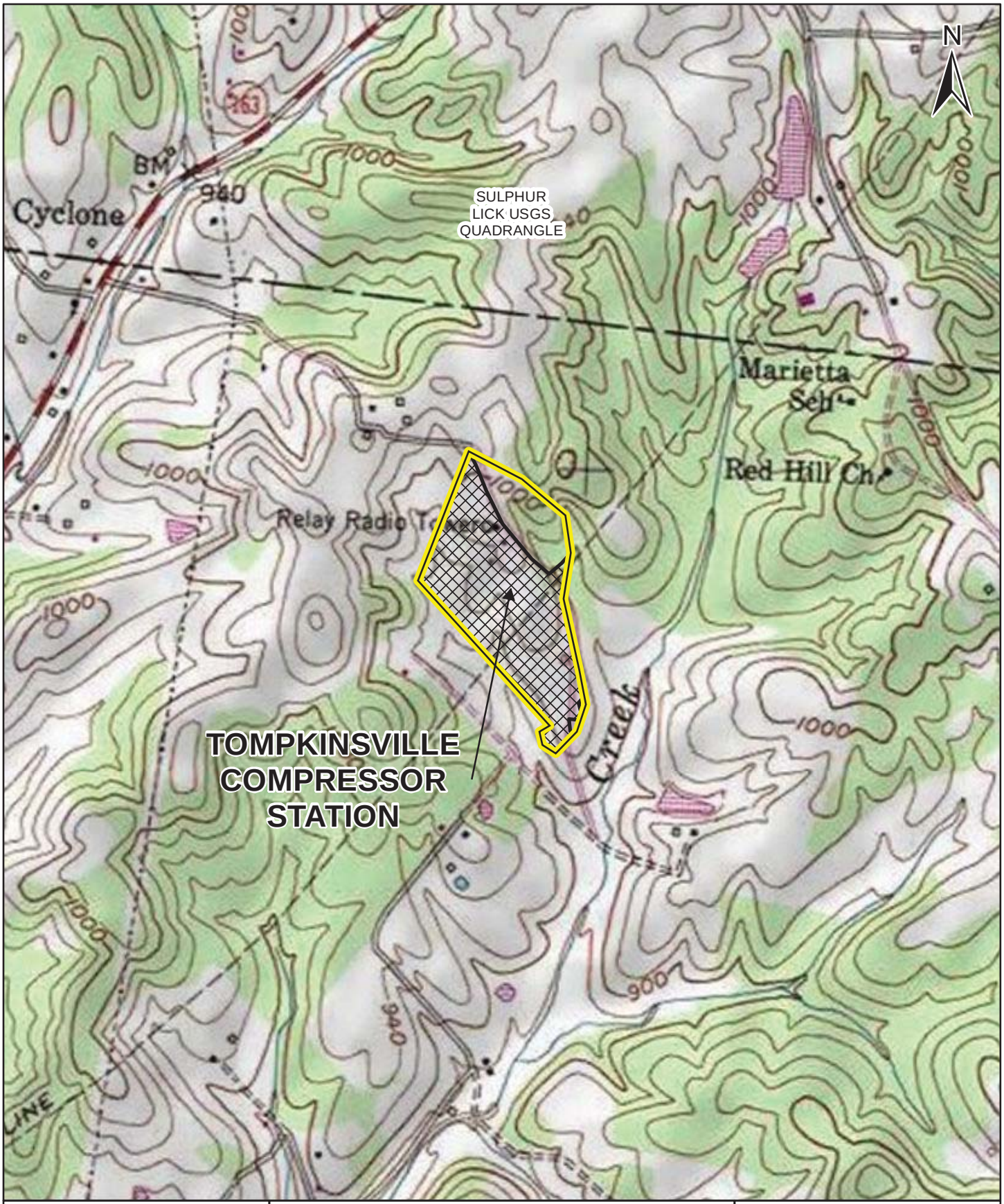

**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**DANVILLE COMPRESSOR STATION**
**LINCOLN COUNTY, KENTUCKY**

DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 7 of 19

**Legend**
Existing Site
Proposed Workspace

SCALE: 1" = 1,000' | REV: E

Y:\Projects\22379_Spectra_Adair_Access\Working\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd




**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**TOMPKINSVILLE COMPRESSOR STATION**
**MONROE COUNTY, KENTUCKY**

**Legend**
Existing Site
Proposed Workspace

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 8 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

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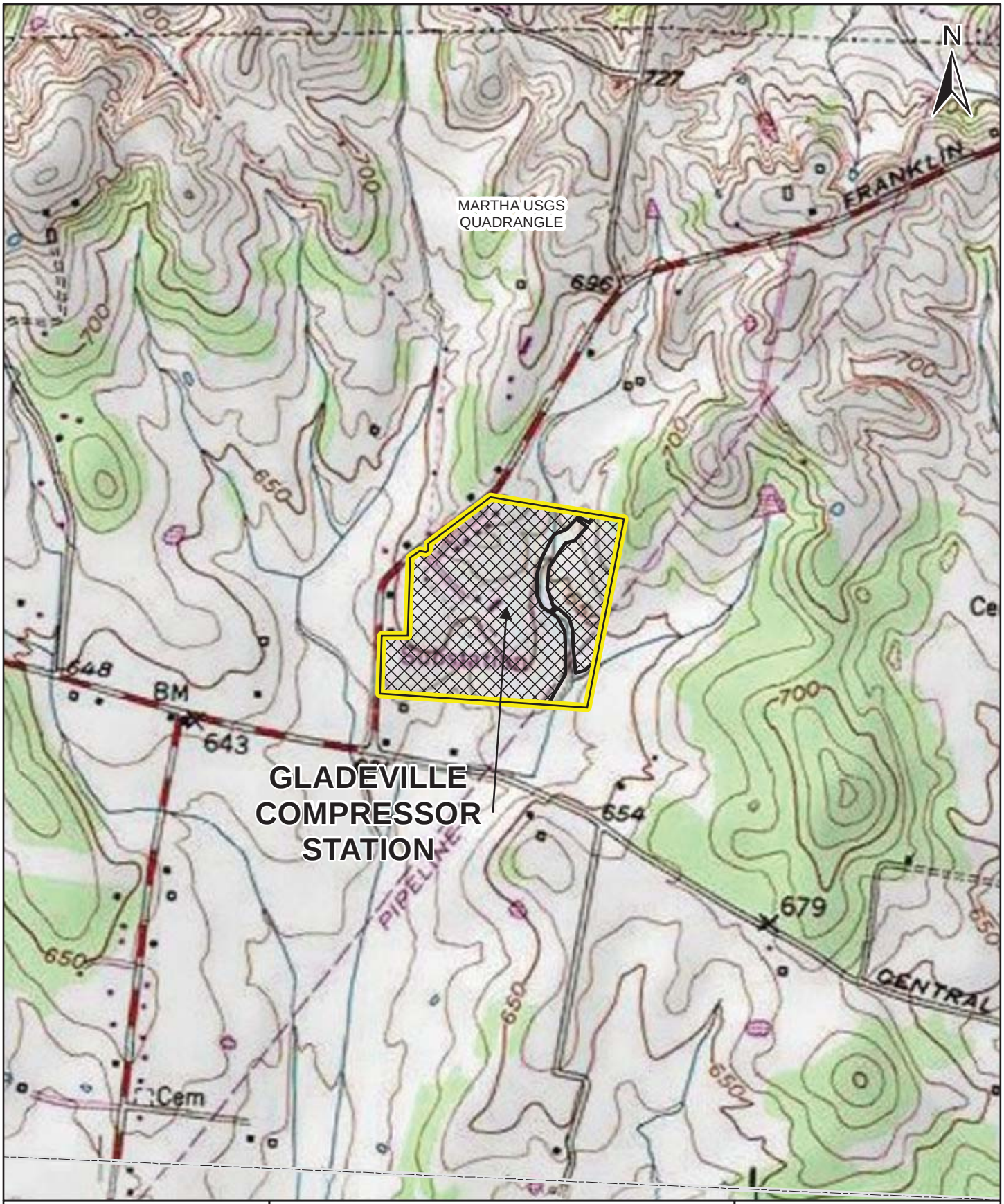


**ACCESS SOUTH / ADAIR SOUTHWEST /**
**LEBANON EXTENSION PROJECTS**
**GLADEVILLE COMPRESSOR STATION**
**WILSON COUNTY, TENNESSEE**

**Legend**
Existing Site
Proposed Workspace

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 9 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

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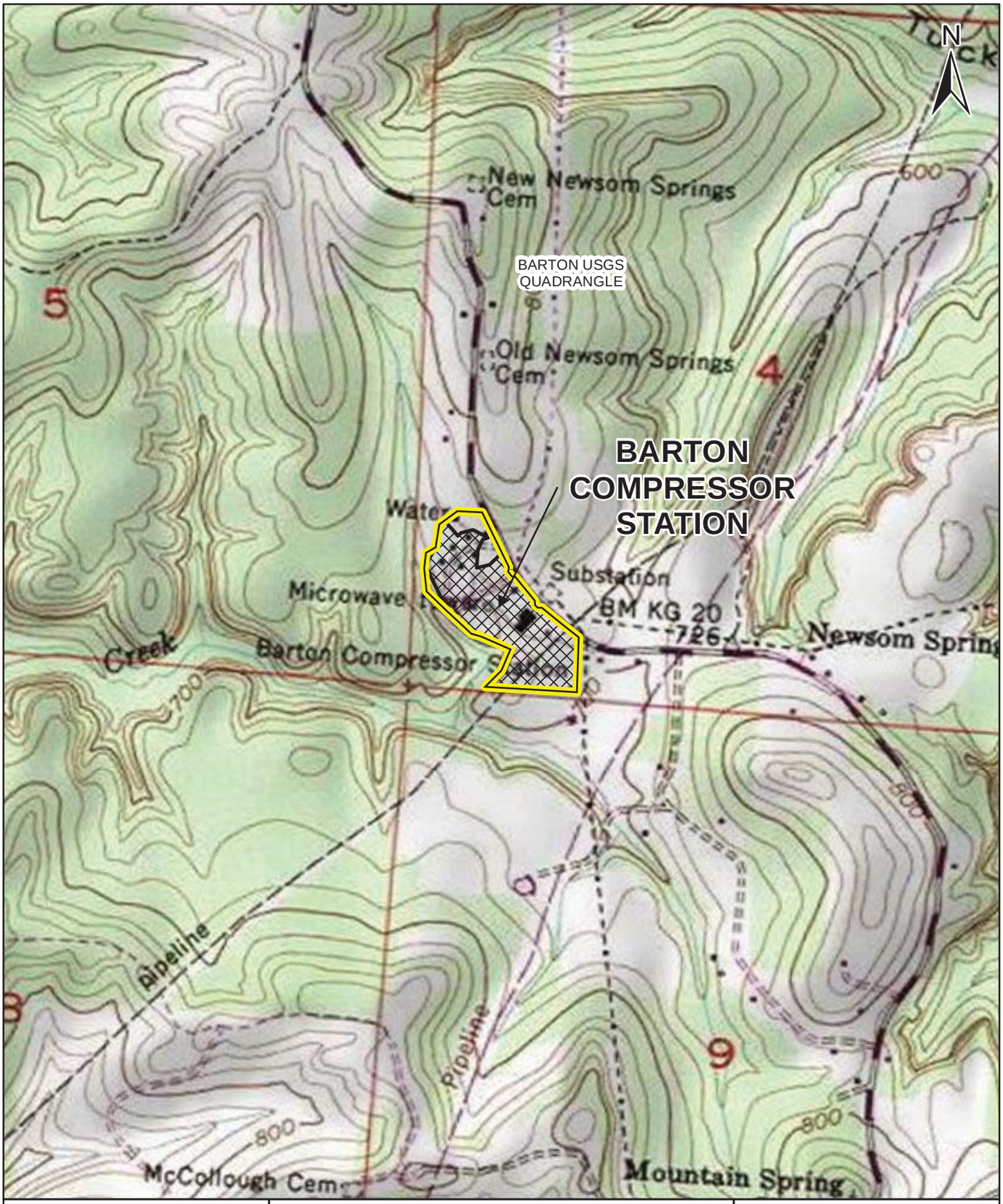
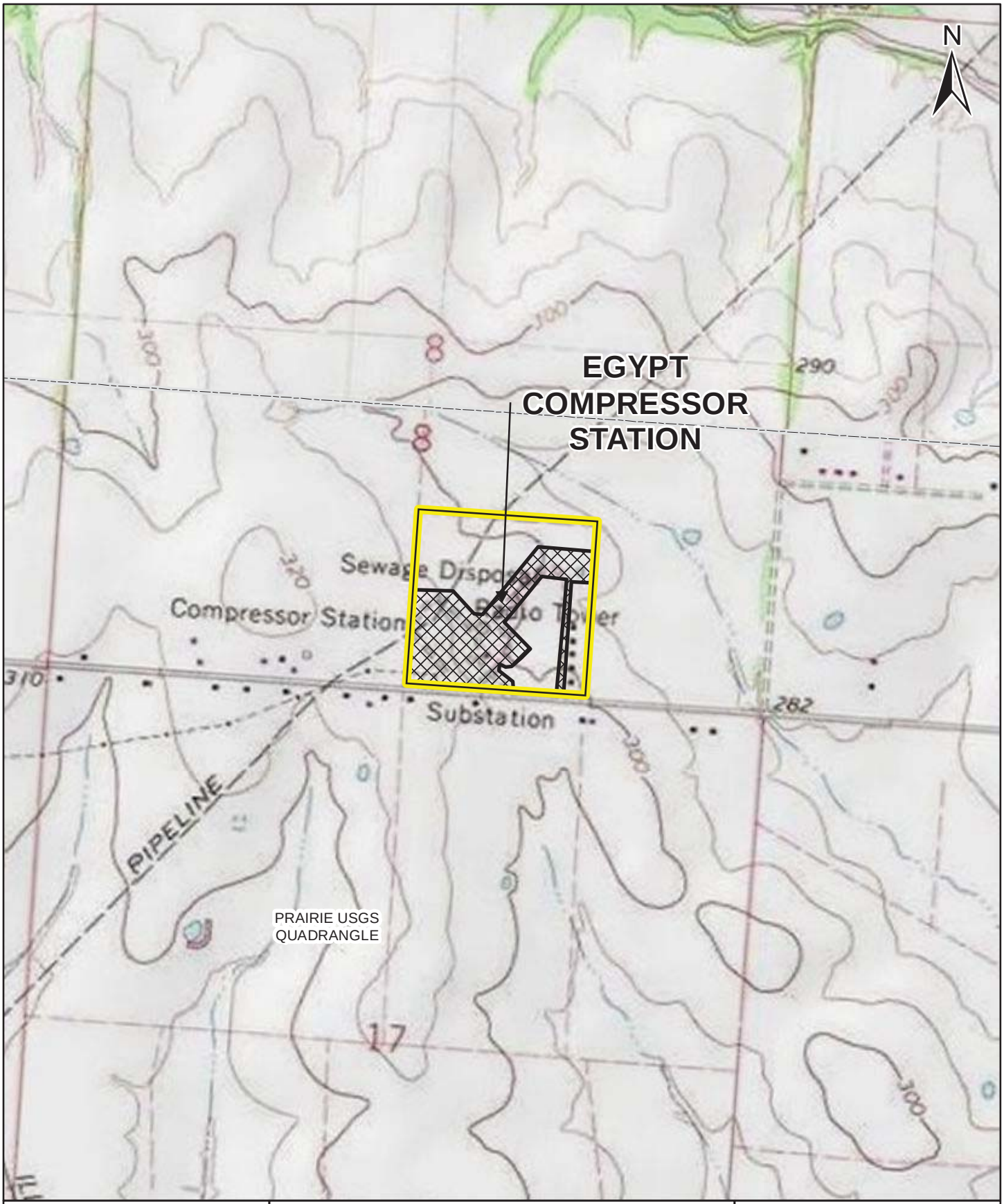



