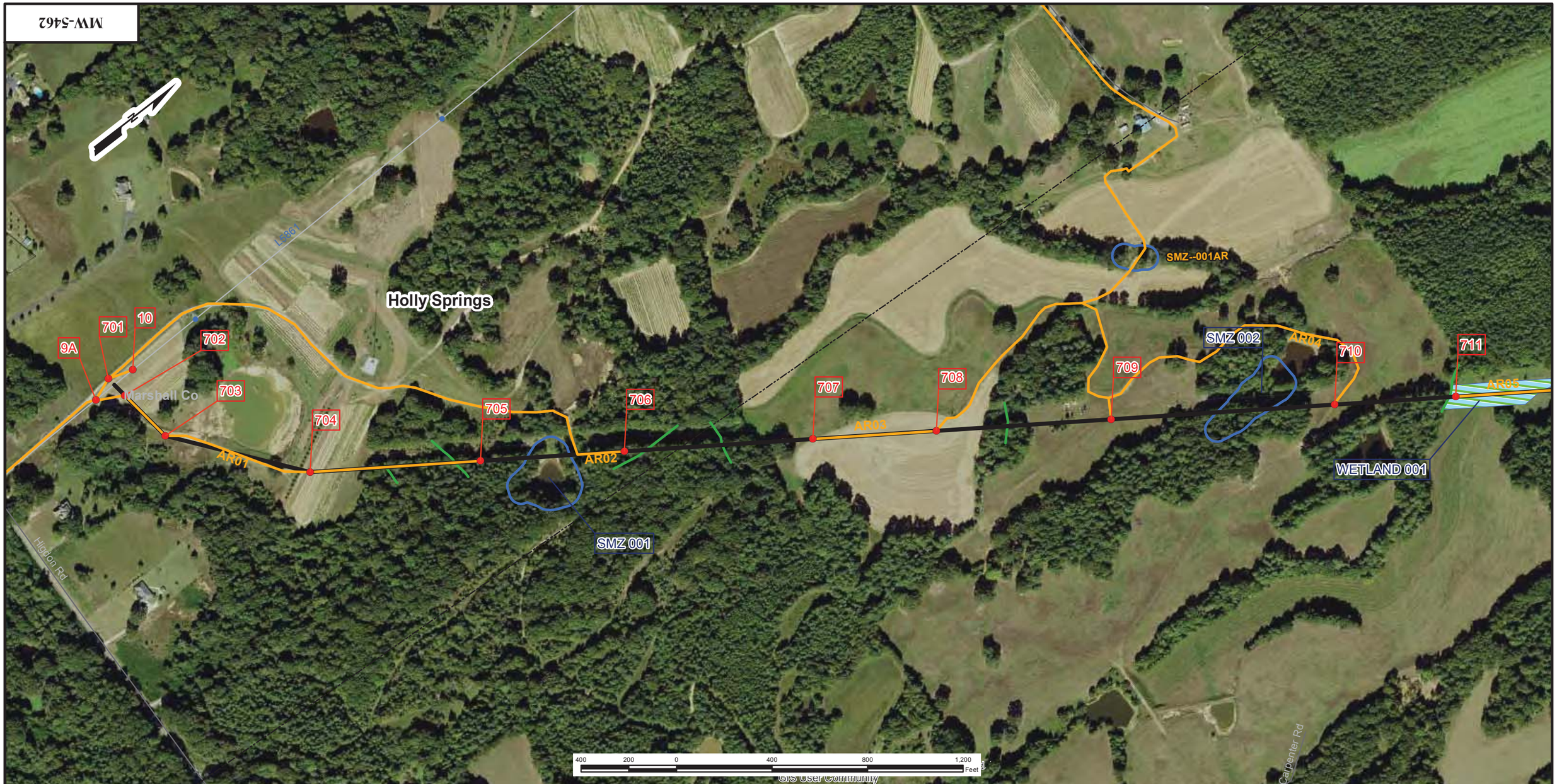
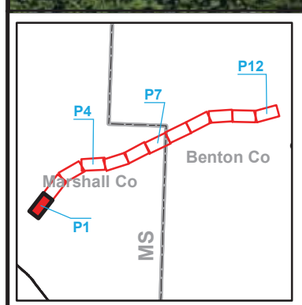
MW-5462





Legend

- Work Structures
- Work Line
- Access Roads
- Substations
- Structures on other lines
- Other TVA lines
- Ephemeral Streams
- ARCHAEOLOGY
- BOTANY
- SMZ
- TERRESTRIAL ZOOLOGY
- WETLAND
- HSNF

REV	WORK ORDER	COMMENTS	DATE	DRWN	SUPV
1	315DT	Added access roads	02/17/2016	MBD	DPS
0	315DT		01/04/2016	MBD	DPS

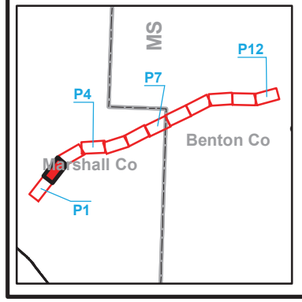
TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P1 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462

WETLAND 001
712
713
SMZ 003
SMZ 004
715
716
717
TERRESTRIAL ZOOLOGY 009
SMZ 006
719
720
721
SMZ 007
722
AR05
AR06
AR07
AR08
Marshall Co
714
TERRESTRIAL ZOOLOGY 001
TERRESTRIAL ZOOLOGY 002
SMZ 005
718
WETLAND 002
Old Hwy 4e
400 200 0 400 800 1,200 Feet
GIS User Community



Legend

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TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P2 OF P12 SHEETS
4/4/16			
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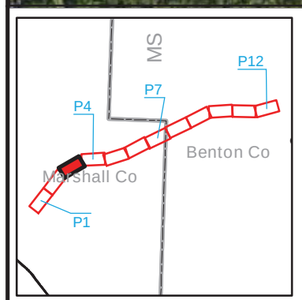
MW-5462



Legend

- Work Structures
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TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P3 OF P12 SHEETS
4/4/16			
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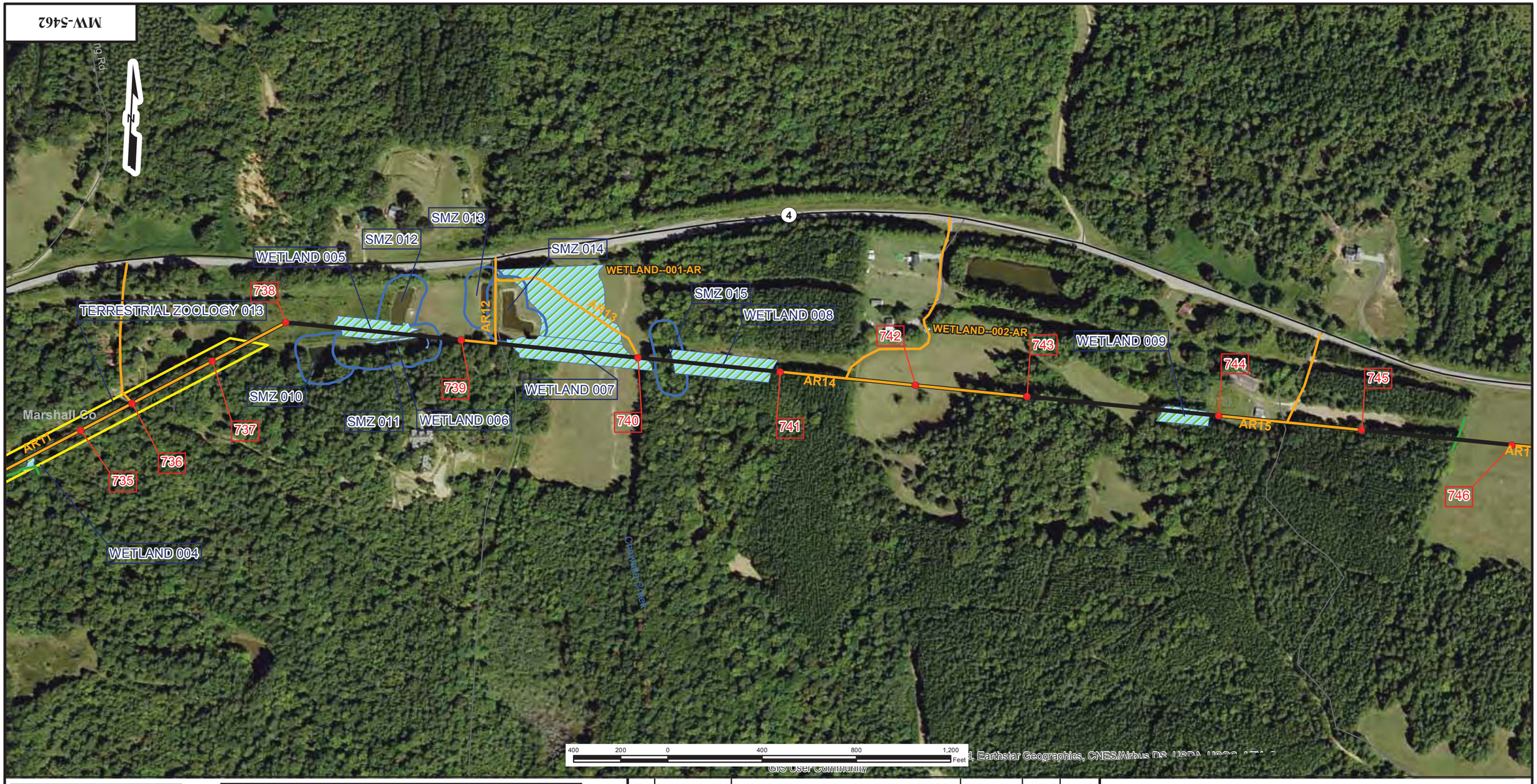
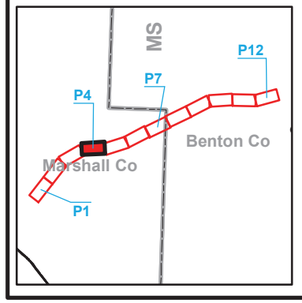
MW-5462





Legend

- Work Structures
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- Other TVA lines
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REV	WORK ORDER	COMMENTS	DATE	DRWN	SUPV
1	315DT	Added access roads	02/17/2016	MBD	DPS
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TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P4 OF P12 SHEETS
4/4/16			
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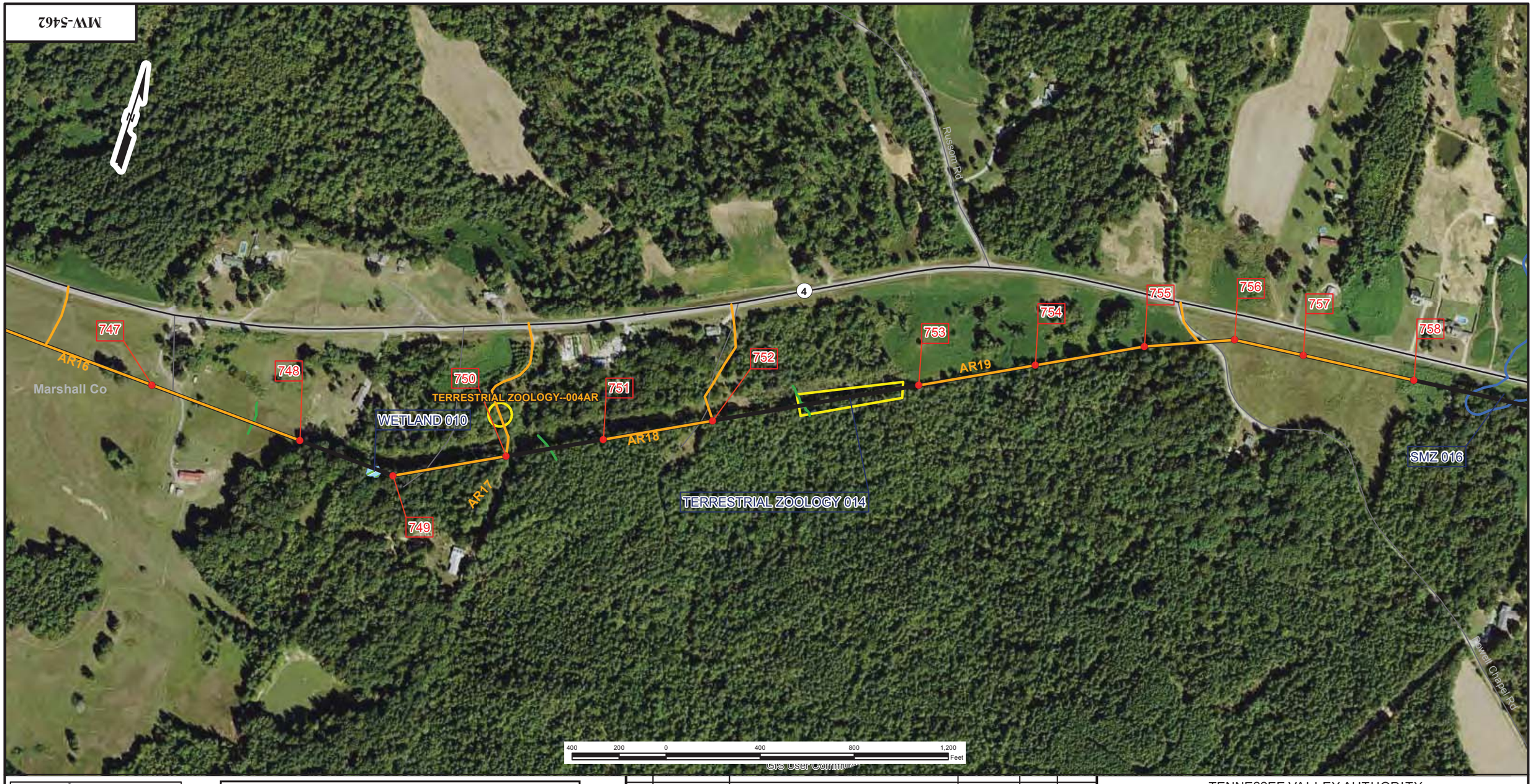
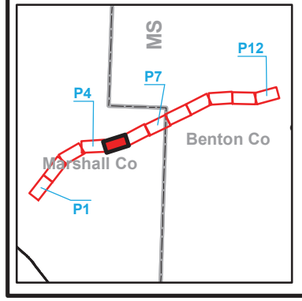
MW-5462





Legend

- Work Structures
- Work Line
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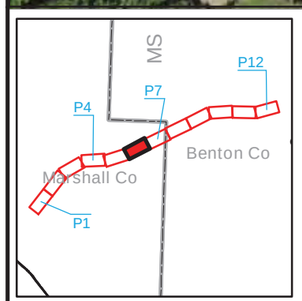
1	315DT	Added access roads	02/17/2016	MBD	DPS
0	315DT		01/04/2016	MBD	DPS

TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P5 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462



Legend

- Work Structures
- Work Line
- Access Roads
- Substations
- Structures on other lines
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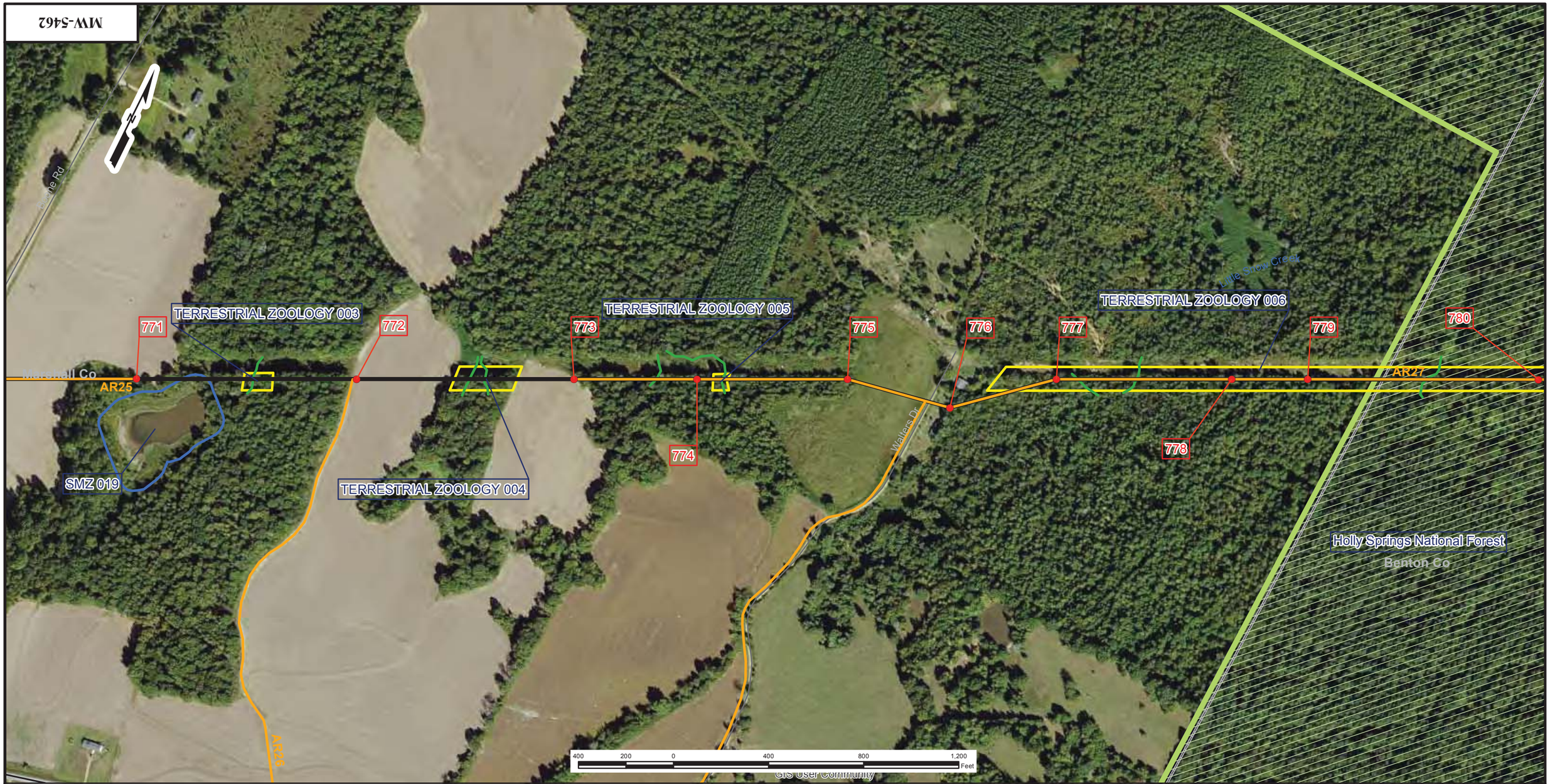
REV	WORK ORDER	COMMENTS	DATE	DRWN	SUPV
1	315DT	Added access roads	02/17/2016	MBD	DPS
0	315DT		01/04/2016	MBD	DPS