**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**BARTON COMPRESSOR STATION**
**COLBERT COUNTY, ALABAMA**

Legend: Existing Site; Proposed Workspace

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 10 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

Y:\Projects\22379_Spectra_Adair_AccessWorking\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd




**ACCESS SOUTH / ADAIR SOUTHWEST /
LEBANON EXTENSION PROJECTS
EGYPT COMPRESSOR STATION
MONROE COUNTY, MISSISSIPPI**

**Legend**
Existing Site
Proposed Workspace

DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 11 of 19

SCALE: 1" = 1,000' | REV: E

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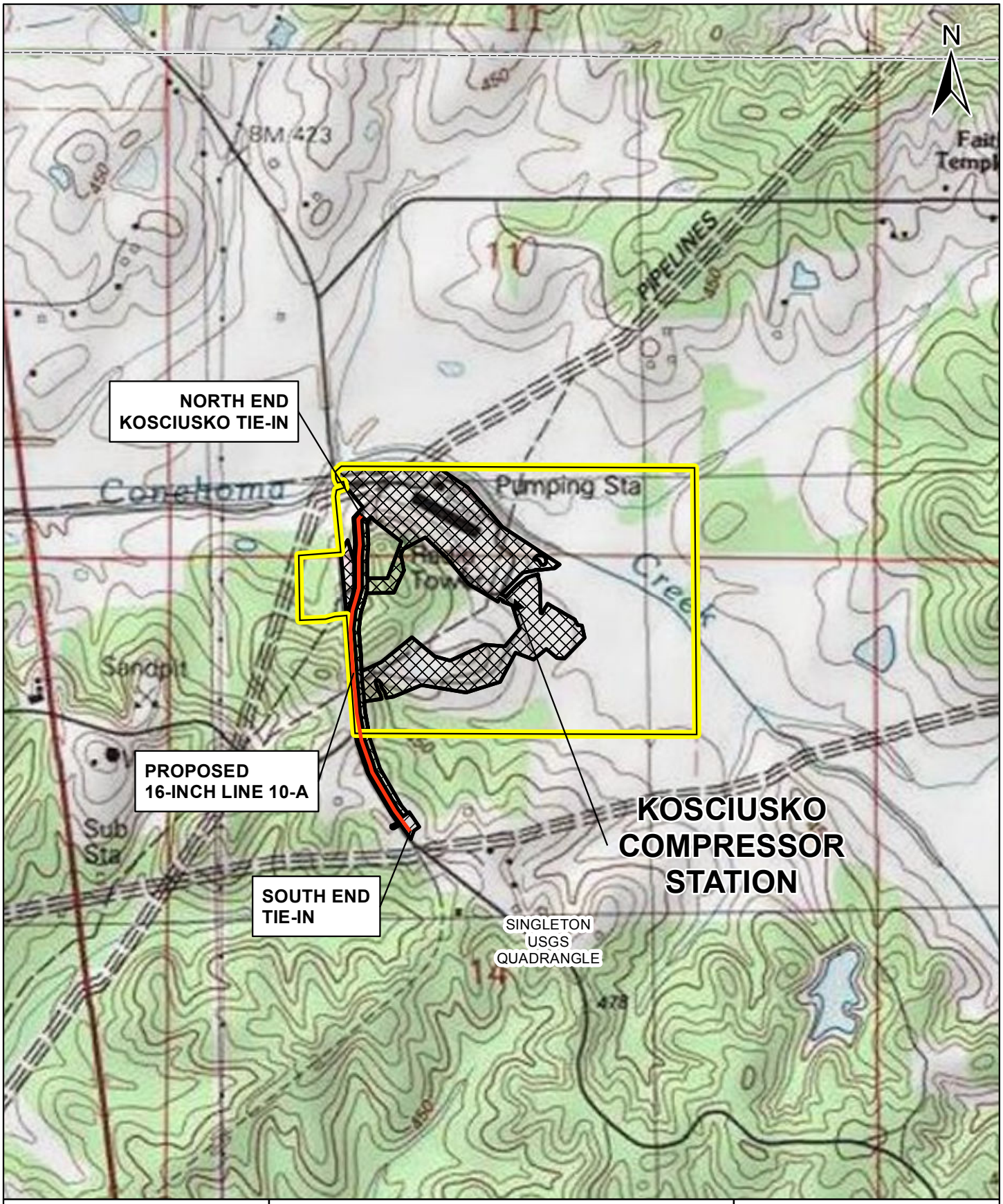


**TEXAS EASTERN KOSCIUSKO PROJECT**
**KOSCIUSKO COMPRESSOR STATION**
**ATTALA COUNTY, MISSISSIPPI**

Legend
Proposed Pipeline
Existing Site
Proposed Workspace

| DATE: 03/16/2016 | DWG. NO: 22954-510-GNW-00023 | SHEET: 1 of 1 | SCALE: 1" = 1,000' | REV: A |
|---|---|---|---|---|

Y:\Projects\22954_Spectra_Kosciusko\Maps\Overall Maps\22954-510-GNW-00023_RevA_Quads_Site.mxd


**ACCESS SOUTH / ADAIR SOUTHWEST /**
**LEBANON EXTENSION PROJECTS**
**LINE 15 TIE-IN WEST**
**MONROE COUNTY, OHIO**

**Legend**

Existing Site

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 13 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

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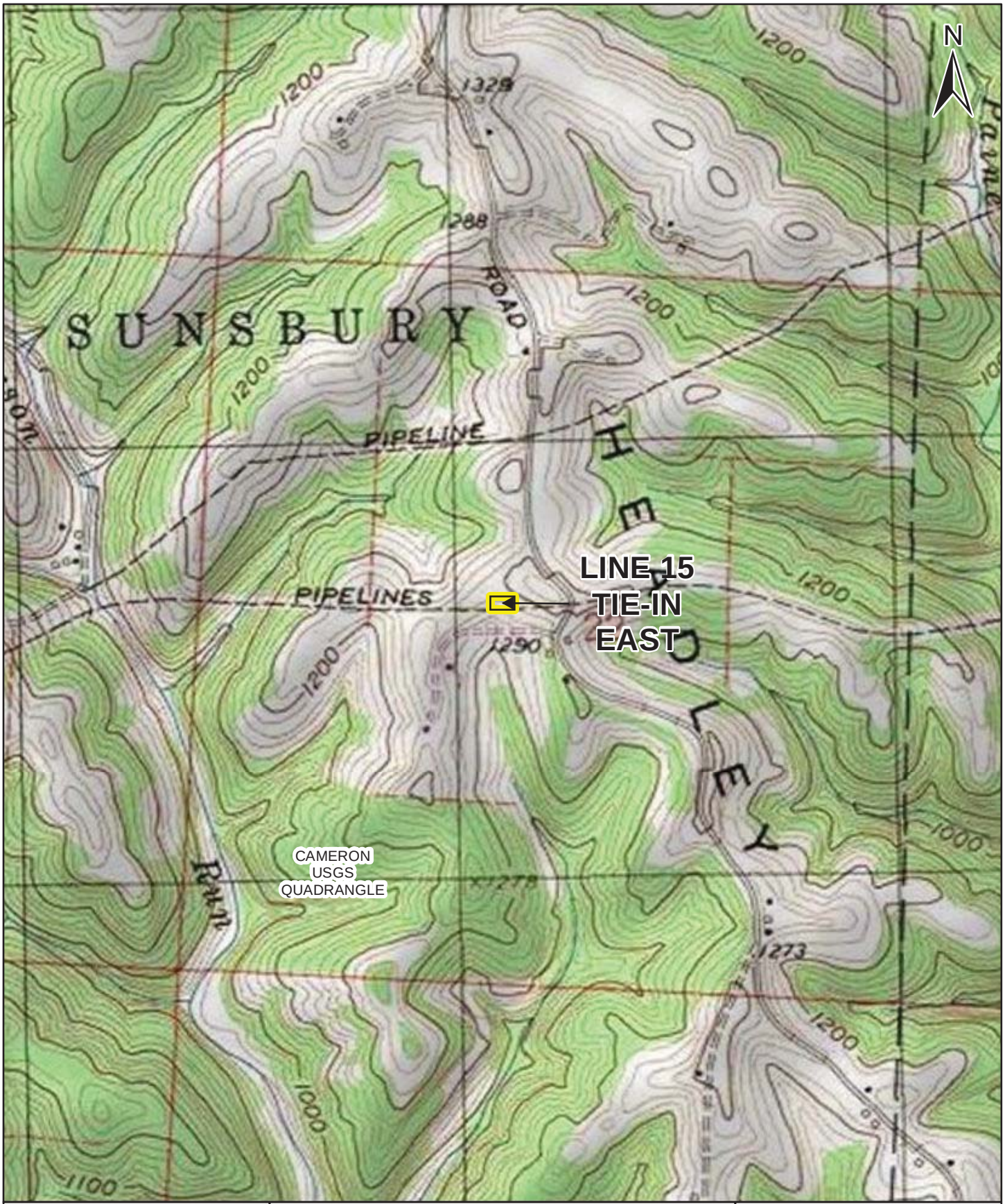


**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**LINE 15 TIE-IN EAST**
**MONROE COUNTY, OHIO**

**Legend**
Existing Site

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 14 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

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| | | |
|---|---|---|
| | **ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**<br>**WHEELERSBURG RECEIVER REMOVAL**<br>**MEIGS COUNTY, OHIO** | **Legend**<br>Existing Site |
| | DATE: 09/21/2015 \| DWG. NO: 22379-510-GNW-00032 \| SHEET: 15 of 19 | SCALE: 1" = 1,000' \| REV: E |

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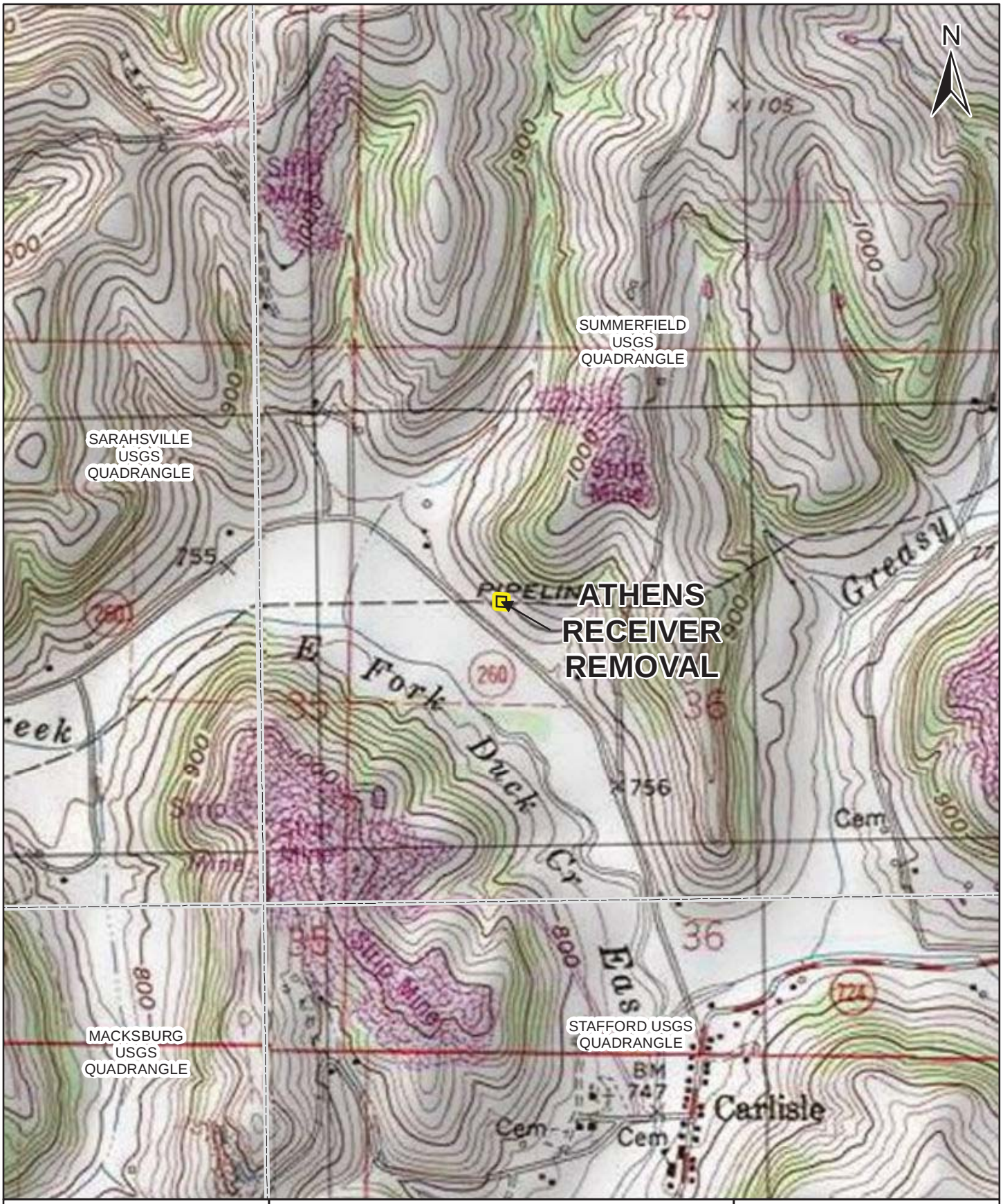


**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**ATHENS RECEIVER REMOVAL**
**NOBLE COUNTY, OHIO**

**Legend**
Existing Site

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 16 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