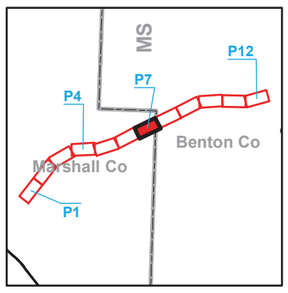
TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P6 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462





Legend

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0	315DT		01/04/2016	MBD	DPS

TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P7 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462

Holly Springs National Forest

TERRESTRIAL ZOOLOGY 006

WETLAND 011

TERRESTRIAL ZOOLOGY 008

WETLAND 012

781 782 783 784 785 786 787 788 789

Benton Co

AR27

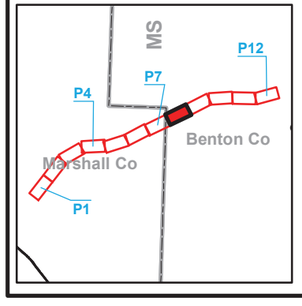
Holly Springs National Forest

Little Snow Creek

Hoover Rd

400 200 0 400 800 1,200 Feet

GIS User Community



Legend

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- Substations
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1	315DT	Added access roads	02/17/2016	MBD	DPS
0	315DT		01/04/2016	MBD	DPS

TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P8 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462

790 791 792 793 794 795 796 797

SMZ 020

AR27 AR28 AR29 AR30 AR31

Benton Co

TERRESTRIAL ZOOLOGY 008

WETLAND 013

Holly Springs National Forest

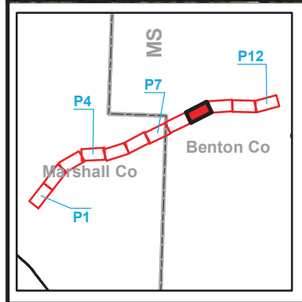
Hoover Rd

Lamar Rd

Bonds Loop

400 200 0 400 800 1,200 Feet

GIS User Community



Legend

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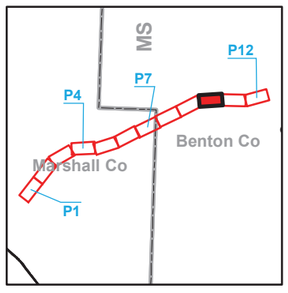
TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P9 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462



Legend

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TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P10 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462

809 810 811 812 813 814 815 816 817

AR36 AR37 AR38

Benton Co

SMZ 021 WETLAND 014 WETLAND 015

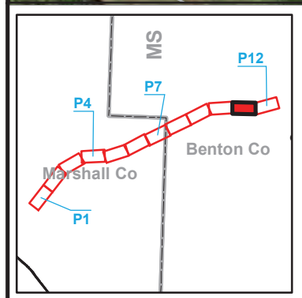
ARCHAEOLOGY 002 ARCHAEOLOGY 003 BOTANY 002

Lamar Rd Lamar Rd China Bend Ln Pine Dr Bobby Joe Rd

L6126

400 200 0 400 800 1,200 Feet

Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Legend

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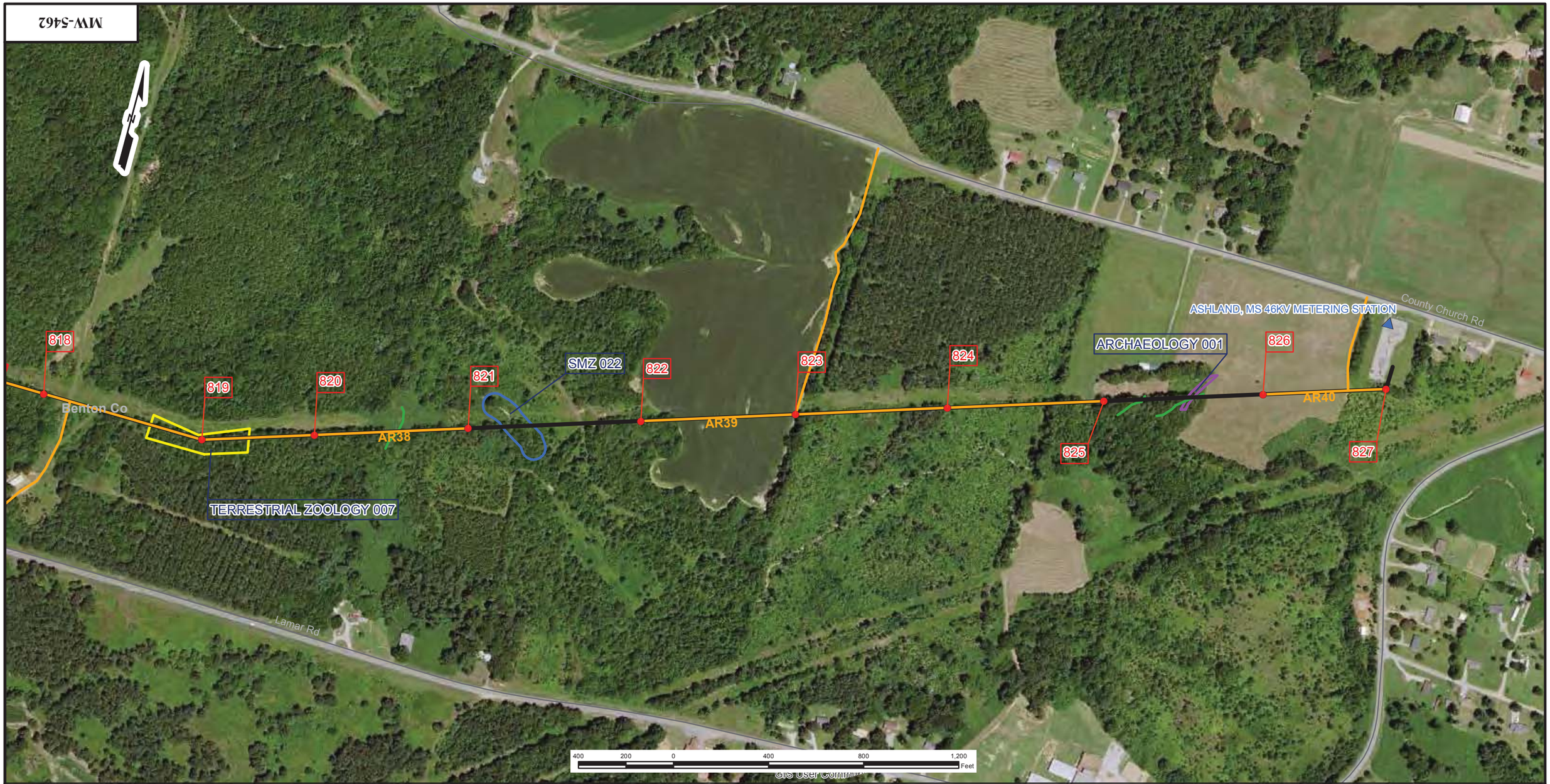
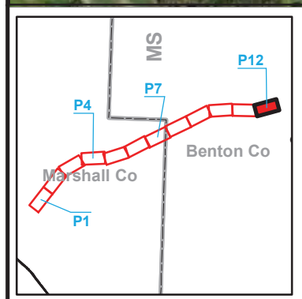
TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P11 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

MW-5462





Legend

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TENNESSEE VALLEY AUTHORITY

CORDOVA - HOLLY SPRINGS TAP TO ASHLAND, MS SUBSTATION 161kV TRANSMISSION LINE ENVIRONMENTAL MAP

DATE	SUBMITTED	APPROVED	SHEET P12 OF P12 SHEETS
4/4/16			
SCALE 1" = 400'	CLASS.CODE ENV MAP	405784	MW-5462 R 1

Ashland 161-kV TL
Project Number 405784
Environmental Commitments

Streamside Management Zone (SMZ) Category A Protection
Areas identified as **SMZ, Category A**, use SMZ, Category A, Standard Stream Protection as defined in Table 9 of "A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities" and TVA Environmental Quality Specifications for Transmission Line Construction during clearing, construction, and maintenance activities.

Ephemeral Stream (WWC)
Locations identified as **Ephemeral Stream (WWC)**, use **Best Management Practices** as defined in Chapter VI of "A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities" during clearing, construction, and maintenance activities.

Wetlands
Implement Best Management Practices for wetlands as defined in "A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities".

Archaeology
Any clearing required will be done by hand or using a feller buncher. Construction access will be conducted when the ground is dry, or using low ground pressure equipment, or wetland mats.

Terrestrial Zoology
Areas contain suitable habitat for Indiana and Northern long-eared bats. Clearing in these areas would occur between October 1 and April 14.

Botany 001
State-listed plant Canadian licorice-root. Contact TVA botanist 865-632-2403 before clearing and construction to coordinate avoidance measures and access.

Botany 002
State-listed plant whorled mountain mint. Contact TVA botanist 865-632-2403 before clearing and construction to coordinate avoidance measures and access.

Natural Areas
Holly Springs National Forest
Contact Buddy Lowrey, blowrey@fs.fed.us, 662-236-6550 ext. 227 and Jim Schiller, jschiller@fs.fed.us, 662-285-3264 ext. 815 prior to work in this area.

Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Line Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor shall plan, coordinate, and conduct operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting. This specification contains provisions that shall be considered in all TVA and contract construction operations. If the contractor fails to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all structure and conductor pulling sites, protective measures to prevent erosion will be taken immediately upon the end of each step in a construction sequence, and those protective measures will be inspected and maintained throughout the construction and right-of-way rehabilitation period.

2. Regulations - TVA and/or the assigned contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.

3. Use Areas - TVA and/or the assigned contractor's use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).

4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission line. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements.

   No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground due to size and function.) Some disking of the right-of-way may occur for proper seedbed preparation.

   Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the structure sites except around foundation holes; the water must be directed away from the site in as dispersed a manner as possible. At tower or

structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any structure.

5. Sanitation - A designated TVA or contractor representative shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

6. Refuse Disposal - Designated TVA and/or contractor personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his operations and by his employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as waste. Contractors must meet similar provisions on any project contracted by TVA.

7. Landscape Preservation - TVA and its contractors shall exercise care to preserve the natural landscape in the entire construction area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.

8. Sensitive Areas Preservation - Certain areas on site and along the right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, water supply watersheds, and public recreational areas such as parks and monuments. Contractors and TVA construction crews shall take all necessary actions to avoid adverse impacts to these sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing or construction operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's right-of-way inspector or construction superintendent and Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants,

debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain best management practices (BMPs) such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the right-of-way, on a construction site, or on access roads.

10. Turbidity and Blocking of Streams - Construction activities in or near SMZs or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. All conditions of a general storm water permit, aquatic resource alteration permit, or a site-specific permit shall be met including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

    Appropriate drainage facilities for temporary construction activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (Muncy, 2012).*

    Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct crossings or to perform required construction under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained.

    Wastewater from construction or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, or pond. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Clearing - No construction activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure sites and conductor setup areas. TVA and the construction contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed that have previously been restabilized after clearing operations. Control measures shall be implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

12. Restoration of Site - All construction disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (Muncy 2012).* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

13. Air Quality Control - Construction crews shall take appropriate actions to minimize the amount of air pollution created by their construction operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.

14. Burning - Before conducting any open burning operations, the contractor shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner.

15. Dust and Mud Control - Construction activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

16. Vehicle Exhaust Emissions - TVA and/or the contractors shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show

excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

17. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way except in designated sensitive areas. The Heavy Equipment Department within TVA or the construction contractor will properly maintain these vehicles with approved spill prevention controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

18. Smoke and Odors - TVA and/or the contractors shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor shall not burn refuse such as trash, rags, tires, plastics, or other debris.

19. Noise Control - TVA and/or the contractor shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.

20. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's *Safety and Health Regulations for Construction*. TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.

21. Damages - The movement of construction crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor will be responsible for erosion damage caused by his actions and especially for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the contract dealing with damages will apply.

References

Muncy, J. A. 2012. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (revised edition). Edited by Abigail Bowen, Jodie Branum, Corey Chandler, Adam Dattilo, Britta Dimick, Shea Gaither, Casey Henley, Todd Liskey, Joe Melton, Cherie Minghini, Paul Pearman, Kenton Smithson, Joe Turk, Emily Willard, Robby

Wilson. Norris: TVA Technical Note TVA/LR/NRM 92/1. Retrieved from <http://www.tva.com/power/projects/bmp_manual_2012.pdf> (n.d.).

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Tennessee Valley Authority Right-of-Way Clearing Specifications

1. General - The clearing contractor shall review the environmental evaluation documents (categorical exclusion checklist, environmental assessment, or environmental impact statement) for the project or proposed activity, along with all clearing and construction appendices, conditions in applicable general and/or site-specific permits, the storm water pollution prevention plan, and any Tennessee Valley Authority (TVA) commitments to property owners. The contractor shall then plan and carry out operations using techniques consistent with good engineering and management practices as outlined in TVA's best management practices (BMPs) manual (Muncy 1992, and revisions thereto). The contractor will protect areas that are to be left unaffected by access or clearing work at and adjacent to all work sites. In sensitive areas and their buffers, the contractor will retain as much native ground cover and other vegetation as possible.

   If the contractor fails to use BMPs or to follow environmental expectations discussed in the prebid or prework meeting or present in contract specifications, TVA will order corrective changes and additional work as deemed necessary in TVA's judgment to meet the intent of environmental laws and regulations or other guidelines. Major violations or continued minor violations will result in work suspension until correction of the situation is achieved or other remedial action is taken at the contractor's expense. Penalty clauses may be invoked as appropriate.

2. Regulations - The clearing contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances including without limitation all air, water, solid and hazardous waste, noise, and nuisance laws, regulations, and ordinances. The contractor shall secure or ensure that TVA has secured all necessary permits or authorizations to conduct work on the acres shown on the drawings and plan and profile for the contract. The contractor's designated project manager will actively seek to prevent, control, monitor, and safely abate all commonly recognized forms of workplace and environmental pollution. Permits or authorizations and any necessary certifications of trained or licensed employees shall be documented with copies submitted to TVA's right-of-way inspector or construction environmental engineer before work begins. The contractor will be responsible for meeting all conditions specified in permits. Permit conditions shall be reviewed in prework discussions.

3. Land and Landscape Preservation - The clearing contractor shall exercise care to preserve the condition of cleared soils by avoiding as much compacting and deep scarring as possible. As soon as possible after initial disturbance of the soil and in accordance with any permit(s) or other state or local environmental regulatory requirements, cover material shall be placed to prevent erosion and sedimentation of water bodies or conveyances to surface water or groundwater. In areas outside the clearing, use, and access areas, the natural vegetation shall be protected from damage. The contractor and his employees must not deviate from delineated access routes or use areas and must enter the site at designated areas that will be marked. Clearing operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the remaining natural vegetation and adjacent surroundings in the vicinity of the work. In sensitive public or environmental areas, appropriate buffer zones shall be observed and the methods of clearing or reclearing modified to protect

the buffer and sensitive area. Some areas may require planting native plants or grasses to meet the criteria of regulatory agencies or commitments to special program interests.

4. Streamside Management Zones - The clearing contractor must leave as many rooted ground cover plants as possible in buffer zones along streams and other bodies of water or wet-weather conveyances thereto. In such streamside management zones (SMZ), tall-growing tree species (trees that would interfere with TVA's National Electrical Safety Code clearances) shall be cut, and the stumps may be treated to prevent resprouting. Low-growing trees identified by TVA as marginal electrical clearance problems may be cut, and then stump treated with growth regulators to allow low, slow-growing canopy development and active root growth. Only approved herbicides shall be used, and herbicide application shall be conducted by certified applicators from TVA's Transmission, Operations, and Maintenance (TOM) organization after initial clearing and construction. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment, such as a feller-buncher. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Disturbed soils in SMZs must be stabilized by appropriate methods immediately after the right-of-way is cleared. Stabilization must occur within the time frame specified in applicable storm water permits or regulations. Stumps within SMZs may be cut close to the ground but must not be removed or uprooted. Trees, limbs, and debris shall be immediately removed from streams, ditches, and wet areas using methods that will minimize dragging or scarring the banks or stream bottom. No debris will be left in the water or watercourse. Equipment will cross streams, ditches, or wet areas only at locations designated by TVA after the application of appropriate erosion control BMPs consistent with permit conditions or regulatory requirements.

5. Wetlands - In forested wetlands, tall trees will be cut near the ground, leaving stumps and roots in place. The cambium may be treated with herbicides applied by certified applicators from the TOM organization to prevent regrowth. Understory trees that must be initially cut and removed may be allowed to grow back or may be treated with tree growth regulators selectively to slow growth and increase the reclearing cycle. The decision will be situationally made based on existing ground cover, wetland type, and tree species since tall tree removal may "release" understory species and allow them to grow quickly to "electrical clearance problem" heights. In many circumstances, herbicides labeled for water and wetland use may be used in reclearing.

6. Sensitive Area Preservation - If prehistoric or historic artifacts or features that might be of archaeological significance are discovered during clearing or reclearing operations, the activity shall immediately cease within a 100-foot radius, and a TVA right-of-way inspector or construction environmental engineer and the Cultural Resources Program manager shall be notified. The site shall be protected and left as found until a determination about the resources, their significance, and site treatment is made by TVA's Cultural Resources Program. Work may continue beyond the finding zone and the 100-foot radius beyond its perimeter.

7. Water Quality Control - The contractor's clearing and disposal activities shall be performed using BMPs that will prevent erosion and entrance of spillage, contaminants, debris, and other pollutants or objectionable materials into drainage

ways, surface water, or groundwater. Special care shall be exercised in refueling equipment to prevent spills. Fueling areas shall be remote from any sinkhole, crevice, stream, or other water body. Open burning debris will be kept away from streams and ditches and shall be incorporated into the soil.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

8. Turbidity and Blocking of Streams - If temporary clearing activities must interrupt natural drainage, appropriate drainage facilities and erosion/sediment controls shall be provided to avoid erosion and siltation of streams and other water bodies or water conveyances. Turbidity levels in receiving waters or at storm water discharge points shall be monitored, documented, and reported if required by the applicable permit. Erosion and sediment control measures such as silt fences, water bars, and sediment traps shall be installed as soon as practicable after initial access, site, or right-of-way disturbance in accordance with applicable permit or regulatory requirements.

   Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct necessary stream crossings under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Any clearing debris that enters streams or other water bodies shall be removed as soon as possible. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained for stream crossings.

9. Air Quality Control - The clearing or reclearing contractor shall take appropriate actions to limit the amount of air emissions created by clearing and disposal operations to well within the limits of clearing or burning permits and/or forestry or local fire department requirements. All operations must be conducted in a manner that prevents nuisance conditions or damage to adjacent land crops, dwellings, highways, or people.

10. Dust and Mud Control - Clearing activities shall be conducted in a manner that minimizes the creation of fugitive dust. This may require limitations as to type of equipment, allowable speeds, and routes utilized. Control measures such as water, gravel, etc., or similar measures may be used subject to TVA approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

11. Burning - The contractor shall obtain applicable permits and approvals to conduct controlled burning. The contractor will comply with all provisions of the permit, notification, or authorization including burning site locations, controlled draft, burning hours, and such other conditions as stipulated. If weather conditions such as wind speed or wind direction change rapidly, the contractor's burning operation may be

temporarily stopped by TVA's field engineer. The debris to be burned shall be kept as clean and dry as possible and stacked and burned in a manner that produces the minimum amount of smoke. Residue from burning will be disposed of according to permit stipulations. No fuel starters or enhancements other than kerosene will be allowed.

12. Smoke and Odors - The contractor will properly store and handle combustible and volatile materials that could create objectionable smoke, odor, or fumes. The contractor shall not burn oil or refuse that includes trash, rags, tires, plastics, or other manufactured debris.

13. Vehicle Exhaust Emissions - The contractor shall maintain and operate equipment in a manner that limits vehicle exhaust emissions. Equipment and vehicles will be kept within the manufacturers' recommended limits and tolerances. Excessive exhaust gases will be eliminated, and inefficient operating procedures will be revised or halted until corrective repairs or adjustments are made.

14. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way, except in designated sensitive areas. The clearing or reclearing contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

15. Noise Control - The contractor shall take steps to avoid the creation of excessive sound levels for employees, the public, or the site and adjacent property owners. Concentration of individual noisy pieces as well as the hours and locations of operation should be considered.

16. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers. The equipment and mufflers shall be maintained at peak operating efficiency.

17. Sanitation - A designated representative of TVA or the clearing contractor shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

18. Refuse Disposal - The clearing or reclearing contractor shall be responsible for daily cleanup and proper labeling, storage, and disposal of all refuse and debris on the site produced by his operations and employees. Facilities that meet applicable regulations

and guidelines for refuse collection will be required. Only approved transport, storage, and disposal areas shall be used.

19. Brush and Timber Disposal (Reclearing) - The reclearing contractor shall place felled tree boles in neat stacks at the edge of the right-of-way, with crossing breaks at least every 100 feet. Property owner requests shall be reviewed with the project manager or right-of-way specialist before accepting them. Lop and drop activities must be specified in the contract and on plan and profile drawings with verification with the right-of-way specialist before conducting such work. When tree trimming and chipping is necessary, disposal of the chips on the easement or other locations on the property must be with the consent of the property owner and the approval of the right-of-way specialist. No trees, branches, or chips shall remain in a surface water body or be placed at a location where washing into a surface water or groundwater source might occur.

20. Brush and Timber Disposal (Initial Clearing) - For initial clearing, trees are commonly part of the contractor's contract to remove as they wish. Trees may be removed from the site for lumber or pulpwood or they may be chipped or stacked and burned. All such activities must be coordinated with the TVA field engineer, and the open burning permits, notifications, and regulatory requirements must be met. Trees may be cut and left in place only in areas specified by TVA and approved by appropriate regulatory agencies. These areas may include sensitive wetlands or SMZs where tree removal would cause excessive ground disturbance or in very rugged terrain where windrowed trees are used as sediment barriers along the edge of the right-of-way.

21. Restoration of Site - All disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (Muncy 2012).* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

References

Muncy, J. A. 2012. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (revised edition). Edited by Abigail Bowen, Jodie Branum, Corey Chandler, Adam Dattilo, Britta Dimick, Shea Gaither, Casey Henley, Todd Liskey, Joe Melton, Cherie Minghini, Paul Pearman, Kenton Smithson, Joe Turk, Emily Willard, Robby Wilson. Norris: TVA Technical Note TVA/LR/NRM 92/1. Retrieved from <http://www.tva.com/power/projects/bmp_manual_2012.pdf> (n.d.).

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Transmission Environmental Protection Procedures
Right-Of-Way Vegetation Management Guidelines

1.0 Overview

A. The Tennessee Valley Authority (TVA) must manage the vegetation on its rights-of-way and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall growing vegetation and other objects. This requirement applies to vegetation within the right-of-way as well as to trees located off the right-of-way.

B. Each year TVA assesses the conditions of the vegetation on and along its rights-of-way. This is accomplished by aerial inspections, periodic field inspections, aerial photography, and information from TVA personnel, property owners and the general public. TVA utilizes this data to evaluate vegetation clearances and identifies vegetation on and off ROW that does, or could potentially pose a risk to reliability.

C. TVA transmission foresters develop a vegetation re-clearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

2.0 Right-of-Way Management Methods

A. TVA takes an integrated vegetation management (IVM) approach that is based on a carefully planned, multidimensional strategy developed in consultation with forestry and habitat experts. Integrated vegetation management aims to improve safety and prevent power outages by creating healthy and self-sustaining ecosystems in ROWs while ensuring compliance with regulatory standards (NERC 2006). These ecosystems foster beneficial, attractive and low-maintenance habitat where tall trees won't grow and other, more benign forms of vegetation can thrive. Integrated vegetation management encourages early successional native habitats that pose less threat to power reliability yet offer safe havens for desirable plants and animals. By combining selective use of herbicides with physical removal, integrated vegetation management can more thoroughly eradicate problem vegetation and allow more compatible species to fill in, making it harder for tall-growing trees to reestablish.

B. TVA uses a variety of herbicides specific to the species present with a variety of possible application techniques. Herbicides are selectively applied from the ground with backpack sprayers or vehicle-mounted sprayers. Any herbicides used are applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the United States Environmental Protection Agency (USEPA) are used.

C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks, and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Health

and Safety Administration. For that reason, TVA utilizes low volume herbicide applications in these areas when feasible.

D. TVA does not encourage tree re-clearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and electrical safety considerations for untrained personnel that might do the work.

E. Mechanical mowers not only cut the tall saplings and seedlings on the right-of-way, they also shatter the stump and the supporting near surface root crown. The tendency of resistant species is to re-sprout from the root crown and shattered stumps can produce a multi-stem dense stand in the immediate area. Repeated use of mowers on short cycle re-clearing with many original stumps re-growing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce re-growth at the rate of 5-10 feet in a year. In years with high rainfall, the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity, little wildlife food or nesting potential, and become a property owner concern. Selective herbicide application may be used to control monoculture stands.

3.0 Herbicide Program

A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS) personnel to explore options for vegetation control. The results have been strong recommendations to use species-specific, low volume herbicide applications in more situations. Research, demonstrations, and other right-of-way programs show a definite improvement of rights-of-way treated with selective low-volume applications of new herbicides using a variety of application techniques and timing. Table 1 below identifies herbicides currently used on TVA rights-of-way. Table 2 identifies pre-emergent herbicides currently being used on bare ground areas on TVA rights-of-way and in substations. Table 3 identifies TGRs that may be used on tall trees that have special circumstances that require trimming on a regular cycle, e.g., restrictions on complete removal. The rates of application utilized are those listed on the U.S. Environmental Protection Agency (USEPA) approved label and consistent with utility standard practice throughout the Southeast.

Table 1 - Herbicides Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredient	Label Signal Word
Accord/Accord XRT II	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Chopper	Imazapyr/RTU	Caution
Clearstand	Imazapyr/Metsulfuron Methyl/Liquid	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Habitat	Imazapyr/Liquid	Caution
Krenite S	Fosamine Ammoinium	Caution
Milestone VM	Aminopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Rodeo	Glyphosate/Liquid	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution
Streamline	Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution
Transline	Clopyralid/Liquid	Caution
Viewpoint	Imazapyr/Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution

Table 2 - Pre-Emergent Herbicides Currently Used for Bare Ground Areas On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Arsenal 5G	Imazapyr/Granule	Caution
Sahara	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron/Diuron/Granules	Caution
SpraKil S-5	Tebuthiuron/Granules	Caution
Topsite	Diuron/Imazapyr	Caution

Table 3 - Tree Growth Regulators (TGRs) Currently Used On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Profile 2SC	TGR-paclobutrazol	Caution
TGR	Flurprimidol	Caution

B. The herbicides listed in Table 1 and 2 and TGRs listed in Table 3 have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the USFS vegetation management environmental impact statements (EISs), and those evaluations are incorporated here by reference (USFS 1989a, 1989b, 2002a, and

2002b). Electronic copies can be accessed at https://cdxnodengn.epa.gov/cdx-enepa-public/action/eis/search. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.

C. Low volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection and more wildlife food plants and cover plants develop. In most situations there is increased development of wild flowering plants and shrubs. In conjunction with herbicides, the diversity and density of low-growing plants provide control of tall-growing species through competition.

D. Herbicides are used in place of rotary mowing in order to avoid damage to nesting and tunneling wildlife. This method retains ground cover year around with a better mix of food species and associated high-protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber-tired equipment).

E. Best Management Practices (BMPs) governing application of herbicides are contained within *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (Muncy 2012) which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation. Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, USEPA guidelines, and respective state regulations and laws.

F. When herbicides are used, their potential adverse impacts are considered in selecting the compound, formulation, and application method. Herbicides that are designated "Restricted Use" by USEPA require application by or under the supervision of applicators certified by the respective state control board. Applications are done either by TVA or by contractors in accordance with the following guidelines identified in the TVA BMP manual (Muncy 2012):

1. The sites to be treated are selected and application directed by the appropriate TVA official.
2. A preflight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.
3. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed 5 miles per hour, in areas of fog, or during periods of temperature inversion.
4. Pellet application will normally not be made when the surface wind speeds exceed 10 miles per hour, or on frozen or water saturated soils.
5. Liquid application is not performed when the temperature reaches 95 degrees Fahrenheit or above.
6. Application during unstable, unpredictable, or changing weather patterns is avoided.

7. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.
8. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZ) adjacent to perennial streams, ponds, and other water sources. Hand application of certain herbicides labeled for use within SMZs is used only selectively.
9. For aerial inspections, buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.
10. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits (b) off the right-of-way and (c) during rainy periods or during the 48- hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters, when soil active herbicides are used.

G. TVA currently uses primarily low volume applications of foliar and basal applications, e.g., Accord (Glyphosate), Arsenal (Imazapyr), Clearstand (Imazapyr / Metsulfuron Methyl), Milestone VM (Aminopyralid) and Streamline (Aminocyclopyrachlor / Metsulfuron Methyl).

4.0 Benefits

A. Proper maintenance—including vegetation management—of ROW and its supporting facilities is crucial to ensuring the reliable transmission of affordable electrical power. Unmanaged and poorly maintained vegetation can cause electricity outages, wildfires, soil erosion, and water quality issues. Utility companies that adopt long-term IVM approaches often benefit from significant vegetation management cost savings, which can be reflected in customer rates.

B. ROW also provide important wildlife habitats. As wildlife habitats in the United States are lost to development, these ROW become increasingly important. The IVM approach can create natural, diverse, and sustaining ecosystems, such as a meadow transition habitat. A variety of wildlife species (including threatened and endangered species) consider these habitats home, such as butterflies, songbirds, small mammals, and deer. These habitats also encourage the growth of native plant species and can increase plant diversity.

C. Invasive and exotic species are often a problem on ROW, and, consequently, the surrounding land. IVM techniques (such as selective herbicide application) can minimize this problem, while ensuring native and endangered species are not affected.

5.0 References

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Muncy, J. A. 2012. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (revised edition). Edited by Abigail Bowen, Jodie Branum, Corey Chandler, Adam Dattilo, Britta Dimick, Shea Gaither, Casey Henley, Todd Liskey, Joe Melton, Cherie Minghini, Paul Pearman, Kenton Smithson, Joe Turk, Emily Willard, Robby Wilson. Norris: TVA Technical Note TVA/LR/NRM 92/1. Retrieved from <http://www.tva.com/power/projects/bmp_manual_2012.pdf> (n.d.).

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Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Substation or Communications Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor and subcontractors shall plan, coordinate, and conduct his or her operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting (including clearing and grading or reclearing and removal or dismantling). This specification contains provisions that shall be considered in all TVA and contract construction, dismantling, or forensic operations. If the contractor and his or her subcontractors fail to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all site perimeters, structure, foundation, conduit, grounding, fence, drainage ways, etc., appropriate protective measures to prevent erosion or release of contaminants will be taken immediately upon the end of each step in a construction, dismantling, or forensic sequence, and those protective measures will be inspected and maintained throughout the construction and site stabilization and rehabilitation period.

2. Regulations - TVA and/or the assigned contractor and subcontractor(s) shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.

3. Use Areas - TVA and/or the assigned contractor and/or subcontractor(s) use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor and subcontractor(s) shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).

4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, site, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission or communication facility. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements and best management practices (BMPs).

   No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual site, structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground

due to size and function.) Some disking of the right-of-way, access, and site(s) may occur for proper seedbed preparation.

Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the site or around structures except around foundation holes; the water must be directed away from the site in as dispersed a manner as possible. At tower or structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any anchor, foundation, or its structure.

5. Sanitation - A designated TVA or contractor and/or subcontractor(s) representative shall contract a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

6. Refuse Disposal - Designated TVA and/or contractor and subcontractor(s) personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his or her operations and by his or her employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as wastes. Records of the amounts generated shall be provided to the site's or project's designated environmental specialist. Contractor(s) and subcontractor(s) must meet similar provisions on any project contracted by TVA. Final debris, refuse, product, and material removal is the responsibility of the contractor unless special written agreement is made with the ultimate TVA owner of the site.

7. Landscape Preservation - TVA and its contractor(s) and subcontractor(s) shall exercise care to preserve the natural landscape in the entire construction, dismantling, or forensic area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.

8. Sensitive Areas Preservation - Certain areas on site and along the access and/or right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, endangered species' habitat, water supply watersheds, and public recreational areas such as parks and monuments. Contractors, their subcontractor(s), and TVA

construction crews shall take all necessary actions to avoid adverse impacts to these sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing, grading, borrow, fill, construction, dismantling, or forensic operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's construction superintendent, project manager, or area environmental program administrator and TVA Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction, dismantling, or forensic activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

   The clearing contractor erected erosion and/or sedimentation control shall be maintained and (when TVA or contract construction personnel are unable) the construction crew(s) shall maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities and at sequential steps of construction at the same location on site. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor and/or subcontractor(s) personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections and any required sampling will be conducted in accordance with permit requirements. Records of all inspections and sampling results will be maintained on site, and copies of inspection forms and sampling results will be forwarded to the TVA project manager or supporting environmental specialist.

   Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the site, access, or right-of-way, on a related construction site or its access roads.

10. Turbidity and Blocking of Streams - Construction, dismantling, or forensic activities in or near streamside management zones or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. **All conditions** of a general storm water permit, aquatic resource alteration permit, or a site-specific permit **shall be met** including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

    Appropriate drainage facilities for temporary construction, dismantling, or forensic activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (Muncy, 2012).*

    On rights-of-way, mechanized equipment shall not be operated in flowing or standing water bodies except when approved and, then, only to construct crossings or to perform

required construction under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses, their adjacent wetlands, or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers' and state permits shall be obtained.

Mechanized equipment shall not be operated in flowing or standing water on substation, switching station, or telecommunication sites.

Wastewater from construction, dismantling, or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, pond or conveyed to a sinkhole. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Floodplain Evaluation - During the planning and design phase of the substation or communications facility, floodplain information should be obtained to avoid locating flood-damageable facilities in the 100-year floodplain. If the preferred site is located within a floodplain area, alternative sites must be evaluated and documentation prepared to support a determination of "no practicable alternative" to siting in the floodplain. In addition, steps taken to minimize adverse floodplain impacts should also be documented.

12. Clearing - No construction, dismantling, or forensic activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure, substation, or communication site or access thereto. TVA and the construction, dismantling, or forensic contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed after each disturbance that have previously been restabilized after clearing operations. Control measures shall be implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

13. Restoration of Site - All construction, dismantling, or forensic-related disturbed areas with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (Muncy 2012).* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

D. Rehabilitation species shall use species designated by federal guidance that are low–maintenance, native species appropriate for the site conditions that prevail at that location.

E. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

F. The site must be protected from species designated by the federal Invasive Species Council and must not be the source of species that can be transported to other locations via equipment contaminated with viable materials; thus, the equipment must be inspected, and any such species' material found must be removed and destroyed prior to transport to another location.

14. Air Quality Control - Construction, dismantling, and/or forensic crews shall take appropriate actions to minimize the amount of air pollution created by their operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.

15. Burning - Before conducting any open burning operations, the contractor and subcontractor(s) shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner on rights-of-way or project manager for TVA sites.

16. RENOVATION OR DEMOLITION DEBRIS MAY NOT BE BURNED.

17. Dust and Mud Control - Construction, dismantling, or forensic activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

18. Vehicle Exhaust Emissions - TVA and/or the contractor(s) and subcontractor(s) shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

19. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way or access route to the site. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order

to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the site except adjacent to or in designated sensitive areas. The Heavy Equipment Department within TVA or the construction, dismantling, or forensic contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Records of amounts generated shall be provided to TVA. Equipment shall not be temporarily stored in stream floodplains whether overnight or on weekends or holidays.

20. Smoke and Odors - TVA and/or the contractor(s) and subcontractor(s) shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor and subcontractor(s) shall not burn refuse such as trash, rags, tires, plastics, or other debris.

21. Noise Control - TVA and/or the contractor and subcontractor(s) shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction, dismantling, or forensic operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.

22. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's *Safety and Health Regulations for Construction.* TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.

23. Damages - The movement of construction, dismantling, or forensic crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor and subcontractor(s) will be responsible for erosion damage caused by his or her actions and employees and, especially, for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the project to be handled shall be documented with an implementation schedule and a property owner signature obtained.

24. Final Site Cleanup and Inspection - The contractor’s designated person shall ensure that all construction, dismantling, or forensic-related debris, products, materials, and wastes are properly handled, labeled as required, and removed from the site. Upon completion of those activities, that person and a TVA-designated person shall walk down the site and complete an approval inspection.

References

Muncy, J. A. 2012. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities

(revised edition). Edited by Abigail Bowen, Jodie Branum, Corey Chandler, Adam Dattilo, Britta Dimick, Shea Gaither, Casey Henley, Todd Liskey, Joe Melton, Cherie Minghini, Paul Pearman, Kenton Smithson, Joe Turk, Emily Willard, Robby Wilson. Norris: TVA Technical Note TVA/LR/NRM 92/1. Retrieved from <http://www.tva.com/power/projects/bmp_manual_2012.pdf> (n.d.).

Revision January 2013

AFFECTED ENVIRONMENT - FLOODPLAINS

A floodplain is the relatively level land area along a stream or river that is subjected to periodic flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of Executive Order (EO) 11988. The proposed 15-mile transmission line route would cross several floodplain areas associated with streams in Benton and Marshall counties, Mississippi.

ENVIRONMENTAL CONSEQUENCES - FLOODPLAINS

The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (United States Water Resources Council 1978). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. Practicable refers to the capability of an action being done within existing constraints. The test of what is practicable depends on the situation involved and includes an evaluation of all pertinent factors, such as environmental impact , economic costs, technological achievability, and public benefit.

No Action Alternative

Under the No Action Alternative, the proposed transmission line would not be constructed. Therefore, there would be no direct, indirect, or cumulative impacts to floodplains because there would be no physical changes to the current conditions found within the floodplains.

Proposed Action Alternative

Under the Proposed Action Alternative, the 15-mile transmission line would be constructed. Portions of the transmission line would cross the 100-year floodplains of Chewalla Creek in Marshall County, Mississippi. Consistent with EO 11988, overhead transmission lines and related support structures are considered to be repetitive actions in the 100-year floodplain. The conducting wires of the transmission line would be located well above the 100-year flood elevation.

The support structures for the transmission line would not be expected to result in any increase in flood hazard, either as a result of increased flood elevations or changes in flow-carrying capacity of the streams being crossed. Construction in the floodplain would be consistent with EO 11988 provided the TVA subclass review criteria for transmission line location in floodplains are followed. To minimize adverse impacts on natural and beneficial floodplain values, the following standard mitigation measures would be implemented:

- The right-of-way would be revegetated where natural vegetation would be removed
- BMPs would be used during construction activities
- Road improvements would be done in such a manner that upstream flood elevations would not be increased

- Construction would adhere to the TVA subclass review criteria for transmission line location in floodplains

Based upon a review of Benton and Marshall counties, Mississippi, Flood Insurance Rate Maps, portions of access roads AR13 and AR14 would be located within 100-year floodplains. To minimize adverse impacts, any road improvements would be done in such a manner that upstream flood elevations would not be increased.

Cumulative Impacts

The proposed substation, to be built by the Holly Springs Utility Department would be located well outside 100-year floodplains, which would be consistent with EO 11988.

Based upon implementation of the above standard mitigation measures, the proposed Ashland transmission line and delivery point project would have no significant impact on floodplains.

REFERENCE

United States Water Resources Council. 1978. "Floodplain Management Guidelines for Implementing E.O. 11988." *Federal Register* 43:6030, February 10, 1978.

Carrie Williamson, PE, CFM
Program Manager
Flood Risk

Terrestrial Ecology – Wildlife, Threatened and Endangered Species
Reviewer's Name: Elizabeth Hamrick

Affected Environment

Terrestrial Ecology - Wildlife

Habitat assessments for terrestrial animal species and associated suitable habitat were conducted in the field August 18-19, 2015 and on February 17, 2016, for the proposed Ashland 161-kV transmission line and associated access roads. The project area occupies approximately 178 acres in Benton and Marshall Counties, Mississippi. Landscape features within and surrounding the project area consists of a variety of fragmented forest habitat, wetlands, stream crossings, agricultural lands, and residential or otherwise disturbed areas. Forested acreage in the project footprint would be cleared and maintained as early successional habitat (e.g., herbaceous vegetation, shrubs, managed crops). Each of the varying ecological community types offers suitable habitat for species common to the region, both seasonally and year-round.

Approximately 94 acres of the project footprint are comprised of forest. Forest types present within the project footprint include deciduous and mixed deciduous-evergreen forests. These forest types provide habitat for an array of terrestrial animal species. Birds typical of this habitat include Acadian fly-catcher, chuck-will's-widow, downy and hairy woodpecker, eastern screech-owl, eastern wood-pewee, great horned-owl, indigo bunting, red-breasted nuthatch, red-headed woodpecker, red-tailed hawk, summer tanager, wood thrush, wild turkey, and yellow-billed cuckoo (National Geographic, 2002). This area also provides foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is partially open. Bat species likely found within this habitat include big brown bat, eastern red bat, evening bat, silver-haired bat, and tricolored bat. Eastern chipmunk, gray fox, and white-footed deermouse are other mammals likely to occur within this habitat (Kays and Wilson 2002). Gray rat snake, Mississippi ring-necked snake and speckled kingsnake are common reptiles of deciduous forests in this region (Conant and Collins 1998, Dorcas and Gibbons 2005, Scott and Redmond 2008).

Agricultural lands (i.e., pasture, horticultural fields) occupy approximately 68 acres of the project footprint. Common inhabitants of this type of early successional habitat include brown-headed cowbird, brown thrasher, common yellowthroat, dickcissel, eastern bluebird, eastern kingbird, eastern meadowlark, field sparrow, and grasshopper sparrow (National Geographic 2002). Bobcat, coyote, eastern cottontail, hispid cotton rat, North American deermouse and red fox are mammals typical of fields and cultivated land (Kays and Wilson 2002). Reptiles including southern copperhead and blackmask racer are also are known to occur in this habitat type (Dorcas and Gibbons 2005).

Developed areas and areas otherwise previously disturbed by human activity are home to a large number of common species. American robin, Carolina chickadee, blue jay, European starling, house sparrow, mourning dove, northern cardinal, northern mockingbird, black vulture and turkey vulture are birds commonly found along road edges, industrial properties and residential neighborhoods (National Geographic 2002). Mammals found in this community type include armadillo, eastern gray squirrel, northern raccoon, and Virginia opossum (Kays and Wilson 2002). Road-side ditches provide potential habitat for amphibians including American toad, upland chorus frog and northern spring peeper. Reptiles potentially present include eastern garter snake and midland brown snake (Conant and Collins 1998, Dorcas and Gibbons 2005).

Forested wetlands and aquatic habitat occur within the project footprint. Such habitat provides resources for birds, including northern harrier, red-winged blackbird, song sparrow, swamp sparrow, and white-throated sparrow (National Geographic 2002). American beaver, golden mouse, muskrat, and nutria are common mammals in emergent wetland and aquatic communities. Eastern ribbon snake, rough green snake, and timber rattlesnake are common reptiles likely present within this habitat (Dorcas and Gibbons 2005). Amphibians likely found in forested wetlands in this area include marbled, mole, Mississippi slimy and spotted salamanders, eastern narrowmouth toad, eastern spadefoot toad, Fowler's toad, gray treefrog and southern leopard frog (Conant and Collins 1998, Scott and Redmond 1996).

Review of the TVA Regional Natural Heritage database in August 2015, indicated that no caves have been documented within three miles of the project area and no caves were identified during the field review in August, 2015. No other unique or important terrestrial habitats were identified within the project area. In addition, no aggregations of migratory birds or wading bird colonies have been documented within three miles of the project area and none were observed during field surveys.

Terrestrial Ecology – Threatened and Endangered Species

The Endangered Species Act (ESA) requires federal agencies to conserve endangered and threatened species, and to determine the effects of proposed actions on endangered and threatened species and Designated Critical Habitat. Endangered species are those determined to be in danger of extinction through all or a significant portion of their range. Threatened species are those determined to likely become endangered within the foreseeable future. Section 7 of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) when proposed actions may affect endangered or threatened species or Designated Critical Habitat.

A review of the TVA Regional Heritage database in March 2016 resulted in one federally listed terrestrial animal record (American burying beetle) within three miles of the project area. One federally endangered species (Indiana bat) is known from Benton County. In addition, the federally threatened northern long-eared bat and wood stork have the potential to occur throughout the state of Mississippi (USFWS 2015b, USFWS 2015c). Thus, habitat suitability and potential impacts to these species also will be addressed (Table 3-1).

Table 3-1. Federally listed terrestrial animal species reported from Benton and Marshall Counties, Mississippi, and other species of conservation concern documented within three miles of proposed Ashland substation, transmission line right-of-way, and access roads.[1]

Common Name	Scientific Name	Federal Status	State Status[2] (Rank[3])
Wood stork[4]	*Mycteria americana*	LT	THR(S2N)
American burying beetle	*Nicrophorus americanus*	LE	END(SX)
Northern long-eared bat[4]	*Myotis septentrionalis*	LT	TRKD(S1N)
Indiana bat[5]	*Myotis sodalis*	LE	END(S1B)

[1] Source: TVA Regional Natural Heritage Database, extracted 03/01/2016; USFWS Ecological Conservation OnlineSystem (http://ecos.fws.gov/ecos/home.action) extracted 03/01/2016.
[2] Status Codes: END = Endangered; LE = Listed Endangered; LT = Listed Threatened; THR = Threatened; TRKD = Tracked.
[3] State Rank: S1 = Critically Imperiled; S2 = Imperiled; S#B = rank of a breeding population; S#N = rank of non-breeding population; SX = Presumed Extirpated.
[4] Federally listed species whose range includes Benton and Marshall Counties, Mississippi. To date, no records of this species are known from these counties.
[5] Federally listed species known from Benton County, Mississippi, but not within three miles of the proposed project.

Wood stork is a federally threatened species whose range has expanded into Mississippi in recent years. They are known to travel up large river basins from breeding grounds to both eastern and western Mississippi. They are seasonal visitors to Mississippi in relation to food availability. They forage in shallow water wetland systems with food sources (fish, crayfish, small reptiles, and amphibians), and calm waters free of dense aquatic vegetation (Turcotte and Watts 1999). They also utilize forested wetlands for their abundant perches. This species has not been recorded in Benton or Marshall County, though they have been recorded in an adjacent county (Lafayette) but the specific location of that record is unknown.

American burying beetles inhabit large mowed and grazed fields, dense shrub thickets, deciduous oak-hickory and coniferous forests on ridges or hillsides and deciduous riparian corridors and pasturelands on valley floors. Adults lay eggs on carrion, which they bury in the soil. Soil characteristics are an important habitat component. Overly hydric, overly xeric or primarily loam soils are unsuitable for American burying beetles (USFWS 1997). Suitable habitat for this species likely is present within the project footprint.

Indiana bats hibernate in caves in winter and use areas around them in fall and spring (for swarming and staging), prior to migration back to summer habitat. During summer, Indiana bats roost under exfoliating bark of dead and living trees in mature forests with an open understory, often near sources of water. Indiana bats are known to change roost trees frequently throughout the summer season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest edges and tree lines, and occasionally over bodies of water (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2015a). The closest documented occurrence of Indiana bat is from a radio-tracking event. Bats were tracked to roost sites approximately 3.23 miles away from the project footprint. Suitable summer roosting habitat for Indiana bat exists within forested fragments of the project area. Suitability was determined by presence of trees with exfoliating bark and relatively open understory. There are no documented caves within three miles of the project

area and none were observed during field surveys in August 2015. Foraging habitat for Indiana bat exists throughout the project footprint over forested wetlands, forest fragments and fence rows.

Northern long-eared bats predominantly overwinter in large hibernacula including caves, abandoned mines, and cave-like structures. During fall and spring they utilize entrances of caves and surrounding forested areas for swarming and staging. In summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by northern long-eared bat is similar to Indiana bat. It is thought, however, that northern long-eared bats are more opportunistic in roost site selection. This species also is known to roost in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). This species has not yet been documented in Benton or Marshall County, but has potential to occur statewide in Mississippi (USFWS 2014, USFWS 2015b, TNBWG 2015). There are no documented caves within three miles of the project area. No caves or other roosting structures were observed during field surveys of the project area in August 2015. Foraging habitat exists throughout the proposed project area in forest fragments and over forested wetlands. Suitable summer roosting habitat for northern long-eared bat exists within forested blocks of the project area. Suitability was determined by presence of trees with exfoliating bark and proximity to water.

Assessment of the project area for presence of summer roosting habitat for Indiana bat and northern long-eared bat followed federal guidance (USFWS 2014, 2015) and resulted in identification of 203 suitable roost trees scattered across 32 acres of fragmented forest some of which includes Holly Springs National Forest. Habitat quality ranged from moderate to high, based on presence of trees with exfoliating bark in the proposed project footprint. Suitable summer roosting areas were comprised of mature mixed evergreen-deciduous hardwood stands dominated by American elm, eastern red cedar, loblolly pine, red oak, sweetgum and white oak.

Environmental Consequences
Terrestrial Ecology – Wildlife
No Action Alternative

Under the No Action Alternative, TVA would not provide power to the Holly Springs Utility Department (HSUD) substation by building the new transmission line or constructing access roads to build and maintain the line. In this event, the HSUD could seek power from an alternative provider. If the project were not completed, clearing of vegetation would not occur on the proposed property. Trees and other vegetation would remain in place in their current state. Ground disturbance would not occur within the project footprint. No direct or indirect impacts to wildlife would occur as a result of proposed actions. If the HSUD obtained alternative funding, overall environmental consequences would be similar to the Action Alternative.

Proposed Action Alternative
Under the Proposed Action Alternative, TVA would build the new transmission line and construct access roads to build and maintain the line. A portion (i.e., 37.5 ft.) of the existing right-of-way would be incorporated into the new 100-ft right-of way on which the new 161-kV transmission line would be built. Clearing of some or all of the 94 acres of forested habitat would take place as part of proposed actions. Vegetation removal may also occur on the other 83 acres of early-successional, herbaceous habitat (pastures and cultivated fields). Impacts to

wildlife habitat are based on the assumption that disturbance would occur across the entire property for industrial development (grading, vegetation removal, etc.).

Proposed actions would result in ground disturbance throughout the proposed property. Any wildlife (primarily common, habituated species) currently using these already heavily disturbed areas would be displaced by habitat removal. Approximately 94 acres of forest would be removed. Direct affects to some individual members of species that may be immobile during time of construction may occur, particularly if construction activities took place during breeding/nesting seasons. However, actions are not likely to affect overall populations of species common to the area, as similarly forested and herbaceous habitat exists in the surrounding landscape.

Construction-associated disturbances and habitat removal would disperse wildlife into surrounding areas in an attempt to find new food and shelter sources and to reestablish territories, potentially resulting in added stress or energy use to these individuals. In the event that surrounding areas are already overpopulated, further stress to wildlife populations could occur to those individuals presently utilizing these areas, as well as those attempting to relocate; however, it is unlikely that the surrounding landscapes are already overpopulated with wildlife and that species currently occupying these adjacent habitats would be negatively impacted by the influx of new residents.

Terrestrial Ecology - Endangered and Threatened Species

No Action Alternative

Under the No Action Alternative, TVA would not provide power to the HSUD substation by rebuilding the 15 mile portion of the Holly Springs-Ashland transmission line or constructing access roads to build and maintain the line. In this event, the HSUD could seek power from an alternative provider. If the project were not completed, clearing of vegetation would not occur on the proposed property. Trees and other vegetation would remain in place in their current state. Ground disturbance would not occur within the project footprint. No direct or indirect impacts to endangered and threatened species would occur as a result of proposed actions. If the HSUD obtained alternative funding, the overall environmental consequences would be similar to the Action Alternative.

Proposed Action Alternative

Under the Proposed Action Alternative, TVA would build the new transmission line and constructing access roads to build and maintain the line. A portion (37.5 ft.) of the existing right-of-way would be incorporated into the new 100-ft right-of way on which the new 161-kV transmission line would be built. Clearing of some or all of the 94 acres of forested habitat would take place as part of the proposed actions. Vegetation removal may also occur on the other 83 acres of early-successional, herbaceous habitat (pastures and cultivated fields). Impacts to threatened and endangered species are based on the assumption that disturbance would occur across the entire property for industrial development (grading, vegetation removal, etc.).