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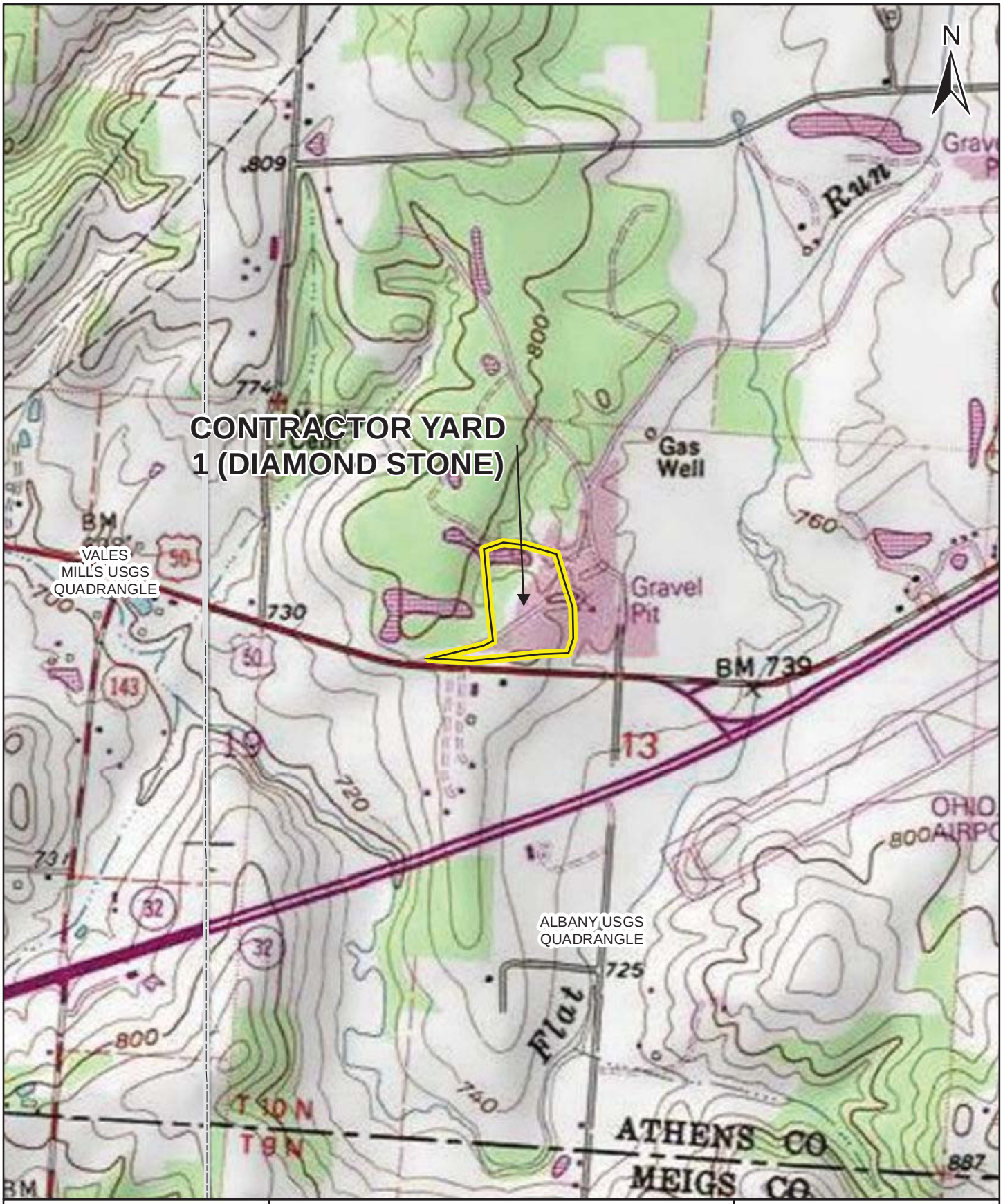
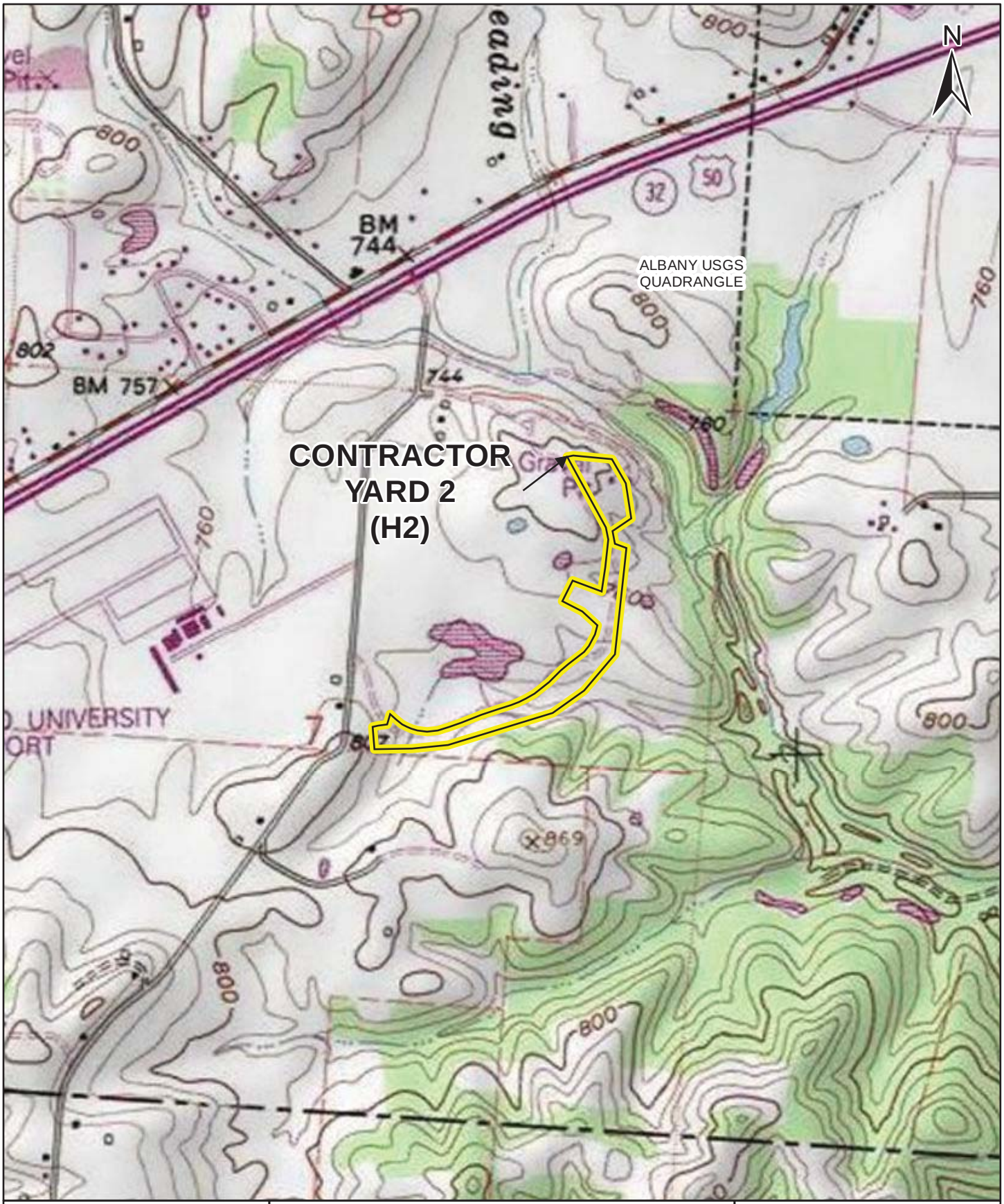



**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**CONTRACTOR YARD 1 (DIAMOND STONE)**
**ATHENS COUNTY, OHIO**

**Legend**
Existing Site

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 17 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

Y:\Projects\22379_Spectra_Adair_Access\Working\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd




**ACCESS SOUTH / ADAIR SOUTHWEST /
LEBANON EXTENSION PROJECTS
CONTRACTOR YARD 2 (H2)
ATHENS COUNTY, OHIO**

**Legend**

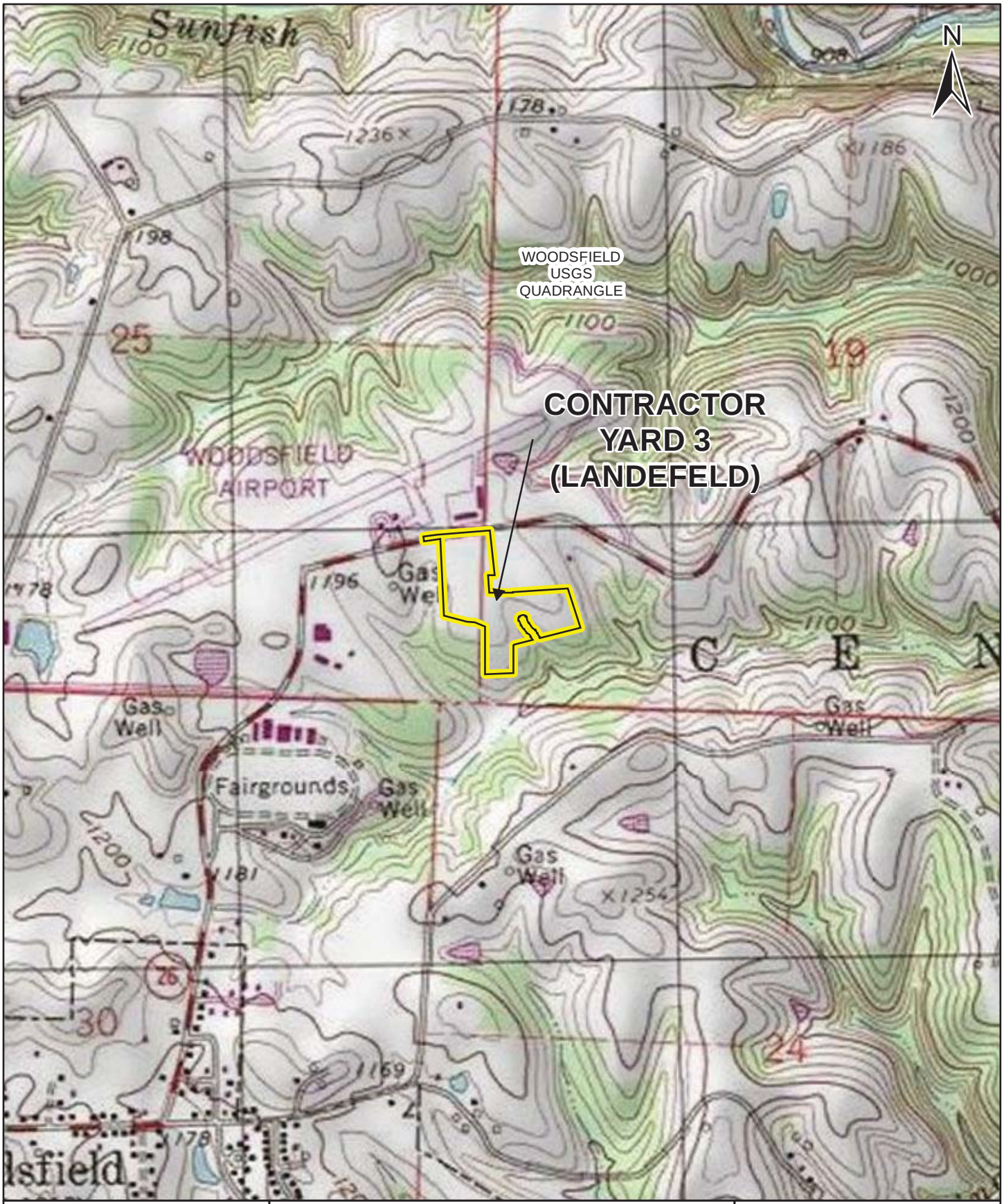
Existing Site

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 18 of 19 |
|---|---|---|

SCALE: 1" = 1,000'

REV: E

Y:\Projects\22379_Spectra_Adair_Access\Working\20150826_GNW_00032_RevC_PreFERC_Quads\22379-510-GNW-00032_RevE_PreFERC_Quads_Sites.mxd




**ACCESS SOUTH / ADAIR SOUTHWEST / LEBANON EXTENSION PROJECTS**
**CONTRACTOR YARD 3 (LANDEFELD)**
**MONROE COUNTY, OHIO**

**Legend**
Existing Site

| DATE: 09/21/2015 | DWG. NO: 22379-510-GNW-00032 | SHEET: 19 of 19 | SCALE: 1" = 1,000' | REV: E |
|---|---|---|---|---|

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# Appendix B
# Proposed Alternative Measures to the FERC Plan and Procedures

## Proposed Alternate Measures to the FERC Procedures

| Facility, County | Wetland / Waterbody ID a/ | Approx. Milepost b/ | ATWS Size (feet) | Distance from Closest Resource Area (feet) | Variance Justification c/ | ATWS ID |
|---|---|---|---|---|---|---|
| **Wheelersburg to Athens Loop** | | | | | | |
| **Meigs County, Ohio** | S-BJT-401 | 611.6 | 150 X 35 | 39.1 | 1,3,6,8,9 | ATWS 1 |
| | S-BJT-404 | 612.2 | 779 X 35 | 18.5 | 7,8,9 | ATWS 7 |
| | W-JLK-359 | 613.4 | 72 X 45 | 10.1 | 4,7 | ATWS 17 |
| | S-BJT-415 | 613.4 | 150 X 35 | 2.9 | 4,7 | ATWS 18 |
| **Athens County, Ohio** | S-BJT-424 | 616.4 | 150 X 35 | 46.3 | 8 | ATWS 44 |
| | S-BJT-424 | 616.5 | 40 X 35 | 44.0 | 7,8 | ATWS 45 |
| | S-BJT-429 | 618.3 | 1210 X 25 | 44.5 | 2,10,11 | ATWS 60 |
| | W-BJT-317 | 618.5 | 250 X 35 | 26.9 | 7,8 | ATWS 63 |
| | W-BJT-319 | 618.8 | 40 X 35 | 48.7 | 3,6,7 | ATWS 66 |
| | W-BJT-320 | 618.9 | 150 X 35 | 47.1 | 7,8 | ATWS 69 |
| | S-JLK-122 | 620.6 | 150 X 35 | 30.4 | 6,7,8 | ATWS 87 |
| | S-JLK-118 | 620.6 | 65 X 35 | 30.8 | 3,6,7,8,12 | ATWS 88 |
| **Athens to Berne Loop** | | | | | | |
| | S-RW-016 | 679.8 | 150 X 35 | 19.9 | 8 | ATWS 116 |
| | W-JLK-387 | 681.7 | 1296 X 25 | 29.3 | 7,8,11 | ATWS 131 |
| **Berne to Holbrook Loop** | | | | | | |
| | S-JLK-235 | 699 | 301 X 35 | 6.9 | 8 | ATWS 138 |
| | S-JLK-233 | 699.1 | 150 X 35 | 8.9 | 8 | ATWS 139 |
| | W-JLK-337 | 699.3 | 150 X 35 | 47.6 | 7,8 | ATWS 142 |
| | S-JLK-230 | 699.4 | 290 X 25 | 13.3 | 7,9 | ATWS 144 |
| | S-JLK-208 | 699.9 | 192 X 35 | 10.1 | 7,8 | ATWS 151 |
| | S-JLK-238 | 700.1 | 1558 X 35 | 4.9 | 7,8,12 | ATWS 152 |

| Facility, County | Wetland / Waterbody ID a/ | Approx. Milepost b/ | ATWS Size (feet) | Distance from Closest Resource Area (feet) | Variance Justification c/ | ATWS ID |
|---|---|---|---|---|---|---|
| **Aboveground Facilities** | | | | | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A |

a/ All Wetland of Waterbodies located within<50 ft. from ATWS.

b/ Texas Eastern MP. MP is taken at the centers of the ATWS.

c/ Justifications definitions for each proposed ATWS is listed below. These proposed ATWS variances table is a subset of (see Table 8C-1 in Appendix B of Resource Report 8 for a full list of ATWS).

1-Beginning point of Project_Assemble construction equipment, Remove Launcher / Receiver barrel, Stage hydrostatic testing equipment, Maintain ingress / egress of construction equipment & personnel.

2-Access Road Entry_Parking, Prefabricate access road crossing pipe segment, spoil storage, & Maintain through access of pipeline construction equipment and personnel.