One federally listed terrestrial animal species has been documented within three miles of the project footprint. Potential impacts to three additional federally listed terrestrial animal species were assessed based on documented presence within Benton County, Mississippi, or the potential for the species to occur in the project footprint. While suitable habitat for American burying beetle likely exists within the project footprint, this species is believed to be extirpated

from the state of Mississippi, as well as the majority of its historic range in the southeastern United States. American burying beetle would not be impacted by project activities.

Foraging habitat for wood stork may occur in wetlands associated with the Cushtusia Creek and Blinker Creek River systems in the study area. Nesting habitat for this species does not occur in these areas. Proposed actions would remove large trees within the proposed right-of-way; however impacts to hydrology of wetlands would be minimized with the use of standard Best Management Practices within these wetland complexes. Any potential impacts of this project to wood stork would be indirect and discountable.

No caves or other winter hibernacula for Indiana bat or northern long-eared bat exist in the project footprint and none would be impacted by proposed actions. Suitable foraging habitat, however, does exist for these species over ponds, streams and wetlands within the proposed property. Best Management Practices would be utilized in streamside management zones around these bodies of water, thus minimizing sedimentation and changes to hydrology. Additional foraging habitat for Indiana and northern long-eared bats exists along fence rows and within forest fragments. This foraging habitat would be removed in association with proposed actions. Similarly suitable foraging habitat, however, is plentiful in the surrounding landscape. Habitat surveys for Indiana bat and northern long eared bat recorded 203 suitable summer roost trees across 32 acres of fragmented forest within the project footprint, some of which falls within Holly Springs National Forest. Habitat suitability was determined by number of trees with exfoliating bark (snags as well as live trees) and nearby water sources. Consultation with the USFWS under Section 7 of the ESA is underway. TVA's consultation with the USFWS would be finalized prior to implementation of the following avoidance measure:

- Any potentially suitable Indiana and northern long-eared bat roosting habitat would be selectively removed between the dates of October 1 and April 14.

With the implementation of this avoidance measure, removal of forest habitat suitable for use by Indiana or northern long-eared bats may affect but is not likely to adversely affect the species.

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ASHLAND ENVIRONMENTAL ASSESSMENT
Aquatic Ecology and T&E Species
Craig L. Phillips, Aquatic Community Ecologist
Matthew P. Reed, Aquatic Ecology Contractor (JSG)

AFFECTED ENVIRONMENT

Aquatic Ecology

The proposed Ashland 161kV Delivery Point TL route is located in Marshall and Benton Counties, Mississippi, in the Loess Plains subregion of the Mississippi Valley Loess Plains ecoregion (Chapman et al. 2004), and crosses the Indian Creek-Wolf River (Hydrologic Unit Code (HUC) 0801021002), Snow Creek-Tippah River (HUC 0803020106), South Tippah Creek-Tippah River (HUC 0803020105), and Upper Coldwater River (HUC 0803020401) 10-digit HUC watersheds. Streams encountered during field surveys were typical of the Mississippi Valley Loess Plains ecoregion, with low gradient and substrates comprised primarily of sand and silt. A total of 73 aquatic features, including two perennial streams, eight intermittent streams, 51 ephemeral streams, and 12 ponds were observed along the proposed TL route during an August 2015 field survey. An additional field survey of the proposed access roads in February 2016 documented one intermittent stream.

Because TL construction and maintenance activities primarily affect riparian conditions and instream habitat, TVA evaluated the condition of these factors at each stream crossing along the proposed TL route. Riparian condition was evaluated during field surveys conducted in August 2015 and February 2016 using a TVA habitat assessment form. A listing of stream crossings in the project area, excluding ephemeral streams, is provided in Appendices 3-1 and 3-2. Additional information regarding watercourses in the vicinity of the project area can be found in Section 3.2.

Three classes were used to indicate the current condition of streamside vegetation across the length of the proposed transmission line, as defined below, and accounted for in Table 3-1.

- Forested - Riparian area is fully vegetated with trees, shrubs, and herbaceous plants. Vegetative disruption from mowing or grazing is minimal or not evident. Riparian width extends more than 60 feet on either side of the stream.
- Partially forested - Although not forested, sparse trees and/or scrub-shrub vegetation is present within a wider band of riparian vegetation (20 to 60 feet). Disturbance of the riparian zone is apparent.
- Nonforested - No or few trees are present within the riparian zone. Significant clearing has occurred, usually associated with pasture or cropland.

Table 3-1. Riparian Condition of Streams Located Along the Proposed Ashland 161kV Delivery Point TL Route and Access Roads.

Riparian Condition	# Perennial Streams	# Intermittent Streams	Total
Forested	0	0	**0**
Partially forested	2	6	**8**
Nonforested	0	3	**3**
Total	**2**	**9**	**11**

TVA then assigns appropriate streamside management zones (SMZs) and best management practices (BMPs) based on these evaluations and other considerations (such as State 303(d) listing and presence of endangered or threatened aquatic species). Appropriate application of the BMPs minimizes the potential for impacts to water quality and instream habitat for aquatic organisms.

The Loess Plains subregion of the Mississippi Valley Loess Plains ecoregion is characterized by gently rolling to irregular plains. Once a highly productive agricultural area, this region is now dominated by pine plantations and mixed forest landscape, with some cropland agriculture including cotton and soybeans still present. Streams in this region are relatively low gradient, and many have been channelized. Significant erosion and sediment loads have accumulated over the years as a result of cropland agriculture (Chapman et al. 2004). Over the course of its 15-mile route, the proposed TL traverses a variety of landscapes, including a portion of Holly Springs National Forest and several large agricultural operations. Streams encountered along the proposed TL route varied from having relatively intact riparian zones with partial forest cover to channelized drainages in or adjacent to large row crop farms.

AFFECTED ENVIRONMENT

Aquatic Threatened and Endangered Species

The Endangered Species Act (ESA) provides broad protection for species of fishes, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species or designated critical habitat. The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes.

The State of Mississippi provides protection for species considered endangered or of special concern within the state other than those federally listed under the ESA. The listing is handled by the Mississippi Commission on Wildlife, Fisheries and Parks; however, the Mississippi Natural Heritage Program and TVA both maintain databases of aquatic animal species that are considered endangered or of special concern in Mississippi.

A review of the TVA Natural Heritage Database (08/25/2015) indicated six state-listed species (three fishes, three mussels) within the Indian Creek-Wolf River (HUC 0801021002), Snow Creek-Tippah River (HUC 0803020106), South Tippah Creek-Tippah River (HUC 0803020105), and Upper Coldwater River (HUC 0803020401) 10-digit HUC watersheds of the proposed project and/or within Benton and Marshall Counties, MS. The mud darter, northern madtom, fatmucket, rayed creekshell, and southern rainbow all occur in the Wolf River, a northwestern-flowing tributary of the Mississippi River, which comes within approximately 4.5 miles of the

northeastern end of the proposed TL route. However, no federally listed species or federally designated critical habitat (DCH) occurs within the 10-digit HUC watersheds potentially affected by the proposed TL route, or within Benton or Marshall County or a 10-mile radius of the proposed project.

Table 3-2. Records of federal and state-listed aquatic animal species within the Indian Creek-Wolf River (HUC 0801021002), Snow Creek-Tippah River (HUC 0803020106), South Tippah Creek-Tippah River (HUC 0803020105), and Upper Coldwater River (HUC 0803020401) 10-digit HUC watersheds of the proposed project and/or within Benton and Marshall Counties and a 10-mile radius of the proposed project.[1]

Common Name	Scientific Name	Element Rank[2]	Federal Status[3]	State Status[3] (Rank)[4]
FISHES				
Mud Darter	*Etheostoma asprigene*	E		TRKD (S3)
Northern Madtom	*Noturus stigmosus*	E		NMGT (S3)
Yazoo Darter	*Etheostoma raneyi*	E		TRKD (S2)
MUSSELS				
Fatmucket	*Lampsilis siliquoidea*	E		NOST (S2)
Rayed Creekshell	*Anodontoides radiatus*	E		TRKD (S2)
Southern Rainbow	*Villosa vibex*	E		TRKD (S2)

[1] Source: TVA Natural Heritage Database, queried on 8/25/2015
[2] Heritage Element Occurrence Rank: E = extant record ≤25 years old
[3] Status Codes: NMGT = In Need of Management; NOST = No Status; TRKD = Tracked by state natural heritage program (no legal status)
[4] State Ranks: S2 = Imperiled; S3 = Vulnerable

ENVIRONMENTAL CONSEQUENCES - AQUATIC ECOLOGY

No Action Alternative

Under the No Action Alternative, the Tennessee Valley Authority (TVA) would not build the new transmission line or widen the existing ROW. No changes to aquatic resources within these areas would result from TVA actions. However, changes to aquatic ecology would likely occur over the long term due to factors such as the continuation of agricultural activities and population growth.

Proposed Action Alternative

Aquatic ecology could be affected by the proposed action. Impacts would either occur directly by the alteration of habitat conditions within the stream or indirectly due to modification of the riparian zone and storm water runoff resulting from construction and maintenance activities along the TL corridor and associated access roads. Potential impacts due to removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of instream habitat, and increased stream temperatures. Other potential effects resulting from construction and maintenance associated with extension of the existing ROW include alteration of stream banks and stream bottoms by heavy equipment and by herbicide runoff into streams.

Siltation has a detrimental effect on many aquatic animals adapted to riverine environments. Turbidity caused by suspended sediment can negatively impact spawning and feeding success of fish and mussel species (Brim Box and Mossa 1999; Sutherland et al. 2002).

Watercourses that convey only surface water during storm events (such as ephemeral streams) and that could be affected by the proposed TL route would be protected by standard best management practices (BMPs) as identified in Muncy (2012). These BMPs are designed in part to minimize disturbance of riparian areas and subsequent erosion and sedimentation that can be carried to streams. TVA also provides additional categories of protection to watercourses based on the variety of species and habitats that exist in the streams, as well as the state and federal requirements to avoid harming certain species. This guidance document, *Transmission Construction Guidelines Near Streams,* is provided on TVA's Transmission System Projects Web page and is taken into account when considering the effects of the proposed Action Alternative (TVA 2016a). The width of the streamside management zones (SMZs) is determined by the type of watercourse, primary use of the water resource, topography, or other physical barriers (Muncy 2012).

A US Army Corps of Engineers 404 Permit would be obtained as needed for any stream alterations located within the project area and the terms and conditions of these permits could require mitigation from the proposed activities. All streams would be protected by Standard Stream Protection (Category A) as defined in Muncy (2012). This standard (basic) level of protection for streams and the habitats around them is to minimize the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work. Appropriate BMPs and SMZs would be implemented during construction, operation, and maintenance of the proposed Ashland 161kV Delivery Point TL. Thus, any direct or indirect impacts to aquatic ecology resulting from the proposed action would be insignificant.

ENVIRONMENTAL CONSEQUENCES - AQUATIC THREATENED & ENDANGERED SPECIES

No Action Alternative

Under the No Action Alternative, TVA would not build the new transmission line or widen the existing ROW. Changes to the area would nonetheless occur over time, as factors such as population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests change within the area. The status and conservation of any potentially affected species would continue to be determined by the actions of others. There would be no direct, indirect, or cumulative effects to federal or state-listed endangered or threatened species or critical habitats by TVA project-related actions.

Proposed Action Alternative

Adverse water quality impacts can potentially result from the implementation of the proposed project, which could have direct and indirect impacts to aquatic biota within watercourses in the project area. However, watercourses that could be affected by the proposed project would be protected by standard BMPs and additional protection measures as identified in Muncy (2012). These BMPs are designed in part to minimize disturbance of riparian areas and subsequent erosion and sedimentation that can be carried to streams.

No federally listed aquatic species or designated critical habitat occur within the 10-digit HUC watersheds potentially affected by the proposed TL route, or within Benton or Marshall County

or a 10-mile radius of the proposed project. Therefore, no direct, indirect, or cumulative impacts to federally protected aquatic species would occur as a result of the proposed 161 kV TL.

The state-listed aquatic species in Table 3-2 that may occur within the Indian Creek-Wolf River (HUC 0801021002), Snow Creek-Tippah River (HUC 0803020106), South Tippah Creek-Tippah River (HUC 0803020105), and Upper Coldwater River (HUC 0803020401) 10-digit HUC watersheds of the proposed project and/or within Benton and Marshall Counties, MS could potentially be impacted directly by the alteration of habitat conditions within the stream or indirectly due to modification of the riparian zone and storm water runoff resulting from construction and maintenance activities along the TL corridor and associated access roads. However, with proper implementation of BMPs, as outlined in Muncy (2012), no impacts to the species are anticipated to occur.

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Appendix 3-1: Stream crossings along the proposed Ashland 161kV Delivery Point Transmission Line Route in Benton and Marshall Counties, Mississippi.

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
001	Other	Category A (50 ft)	NA	Impounded section of blueline stream forms a pond in ROW; dike at lower end is located in ROW
002	Other	Category A (50 ft)	NA	Upper area of pond in ROW
003	Other	Category A (50 ft)	NA	Pond on edge of ROW
004	Intermittent	Category A (50 ft)	NA	Stream draining pond below dike; 4-5' wide, 1-2' deep; sandy substrate
005	Other	Category A (50 ft)	NA	Pond.
006	Intermittent	Category A (50 ft)	NA	14ft wide x 6ft deep channel with sand/ silt substrate. Cattle have impacted stream banks.
007	Intermittent	Category A (50 ft)	NA	3ft-10ft wide with 1-? depth. Observable substrate was clay/silt. Fish observed.
008	Intermittent	Category A (50 ft)	NA	5ft wide x 3ft deep channel with sand substrate. Channel breaks down in farm road but removes at mouth of asc09
009	Other	Category A (50 ft)	NA	Pond. Cotton mouth observed.
010	Other	Category A (50 ft)	NA	Pond.
011	Other	Category A (50 ft)	NA	Pond.
012	Other	Category A (50 ft)	NA	Pond.
013	Other	Category A (50 ft)	NA	Pond.
014	Other	Category A (50 ft)	NA	Pond.
015	Perennial	Category A (50 ft)	Chewallla Creek	Chewallla Creek. 20ft wide x 8ft deep channel with bedrock/ silt substrate. Darters and sunfish observed.
016	Intermittent	Category A (50 ft)	Unnamed trib. to Coldwater River	Stream channel is complety covered in kudzu. Could not get good observation of channel or substrate characteristics.
017	Intermittent	Category A (50 ft)	Unnamed trib. to Coldwater River	Channel is covered in kudzu. Could not get good observation of channel or substrate.
018	Intermittent	Category A (50 ft)	Unnamed trib. to Coldwater River	3-4ft wide channel with sand substrate.

019	Other	Category A (50 ft)	NA	Pond on edge of ROW
020	Perennial	Category A (50 ft)	Unnamed trib. to Grays Creek	Perennial stream crossing dirt road in ROW; minnows and sunfish observed above road crossing; 6' wide; 1-3' deep
021	Other	Category A (50 ft)	NA	Pond.
022	Intermittent	Category A (50 ft)	NA	Intermittent stream crossing ROW; 10-12' wide; mostly dry; channel bed eroded down to approx. 8-10' deep; sandy susbtrate

Appendix 3-2: Stream crossings along the proposed Ashland 161kV Access Roads in Benton and Marshall Counties, Mississippi.

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
001AR	Intermittent	Category A (50 ft)	Unnamed trib. to Coldwater River	Intermittent stream crossing AR; 3’ w; 4” h; substrate = sand

Ashland EA Input
Terrestrial Ecology and T&E Plants
Adam Dattilo & David Nestor, Botanists

Affected Environment

Terrestrial Ecology (Plants)

The proposed upgrades to the TVA transmission system would occur in the Loess Plains IV ecoregion. The Loess Plains are gently rolling, irregular plains, between 250-500 feet in elevation. The substrate is comprised in part of loess, a geologic deposit of wind-transported silt-sized quartz and other common minerals. Portions of the Loess Plains were once highly productive agricultural areas, although many locations are now in pine plantations or have reverted to mixed forest. The dominant natural vegetation of the area was oak-hickory, oak-hickory-pine, and mixed mesophytic forests (Chapman et al. 2004).

Field surveys were conducted in September 2015 and February 2016 to document plant communities, infestations of invasive plants, and to search for possible threatened and endangered plant species along the proposed ROW and access roads. Using the National Vegetation Classification System (Grossman et al. 1998), vegetation types observed during field surveys can be classified as a combination of deciduous forest, evergreen, mixed evergreen deciduous forest, and herbaceous vegetation. No forested areas in the proposed project area had structural characteristics indicative of old growth forest stands (Leverett 1996). The plant communities observed on-site are common and well represented throughout the region. About half of the proposed ROW is currently comprised of herbaceous vegetation and about half is forested.

Herbaceous vegetation is characterized by greater than 75 percent cover of forbs and grasses and less than 25 percent cover of other types of vegetation. Cultivated agricultural fields, pastures, maintained and unmaintained transmission line ROW or disturbed sites in various stages of residential development account for the vast majority herbaceous vegetation in the project area. Most of these areas are dominated by plants indicative of early successional habitats including many non-native species. Common species in the most disturbed areas include the row crops corn, soybeans, and sorghum along with beaked panic grass, Bermuda grass, broomsedge bluestem, Chinese lespedeza, hogwort, lanceleaf ragweed, partridge pea, pine barren flat sedge, poorjoe, and spurred butterfly pea. In addition, a large population of the state-listed whorled mountain-mint was found in an existing ROW near the Ashland, MS 46kV substation. Several small emergent wetlands in the project area support a higher proportion of native species including arrowleaf tearthumb, beaked panic grass, climbing dogbane, common rush, cypress panic grass, dotted smartweed, giant goldenrod, netted chain fern, Maryland meadow beauty, sensitive fern, and velvet panicum.