3-Bored Road Crossing_Parking, Spoil Storage, Additional Equipment to bore road and install pipe joints individually, Additional spoil due to excavating bore pit, & Maintain through access of pipeline construction equipment and personnel.

4-Bored Railroad Crossing_Parking, Spoil Storage, Additional Equipment to bore road and install pipe joints individually, Additional spoil due to excavating bore pit, & Maintain through access of pipeline construction equipment and personnel.

5-Open Cut Road Crossing_Parking, Spoil Storage, Road crossing materials storage, Prefabricate pipe segment to be installed through road, & Maintain through access of pipeline construction equipment and personnel.

6-Pipeline(s) Cross Under_Parking, Spoil Storage, Excavate extra depth ditch to cross under existing pipelines, Prefabricate pipeline segment to install under existing pipelines, Additional construction equipment to install the pipeline segment under existing pipelines, & Maintain through access of pipeline construction equipment and personnel.

7-Overhead Powerline(s) Crossing_Parking, Spoil Storage, Prefabricate pipeline segment to install under overhead powerlines, Additional construction equipment to install the pipeline segment under overhead powerlines, & Maintain through access of pipeline construction equipment and personnel.

8-Wetland Crossing_Parking, Spoil storage, Timber mat storage, Prefabricate wetland and stream pipe segment, & Maintain through access of pipeline construction equipment and personnel.

9-Stream(s) Crossing_Parking, Spoil Storage, Prefabricate pipe segment for stream xing, & Maintain through access of pipeline construction equipment and personnel.

10-Store construction equipment and materials, Parking, Maintain through access of pipeline construction equipment and personnel.

11-Congested Area_Parking, Spoil Storage, Maintain through access of pipeline construction equipment and personnel.

12-Change Working Side of Pipeline CWA_Maintain through access of pipeline construction equipment and personnel in transition of side of pipeline from which equipment will operate.

13-Steep Vertical Slope_Prepare level work site, Spoil storage (Additional area due to minimum of 30% expansion of material once excavated), Parking, & Maintain through access of pipeline construction equipment and personnel.

14-Severe Side Slope_Prepare level work site, Spoil storage (Additional area due to minimum of 30% expansion of material once excavated), Parking, & Maintain through access of pipeline construction equipment and personnel.

15-Horizontal Directional Drill_Prepare level worksite for drilling rig and associated equipment, drill pipe storage, parking, string and weld pull-back pipeline section.

16-Ending point of Project_Install main line valve and Launcher / Receiver barrel, Topsoil segregation, Additional trench excavation, Spoil storage, Hydrostatic testing equipment, Disassemble pipeline construction equipment, & Maintain through access of pipeline construction equipment and personnel.

# Appendix C
# Proposed ATWS

| Location of ATWS Along the Pipeline Facilities | | | | | | | |
|---|---|---|---|---|---|---|---|
| **County, State** | **MP** | **Side of Construction Work Area** | **Acres** | **Justification a/** | **Length Max b/** | **Width Max b/** | **Name** |
| ***Wheelersburg to Athens Loop*** | | | | | | | |
| Meigs County, OH | 611.6 | Working | 0.1 | 1,3,6,8,9 | 150 | 35 | ATWS 1 |
| | 611.7 | Non-Working | 0.4 | 8,11 | 623 | 25 | ATWS 2 |
| | 611.9 | Working | 0.3 | 3,6,8 | 598 | 25 | ATWS 3 |
| | 611.9 | Working | 0.1 | 1,3,6 | 150 | 35 | ATWS 4 |
| | 612.0 | Working | 0.1 | 2,3,7 | 145 | 35 | ATWS 5 |
| | 612.1 | Working | 0.4 | 7,8,9 | 674 | 25 | ATWS 6 |
| | 612.2 | Working | 0.6 | 7,8,9 | 779 | 35 | ATWS 7 |
| | 612.3 | Non-Working | 0.4 | 8,11 | 463 | 35 | ATWS 8 |
| | 612.4 | Non-Working | 0.2 | 7,8,11 | 294 | 35 | ATWS 9 |
| | 612.5 | Working | 0.1 | 5,7,8,11 | 150 | 35 | ATWS 10 |
| | 612.7 | Working | 0.1 | 3,6 | 150 | 35 | ATWS 11 |
| | 612.7 | Working | 0.1 | 3,6 | 150 | 35 | ATWS 12 |
| | 613.0 | Non-Working | 0.2 | 8,11 | 313 | 25 | ATWS 13 |
| | 613.1 | Non-Working | 0.0 | 8,11 | 75 | 25 | ATWS 14 |
| | 613.2 | Non-Working | 0.1 | 8,11 | 208 | 25 | ATWS 15 |
| | 613.2 | Working | 0.1 | 8 | 150 | 35 | ATWS 16 |
| | 613.4 | Working | 0.1 | 4,7 | 72 | 45 | ATWS 17 |
| | 613.4 | Working | 0.1 | 4,7 | 150 | 35 | ATWS 18 |
| | 613.6 | Working | 0.3 | 9,10 | 580 | 25 | ATWS 19 |
| | 613.7 | Working | 0.2 | 2,9,10 | 300 | 35 | ATWS 20 |
| | 613.7 | Working | 0.7 | 2 | 1284 | 25 | ATWS 21 (AR Workspace) |
| | 614.0 | Working | 0.2 | 10,11 | 415 | 25 | ATWS 22 |
| | 614.1 | Non-Working | 0.3 | 10,11 | 450 | 25 | ATWS 23 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 614.2 | Working | 0.1 | 3,7 | 125 | 35 | ATWS 24 |
| | 614.2 | Working | 0.1 | 3,7 | 150 | 35 | ATWS 25 |
| | 614.2 | Non-Working | 0.1 | 5,11 | 150 | 50 | ATWS 26 |
| | 614.4 | Non-Working | 0.5 | 2 | 875 | 25 | ATWS 27 (AR Workspace) |
| | 614.4 | Working | 0.4 | 2,9 | 325 | 70 | ATWS 28 |
| | 614.5 | Working | 0.1 | 3,6 | 150 | 35 | ATWS 29 |
| | 614.5 | Working | 0.1 | 3,6,7 | 150 | 35 | ATWS 30 |
| | 614.7 | Non-Working | 0.4 | 5,11 | 779 | 25 | ATWS 31 |
| | 614.8 | Working | 0.3 | 5,7,8,11 | 510 | 25 | ATWS 32 |
| | 615.3 | Non-Working | 0.8 | 8,10,11 | 1474 | 25 | ATWS 33 |
| | 615.3 | Working | 1.3 | 2 | 2348 | 25 | ATWS 34 (AR Workspace) |
| | 615.4 | Working | 0.1 | 2,9 | 180 | 35 | ATWS 35 |
| | 615.8 | Working | 0.1 | 9,10 | 178 | 25 | ATWS 36 |
| | 615.9 | Non-Working | 0.3 | 7,11 | 475 | 25 | ATWS 37 |
| | 616.1 | Non-Working | 0.3 | 6,8 | 450 | 25 | ATWS 38 |
| | 616.1 | Working | 0.1 | 3,6,8,11 | 150 | 35 | ATWS 39 |
| | 616.2 | Working | 0.1 | 3,6 | 150 | 35 | ATWS 40 |
| | 616.2 | Non-Working | 0.1 | 3,5,6,11 | 145 | 35 | ATWS 41 |
| | 616.3 | Working | 0.2 | 6,11 | 335 | 35 | ATWS 42 |
| | 616.3 | Working | 0.1 | 6,10 | 130 | 25 | ATWS 43 |
| Athens County, OH | 616.4 | Working | 0.1 | 8 | 150 | 35 | ATWS 44 |
| | 616.5 | Working | 0.0 | 7,8 | 40 | 35 | ATWS 45 |
| | 616.5 | Working | 0.1 | 3,8 | 100 | 35 | ATWS 46 |
| | 616.6 | Working | 0.1 | 3,5 | 145 | 35 | ATWS 47 |
| | 616.6 | Non-Working | 0.1 | 3,5 | 205 | 25 | ATWS 48 |
| | 616.6 | Working | 0.1 | 3,5 | 150 | 35 | ATWS 49 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 616.6 | Non-Working | 0.1 | 3,7,8 | 180 | 25 | ATWS 50 |
| | 616.6 | Working | 0.1 | 3,7,8 | 123 | 35 | ATWS 51 |
| | 616.7 | Working | 0.3 | 7,8,11 | 500 | 25 | ATWS 52 |
| | 616.9 | Non-Working | 0.2 | 7,8 | 300 | 25 | ATWS 53 |
| | 617.0 | Non-Working | 0.4 | 6,7 | 750 | 25 | ATWS 54 |
| | 617.1 | Non-Working | 0.2 | 7,10 | 415 | 25 | ATWS 55 |
| | 617.2 | Working | 0.3 | 10,11 | 500 | 25 | ATWS 56 |
| | 617.4 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 57 |
| | 617.4 | Working | 0.2 | 3,7,8 | 200 | 35 | ATWS 58 |
| | 617.5 | Working | 0.1 | 3,6 | 150 | 35 | ATWS 59 |
| | 618.3 | Working | 0.7 | 2,10,11 | 1210 | 25 | ATWS 60 |
| | 618.4 | Non-Working | 0.1 | 2,9 | 200 | 25 | ATWS 61 |
| | 618.4 | Non-Working | 0.6 | 2 | 1092 | 25 | ATWS 62 (AR Workspace) |
| | 618.5 | Working | 0.2 | 7,8 | 250 | 35 | ATWS 63 |
| | 618.6 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 64 |
| | 618.6 | Non-Working | 0.2 | 10,11 | 280 | 35 | ATWS 65 |
| | 618.8 | Working | 0.0 | 3,6,7 | 40 | 35 | ATWS 66 |
| | 618.8 | Non-Working | 0.1 | 3,6,7 | 108 | 25 | ATWS 67 |
| | 618.8 | Working | 0.1 | 3,6,7 | 150 | 35 | ATWS 68 |
| | 618.9 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 69 |
| | 619.0 | Non-Working | 0.1 | 7,8,11 | 150 | 25 | ATWS 70 |
| | 619.1 | Working | 0.4 | 3 | 517 | 35 | ATWS 71 |
| | 619.1 | Non-Working | 0.5 | 3,7 | 780 | 25 | ATWS 72 |
| | 619.2 | Non-Working | 0.2 | 7,8 | 450 | 25 | ATWS 73 |
| | 619.3 | Non-Working | 0.2 | 7,8 | 300 | 25 | ATWS 74 |
| | 619.7 | Working | 0.1 | 7,11 | 150 | 35 | ATWS 75 |
| | 619.7 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 76 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 619.8 | Working | 0.2 | 7,8 | 296 | 35 | ATWS 77 |
| | 619.9 | Working | 0.1 | 6,8 | 160 | 35 | ATWS 78 |
| | 620.0 | Non-Working | 0.3 | 3,6 | 525 | 25 | ATWS 79 |
| | 620.0 | Non-Working | 0.1 | 3,7 | 136 | 35 | ATWS 80 |
| | 620.2 | Working | 0.1 | 7,8 | 160 | 35 | ATWS 81 |
| | 620.2 | Non-Working | 0.8 | 7,8 | 1380 | 25 | ATWS 82 |
| | 620.3 | Non-Working | 0.3 | 2 | 584 | 25 | ATWS 83 (AR Workspace) |
| | 620.4 | Working | 0.1 | 8,11 | 150 | 35 | ATWS 84 |
| | 620.5 | Non-Working | 0.2 | 7,11 | 400 | 25 | ATWS 85 |
| | 620.6 | Non-Working | 0.3 | 2,3,6 | 525 | 25 | ATWS 86 (AR Workspace) |
| | 620.6 | Working | 0.1 | 6,7,8 | 150 | 35 | ATWS 87 |
| | 620.6 | Working | 0.1 | 3,6,7,8,12 | 65 | 35 | ATWS 88 |
| ***Athens To Berne Loop*** | | | | | | | |
| Noble County, OH | 677.3 | Non-Working | 0.1 | 1,9 | 110 | 84 | ATWS 89 |
| | 677.3 | Working | 0.1 | 1,2 | 73 | 55 | ATWS 90 |
| | 677.4 | Working | 0.8 | 1,9 | 490 | 106 | ATWS 91 |
| | 677.5 | Working | 0.3 | 3 | 339 | 35 | ATWS 92 |
| | 677.5 | Non-Working | 0.4 | 3 | 534 | 35 | ATWS 93 |
| | 677.6 | Non-Working | 1.0 | 2,9 | 489 | 140 | ATWS 94 |
| | 677.6 | Non-Working | 0.4 | 2,7,8,11 | 691 | 25 | ATWS 95 (AR Workspace) |
| | 677.7 | Working | 0.3 | 7,8 | 412 | 35 | ATWS 96 |
| | 677.7 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 97 |
| | 677.8 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 98 |
| | 677.9 | Working | 0.4 | 7,11 | 707 | 25 | ATWS 99 |
| | 678.0 | Working | 0.1 | 3,6,8 | 150 | 35 | ATWS 100 |
| | 678.0 | Non-Working | 0.1 | 3,6,8 | 150 | 25 | ATWS 101 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 678.1 | Non-Working | 0.0 | 3,6,8 | 100 | 25 | ATWS 102 |
| | 678.1 | Working | 0.1 | 11 | 150 | 35 | ATWS 103 |
| | 678.2 | Working | 1.5 | 6,10,11 | 2536 | 25 | ATWS 104 |
| | 678.7 | Working | 0.2 | 5 | 387 | 25 | ATWS 105 |
| | 678.8 | Non-Working | 0.2 | 3,5 | 396 | 25 | ATWS 106 |
| | 678.8 | Working | 0.1 | 3,5 | 150 | 35 | ATWS 107 |
| | 678.9 | Working | 0.1 | 3,5,6 | 160 | 35 | ATWS 108 |
| | 678.9 | Working | 0.3 | 3,5,6,8 | 608 | 25 | ATWS 109 |
| | 679.2 | Non-Working | 0.4 | 11 | 539 | 35 | ATWS 110 |
| | 679.3 | Working | 0.4 | 11 | 638 | 25 | ATWS 111 |
| | 679.4 | Working | 0.1 | 8 | 150 | 35 | ATWS 112 |
| | 679.4 | Working | 0.1 | 8 | 150 | 35 | ATWS 113 |
| | 679.5 | Working | 0.8 | 2 | 1370 | 25 | ATWS 114 (AR Workspace) |
| | 679.6 | Working | 0.7 | 9 | 960 | 35 | ATWS 115 |
| | 679.8 | Working | 0.1 | 8 | 150 | 35 | ATWS 116 |
| | 679.9 | Working | 0.1 | 8 | 150 | 35 | ATWS 117 |
| | 680.4 | Working | 0.1 | 3 | 150 | 35 | ATWS 118 |
| | 680.4 | Working | 0.4 | 3 | 235 | 75 | ATWS 119 |
| Monroe County, OH | 680.6 | Non-Working | 2.2 | 6,9 | 3773 | 25 | ATWS 120 |
| | 680.7 | Working | 1.1 | 8,9 | 1846 | 35 | ATWS 121 |
| | 681.0 | Working | 0.1 | 8 | 150 | 35 | ATWS 122 |
| | 681.0 | Working | 0.1 | 8 | 100 | 35 | ATWS 123 |
| | 681.1 | Non-Working | 0.2 | 7 | 270 | 25 | ATWS 124 |
| | 681.1 | Non-Working | 0.1 | 7,8 | 135 | 25 | ATWS 125 |
| | 681.2 | Non-Working | 0.1 | 7,8 | 120 | 25 | ATWS 126 |
| | 681.3 | Non-Working | 0.3 | 7,8 | 540 | 25 | ATWS 127 |
| | 681.4 | Non-Working | 0.1 | 7,8 | 185 | 25 | ATWS 128 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 681.4 | Non-Working | 0.1 | 7,8 | 120 | 25 | ATWS 129 |
| | 681.5 | Non-Working | 0.2 | 8 | 400 | 25 | ATWS 130 |
| | 681.7 | Non-Working | 0.7 | 7,8,11 | 1296 | 25 | ATWS 131 |
| | 681.9 | Working | 0.2 | 3,6,7,8 | 150 | 65 | ATWS 132 |
| ***Berne To Holbrook Loop*** | | | | | | | |
| Monroe County, OH | 698.3 | Non-Working | 0.3 | 1,3 | 362 | 40 | ATWS 133 |
| | 698.3 | Working | 0.6 | 1,3,6,11 | 798 | 35 | ATWS 134 |
| | 698.4 | Non-Working | 0.3 | 3,6,7 | 439 | 25 | ATWS 135 |
| | 698.5 | Working | 0.6 | 5,10,11 | 1000 | 25 | ATWS 136 |
| | 698.9 | Working | 0.6 | 3,6,7,8 | 812 | 35 | ATWS 137 |
| | 699.0 | Working | 0.2 | 8 | 301 | 35 | ATWS 138 |
| | 699.1 | Working | 0.1 | 8 | 150 | 35 | ATWS 139 |
| | 699.1 | Working | 0.3 | 11 | 436 | 25 | ATWS 140 |
| | 699.2 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 141 |
| | 699.3 | Working | 0.1 | 7,8 | 150 | 35 | ATWS 142 |
| | 699.3 | Non-Working | 1.9 | 2 | 3302 | 25 | ATWS 143 (AR Workspace) |
| | 699.4 | Working | 0.2 | 7,9 | 290 | 25 | ATWS 144 |
| | 699.5 | Working | 0.7 | 9 | 239 | 144 | ATWS 145 |
| | 699.6 | Non-Working | 0.9 | 7,11 | 1228 | 30 | ATWS 146 |
| | 699.7 | Working | 0.1 | 3,7 | 150 | 35 | ATWS 147 |
| | 699.8 | Non-Working | 0.5 | 2 | 911 | 25 | ATWS 148 (AR Workspace) |
| | 699.8 | Working | 0.5 | 2,9 | 238 | 108 | ATWS 149 |
| | 699.9 | Non-Working | 0.5 | 11 | 909 | 25 | ATWS 150 |
| | 699.9 | Working | 0.2 | 7,8 | 192 | 35 | ATWS 151 |
| | 700.1 | Working | 1.3 | 7,8,12 | 1558 | 35 | ATWS 152 |
| | 700.3 | Working | 6.3 | 9 | 775 | 400 | ATWS 153 |