Mixed evergreen-deciduous forest, defined as stands where both evergreen and deciduous species contribute between 25-75 percent of total canopy cover, is the most common type of forest found along the proposed ROW and accounts for over 65 percent of total forest cover. Mature mixed evergreen-deciduous forest occurs on upland sites and commonly contains the evergreens eastern red cedar, loblolly and shortleaf pine and deciduous species black cherry, cherrybark oak, mockernut hickory, pignut hickory, post oak, southern red oak, sweetgum, and white oak. In this forest type, the diameter

at breast height for trees ranged between 6 inches and 24 inches. The understory and shrub layer consisted of Chinese privet, farkleberry, flowering dogwood, red buckeye, and winged elm. Common herbaceous species and vines species include cat greenbrier, Christmas fern, Japanese stiltgrass, jumpseed, muscadine, poison ivy, roundleaf greenbrier, and western bracken fern. Other mixed forest stands were more heavily disturbed from the presence of cattle and generally contained smaller overstory trees.

Deciduous forest, which is characterized by trees with overlapping crowns where deciduous species account for more than 75 percent of the canopy cover, accounts for about twenty percent of the total forest cover. Deciduous forests are dominated by a variety of tree species including black cherry, black gum, cherrybark oak, mockernut hickory, persimmon, pignut hickory, red maple, slippery elm, southern red oak, sweetgum, white ash, and white oak. The understory consisted of farkleberry, red buckeye, sassafras, and winged elm. Herbaceous plants and woody vines observed included Christmas fern, Japanese honeysuckle, Japanese stiltgrass, roundleaf greenbrier, trumpet creeper, and Virginia creeper. In addition, the state-listed plant Nondo lovage was found in this habitat type. Small, forested wetlands were found in several locations of the proposed ROW; American elm, black willow, box elder, green ash, river birch, sweetgum, and sycamore were the dominant overstory species on these sites. The herbaceous layer for these forested wetlands consisted of mainly Japanese stiltgrass, netted chain fern, sensitive fern, smallspike false nettle, and Virginia dayflower. All forested areas encountered are fragmented; the largest contiguous stand covers just twenty acres. Most deciduous forests in the project area have trees that average between 6 and 20 inches diameter at breast height.

Evergreen forest, which accounts for about fifteen percent of total forest cover, has very low species diversity and is dominated by plantation-grown loblolly pine. Canopy trees in forest stands like these are all approximately the same size, are regularly harvested to produce wood products, and bear little resemblance to native plant communities found in the region. Herbaceous layer is scarce due to prior disturbances.

Executive Order 13112 serves to prevent the introduction of invasive species and provides for their control to minimize the economic, ecological, and human health impacts that those species potentially cause. In this context, invasive species are nonnative species that invade natural areas, displace native species, and degrade ecological communities or ecosystem processes (Miller 2010). No federal-noxious weeds were observed, but populations of six plant species designated by the Mississippi Exotic Plant Pest Council as high priority invasive plants were observed sporadically throughout the project area (Table 3-4; MS-EPPC, 2010). During field surveys, invasive plants were prevalent in both forest and herbaceous vegetation types.

Table 3-4. Invasive plant species observed in the proposed Ashland project area.

Common Name	Scientific Name
Tree of heaven	*Ailanthus altissima*
Chinese Privet	*Ligustrum sinense*
Japanese Honeysuckle	*Lonicera japonica*
Japanese Stilitgrass	*Microstegium vimineum*
Kudzu	*Pueraria montana*
Johnson grass	*Sorghum halepense*

Threatened and Endangered Species (Plants)

Review of the TVA Natural Heritage Database (queried August 2015) indicates that no federally listed plant species have been observed within a five-mile radius, but two state-listed plant species have been previously reported within a five-mile vicinity of the project area (Table 3-5). No federally listed plant species have been previously reported from Benton and Marshall Counties, Mississippi. No designated critical habitat for plants occurs in the project area. In addition to the species previously reported from the vicinity of the project area, two state-listed species were observed during field surveys.

Nondo Lovage was observed in the proposed ROW in a stand of deciduous forest adjacent to the existing 46-kV transmission line ROW just west of Old Mississippi Highway 4. About 20 plants were found in a small area about four square meters. A follow-up survey of about 10 additional acres revealed that at least three additional occurrences exist outside of the ROW on the same parcel. These occurrences contained 7, 26, and 32 plants, respectively.

Whorled Mountain-mint was observed in an existing maintained 46-kV transmission ROW about 1.1 miles west of the Ashland 46kV substation. About 100 plants were found scattered throughout 600 linear feet of the open, herbaceous ROW.

Table 3-5. All plant species of conservation concern previously reported from within 5 miles of the Ashland 161-kV Delivery Point project area.[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
PLANTS				
Nondo Lovage[4]	*Ligusticum canadense*	-	SLNS	S1
Monkey-flower	*Mimulus ringens*	-	SLNS	S1S2
Purple Fringeless Orchid	*Platanthera peramoena*	-	SLNS	S2S3
Whorled Mountain-mint[4]	*Pycnanthemum pilosum*	-	SLNS	S1

[1] Source: TVA Natural Heritage Database, queried 08/13/2015.
[2] Status Codes: SLNS = State Listed, no status assigned.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain.
[4]State-listed plant species documented from the right-of-ways where work would occur.

Environmental Consequences

Terrestrial Ecology (Plants)

No Action Alternative:

Under the No Action Alternative, the area within the proposed ROW and access roads would remain in its current condition. Thus, adoption of the No Action Alternative would not affect plant life because no project-related work would occur. Changes to local plant communities resulting from natural ecological processes and human-related disturbance would continue to occur, but the changes would not result from the proposed project. All invasive species found in the project area are common throughout the region and implementation of the No Action Alternative would not change this situation.

Proposed Action Alternative:

Adoption of the Proposed Action Alternative would not significantly affect the terrestrial ecology of the region. Converting forest land to managed ROW for construction of the proposed transmission line would be long term in duration, but insignificant. Adoption of this alternative would require clearing of approximately 94 acres of forest. However, these forested communities are common and well represented throughout the region. As of 2013, there were over 1,400,000 acres of forest land in Benton and Marshall and seven surrounding Mississippi and Tennessee counties (U.S. Forest Service 2015). Cumulatively, project related effects to forest resources would be negligible (.067%) when compared to the total amount of forest land occurring in the region. Also, project-related work would temporarily affect herbaceous plant communities, but these areas would likely recover to their pre-project condition in less than one year.

The entire project area currently has a large component of invasive terrestrial plants and adoption of the Action Alternative would not significantly affect the extent or abundance of these species at the county, regional, or state level. The use of TVA standard operating procedure of revegetating with noninvasive species (Muncy 2012) would serve to minimize the potential introduction and spread of invasive species in the project area.

Endangered, Threatened, and Rare Species (Plants)

No Action Alternative:

Adoption of the No Action Alternative would not impact federally listed plants, designated critical habitat, or state-listed plants species because no project-related work would occur. No federally listed plants or designated critical habitat occurs within the project area, but state-listed plant populations would continue to exist in their current form for some length of time. Changes to local plant communities resulting from natural ecological processes and human-related disturbance would continue to occur. These changes may benefit or negatively affect the state-listed plants present in the proposed ROW, but the changes would be unrelated to the proposed project.

Proposed Action Alternative:

Adoption of the Proposed Action alternative would not affect federally listed plant species or designated critical habitat because neither occurs in the project area. The

state-listed species Nondo lovage would be negatively affected by implementation of the Action Alternative, but the impacts would not be significant. According to the TVA Natural Heritage database, Nondo lovage has only been previously observed at three locations in Mississippi. The initial observation of Nondo lovage in Mississippi was made in the late 1970's; none has been seen since the original observation. An attempt was made by the Mississippi Natural Heritage Program to relocate one of the occurrences in 2005, but biologists failed to find the species. Therefore, the new occurrence found by TVA botanists constitutes the first documented siting of the species in Mississippi in over 30 years. Nondo lovage prefers forested situations and it is unlikely that the 20 or so individual plants located within the proposed new ROW would survive when the forest canopy is removed. However, even if those 20 plants are lost, approximately 65 individuals would continue to persist off the ROW.

Whorled mountain-mint is also very rare in Mississippi and has only been previously observed at three locations in the state (TVA Natural Heritage Database 2015; SERNEC 2015). Two of the three collections were made in the 1960's and have not been seen since the original observation; no reference is made to the abundance of whorled mountain-mint for these historical observations. The third documented occurrence of the species in Mississippi was made in 1994. At this site, the collector referred to the plant as being "locally abundant", which often indicates that hundreds to thousands of plants are present. When TVA botanists observed whorled mountain-mint during field surveys, about 100 plants occurred in open portions of the existing 46kV ROW. This indicates that the species prefers open situations and can tolerate periodic vegetation clearing (mechanical and chemical) associated with ROW maintenance. TVA plans to implement avoidance measure during construction of the proposed transmission line that will prevent the species from being extirpated from the ROW. Most of the proposed ROW adjacent to where whorled mountain-mint occurs is currently forested and is unsuitable for the species. However, when this forest is cleared for construction and operation of the transmission line, it is likely that the whorled-mountain mint would begin to colonize this newly available habitat. Future ROW vegetation maintenance could negatively affect whorled mountain-mint if herbicide is applied indiscriminately, but this outcome can be avoided using TVA's computer-based Sensitive Area Review process to record the location of whorled mountain-mint on the ROW. This will trigger coordination between TVA ROW Foresters and biologists when the proposed transmission line requires vegetation maintenance. The resulting vegetation management will use targeted application of herbicide and/or mowing to control woody species while avoiding impacts to mountain-mint. With the commitments listed below, adoption of the Action Alternative would not significantly impact whorled mountain-mint.

- Contact TVA botanist before clearing and construction to coordinate avoidance measures and access in this portion of the ROW.
- The location of the whorled mountain-mint would be included in TVA's Sensitive Area Review database.

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ASHLAND EA INPUT – GROUNDWATER

PREPARED BY: Amos L. Smith, P.G.

Affected Environment – Groundwater and Geology

The project area is located in the East Gulf Coastal Plain Section of the Coastal Plain Physiographic Province and is underlain by sedimentary rock belonging to the Midway, Wilcox and Claiborne formations which comprise units of the Mississippi embayment aquifer system (Bednar, 1986). The principal aquifers in the project area are the Middle Wilcox and Lower Claiborne-Upper Wilcox aquifers. These units consist of an interbedded mix of Tertiary Age fluvial sand and gravel, deltaic sand, silt and clay, and marginal marine sand, silt, and clay (USGS 1998). There are no carbonate sedimentary rock units in the project area therefore the potential for the development of karstic features is remote. The aquifers in this region are important sources of drinking water. Information supplied by Environmental Protection Agency (2015) indicates groundwater is the primary source of water supply for Marshall and Benton Counties.

Environmental Consequences – Groundwater and Geology

No Action Alternative

Under the No Action alternative, no impacts to groundwater would occur within the project area.

Proposed Action Alternative

Under this alternative, the proposed construction activities should have negligible impact to geological resources in the project area however there is the potential for impact to groundwater resources. Site clearing and grading for structures and access roads could cause erosion resulting in the movement of sediment into springs or groundwater infiltration zones. All applicable regulations regarding storm water permitting would be followed and applicable Best Management Practices (BMPs) would be utilized to minimize and control erosion during construction. Control methods to contain and properly dispose of all wastes and accidental spills would be implemented in order to prevent the discharge of potential contaminants to groundwater.

Herbicides used during clearing and subsequent maintenance activities have the potential to enter groundwater. Although some herbicides break down quickly, others may persist in groundwater. Use of fertilizers and herbicides would be considered with caution before application and applied according to the manufacturer's label. BMPs dealing with herbicide application would also be used to prevent impacts to groundwater.

Proper implementation of these BMP's and control measures are expected to result in insignificant impact to groundwater as a result of the proposed action.

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Ashland 161-kV Delivery Point EA INPUT - SURFACE WATER

PREPARED BY: Originally by Amanda K. Bowen P.E., Water Resources Civil Engineer, SRM&E and adapted by Chevy Williams, Water Specialist II, SRM&E for access roads

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Affected Environment

The proposed Ashland 161kV Delivery Point TL route and access roads are located in Marshall and Benton Counties, Mississippi. This project area drains to several streams within the Indian Creek-Wolf River (Hydrologic Unit Code (HUC) 0801021002), Snow Creek-Tippah River (HUC 0803020106), South Tippah Creek-Tippah River (HUC 0803020105), and Upper Coldwater River (HUC 0803020401) 10-digit HUC watersheds. A total of 73 aquatic features, including two perennial streams, nine intermittent streams, 51 ephemeral streams (or wet-weather conveyances), and 12 ponds were originally observed along the proposed TL route and access roads. The surface water streams in the vicinity of this project are listed below in Table 3-3. Precipitation in the general area of the proposed project averages about 58.0 inches per year. The wettest month is March with an average of 6.1 inches of precipitation, and the driest month is August at 3.4 inches. The average annual air temperature is 59.0 degrees Fahrenheit, ranging from a monthly average of 37.5 degrees Fahrenheit in January to 78.9 degrees Fahrenheit in July (NOAA 2002). Stream flow varies with rainfall and averages about 19.9 inches of runoff per year, i.e., approximately 1.47 cubic feet per second, per square mile of drainage area (USGS 2008).

The federal Clean Water Act requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state. None of the streams in the project area is on Mississippi’s 303(d) list (MDEQ 2014). Table 3-3 provides a listing of local stream with their state (MDEQ 2010) designated uses.

Table 3-3. Uses for Streams in the Vicinity of the Proposed Ashland 161kV Delivery Point

Stream	Use Classification[1]				
	FW	REC	PWS	SH	ES
Mississippi River[2]					
Wolf River[2]	X				
Grays Creek	X				
Robinson Bottom	X				X
Yazoo River[2]	X				
Tallahatchie River[2]	X				
Little Tallahatchie River[2]	X				
Tippah River[2]	X				
Chewalla Creek	X	X			
Snow Creek[2]	X				
Little Snow Creek	X				
Big Snow Creek	X				
Coldwater River	X				
Unnamed Tributary	X				

[1] Codes: FW = Fish and Wildlife; REC = Recreation; PWS = Public Water Supply; SH = Shellfish Harvesting; ES = Ephemeral Stream
[2] Not part of the project area, just shown for river network path

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the new 161-kV transmission line would not be built, therefore, no environmental impacts to surface water or soil erosion would occur.

Proposed Action Alternative

*Surface Runoff - C*onstruction activities have the potential to temporarily affect surface water via storm water runoff. Soil erosion and sedimentation can clog small streams and threaten aquatic life. TVA would comply with all appropriate state and federal permit requirements. Appropriate BMPs would be followed, and all proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollution materials to the receiving waters would be minimized. Coverage under the large construction storm water general permit would be required if the project disturbs more than 1 acre. This permit also requires the development and implementation of a Storm Water Pollution Prevention Plan. This SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. Additionally, BMPs, as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (Bowen, Muncy et al. 2012), would be used to avoid contamination of surface water in the project area. Additionally a US Army Corps of Engineers Section 404 and State 401 Water Quality Certification will be required for every stream crossing.

TVA routinely includes precautions in the design, construction, and maintenance of its transmission line projects to minimize these potential impacts. Permanent stream crossings that cannot be avoided are designed to not impede runoff patterns and the natural movement of aquatic fauna. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements and TVA requirements as described in Muncy (2012). Right-of-way maintenance would employ manual and low-impact methods wherever possible. Proper implementation of these controls is expected to result in only minor temporary impacts to surface waters. No cumulative impacts are anticipated.

Additionally, impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. Because the steel transmission poles have such a small foot print, this construction would not significantly impact impervious surface area. All flows would need to be properly treated with either implementation of the proper BMPs or to engineer a discharge drainage system that could handle any increased flows prior to discharge into the outfall(s).

Domestic Sewage - Portable toilets would be provided for the construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out.

Equipment Washing and Dust Control – Equipment washing and dust control discharges would be handled in accordance with BMPs described in the Storm Water Pollution Prevention Plan for water-only cleaning.

Transmission Line Maintenance - Improper use of herbicides to control vegetation could result in runoff to streams and subsequent aquatic impacts. Therefore any pesticide/herbicide use as part of construction or maintenance activities would have to comply with the MDEQ General Permit for Application of Pesticides, which also requires a pesticide discharge management plan. In areas requiring chemical treatment, only USEPA-registered and TVA approved herbicides would be used in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts. Proper implementation and application of these products would be expected to have no significant impacts to surface waters. No cumulative impacts are anticipated.

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PROJECT TITLE: ASHLAND 161-KV DELIVERY POINT CEC AND AEA

PREPARED BY: Kim Pilarski-Hall, Natural Resources Compliance Programs

For Part 2, #4 - *Potentially affect Wild and Scenic Rivers or their tributaries?* No

Commitment: None

Comments: Because no such designated waters occur at or adjacent to the project site, the proposed action is not anticipated to impact Wild and Scenic Rivers or their tributaries.

For Part 2, #5 - *Potentially affect a stream on the Nationwide Rivers Inventory?* No

Commitment: None

Comments: Because no such designated waters occur at or adjacent to the project site, the proposed action is not anticipated to impact any NRI streams.

For Part 2, #9 - *Potentially affect ecologically critical areas, federal, state, or local park lands, national or state forests, wilderness areas, scenic areas, wildlife management areas, recreational areas, greenways, or trails?* Yes

Permit: Contact Jim Schiller, jschiller@fs.fed.us, 662-285-3264 ext. 815 to coordinate work via the U.S. Forest Service Special use Permit.

Comments: A review of data from the TVA Natural Heritage Project database indicates a 0.57-mile segment of the middle portion of the proposed TL crosses the Holly Springs National Forest (HSNF). Existing access would be used for construction and maintenance of the proposed TL within the boundaries of HSNF. The national forest was established in 1936 and is comprised of 155,661 acres of Forest Service land managed for recreation, timber, and wildlife.