a/ Justification definitions for each proposed ATWS are listed below:

1 - Beginning Point of Projects - Assemble construction equipment, remove launcher/receiver barrel, stage hydrostatic testing equipment, maintain ingress/egress of construction equipment & personnel

2 - Access Road Entry - Parking, prefabricate access road crossing pipe segment, spoil storage, & maintain through access of pipeline construction equipment and personnel

3 - Bored Road Crossing - Parking, spoil storage, additional equipment to bore road and install pipe joints individually, additional spoil due to excavating bore pit, & maintain through access of pipeline construction equipment and personnel

4 - Bored Railroad Crossing - Parking, spoil storage, additional equipment to bore railroad and install pipe joints individually, additional spoil due to excavating bore pit, & maintain through access of pipeline construction equipment and personnel

5 - Pipeline(s) Cross Under - Parking, spoil storage, excavate extra depth ditch to cross under existing pipelines, prefabricate pipeline segment to install under existing pipelines

6 - Overhead Powerline(s) Crossing - Parking, spoil storage, prefabricate pipeline segment to install under overhead powerlines, additional construction equipment to install the pipeline segment under overhead powerlines, & maintain through access of pipeline construction equipment and personnel

7 - Wetland Crossing - Parking, spoil storage, timber mat storage, prefabricate wetland and stream pipe segment, & maintain through access of pipeline construction equipment and personnel

8 - Stream(s) Crossing - Parking, spoil storage, prefabricate pipe segment for stream crossing, & maintain through access of pipeline construction equipment and personnel

9 - Store construction equipment and materials, parking, maintain through access of pipeline construction equipment and personnel

10 - Congested Area - Parking, spoil storage, maintain through access of pipeline construction equipment and personnel

11 - Change Working Side of Pipeline Construction Work Area - Maintain through access of pipeline construction equipment and personnel in transition of side of pipeline from which equipment will operate and weld pullback pipeline section

12 - Ending Point of Projects - Install main line valve and launcher/receiver barrel, topsoil segregation, additional trench excavation, spoil

b/ In cases where the ATWS crosses a county line the entire dimension of the ATWS is provided.

# Appendix D
# Waterbody Crossings

# Waterbody Crossings for the Access South, Adair Southwest, and Lebanon Extension Projects

| Facility, County, Waterbody ID a/ | Waterbody Name | MP b/ | Flow Type c/ | FERC Classification d/ | State Water Quality Aquatic Life Habitat Classification e/ | State Water Supply Classification f/ | State Recreation Classification g/ | Crossing Width (feet) h/ | Proposed Construction Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wheelersburg to Athens Loop** | | | | | | | | | |
| **Meigs County, Ohio** | | | | | | | | | |
| S-BJT-401 | Trib. to Sisson Run | 611.7 | Ephemeral | Intermediate | WWH | AWS and IWS | Primary Contact B | 28 | Dry Crossing |
| S-JLK-149 | Trib. to Sisson Run | 611.7 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 3 | Dry Crossing |
| S-BJT-402 | Trib. to Sisson Run | 611.8 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 10 | Dry Crossing |
| S-BJT-405 | Trib. to Leading Creek | 612.4 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 10 | Dry Crossing |
| S-BJT-407 | Trib. to Leading Creek | 612.5 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 28 | Dry Crossing |
| S-BJT-408 | Trib. to Leading Creek | 612.7 | Intermittent | Intermediate | WWH | AWS and IWS | Primary Contact B | 14 | ATWS |
| S-BJT-409 | Trib. to Leading Creek | 613 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 10 | Dry Crossing |
| S-BJT-409A | Trib. to Leading Creek | 613 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 10 | Dry Crossing |
| S-BJT-412 | Trib. to Leading Creek | 613.1 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 8 | Dry Crossing |
| S-BJT-411 | Trib. to Leading Creek | 613.1 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 8 | Dry Crossing |
| S-BJT-413 | Trib. to Leading Creek | 613.2 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 12 | Dry Crossing |
| S-BJT-415 | Leading Creek | 613.4 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 14 | Dry Crossing |
| S-JLK-099 | Trib. to Leading Creek | 613.9 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-JLK-097 | Trib. to Leading Creek | 614.1 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 1 | Dry Crossing |
| S-JLK-106 | Trib. to Leading Creek | 614.2 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-JLK-103 | Trib. to Leading Creek | 614.3 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 1 | Dry Crossing |
| S-JLK-105 | Trib. to Fivemile Run | 614.6 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 5 | Dry Crossing |
| S-JLK-112 | Trib. to Fivemile Run | 614.9 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 6 | Dry Crossing |
| S-JLK-115 | Trib. to Leading Creek | 615.1 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-BJT-416 | Trib. to Fivemile Run | 615.7 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| S-BJT-418 | Trib. to Leading Creek | 615.9 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| S-BJT-419 | Trib. to Leading Creek | 616 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 5 | Dry Crossing |
| S-BJT-420 | Trib. to Leading Creek | 616.2 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 9 | Dry Crossing |

| Facility, County, Waterbody ID a/ | Waterbody Name | MP b/ | Flow Type c/ | FERC Classification d/ | State Water Quality Aquatic Life Habitat Classification e/ | State Water Supply Classification f/ | State Recreation Classification g/ | Crossing Width (feet) h/ | Proposed Construction Method |
|---|---|---|---|---|---|---|---|---|---|
| **Athens County, Ohio** | | | | | | | | | |
| S-BJT-424 | Trib. to Leading Creek | 616.5 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-BJT-425 | Trib. to Leading Creek | 616.5 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-RW-002 | Trib. to Leading Creek | 616.7 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 1 | Dry Crossing |
| S-RW-001 | Trib. to Leading Creek | 616.7 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 1 | Dry Crossing |
| S-RW-004 | Trib. to Margaret Creek | 616.9 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| S-RW-005 | Trib. to Margaret Creek | 616.9 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 1 | Dry Crossing |
| S-JLK-154 | Trib. to Margaret Creek | 617.4 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 12 | Dry Crossing |
| S-JLK-210 | Trib. to Margaret Creek | 617.5 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| S-JLK-156 | Trib. to Margaret Creek | 617.9 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-BJT-428 | Trib. to Margaret Creek | 618 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 7 | Dry Crossing |
| S-BJT-430 | Trib. to Margaret Creek | 618.1 | Intermittent | Intermediate | WWH | AWS and IWS | Primary Contact B | 46 | Dry Crossing |
| S-BJT-430E | Trib. to Margaret Creek | 618.1 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 9 | Dry Crossing |
| S-BJT-430C | Trib. to Margaret Creek | 618.2 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 9 | Dry Crossing |
| S-BJT-430D | Trib. to Margaret Creek | 618.2 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 9 | Dry Crossing |
| S-BJT-430B | Trib. to Margaret Creek | 618.2 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 9 | Dry Crossing |
| S-BJT-430A | Trib. to Margaret Creek | 618.2 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 9 | Dry Crossing |
| S-BJT-430G | Trib. to Margaret Creek | 618.2 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 9 | Dry Crossing |
| S-BJT-434 | Trib. to Margaret Creek | 618.5 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 14 | Dry Crossing |
| S-BJT-442 | Trib. to Margaret Creek | 618.7 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 6 | Dry Crossing |
| S-BJT-436 | Trib. to Margaret Creek | 619 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 8 | Dry Crossing |
| S-BJT-438 | Trib. to Margaret Creek | 619.3 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-BJT-439 | Trib. to Margaret Creek | 619.3 | Ephemeral | Intermediate | WWH | AWS and IWS | Primary Contact B | 15 | Dry Crossing |
| S-BJT-441 | Trib. to Biddle Creek | 619.9 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 6 | Dry Crossing |
| S-BJT-441 (2) | Trib. to Biddle Creek | 619.8 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 6 | Dry Crossing |
| S-JLK-127 | Trib. to Biddle Creek | 619.9 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 10 | Dry Crossing |

| Facility, County, Waterbody ID a/ | Waterbody Name | MP b/ | Flow Type c/ | FERC Classification d/ | State Water Quality Aquatic Life Habitat Classification e/ | State Water Supply Classification f/ | State Recreation Classification g/ | Crossing Width (feet) h/ | Proposed Construction Method |
|---|---|---|---|---|---|---|---|---|---|
| S-JLK-124 | Trib. to Biddle Creek | 620.0 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 8 | Dry Crossing |
| S-JLK-124 (2) | Trib. to Biddle Creek | 620.1 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 29 | Dry Crossing |
| S-JLK-124 (3) | Trib. to Biddle Creek | 620.2 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 10 | ATWS |
| S-JLK-157 | Trib. to Biddle Creek | 620.2 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 3 | Dry Crossing |
| S-JLK-158 | Trib. to Biddle Creek | 620.3 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 1 | Dry Crossing |
| S-JLK-122 | Trib. to Biddle Creek | 620.5 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 5 | Dry Crossing |
| S-JLK-117 | Trib. to Biddle Creek | 620.6 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 5 | Dry Crossing |
| S-JLK-118 | Trib. to Biddle Creek | 620.6 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 7 | Dry Crossing |
| **Athens to Berne Loop** | | | | | | | | | |
| **Noble County, Ohio** | | | | | | | | | |
| S-JLK-138 | Trib. to East Fork Duck Creek | 677.5 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 5 | Dry Crossing |
| S-JLK-129 | Trib. to Greasy Run | 677.8 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 13 | Dry Crossing |
| S-RW-008 | Trib. to Greasy Run | 678 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 14 | Dry Crossing |
| S-RW-009 | Trib. to Greasy Run | 678.6 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 1 | Dry Crossing |
| S-RW-015 | Trib. to Greasy Run | 679.4 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 7 | Dry Crossing |
| S-RW-016 | Trib. to Greasy Run | 679.8 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| S-JLK-131 | Trib. to Greasy Run | 679.8 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 3 | Dry Crossing |
| S-JLK-132 | Greasy Run | 679.9 | Perennial | Intermediate | LWH | AWS and IWS | Primary Contact B | 18 | Dry Crossing |
| **Monroe County, Ohio** | | | | | | | | | |
| S-JLK-134 | Trib. to Clear Fork Little Muskingum River | 681.0 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 7 | Dry Crossing |
| S-RW-022 | Trib. to Clear Fork Little Muskingum River | 681.4 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 3 | Dry Crossing |
| S-RW-020 | Trib. to Clear Fork Little Muskingum River | 681.6 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-RW-017 | Clear Fork Little Muskingum River | 681.8 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 28 | Dry Crossing |

| Facility, County, Waterbody ID a/ | Waterbody Name | MP b/ | Flow Type c/ | FERC Classification d/ | State Water Quality Aquatic Life Habitat Classification e/ | State Water Supply Classification f/ | State Recreation Classification g/ | Crossing Width (feet) h/ | Proposed Construction Method |
|---|---|---|---|---|---|---|---|---|---|
| S-BJT-102113-4 | Trib. to Clear Fork Little Muskingum River | 681.9 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Temporary Equipment Bridge |
| **Berne to Holbrook Loop** | | | | | | | | | |
| **Monroe County, Ohio** | | | | | | | | | |
| S-JLK-222 | Trib. to Sunfish Creek | 698.3 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 3 | Dry Crossing |
| S-JLK-235 | Trib. to Ackerson Run | 698.6 | Intermittent | Minor | WWH | AWS and IWS | Primary Contact B | 6 | Dry Crossing |
| S-JLK-233 | Trib. to Ackerson Run | 698.7 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 5 | Dry Crossing |
| S-JLK-232 | Trib. to Ackerson Run | 698.8 | Perennial | Minor | WWH | AWS and IWS | Primary Contact B | 8 | Dry Crossing |
| S-JLK-229 | Trib. to Ackerson Run | 699.0 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 4 | Dry Crossing |
| S-JLK-228 | Trib. to Ackerson Run | 699.3 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| S-JLK-192 | Ackerson Run | 699.3 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 13 | Dry Crossing |
| S-JLK-208 | Trib. to Ackerson Run | 699.5 | Perennial | Intermediate | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| S-JLK-238 | Trib. to Ackerson Run | 699.6 | Ephemeral | Minor | WWH | AWS and IWS | Primary Contact B | 2 | Dry Crossing |
| ***Aboveground Facilities*** | | | | | | | | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