Best Management Practices (BMPs) will be implemented to minimize or avoid any impacts resulting from the proposed transmission line construction and operation. These measures are designed to minimize disturbance resulting from construction activities. Implementation of standard BMPs will ensure no direct, indirect or cumulative impacts to the Holly Springs National Forest.

One natural area is within 5 miles of the proposed project. North Mississippi Branch Experiment Station is located 2.8 miles from the proposed TL ROW. Because the distance from the project site to this feature is sufficient, no direct, indirect or cumulative impacts to these natural areas are anticipated as a result of the proposed action.

Socioeconomics and Environmental Justice

Affected Environment

The proposed ROW is primarily rural and agricultural property. The route traverses sparsely populated areas, avoiding residential property. The proposed ROW has been routed to minimize impacts to the properties it would cross, generally avoiding populated areas to the extent feasible. The proposed line would cross several minor roadways and a major state highway, and would be located in Census Tract (CT) 9504.02 Block Group (BG) 3 and CT 9505 BG 3 in Marshall County, and CT 9501 BG 5 and BG 2 in Benton County. These individual block groups have a total population of 2,885, 1,398, 826, and 2,042, respectively (U.S. Census Bureau 2016a). As shown in Table 3-7, the estimated 2014 population of Marshall and Benton counties was 37,144 and 8,729, respectively. The 2014 population of Holly Springs, the largest city in Marshall County, was estimated at 7,574.

The minority population of Holly Springs is approximately 80.7 percent of the total population (Table 3-7). The percentage of minority population in the block groups around the proposed route is approximately 73.4 percent in Marshall County and 64.3 percent in Benton County. These percentages are more than the minority population of the State of Mississippi (about 42.7 percent).

The poverty rate in CT 9504.02 BG 3 is 27.2 percent, CT 9505 BG 3 is 26.4 percent, CT 9501 BG 5 is 11.4 percent, and CT 9501 BG 2 is 15.0 percent (U.S. Census Bureau 2016b). The poverty rate in Holly Springs is 29.6 percent, 25.6 percent in Benton County, and 21.5 percent in Marshall County (Table 1). The poverty rate in Mississippi is 21.5 percent, indicating Benton County, Holly Springs, and the block groups in Marshall County have a higher rate than the state, Marshall County has the same rate, and the block groups in Benton County have a lower rate. This poverty rate is based on an average annual income of $23,834 for a family of four (USCB 2016a).

Table 1. Socioeconomic and Demographic Conditions in Marshall and Benton Counties, Mississippi

Demographic Characteristic[(a)]	Holly Springs	Marshall County	Benton County	Mississippi
Estimated 2014 population	7,574	37,144	8,729	2,994,079
Black or African American	79.2%	46.9%	37.3%	37.5%
Hispanic or Latino	1.2%	3.2%	1.7%	3.0%
Total Minority	80.7%	49.9%	39.5%	42.7%
White (non- Hispanic or Latino)	19.3%	50.1%	60.5%	57.3%
Per capita income (2009-2013)	$12,521	$18,526	$19,734	$20,956
Median household income (2010-2014)	$27,591	$39,137	$29,132	$39,464
Below poverty level (2010-2014)	29.6%	21.5%	25.6%	21.5%

Source: U.S. Census Bureau (2016a)
(a): Hispanics may be of any race, so also are included in applicable race categories.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, no new facilities or transmission line would be constructed. However, a decline in the reliability of electric service for some customers could be possible in the future. Service problems and interruptions could gradually become more frequent and more severe as population growth occurs and demand for power increases. These outages could have negative impacts on the ability of businesses in the area to operate and grow. Residents of the area could also incur negative impacts from outages, such as more frequent loss of power for household heating or cooling, as well as other activities such as cooking or clothes washing. These conditions could diminish the quality of life for residents in the area and could likely have negative impacts on property values in the area. It is anticipated that the No Action Alternative would result in negative impacts on the local population.

Proposed Action Alternative

Under the Proposed Action Alternative, the ROW for the TL would occupy approximately 178 acres. To construct a proposed TL, TVA would normally purchase an easement from private land owners. That easement gives TVA the right to locate, operate, and maintain the TL across the property owner's land. In certain cases, TVA may be required to acquire property. In either case, current landowners would be compensated for the value of such rights or properties. The direct local economic effect from the purchase of any additional property or ROW easements would be minor.

Under the Action Alternative, the proposed TL would encourage investment in the area and facilitate employment opportunities. Virtually the entire ROW would cross primarily agricultural land and public and private roads; developed areas have been avoided to the extent possible.

The surveys of market participants and real estate professionals found evidence of concern and, at least in one survey, an assumption that such concern would impact property values. Others noted the unattractiveness of the transmission lines and structures. However, most of the regression-based sales price analyses found little or no effects on price. What effects that were found tended to dissipate with time and distance. Lastly, price analyses based on less formal paired sales and other techniques failed to find any effects (Jackson and Pitts 2010). Moreover, most homes in the area are located far enough from the proposed TL route that property values would not be directly affected.

In another study by the same author specifically related to rural property, it was noted that prices for online sales, which are properties that are sold with a TL easement, were 1.1 percent to 2.4 percent less than otherwise comparable sales located at least one-quarter mile away from any TL (offline sales). None of these differences were statistically significant (Jackson 2010).

Various studies have concluded that TLs of this size have little or no impact on the value of nearby properties, and that if impacts to value occur, they would tend to dissipate over time (Kroll and Priestley 1992). Any TL construction or maintenance activities would be temporary and would generally have little impact on residents of the area. Operational activities would be limited to mowing the ROW, which is similar to the agricultural activity of the area.

The population in the areas near the proposed TL ROW is generally small compared to more urban areas. The minority population consists of 70 percent of the total population in the block groups traversed by the transmission line project. Poverty rates in the block groups in Marshall County are higher than the county and state levels and those block groups in Benton County have a lower poverty rate. TVA construction and maintenance personnel would utilize the local businesses while in the area and add to the local economy. Positive impacts to the local economy through purchase of supplies, meals and fuel by workers are anticipated. However, given the modest size of the project, the construction and operation of the TL, including maintenance activities, are expected to have minimal direct and indirect effects on the local community.

No significant negative impacts are expected as a result of the project. Therefore, while there are higher percentage minority and higher poverty levels in the area, there would be no disproportionate impacts to disadvantaged populations.

In conducting the analysis of potential cumulative effects, reasonably foreseeable actions in the local area as well as likely regional trends in environmental conditions were considered. The provision of a LPC under the Action Alternative creates the potential for industrial growth in the area over the long-term (20 years or more). Consequently, this could result in some localized long-term and cumulative socioeconomic benefits as compared to the No Action Alternative. Additional power supply in the area would provide a resource that could more successfully accommodate residential, commercial, and industrial expansion and development. However, any such future developments are speculative.

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Ashland 161-kV Delivery Point EA
Recreation Resources
Robert A Marker (Recreation Specialist)
08/31/2015

Existing Conditions

The existing 46- kV transmission line and the proposed 161-KV line cross a portion of Holly Springs National Forest. While no developed Forest Service recreation facilities are located near the line, this section of the forest is available to the public for dispersed recreation activities such as hiking, wildlife observation, and hunting. No other formal outdoor recreation areas are located within or near the pathway of the project. However, some of the other properties crossed by the project receive dispersed outdoor recreation use.

Environmental Consequences

No Action Alternative

Under the no action alternative, TVA would not expand the right of way and would not construct a new 161-kV transmission line. Consequently, there would be no impacts on any current dispersed outdoor recreation activity.

Proposed Action Alternative

Under the proposed action alternative TVA would secure the necessary land rights and construct the new transmission line. Construction related activities could cause some temporary shifts in any nearby dispersed recreation activity but these temporary impacts would be minor. Long term impacts on recreation use patterns within and in the immediate vicinity of the line should be insignificant.

Affected Environment

With regards to cultural resources the area of potential effects (APE) is taken as the affected environment for purposes of this EA. APE is defined at 36 CFR §800.16(d) (a section of the federal regulations implementing Section 106 of the National Historic Preservation Act) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." TVA has defined the APE for archaeological resources for proposed actions as the 30-m (100-ft) right-of-way (ROW) for the proposed 15-mile transmission line, which encompasses approximately 178 acres, and the approximately 9.6 km (6 miles) of associated off-ROW access roads. The architectural APE for the project consists of areas within a 0.5 mile (0.8 km) radius surrounding the center line of the proposed new 161-kV transmission line, as well as any areas where the project will alter existing topography or vegetation in view of a historic resource.

TVA completed a Phase I cultural resources survey of the APE in order to identify any historic properties that may be impacted by the undertaking. *Historic property* is defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP] maintained by the Secretary of the Interior," (36 CFR Part 800.16(l)). The investigation included an archaeological survey within the archaeological APE and a survey for historic above ground (architectural) resources within the architectural APE. The survey identified two archaeological sites (22BE661 and 22BE662), two isolated finds of archaeological material, and two linear archaeological resources (22BE663 and 22BE664). Both linear resources consist of sections of historic roads. IF-1 consisted of a fragment of Bristol glazed stoneware and a brick fragment, both found in a shovel test. IF-2 consisted of a stemmed bifacial tool made of Fort Payne chert found on the ground surface. TVA has determined that the two archaeological sites and two linear resources may have potential to provide data important in history or prehistory. However, given the limited scope of phase I investigations, the eligibility of all four of these resources for inclusion in the NRHP is considered "undetermined". TVA considers the isolated finds to be ineligible for inclusion in the NRHP because they do not meet NRHP criteria of significance.

The historic architectural survey identified 21 previously undocumented architectural resources, denoted IS-1 through IS-21. TVA has determined that all 21 of these resources are ineligible for inclusion in the NRHP due to a lack of architectural distinction and to loss of historic integrity resulting from modern alterations. No architectural resources that are included in or eligible for inclusion in the NRHP were identified in the APE.

TVA consulted with the Mississippi State Historic Preservation Officer (SHPO) and federally-recognized Indian tribes concerning these findings and determinations, pursuant to 36 CFR § 800.4. SHPO responded by letter dated May 5, 2016 and stated concurrence with TVA's NRHP eligibility determinations for the identified archaeological and above-ground resources. TVA received no response from any of the consulted tribes.

Environmental Consequences

For archaeological sites 22BE661 and 22BE662, project effects could result from vegetation clearing, construction, maintenance, and operation of the proposed new 161-kV TL. These

effects could include compaction from heavy equipment, the mixing of stratigraphic layers, displacement and removal of artifacts and features due to ground disturbance, and looting or vandalism stemming from the increased exposure of archaeological deposits due to vegetation clearing. The integrity of the two linear resources (22BE663 and 22BE664) is mainly related to their form and position in the landscape. Project effects to these linear resources could include erosion of the banks or floor of the roads, which could occur directly from the use of heavy equipment or indirectly from vegetation removal. Effects could also occur from deposition of gravel, construction fill, or other construction-related materials within the roads.

In order to avoid the possibility of any such effects occurring to archaeological sites 22BE661 – 22BE664, TVA will create a 10-meter sensitive area buffer surrounding each of the two sites and two linear features, and place restrictions on any work that would take place within the buffers. No TL structures (poles or guy wires) will be installed within the sensitive area buffers. Vegetation clearing will be conducted during times of dry and firm ground, or using low ground pressure equipment, or with wetland mats placed within the sensitive areas. No heavy equipment will be operated within the boundaries of the two linear features. The sensitive areas will be marked, and the restrictions noted, on all plans and designs to be used during the undertaking. TVA finds that, with these restrictions on the work, the undertaking would have no adverse effects on NRHP-eligible properties in the APE and SHPO has agreed. Therefore, TVA finds that the undertaking will have no significant impacts on historic properties.

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY

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Received 5/9/16

May 5, 2016

Mr. Clinton E. Jones, Senior Manager, Compliance
Mr. Richard Yarnell,
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville TN 37902

RE: A Phase I Cultural Resources Survey of TVA's Planned Ashland Transmission Line and Associated Access Roads, MDAH Project Log #04-060-16, Report #16-0130, Marshall County

Dear Mr. Jones:

We have reviewed the March 2016 cultural resources survey report by Hunter B. Johnson, Principal Investigator, received on April 11, 2016, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, we concur that all 17 of the historic structures assessed and 2 of the newly identified archaeological sites 22Mr703 and 22Mr704 are ineligible for listing in the National Register of Historic Places. We also concur that newly identified archaeological sites 22Be661 and 22Be662, as well as linear resources 22Be663, and 22Be664, demonstrate research potential and should be avoided as recommended and protected as described, unless or until the ineligibility of the sites have been determined. If theses sitees is so avoided and protected, we concur no eligible cultural resources will be adversely affected by the project. With this condition, we have no objections with the undertaking.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide a copy of this letter to Mr. Johnson. Please contact me if you have any questions.

Sincerely,

Greg Williamson
Review and Compliance Officer

FOR: Katie Blount
State Historic Preservation Officer

Visual Resources

Affected Environment

The physical, biological, and man-made features of an area combine to make the visual landscape character both identifiable and unique. Scenic resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, human perceptions of landscape beauty/sense of place (scenic attractiveness), and the degree of visual unity and wholeness of the natural landscape in the course of human alteration (scenic integrity). The varied combinations of natural features and human alterations that shape landscape character also help define its scenic importance. Where and how the landscape is viewed would affect the more subjective perceptions of its esthetic quality and sense of place.

Views of a landscape are described in terms of what is seen in foreground, middle ground, and background distances. In the foreground (an area within 0.5 miles of the observer), details of objects are easily distinguished in the landscape. In the middle ground (normally between 0.5 and 4.0 miles from the observer), objects may be distinguishable, but their details are weak and they tend to merge into larger patterns. Details and colors of objects in the background (the distant part of the landscape) are not normally discernible unless they are especially large and standing alone. The impressions of the visual character of an area can have a significant influence on how it is appreciated, protected, and used. The general landscape character of the study area is described in this section. The scenic integrity indicates the degree of intactness or wholeness of the landscape character (TVA 2003).

The tap point is located in a rural location and can be viewed by two residential properties. The surrounding land cover is mostly cultivated farmland with forested areas. The proposed tap point is located along Higdon Road and is visible through the current Holly Springs-Ashland 46-kV TL ROW.

HSUD's Ashland substation is located on a 2.15 acre parcel owned by The City of Holly Springs Utility Department according to the State of Mississippi Property Assessor. The proposed line would begin at the tap point on the Holly Springs-Miller 161-kV TL in Marshall County and travel northeast and parallel to Highway 4. Approximately 1.75 miles from the tap point the proposed line would cross Old Highway 4E at two locations. Approximately three miles east of the western crossing of Old Highway 4E the proposed line crosses Highway 4. The proposed line will continue northeast and cross Hoover Road, Bond Loop, and Lamar Road. North of the Lamar Road crossing the proposed line would turn east where it terminates at the tap point at the Ashland Substation on County Church Road.

The transmission line would terminate at the Ashland Substation located on County Church Road. The termination point is visible from eight residences, and the surrounding area is residential with manicured lawns, cultivated fields, and some forested areas.

The 15 miles of proposed transmission line would be located within a 50 foot offset of the existing Holly Springs-Ashland 46-kV ROW between Holly Springs and Ashland, Mississippi. Along the proposed new route, five places of worship and one school (Ashland Elementary School) are located within the foreground viewing distance (see **Figure 1**). A few residences will be visually impacted by the TL line road crossings, specifically at the Walker Road, Hoover Road, Lamar Road, and Hammer Mountain Road crossings. Two businesses (Lil Darlins' and Marathon gas station) on Highway 4 would be visually impacted by the TL crossing. The proposed transmission line would cross a large portion of a farm at the eastern crossing of Old Highway 4E (see **Photo 1 and Photo 2**) A number of places of worship, cemeteries and

schools as well as two airports (Thomas Field and John Farese Airpark) are located in the middle ground distance from the proposed project. However, due to topography and forested land, the proposed project would not be in view from these properties. Scenic attractiveness is common to good along the proposed route and ranges from rural residential to farmland and forested land. Scenic integrity is moderate to high based on the forested nature of the landscape along most portions of the proposed transmission line, with rural residential areas at the eastern and western ends of the project.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed transmission line would not be constructed. Aesthetics including visual resources would not change from the current condition. Changes to the scenic quality of the area could nonetheless occur over time as other factors, such as population trends, land use and development, recreational patterns, and cultural, ecological, and educational interests change within the area.

Proposed Action Alternative

The visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action, are reviewed and classified in the visual analysis process. The classification criteria are adapted from a scenic management system developed by the United States Forest Service (USFS) and are integrated with planning methods used by TVA. The classifications are based on methodology and descriptions from the United States Department of Agriculture (USDA) (1995) and TVA (2003). Sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes are also considered during the analysis. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place. The foreground, middle ground, and background viewing distance parameters were described in the previous section.

The new tap point, where a new transmission line taps into an existing transmission line to feed load of a nearby Sub-Station, would be visually similar to the existing lines and structures currently seen in the existing landscape of the forested area. The new line would primarily be located east of Highway 4 in unpopulated forested areas of Holly Springs National Forest, and north of Highway 4 in rural residential areas of Ashland. Views for area motorists and residents are not likely to be negatively affected.

The proposed transmission line would be routed northeast from a rural residential area of approximately 20 homes located along Higdon Road. Approximately 25 homes located in a residential area along Hoover Road are within the foreground viewing distance of the proposed transmission line. There are approximately 30 homes along County Church Road and Lamar Road at the proposed termination point. Views from the road in these areas would be brief and in the foreground. This portion of the transmission line would be located in the foreground viewing distance Ashland Elementary School and Macedonia Church.

Operation, construction, and maintenance of the proposed transmission line would have limited visual impacts. There may be some minor visual discord during the construction period due to the presence of personnel and equipment and the use of laydown and materials storage areas. These minor visual obstructions would be temporary until the existing and proposed ROW and laydown areas have been restored through the use of TVA standard BMPs (Muncy, 2012).