a/ Identifies Projects facility type (pipeline or aboveground), County where the stream is located a Project ID.
b/ Stream crossing reference by nearest Projects pipeline facility MP.
c/ Flow types were identified in the field based on suggested flow terminology from OEPA's Field Evaluation Manual for OH's Primary Headwater Streams.
**Perennial** - streams that flow permanently on surface of the stream channel.
**Intermittent** - streams having flow for extended periods of time seasonally, but gradually reach a state where there are either isolated pools of water that are not hydraulically connected by sub-surface flow, or a dry channel. Biology may be present in wet hyporheic subsurface substrate. Usually have a warm water Class II type of biology present from roughly October to June.
**Ephemeral** - streams are normally dry and only flow during and after precipitation runoff.
d/ FERC stream classification are based on FERC's "Procedures" definition of minor, intermediate and major waterbodies. Minor = waterbodies less than or equal to 10 feet wide; Intermediate = waterbodies greater than 10 feet wide but less than or equal to 100 feet wide; Major = greater than 100 feet wide.
e/ State of Ohio Water Use Quality Designations for Aquatic Life Habitat. Only Aquatic Life Habitat designation types that area crossed by the Projects are defined below:
**WWH** - "Warmwater Habitat" - these are waters capable of supporting and maintaining a balanced, integrated, adaptive community of warmwater aquatic organisms having a species composition, diversity, and functional organization comparable to the twenty-fifth percentile of the identified reference sites within each of the following ecoregions: the interior plateau ecoregion, the Erie/Ontario lake plains ecoregion, the western Allegheny plateau ecoregion and the eastern corn belt plains ecoregion. For the Huron/Erie lake plains ecoregion, the comparable species composition, diversity and functional organization are based upon the ninetieth percentile of all sites within the region. For all ecoregions, the attributes of species composition, diversity and functional organization would be measured using the index of biotic integrity, the modified index of well-being and the invertebrate community index as defined in "Biological Criteria for the Protection of Aquatic Life: Volume II, User's Manual for Biological Field Assessment of OH Surface Waters," as cited in paragraph (B) of rule 3745-1-03 of the Administrative Code. In addition to those water body segments designated in rules 3745-1-08 to 3745-1-32 of the Administrative Code, all upground storage reservoirs are designated WWH. Attainment of this use designation (except for upground storage reservoirs) is based on the criteria in table 7-15 of this rule. A temporary variance to the criteria associated with this use designation may be granted as described in paragraph (F) of rule 3745-1-01 of the Administrative Code.
**LWH** "Limited warmwater" - these are waters that were temporarily designated in the 1978 water quality standards as not meeting specific WWH criteria. Criteria for the support of this use designation are the

| Facility, County, Waterbody ID a/ | Waterbody Name | MP b/ | Flow Type c/ | FERC Classification d/ | State Water Quality Aquatic Life Habitat Classification e/ | State Water Supply Classification f/ | State Recreation Classification g/ | Crossing Width (feet) h/ | Proposed Construction Method |
|---|---|---|---|---|---|---|---|---|---|

same as the criteria for the support of the use designation WWH. However, individual criteria are varied on a case-by-case basis and supersede the criteria for WWH where applicable. Any exceptions from WWH criteria apply only to specific criteria during specified time periods and/or flow conditions. The adjusted criteria and conditions for specified stream segments are denoted as comments in rules 3745-1-08 to 3745-1-30 of the Administrative Code. Stream segments currently designated LWH would undergo use attainability analyses and would be redesignated other aquatic life habitats.

f/ State of Ohio Water Use Quality Designations Water Supply. Only Water Supply designation types that are crossed by the Projects are defined below:

**AWS** - "Agricultural" - these are waters suitable for irrigation and livestock watering without treatment.

**IWS** - "Industrial" - these are waters suitable for commercial and industrial uses, with or without treatment. Criteria for the support of the industrial water supply use designation would vary with the type of industry involved.

g/ State of Ohio Water Use Quality Designations Recreation. These use designations are in effect only during the recreation season, which is the period from May first to October 31. The director may require effluent disinfection during the months outside the recreation season if necessary to protect an unusually high level of water based recreation activity such as, but not limited to, canoeing, kayaking, scuba diving, or sport fishing during spawning runs and, in the normal pursuit of the recreation activity, there is a strong likelihood of exposure to water borne pathogens through ingestion of water or from dermal exposure through fresh cuts or abrasions. Primary Contact Classes A, B, and secondary contact recreational uses are crossed by the Projects. Primary contact are waters that, during the recreation season, are suitable for one or more full-body contact recreation activities such as, but not limited to, wading, swimming, boating, water skiing, canoeing, kayaking, and scuba diving. Three classes of primary contact recreation use are defined to reflect differences in the observed and potential frequency and intensity of usage. Only Recreation designation types that are crossed by the Projects are defined below:

**Primary Contact A.** These are waters that support, or potentially support, frequent primary contact recreation activities. The following water bodies are designated as class A primary contact recreation waters. The streams and rivers listed in table 7-16 of this rule 3745-1-07 are popular paddling streams with public access points developed, maintained, and publicized by governmental entities.

**Primary Contact B**. These are waters that support, or potentially support, occasional primary contact recreation activities. All surface waters of the state are designated as class B primary contact recreation unless otherwise designated as bathing waters, class A primary contact recreation, class C primary contact recreation or secondary contact recreation.

**Secondary Contact** These are waters that result in minimal exposure potential to water borne pathogens because the waters are: rarely used for water based recreation such as, but not limited to, wading; situated in remote, sparsely populated areas; have restricted access points; and have insufficient depth to provide full body immersion, thereby greatly limiting the potential for water based recreation activities. Waters designated secondary contact recreation are identified in rules 3745-1-08 to 3745-1-30 of the Administrative Code.

h/ The approximate crossing width is measured at the pipeline centerline and does not represent the width of the stream. In instances where a stream is not crossed by the pipeline centerline, the crossing width provided is the average width of the stream within the Projects study area.

# Appendix E
# Wetland Crossings

## Wetland Crossings for the Access South, Adair Southwest, and Lebanon Extension Projects

| Facility, County, Wetland ID a/ | NWI Classification b/ | Enter MP c/ | Exit MP c/ | Crossing Length (feet) d/ | Total Wetland Acreage Impacted | Total Forested Wetland Acreage Impacted e/ | Total Wetland Acreage Impacted by O&M f/ | Total Forested Wetland Acreage Impacted by O&M |
|---|---|---|---|---|---|---|---|---|
| **Wheelersburg to Athens Loop** | | | | | | | | |
| **Meigs County, OH** | | | | | | | | |
| W-BJT-302 | PEM | 612.0 | 612.0 | 32 | 0.02 | - | 0.01 | - |
| W-BJT-304 | PEM | 612.4 | 612.5 | 490 | 0.71 | - | 0.49 | - |
| W-JLK-360 | PEM | 613.4 | 613.4 | 26 | 0.02 | - | 0.01 | - |
| W-JLK-359 | PFO | 613.4 | 613.4 | 37 | 0.04 | 0.04 | 0.04 | 0.04 |
| W-JLK-264 | PEM | 613.9 | 613.9 | 48 | 0.02 | - | 0.01 | - |
| W-JLK-261 | PEM | 614.1 | 614.1 | 54 | 0.02 | - | 0.02 | - |
| W-JLK-267 | PEM | 614.2 | 614.2 | 31 | 0.03 | - | 0.02 | - |
| W-JLK-268 | PEM | 614.3 | 614.3 | 116 | 0.05 | - | 0.03 | - |
| W-PJR-022 | PEM | 614.5 | 614.5 | 22 | < 0.01 | - | < 0.01 | - |
| W-JLK-273 | PEM | 614.6 | 614.6 | 36 | 0.03 | - | 0.02 | - |
| W-JLK-279 | PEM | 614.7 | 614.7 | 31 | < 0.01 | - | < 0.01 | - |
| W-JLK-276 | PEM | 614.9 | 614.9 | 8 | < 0.01 | - | < 0.01 | - |
| W-JLK-275 | PEM | 614.9 | 614.9 | 23 | 0.02 | - | 0.01 | - |
| W-JLK-277 | PEM | 615.1 | 615.1 | 41 | 0.02 | - | 0.01 | - |
| W-PJR-027 | PEM | 615.1 | 615.1 | 24 | 0.01 | - | 0.01 | - |
| W-BJT-305 | PEM | 615.6 | 615.6 | 26 | 0.01 | - | 0.01 | - |
| W-BJT-306 | PEM | 615.7 | 615.7 | 29 | 0.01 | - | 0.01 | - |
| W-BJT-307 | PEM | 615.9 | 615.9 | 58 | 0.05 | - | 0.05 | - |
| W-BJT-308 | PEM | 616.0 | 616.0 | 18 | < 0.01 | - | < 0.01 | - |
| **Athens County, OH** | | | | | | | | |
| W-BJT-309 | PEM | 616.5 | 616.5 | 33 | 0.03 | - | 0.03 | - |

| Facility, County, Wetland ID a/ | NWI Classification b/ | Enter MP c/ | Exit MP c/ | Crossing Length (feet) d/ | Total Wetland Acreage Impacted | Total Forested Wetland Acreage Impacted e/ | Total Wetland Acreage Impacted by O&M f/ | Total Forested Wetland Acreage Impacted by O&M |
|---|---|---|---|---|---|---|---|---|
| W-PJR-001 | PEM | 616.7 | 616.7 | 34 | 0.06 | - | 0.03 | - |
| W-PJR-003 | PEM | 616.8 | 616.8 | 37 | 0.01 | - | < 0.01 | - |
| W-JLK-289 | PEM | 616.9 | 616.9 | 63 | 0.09 | - | 0.07 | - |
| W-JLK-288 | PEM | 616.9 | 616.9 | 50 | 0.03 | - | 0.03 | - |
| W-JLK-287 | PEM | 617.0 | 617.0 | 10 | < 0.01 | - | - | - |
| W-JLK-286 | PEM | 617.1 | 617.1 | 61 | 0.02 | - | 0.02 | - |
| W-JLK-285 | PEM | 617.1 | 617.1 | 29 | 0.01 | - | < 0.01 | - |
| W-PJR-029 | PEM | 617.9 | 617.9 | 39 | 0.01 | - | 0.01 | - |
| W-BJT-311 | PEM | 618.0 | 618.0 | 217 | 0.08 | - | 0.04 | - |
| W-BJT-314 | PEM | 618.1 | 618.1 | 92 | 0.07 | - | 0.06 | - |
| W-BJT-315 | PEM | 618.1 | 618.1 | 30 | 0.01 | - | < 0.01 | - |
| W-BJT-313 | PEM | 618.2 | 618.2 | 110 | 0.08 | - | 0.05 | - |
| | PFO | | | | 0.08 | 0.08 | 0.05 | 0.05 |
| W-BJT-316 | PEM | 618.5 | 618.5 | 30 | 0.01 | - | < 0.01 | - |
| W-BJT-318 | PEM | 618.5 | 618.5 | 35 | 0.01 | - | < 0.01 | - |
| W-BJT-319 | PEM | 618.8 | 618.8 | 51 | 0.04 | - | < 0.01 | - |
| W-BJT-320 | PEM | 619.0 | 619.0 | 52 | 0.03 | - | 0.03 | - |
| | PSS | | | | 0.02 | - | 0.01 | - |
| W-BJT-321 | PEM | 619.2 | 619.2 | 85 | 0.05 | - | 0.04 | - |
| W-BJT-322 | PEM | 619.2 | 619.2 | 117 | 0.14 | - | 0.11 | - |
| W-BJT-323 | PEM | 619.3 | 619.3 | 38 | 0.01 | - | < 0.01 | - |
| W-BJT-324 | PEM | 619.3 | 619.3 | 181 | 0.08 | - | 0.08 | - |
| | PSS | | | | 0.01 | - | 0.01 | - |
| W-BJT-325 | PEM | 619.6 | 619.6 | 75 | 0.08 | - | 0.05 | - |

| Facility, County, Wetland ID a/ | NWI Classification b/ | Enter MP c/ | Exit MP c/ | Crossing Length (feet) d/ | Total Wetland Acreage Impacted | Total Forested Wetland Acreage Impacted e/ | Total Wetland Acreage Impacted by O&M f/ | Total Forested Wetland Acreage Impacted by O&M |
|---|---|---|---|---|---|---|---|---|
| W-PJR-024 | PEM | 620.0 | 620.0 | 38 | 0.03 | - | 0.01 | - |
| W-JLK-284 | PSS | 620.0 | 620.0 | 104 | 0.13 | - | 0.04 | - |
| W-JLK-283 | PEM | 620.1 | 620.1 | 84 | 0.07 | - | 0.06 | - |
| W-JLK-281 | PEM | 620.6 | 620.6 | 37 | 0.01 | - | 0.01 | - |
| W-JLK-282 | PEM | 620.6 | 620.6 | 55 | < 0.01 | - | < 0.01 | - |
| **Athens to Berne Loop** | | | | | | | | |
| **Noble County, OH** | | | | | | | | |
| W-JLK-293 | PEM | 677.9 | 677.9 | 95 | 0.10 | - | 0.07 | - |
| W-PJR-007 | PEM | 679.0 | 679.0 | 40 | 0.04 | - | 0.02 | - |
| W-PJR-008 | PEM | 679.8 | 679.8 | 17 | 0.01 | - | < 0.01 | - |
| **Monroe County, OH** | | | | | | | | |
| W-JLK-295 | PEM | 681.1 | 681.1 | 60 | 0.03 | - | 0.01 | - |
| W-JLK-296 | PEM | 681.1 | 681.1 | 24 | 0.01 | - | 0.01 | - |
| W-JLK-297 | PEM | 681.1 | 681.1 | 28 | 0.03 | - | 0.02 | - |
| W-JLK-298 | PEM | 681.2 | 681.2 | 46 | 0.02 | - | 0.01 | - |
| W-JLK-299 | PEM | 681.2 | 681.2 | 11 | 0.01 | - | < 0.01 | - |
| W-JLK-300 | PEM | 681.3 | 681.3 | 26 | 0.02 | - | 0.02 | - |
| W-JLK-301 | PEM | 681.3 | 681.3 | 97 | 0.05 | - | 0.05 | - |
| W-JLK-302 | PEM | 681.3 | 681.3 | 41 | 0.05 | - | 0.04 | - |
| W-PJR-014 | PEM | 681.4 | 681.4 | 47 | 0.03 | - | 0.03 | - |
| W-JLK-387 | PEM | 681.8 | 681.8 | 24 | 0.01 | - | < 0.01 | - |
| **Berne to Holbrook Loop** | | | | | | | | |
| **Monroe County, OH** | | | | | | | | |
| W-JLK-350 | PEM | 698.0 | 698.0 | 13 | 0.01 | - | < 0.01 | - |

| Facility, County, Wetland ID a/ | NWI Classification b/ | Enter MP c/ | Exit MP c/ | Crossing Length (feet) d/ | Total Wetland Acreage Impacted | Total Forested Wetland Acreage Impacted e/ | Total Wetland Acreage Impacted by O&M f/ | Total Forested Wetland Acreage Impacted by O&M |
|---|---|---|---|---|---|---|---|---|
| W-JLK-331 | PEM | 698.3 | 698.3 | 54 | 0.07 | - | 0.05 | - |
| W-JLK-336 | PEM | 698.8 | 698.8 | 102 | 0.12 | - | 0.07 | - |
| W-JLK-337 | PSS | 698.8 | 698.8 | 27 | 0.01 | - | - | - |
| W-JLK-335 | PEM | 699.1 | 699.1 | 160 | 0.05 | - | 0.03 | - |
| W-JLK-334 | PEM | 699.2 | 699.2 | 372 | 0.11 | - | 0.04 | - |
| W-JLK-322 | PEM | 699.2 | 699.2 | 10 | < 0.01 | - | - | - |
| W-JLK-321 | PEM | 699.2 | 699.2 | 92 | 0.08 | - | < 0.01 | - |
| W-JLK-333 | PEM | 699.3 | 699.3 | 37 | 0.01 | - | < 0.01 | - |
| W-JLK-326 | PSS | 699.5 | 699.5 | 30 | 0.02 | - | 0.02 | - |
| ***Aboveground Facilities*** | | | | | | | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Pipeline Facilities Subtotal** | | | | **4,390** | **3.33** | **0.12** | **2.27** | **0.09** |
| **Aboveground Facilities Subtotal** | | | | **0** | **0.00** | **0.00** | **0.00** | **0.00** |
| **Projects Totals** | | | | **4,390** | **3.33** | **0.12** | **2.27** | **0.09** |

a/ Facility indicates where a particular wetland is located along Projects mainline or aboveground facility. County indicates which county the wetland is located. Wetland ID indicates the project identifier of each wetland crossing.
b/ NWI Classifications
PEM – Palustrine emergent wetland
PSS – Palustrine scrub-shrub wetland
PFO – Palustrine forested wetland
PUB – Palustrine unconsolidated bottom wetland
c/ Enter MP is the first point at which the construction workspace intersects the wetland. Exit MP is the last point at which the construction workspace intersects the wetland
d/ Crossing length is the greatest distance of the resource crossed parallel to the pipeline.
e/ Total wetland/forested wetland acreage impacted includes impacts associated with all areas within the construction workspace limits, temporary and permanent.
f/ Total wetland/forested wetland acreage impacted by O&M includes impacts associated with vegetation maintenance.

# Appendix F
# Federally and State Listed Species Eliminated from Further Review

# Federal Species Eliminated from Further Review

| Common Name | Scientific Name | Listing State | Federal Status /a | Determination and Comments |
|---|---|---|---|---|
| Wood stork | *Mycteria americana* | Mississippi | T | *No effect.* Typical foraging sites include freshwater marshes, swales, ponds, hardwood and cypress swamps, narrow tidal creeks or shallow tidal pools, and artificial wetlands. Proposed workspaces for the facilities modifications at the Kosciusko and Egypt Compressor stations are limited to areas that are regularly mowed, graveled or paved. There is no habitat for the wood stork within the proposed workspaces and therefore no impacts are anticipated. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Louisiana black bear | *Acipenser oxyrinchus desotoi* | Mississippi | T | *No effect.* Necessary habitat requirements include hard mast, soft mast, escape cover, denning sites, forested corridors, and limited human access. As all work is to be conducted within the existing compressor station, no destruction of the bear's habitat will occur and thus no impacts to the bear are anticipated. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Price's potato bean | *Apios priceana* | Mississippi | T | *No effect.* This plant is often found in wooded areas that grade into creek and river bottoms. Proposed workspaces for the facilities modifications at the Kosciusko and Egypt Compressor stations are limited to areas that are regularly mowed, graveled, or paved. No workspace is proposed in wooded areas or near streams. Therefore no impacts are anticipated. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Mitchell's satyr butterfly | *Neonympha mitcjhelli mitchellii* | Mississippi | E | *No effect.* This butterfly is restricted to wetlands where low nutrient systems receive carbonate-rich ground water from seeps and springs. Proposed workspaces for the facilities modifications at the Kosciusko and Egypt Compressor stations are limited to areas that are regularly mowed, graveled, or paved, and no wetlands will be impacted during construction. Therefore no impacts are anticipated. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Southern combshell | *Epioblasma penita* | Mississippi | E | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |

| Common Name | Scientific Name | Listing State | Federal Status /a | Determination and Comments |
|---|---|---|---|---|
| Orange-nacre mucket | *Lampsilis perovalis* | Mississippi | T | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Alabama moccasinshell | *Medionidus acutissimus* | Mississippi | T | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| black clubshell | *Pleurobema curtum* | Mississippi | E | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Southern clubshell | *Pleurobema decisum* | Mississippi | E | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Ovate clubshell | *Pleurobema perovatum* | Mississippi | E | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Heavy pigtoe | *Pleurobema taitianum* | Mississippi | E | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |
| Inflated heelsplitter | *Potamilus inflatus* | Mississippi | T | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 1, 2016 letter from the USFWS Mississippi Field Office stated that there would be no effect on this species, and that no further consultation was required. |

| Common Name | Scientific Name | Listing State | Federal Status /a | Determination and Comments |
|---|---|---|---|---|
| Snuffbox mussel[b] | *Epioblasma triquetra* | Kentucky | E | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 29, 2015 letter from the USFWS Louisville Field Office stated that the proposed project would be unlikely to affect listed species. |
| Sheepnose mussel[b] | *Plethobasus cyphyus* | Kentucky | E | *No effect.* Freshwater mussels generally require clean, swiftly moving waters with pools and riffles. As no in-water work is proposed, no direct impacts on mussel species would occur. An April 29, 2015 letter from the USFWS Louisville Field Office stated that the proposed project would be unlikely to affect listed species. |
| | | Ohio | | *No effect*. based on proposed construction work (no in-water activities) and implementation of FERC Plan and Procedures. A November 3, 2015 technical assistance letter from the Ohio Field Office advised that adverse effects on any federal species were not anticipated. Mussel surveys were conducted on September 3, 2015 at two streams by an OH-listed mussel surveyor in accordance with the 2015 Survey Protocol. No federally listed mussel species were encountered at either location. |
| Fanshell mussel | *Cyprogenia stegaria* | Ohio | E | *No effect*, based on proposed construction work (no in-water activities) and implementation of FERC Plan and Procedures. A November 3, 2015 technical assistance letter from the Ohio Field Office advised that adverse effects on any federal species were not anticipated. Mussel surveys were conducted on September 3, 2015 at two streams by an OH-listed mussel surveyor in accordance with the 2015 Survey Protocol. No federally listed mussel species were encountered at either location. |
| Pink mucket mussel | *Lampsilis orbiculata* | Ohio | E | *No effect*, based on proposed construction work (no in-water activities) and implementation of FERC Plan and Procedures. A November 3, 2015 technical assistance letter from the Ohio Field Office advised that adverse effects on any federal species were not anticipated. Mussel surveys were conducted on September 3, 2015 at two stream crossings by an OH-listed mussel surveyor in accordance with the 2015 Survey Protocol. No federally listed mussel species were encountered at either location. |
| Grey bat[b] | *Myotis grisecens* | Kentucky | E | *No effect.* No habitat for the grey bat would be affected at the compressor stations in Kentucky. An April 29, 2015 letter from the USFWS Louisville Field Office stated that the proposed project would be unlikely to affect listed species. |

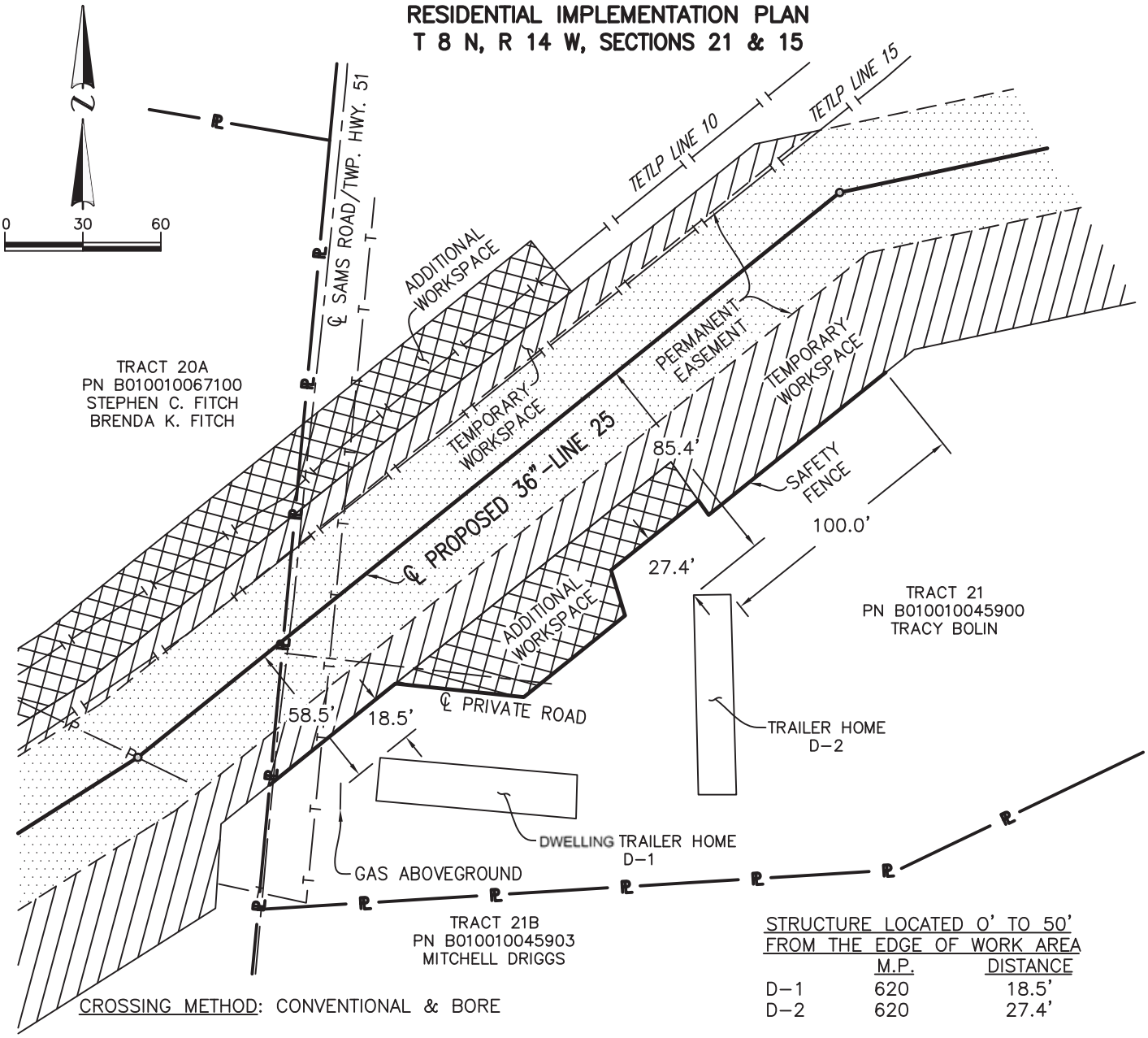
| Common Name | Scientific Name | Listing State | Federal Status /a | Determination and Comments |
|---|---|---|---|---|
| a/ E: endangered T: threatened<br>b/ Species listed by the KYFWDR for Kentucky, but not listed by USFWS in Kentucky | | | | |

## State Species Eliminated from Further Review

| Scientific Name | Common Name | State Status | Notes |
|---|---|---|---|
| *Arabis hirsuta* | Western Hairy Rockcress | Threatened (TN) | Clearance received April 14, 2015. Based on the lack of suitable habitat, no impacts on rare, threatened, or endangered species are anticipated. |
| *Astragalus tennesseenis* | Tennessee Milk-vetch | Special Concern (TN) | |
| *Chondestes grammacus* | Lark Sparrow | Threatened (TN) | |
| *Dalea candida* | White Prairie-clover | Threatened (TN) | |
| *Dalea foliosa* | Leafy Prairie-clover | Endangered (TN) | |
| *Echinacea tennesseenis* | Tennessee Coneflower | Threatened (TN) | |
| *Evolvulus nuttanllianus* | Evolvulus | Threatened (TN) | |
| *Helianthus occidentalis* | Naked-stem Sunflower | Special Concern (TN) | |
| *Neotoma magister* | Allegheny Woodrat | Deemed in need of management (TN) | |
| *Panax quinquefolius* | American Ginseng | Special Concern-Commercially Exploited (TN) | |
| *Phemeranthus calcaricus* | Limestone Fame-flower | Special Concern (TN) | |
| *Phlox pilosa ssp ozarkana* | Ozark Downy Phlox | Special Concern (TN) | |
| *Schoenolirion croceum* | Yellow Sunnybell | Threatened (TN) | |
| *Scleria verticillata* | Low Nutrush | Special Concern (TN) | |
| *Sporobolus heterolepsis* | Northern Dropseed | Threatened (TN) | |
| *Typhlichthys subterraneus* | Southern Cavefish | Deemed in need of Management (TN) | |
| *Zanthoxylum americanum* | Northern Prickly-ash | Special Concern (TN) | |
| *Lilium superbum* | Turk's-cap Lily | Species of Concern (MS) | Clearance received November 11, 2015. No threat to listed species or their habitats. |
| *Chelone glabra* | White Turtlehead | Species of Concern (MS) | |

# Appendix G
# Residential Construction Plans

# RESIDENTIAL IMPLEMENTATION PLAN
## T 8 N, R 14 W, SECTIONS 21 & 15




CROSSING METHOD: CONVENTIONAL & BORE

STRUCTURE LOCATED 0' TO 50' FROM THE EDGE OF WORK AREA

| | M.P. | DISTANCE |
|---|---|---|
| D-1 | 620 | 18.5' |
| D-2 | 620 | 27.4' |

NOTES:
1. TRUE ORIENTATION OF STRUCTURE TO THE CENTERLINE OF THE PROPOSED PIPELINE MAY DIFFER FROM THAT SHOWN.
2. ADDITIONAL CONSTRUCTION LIMITATIONS/INSTRUCTIONS FOR THIS TRACT MAY BE DEFINED UNDER SPECIAL CONSTRUCTION PROVISIONS OF THE RIGHT-OF-WAY LINE LIST.
3. FOR ADDITIONAL CONSTRUCTION PROCEDURES, SEE RESIDENTIAL/STRUCTURAL IMPLEMENTATION PLAN NOTES.

## SITE SPECIFIC RESIDENTIAL/STRUCTURAL CONSTRUCTION TECHNIQUES

PREFERRED TECHNIQUE
1. ELIMINATE TEMPORARY WORK SPACE ON NORTH SIDE OF CONSTRUCTION WORK AREA FOR A MINIMUM DISTANCE OF 20 FEET BEYOND NEAREST POINT OF STRUCTURE.
2. INSTALL AND MAINTAIN SAFETY FENCE ALONG EDGE OF THE TEMPORARY WORK SPACE AREA, SAFETY FENCE TO EXTEND AT LEAST 100 FEET BEYOND THE EXTREMES OF THE STRUCTURES. SAFETY FENCE IS TO BE INSTALLED BEFORE EQUIPMENT IS USED IN THE RIGHT OF WAY AND IS TO BE REMOVED ONLY AFTER CONSTRUCTION AND RESTORATION IS COMPLETE.

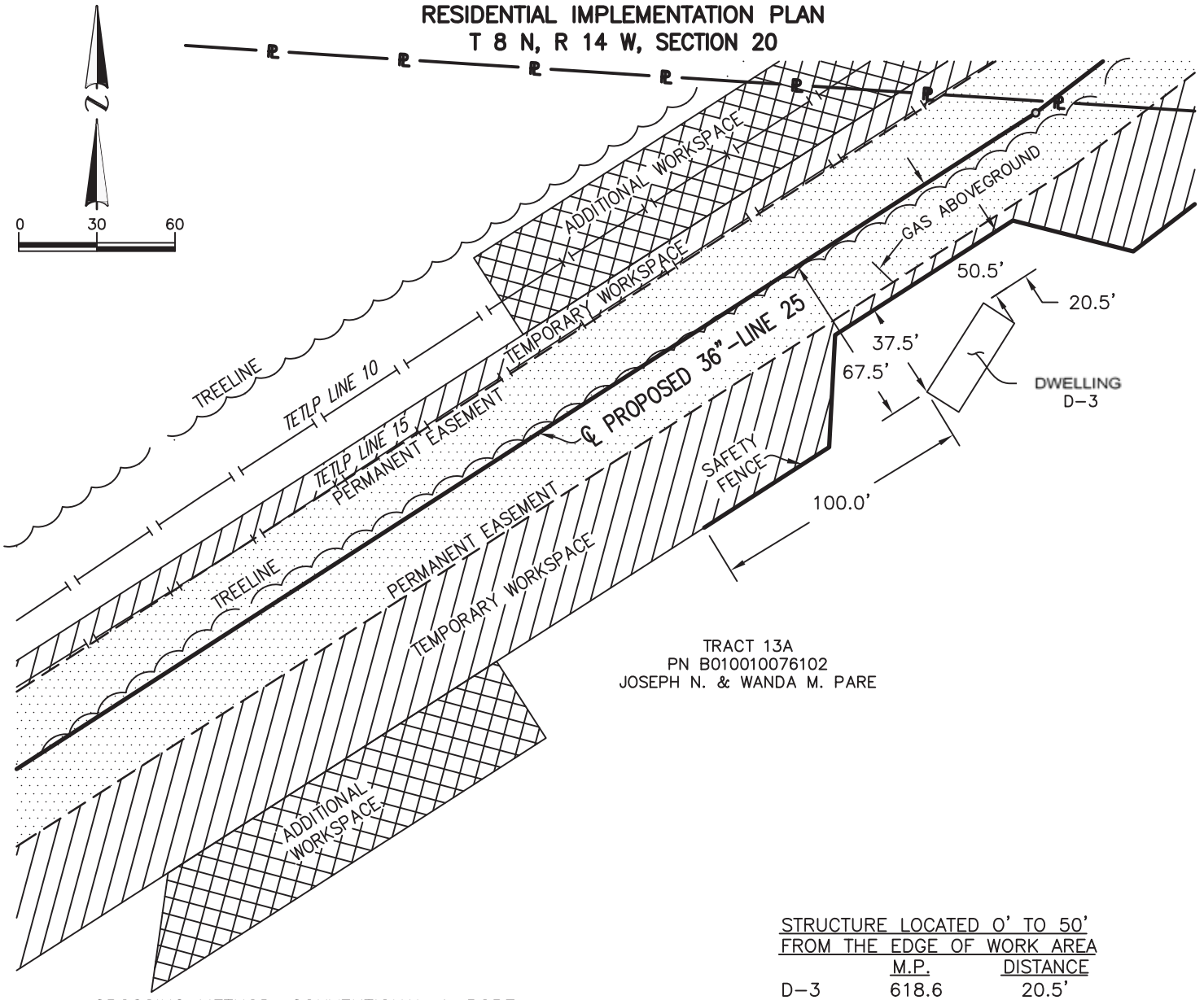
| NO. | REVISION | DATE | APPR. |
|---|---|---|---|
| A | ISSUED FOR REVIEW | 03/28/15 | AB |

ACCESS SOUTH/ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECT

RESIDENTIAL IMPLEMENTATION PLAN
0' TO 50' OF WORK AREA
ATHENS COUNTY, OHIO

| SCALE | DATE | DRAWN | CHECKED | APPROVED | PROJ. NO. | DRAWING NUMBER | SHEET |
|---|---|---|---|---|---|---|---|
| 1"=60' | 08/27/15 | MN | MDR | AB | 22379 | 22379-510-SSP-19002 | 1 OF 1 |

# RESIDENTIAL IMPLEMENTATION PLAN
## T 8 N, R 14 W, SECTION 20




TRACT 13A
PN B010010076102
JOSEPH N. & WANDA M. PARE

| STRUCTURE LOCATED 0' TO 50' FROM THE EDGE OF WORK AREA | | |
|---|---|---|
| | M.P. | DISTANCE |
| D-3 | 618.6 | 20.5' |

CROSSING METHOD: CONVENTIONAL & BORE

NOTES:
1. TRUE ORIENTATION OF STRUCTURE TO THE CENTERLINE OF THE PROPOSED PIPELINE MAY DIFFER FROM THAT SHOWN.
2. ADDITIONAL CONSTRUCTION LIMITATIONS/INSTRUCTIONS FOR THIS TRACT MAY BE DEFINED UNDER SPECIAL CONSTRUCTION PROVISIONS OF THE RIGHT-OF-WAY LINE LIST.
3. FOR ADDITIONAL CONSTRUCTION PROCEDURES, SEE RESIDENTIAL/STRUCTURAL IMPLEMENTATION PLAN NOTES.

## SITE SPECIFIC RESIDENTIAL/STRUCTURAL CONSTRUCTION TECHNIQUES

PREFERRED TECHNIQUE
1. ELIMINATE TEMPORARY WORK SPACE ON NORTH SIDE OF CONSTRUCTION WORK AREA FOR A MINIMUM DISTANCE OF 20 FEET BEYOND NEAREST POINT OF STRUCTURE.
2. INSTALL AND MAINTAIN SAFETY FENCE ALONG EDGE OF THE TEMPORARY WORK SPACE AREA, SAFETY FENCE TO EXTEND AT LEAST 100 FEET BEYOND THE EXTREMES OF THE STRUCTURES. SAFETY FENCE IS TO BE INSTALLED BEFORE EQUIPMENT IS USED IN THE RIGHT OF WAY AND IS TO BE REMOVED ONLY AFTER CONSTRUCTION AND RESTORATION IS COMPLETE.

| NO. | REVISION | DATE | APPR. |
|---|---|---|---|
| A | ISSUED FOR REVIEW | 09/30/15 | AB |

ACCESS SOUTH/ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECT

RESIDENTIAL IMPLEMENTATION PLAN
0' TO 50' OF WORK AREA
ATHENS COUNTY, OHIO

| SCALE | DATE | DRAWN | CHECKED | APPROVED | PROJ. NO. | DRAWING NUMBER | SHEET |
|---|---|---|---|---|---|---|---|
| 1"=60' | 09/30/15 | MN | MDR | AB | 22379 | 22379-510-SSP-19004 | 1 OF 1 |

# RESIDENTIAL/STRUCTURAL IMPLEMENTATION PLAN NOTES

## GENERAL NOTES

1. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS WITHIN 50 FEET OF THE CONSTRUCTION WORK AREA (CWA).
   - A. CONSTRUCTION LIMITS OF THE DISTURBANCE SHALL BE REDUCED AS SHOWN ON THE CONSTRUCTION DRAWINGS.
   - B. SAFETY FENCE SHALL BE INSTALLED AT THE EDGE OF THE CONSTRUCTION WORK AREA ADJACENT TO THE RESIDENCE FOR A MINIMUM DISTANCE OF 100 FEET ON EITHER SIDE.
   - C. CONSTRUCTION ACTIVITIES ARE TO PRIMARILY TAKE PLACE DURING DAYLIGHT HOURS EXCEPT FOR AREAS WHERE DIRECTIONAL DRILLING AND WELL POINT ACTIVITIES ARE TAKING PLACE.
   - D. TOP SOIL SHALL BE SEGREGATED WHERE APPROPRIATE OR AS NEGOTIATED WITH THE LANDOWNER.
   - E. CLEANUP AND BACKFILL SHALL TAKE PLACE AS SOON AS THE PIPELINE IS INSTALLED.
   - F. LAWNS AND LANDSCAPING SHALL BE RESTORED AND REPLACED TO PRECONSTRUCTION CONDITIONS AND FENCES AND OTHER STRUCTURES SHALL BE REPAIRED WITHIN THE CONSTRUCTION AREA OR AS NEGOTIATED WITH THE LANDOWNER. THIS WORK SHALL BE COMPLETE WITHIN A REASONABLE TIME AFTER THE TRENCH IS BACKFILLED AND CLEANED UP.
   - G. ALL TRASH AND DEBRIS SHALL BE CLEANED UP DAILY FROM THE CONSTRUCTION SITE.
   - H. CONSTRUCTION BY STOVEPIPE METHOD OR DRAG SECTION TECHNIQUES IS TO BE USED WHERE FEASIBLE AND APPROPRIATE.
   - I. TRAFFIC FLOW AND EMERGENCY VEHICLE ACCESS SHALL BE MAINTAINED ON RESIDENTIAL ROADWAYS. TRAFFIC CONTROL PERSONNEL AND/OR DETAIL SIGNS SHALL BE USED WHERE REQUIRED OR APPROPRIATE.
   - J. LANDOWNER ACCESSIBILITY TO THEIR RESIDENCE SHALL BE MAINTAINED AT ALL TIMES DURING DRIVEWAY OR ROAD CROSSING WORK (UTILIZING A STEEL PLATE OVER THE DITCH OR PROVIDING A "GO AROUND") FOR ONE LANE ACCESS.
   - K. ANY BORE PITS OR SECTIONS OF TRENCH LEFT OPEN AT THE END OF THE WORKDAYS SHALL BE FENCED, COVERED WITH STEEL PLATE OR TIMBER MATS WITHIN 20 FEET OF INHABITED STRUCTURES.
   - L. NEAR RESIDENCE ROAD SURFACES ARE TO BE INSPECTED PERIODICALLY AND, IF NECESSARY, HARD TOP SURFACES SHALL BE CLEANED AND EXPOSED SOIL WETTED FOR DUST CONTROL.
   - M. LAND OWNERS SHALL BE NOTIFIED PRIOR TO CONSTRUCTION ON HIS/HER PROPERTY.
   - N. NO REFUELING OR STORAGE OF HAZARDOUS MATERIALS WITHIN 200 FEET OF A PRIVATE WELL.

2. CONTRACTOR SHALL COMPLY WITH THE ABOVE REQUIREMENTS AND THE FOLLOWING REQUIREMENTS FOR RESIDENCE WITHIN 25 FEET OF THE CONSTRUCTION WORK AREA.
   - A. THE CONTRACTOR SHALL COMPLY WITH THE WORKSPACE LIMITATIONS AND THE CONSTRUCTION TECHNIQUES SHOWN ON THE RESIDENTIAL SITE-SPECIFIC DRAWINGS.
   - B. THE CONTRACTOR SHALL NOT OPEN THE TRENCH UNTIL THE PIPE IS READY FOR INSTALLATION AND SHALL BACKFILL THE TRENCH IMMEDIATELY AFTER INSTALLATION IS COMPLETE.
   - C. CONSTRUCTION WORKSPACE SHALL BE MINIMIZED SUCH THAT A MINIMUM OF 10 FEET WILL BE MAINTAINED BETWEEN EACH STRUCTURE AND THE CONSTRUCTION WORKSPACE DURING CONSTRUCTION ACTIVITIES.

## CONVENTIONAL CONSTRUCTION METHOD NOTES

1. CONSTRUCTION SHALL TAKE PLACE IN DAYLIGHT HOURS UNLESS THERE ARE OTHER CONSTRUCTION ACTIVITIES NOT RELATED TO RESIDENTIAL CONSTRUCTION TAKING PLACE THAT REQUIRE LONGER HOURS OF CONTINUOUS WORK.
2. CONSTRUCTION WORK AREA (CWA) SHALL NOT EXTEND TO A DISTANCE LESS THAN 10' FROM INHABITED STRUCTURE.
3. SAFETY FENCE SHALL BE INSTALLED AND MAINTAINED ALONG THE CWA BOUNDARY AND SHALL EXTEND AT LEAST 100' BEYOND THE EXTREMES OF THE INHABITED STRUCTURE(S).

## STOVE PIPE CONSTRUCTION METHOD NOTES

1. CONSTRUCTION SHALL TAKE PLACE IN DAYLIGHT HOURS UNLESS THERE ARE OTHER CONSTRUCTION ACTIVITIES NOT RELATED TO RESIDENTIAL CONSTRUCTION TAKING PLACE THAT REQUIRE LONGER HOURS OF CONTINUOUS WORK.
2. CONSTRUCTION WORK AREA (CWA) SHALL NOT EXTEND TO A DISTANCE LESS THAN 10' FROM INHABITED STRUCTURE.
3. SAFETY FENCE SHALL BE INSTALLED AND MAINTAINED ALONG THE CWA BOUNDARY AND SHALL EXTEND AT LEAST 100' BEYOND THE EXTREMES OF THE INHABITED STRUCTURE(S).

## DRAG SECTION CONSTRUCTION METHOD NOTES

1. CONSTRUCTION SHALL TAKE PLACE IN DAYLIGHT HOURS UNLESS THERE ARE OTHER CONSTRUCTION ACTIVITIES NOT RELATED TO RESIDENTIAL CONSTRUCTION TAKING PLACE THAT REQUIRE LONGER HOURS OF CONTINUOUS WORK.
2. CONSTRUCTION WORK AREA (CWA) SHALL NOT EXTEND TO A DISTANCE LESS THAN 10' FROM INHABITED STRUCTURE.
3. SAFETY FENCE SHALL BE INSTALLED AND MAINTAINED ALONG THE CWA BOUNDARY AND SHALL EXTEND AT LEAST 100' BEYOND THE EXTREMES OF THE INHABITED STRUCTURE(S).

## BORE CONSTRUCTION METHOD NOTES

1. CONSTRUCTION SHALL TAKE PLACE IN DAYLIGHT HOURS UNLESS THERE ARE OTHER CONSTRUCTION ACTIVITIES NOT RELATED TO RESIDENTIAL CONSTRUCTION TAKING PLACE THAT REQUIRE LONGER HOURS OF CONTINUOUS WORK.

## HORIZONTAL DIRECTIONAL DRILL CONSTRUCTION METHOD NOTES

1. MOST CONSTRUCTION SHALL TAKE PLACE DURING DAYLIGHT HOURS. SOME HDD ACTIVITIES MAY RUN 24 HOURS.

## PENDING REROUTES

1. STRUCTURES THAT HAVE PENDING REROUTES, WILL NOT SHOW BUFFERS 10' AROUND (CWA) FROM STRUCTURES.

| NO. | REVISION | DATE | APPR. |
|---|---|---|---|
| A | ISSUED FOR REVIEW | 09/30/15 | AB |

| SCALE | DATE | DRAWN | CHECKED | APPROVED | PROJ. NO. | DRAWING NUMBER | SHEET |
|---|---|---|---|---|---|---|---|
| 1"=100' | 09/30/15 | MN | MDR | AB | 22379 | 22379-510-SSP-19003 | 1 OF 1 |

ACCESS SOUTH/ADAIR SOUTHWEST/ LEBANON EXTENSION PROJECT

RESIDENTIAL/STRUCTURAL IMPLEMENTATION PLAN NOTES

Document Content(s)