There may also be minor visual discord during maintenance but this would be limited to every three to five years. The ROW would be less visible than roadway maintenance. Therefore, overall visual impacts are anticipated to be minimal as a result of the proposed transmission line.

Cumulative Impacts

It is anticipated that the incremental visual impacts of the proposed transmission line would be minor when considered in conjunction with other past, present, and reasonably foreseeable actions within the area.

References Used in Analysis

Muncy, J.A. 2012. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (revised edition). Norris: Tennessee Valley Authority Technical Note TVA/LR/NRM 92/1. Retrieved from http://www.tva.com/power/projects/bmp_manual_2012.pdf access April 20, 2015

State of Mississippi Property Assessor. Mississippi Free Public Records Directory: Benton County. http://publicrecords.onlinesearches.com/view/lid/84696

Tennessee Valley Authority. 2003. TVA Visual Resources Scenic Value Criteria for Scenery Inventory and Management.

United States Department of Agriculture. 1995. Landscape Aesthetics, A Handbook for Scenery Management. Handbook No. 701. USDA, United States Forest Service.

List of Preparers for Visual Impacts

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Involvement: **Visual Impacts Report and Map**

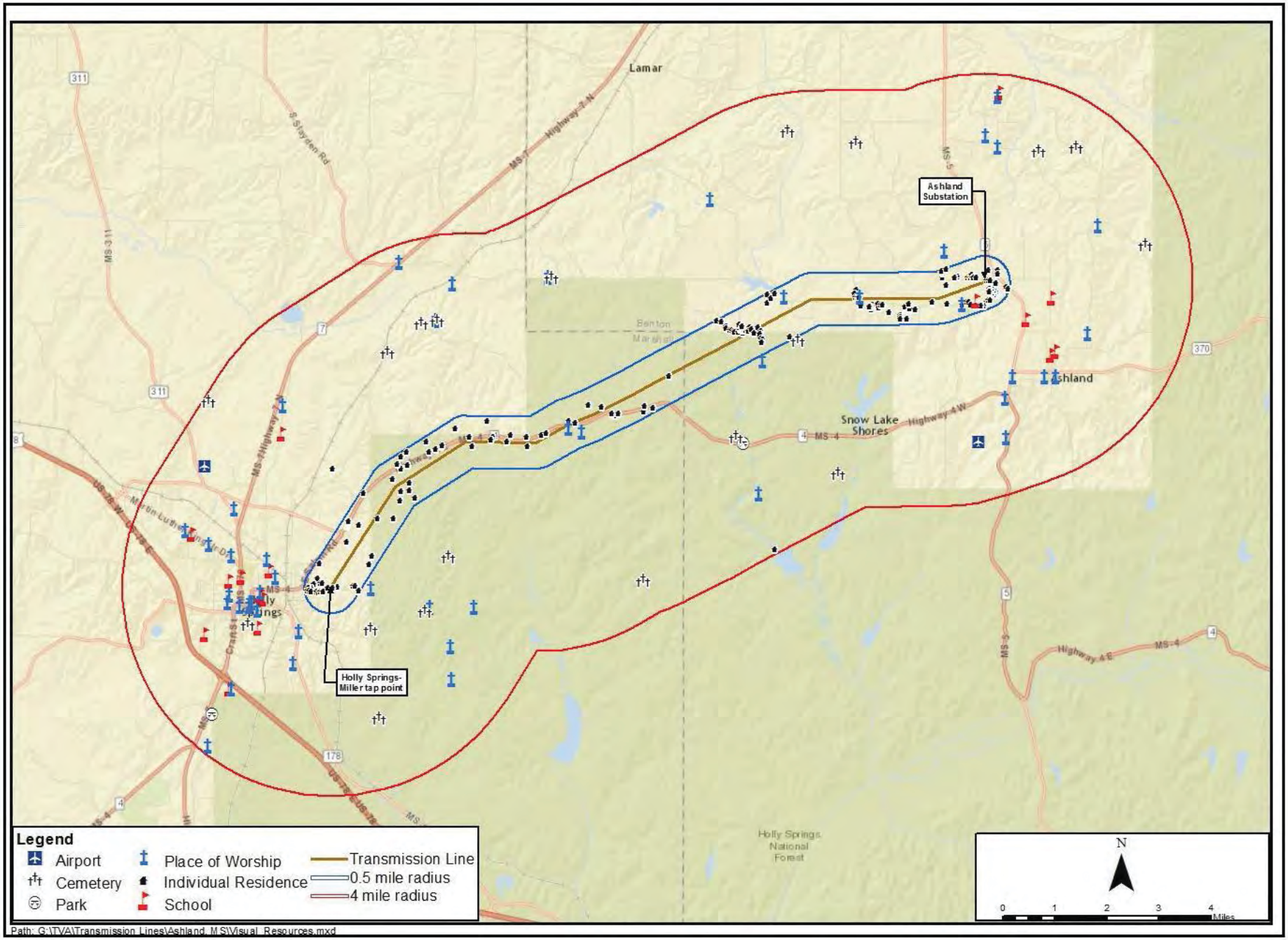

Figure 1 – Visual Resource for Ashland 161-kV Transmission Line

Photo 1 – Holly Springs-Miller 161-kV tap location

Photo 2 – Holly Springs-Ashland 46-kV TL at Old Highway 4E

ASHLAND EA INPUT – WETLANDS

PREPARED BY: Britta Lees/Adam Kennon, B&CC-Wetlands

AFFECTED ENVIRONMENT

Wetlands are those areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetland fringe areas also are found along the edges of most watercourses and impounded waters (both natural and man-made). Field surveys were conducted on August 18 and 19, 2015, within the proposed right-of-way.

Wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic (wet-site) vegetation, hydric soil, and wetland hydrology (USACE 2010; Environmental Laboratory 1987; Lichvar et al. 2014; U.S. Department of Defense and USEPA 2003). Broader definitions of wetlands, such as that used by the USFWS (Cowardin et al. 1979), the Tennessee definition (Tennessee Code 11-14-401), and the TVA Environmental Review Procedures definition (TVA 1983), were also considered in this review. Using a TVA-developed modification of the Ohio Rapid Assessment Method (Mack 2001) specific to the TVA region (TVA Rapid Assessment Method or "TVARAM") was used to categorize wetlands by their functions, sensitivity to disturbance, rarity, and ability to be replaced.

TVARAM scores are used to classify wetland quality into three categories. Category 1 wetlands are considered "limited quality waters." They represent degraded aquatic resources having limited potential for restoration with such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and wetlands that are degraded but have reasonable potential for restoration. Avoidance and minimization are the preferred mitigation measures for Category 2 wetlands. Category 3 generally includes wetlands of very high quality or of regional/statewide concern, such as wetlands that provide habitat for threatened or endangered species.

The Ashland MS 161kV transmission line corridor would run ~15 miles from southwest to northeast between Holly Springs and Ashland, Mississippi. The new right-of-way would traverse a rural landscape, dominated by agricultural land and upland forest. The ROW crosses sporadic streams and drainage ways with associated riparian habitat. Fifteen wetlands, totaling 4.75 acres, were identified within the proposed ROW (Table 3-6).

Table 3-6. Wetlands Within the Proposed Ashland MS 161kV ROW.

Wetland Identifier	Type[1]	TVARAM[2] Existing Functional Capacity (Score)	Wetland Acreage in Project Footprint	Forested Wetland in Project Footprint
W001	PEM1E	Low (18)	1.10	0
W002	PEM/PSS/PFO1E	Moderate (42)	0.10	0.05
W003	PEM1E	Moderate (44)	Adjacent	0
W004	PFO1E	Moderate (40)	0.05	0.05
W005	PEM/PSS1H	Moderate (47.5)	0.52	0
W006	PEM/PSS1H	Moderate (32)	0.05	0
W007	PEM/PFO1E	High (62)	1.21	0.30
AR[3]-W001	PEM1E		0.50	0
W008	PSS/PFO1E	High (62)	0.97	0.76
W009	PFO1E	Low (23)	0.31	0.31
W010	PFO1E	Low (28)	0.06	0.06
W011	PSS/PFO1E	High (63)	0.68	0.42
W012	PEM/PSS1E	Moderate (32)	0.07	0
W013	PEM1E	Low (16)	0.51	0
W014	PEM/PSS1H	Moderate (40)	0.02	0
W015	PSS1E	Low (23.5)	0.03	0
AR-W002	PFO1E	Moderate (	<0.01	<0.01
		Total Acres	**5.25**	**1.95**

[1]Classification codes as defined in Cowardin et al. (1979): suffix "E" = Seasonally flooded/saturated; H=Permanently Flooded; PEM1 = Palustrine emergent, persistent vegetation; PFO1=Palustrine forested, broadleaf deciduous vegetation; PSS1=Palustrine, scrub-shrub, broadleaf deciduous vegetation.
[2]TVARAM = A TVA Rapid Assessment Method that categorizes wetland quality by their functions, sensitivity to disturbance, rarity, and ability to be replaced.
[3]AR=Access Road.

W001 comprises 1.10 acre of emergent wetland habitat within the ROW, and extends outside the ROW to the east and west for an estimated total of five acres. Soils were saturated and exhibited hydric soil coloration. W001 receives rain water runoff via a wide drainage flat and empties into an unnamed tributary of the Coldwater River. Maryland meadow beauty and rice cutgrass dominated this wetland habitat.

W002 consists of a wide flat along an intermittent stream channel feeding a man-made pond. W002 totaled 0.1 acre within the ROW, comprising 0.05 ace of forested wetland and 0.05 acre of emergent/scrub-shrub as it enters the ponded area. Total wetland area extending north and south of the ROW is estimated at two acres, including the adjacent pond. This wetland is assumed to maintain ephemeral connectivity to the Coldwater River via pond overflow. Inundation resulted in a saturated soil profile with mottled coloration, indicative of hydric conditions. W002 was dominated by wetland vegetation including sweetgum, American elm, and false nettle.

W003 consists of 0.07 acre adjacent to the mapped ROW. This wetland area comprises a wide inlet to a man-made pond. With pond acreage included, it is estimated the wetland and open water area total 0.2 acre. Hydric soil coloration was evident within a saturated soil profile.

Hydrologic connectivity is achieved via pond spillway through tributaries of Chewalla Creek. W003 was dominated by emergent wetland vegetation including bulrush and redtop panic grass.

W004 is a 0.05 acre forested wetland basin located at a sharp bend of natural drain. This area likely experiences a higher than normal water table, as is evident in the hydric coloration of the soil profile. During rain events, overbanking of the channel contributes to wetland hydrology. This wetland exits the ROW to the south for an estimated total of 0.25 acre within the natural drain. W004 was dominated by wetland species such as sycamore, American elm, and sweetgum. The understory was primarily bare dirt or covered by Nepalese browntop, an exotic invasive grass.

W005 consists of 0.52 acre of emergent/scrub-shrub wetland habitat within the ROW. This area has been severely altered for man-made pond, spillway, and levee construction. This wetland area is sandwiched within a flat bottom south of Highway 4 but north of a forested hillside, and surrounds an open water pond, totaling an estimated two to three acres as it extends north of the proposed ROW. Immediately to the east is the Chewalla Creek floodplain, currently an open field where wetland drainage activities have only proven to be moderately successful. W005 maintains hydrologic connectivity with Chewalla Creek via floodplain dynamics. Crayfish borrows, landscape setting, and hyric soil coloration indicate waterlogged conditions. Dominant vegetation consists of hydrophytic species such as beaked panic grass and scattered sweetgum and red maple saplings.

W006 consists of shoreline fringe wetland surrounding a portion of a man-made pond within the ROW. This fringe wetland area is approximately five feet wide, with an open water boundary to the south and the pond levee to the north. Pond hydrology provides surface water and saturated soils via a dammed water table. Soils exhibited hydric coloration. Dominant hydrophytic vegetation consisted of bulrush and soft pathrush within emergent zones and black willow and sycamore saplings dominating sporadic scrub-shrub shoreline.

W007/AR-W001 is comprised of a 0.3 acre forested wetland area adjacent to a 0.91 acre emergent wetland field, totaling 1.21 acre within the ROW. In addition, this wetland area extends north of the ROW within the same field to cover ~0.5 acres of access road #13. The emergent wetland field appears to have been unsuccessfully tiled and historic drainage ways either moved or buried, such that indicators of wetland hydrology, hydric soil, and wetland vegetation persist. W007 is located within the west floodplain of Chewalla Creek, separated from the creek by an upland levee within the ROW. The Chewalla Creek floodplain wetland complex is estimated to total greater than one hundred acres. The forested portion of this wetland habitat consisted of mottled soil coloration at a depth greater than six inches, overlain by drift deposits and crayfish borrows, all of which indicate hydric conditions. Forested wetland within the ROW was dominated by river birch and sweetgum with a relatively bare understory. The emergent wetland habitat within the ROW exhibited similar hydric soil and hydrology indicators. Dominant hydrophytic vegetation consisted of hairy aster, smartweed, flatsedge, soft pathsruh, redtop panic grass, deertongue grass, and thin paspalum.

W008 comprises the ROW area within the east floodplain of Chewalla Creek. Similarly to W007, this wetland area is a sliver of the larger Chewalla Creek floodplain. This wetland area is located adjacent to the creek bed, and exhibits forested wetland habitat within the proposed ROW and scrub-shrub wetland habitat where the proposed ROW overlaps the existing ROW. This wetland area totals 0.97 acre, with 0.76 being forested and 0.21 being scrub-shrub inside the ROW construction footprint. W008 exhibited hydric soil coloration, crayfish burrows, and drift deposits indicating saturated conditions. Dominant vegetation consisted of hydrophytic species. The

forested wetland area was dominated by river birch with an understory of sensitive fern and Nepalese browntop grass. The scrub-shrub area contained sweetgum and sycamore saplings.

W009 consisted of 0.31 acre of low quality forested wetland within the proposed ROW. This wetland habitat extends south of the ROW for an estimated one to two acres. Hydrologic connectivity is located off ROW and assumed to maintain ephemeral drainage to intermittent and perennial tributaries of Chewalla Creek. Water stained leaves and crayfish borrows over soils exhibiting mottled coloration, indicated hydric conditions. Dominant vegetation consisted of hydrophytic species, including American elm and green ash, with an understory of Chinese privet.

W010 is 0.06 acre of forested wetland located entirely within the ROW. W010 consists of a failed farm pond containing wetland soils, hydrology, and wetland tree species. Sparse landscape position has resulted in water collected at a duration sufficient for developing hydric soil coloration. W010 was dominated by river birch in the overstory, with a sizable stand of false nettle beneath, both hydrophytic species.

W011 is a forested wetland associated with the floodplain of the upper reaches of Little Snow Creek. This wetland contains 0.68 acre within the ROW, extending north and south of the ROW for an estimated total of nine acres. W011 contained hydric soils with oxidized root channels, indicating saturated conditions. Dominant species included sycamore, box elder, sweetgum, and elderberry, all wetland species.

W012 consists of 0.07 acre of scrub-shrub and emergent wetland habitat within the ROW. W012 exhibited standing water with hydric soils coloration indicative of saturated conditions. W012 maintains hydrologic connectivity via an unnamed tributary of Little Snow Creek. Dominant vegetation consisted of wetland species such as black willow saplings and tag alder.

W013 consists of 0.51 acre of emergent wetland habitat within the ROW, and extends outside the ROW to the north and south for an estimated total of >50 acre. W013 exhibited standing water over saturated soils with mottled coloration indicative of hydric conditions. W013 is connected to an unnamed tributary of Grays Creek. Soft pathrush, a wetland species, was the dominant vegetation present.

W014 consists of shoreline fringe wetland surrounding a portion of a man-made pond within the ROW. This fringe wetland area is approximately five feet wide, with an open water boundary to the south and the pond levee to the north. Pond hydrology provides surface water and saturated soils via a dammed water table. Soils exhibited hydric coloration. Dominant hydrophytic vegetation consisted of soft pathrush along emergent zones and black willow and green ash saplings dominating sporadic scrub-shrub areas.

W015 consists of a scrub-shrub wetland area at the base of a nearby pond, likely receiving seepage from the pond dam. Landscape position and obvious drainage patterns allow duration of inundation sufficient for hydric soil development. Dominant hydrophytic vegetation consisted of black willow saplings and blackberry vines.

AR-W002 consists of a forested wetland drain crossed by access road #14. Standing water, saturated soils, and a high water table was present at the time of the site visit. Duration of inundation within this wetland drain has been sufficient for hydric soil development, although soils were compacted within an existing roadbed crossing AR-W002. Dominant hydrophytic

vegetation consisted of river birch, sycamore, and sweetgum trees adjacent to the roadbed. The roadbed itself was narrow and devoid of vegetation.

ENVIRONMENTAL CONSEQUENCES

Activities in wetlands are regulated under Section 401 and 404 of the CWA and are addressed by EO 11990 (Protection of Wetlands). Section 401 requires water quality certification by the state for projects permitted by the federal government (Strand 1997). Section 404 implementation requires activities resulting in the discharge of dredge or fill into waters of the U.S. to be authorized through a Nationwide General Permit or Individual Permit issued by the USACE. EO 11990 requires federal agencies to minimize wetland destruction, loss, or degradation, and preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities.

No Action Alternative

Under the No Action Alternative, the proposed Ashland MS 161kV Transmission Line would not be built. As such, no project related disturbance to wetlands within the transmission line ROW would occur. Therefore, no wetlands would be affected. Changes to wetlands would nonetheless occur over time as other factors such as population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests change within the area.

Proposed Action Alternative

Under the Proposed Action Alternative, the proposed Ashland MS 161kVTransmission Line would be constructed. Efforts were made during the transmission line siting process to avoid wetlands. However, because of project and topographic constraints, and because of the goal of minimizing impacts to other environmental resources, no practicable alternative was available that would allow complete avoidance of wetlands.

A total of 5.25 acres of wetlands located within the ROW would be spanned by the proposed transmission line (Table 3-6). Adequate clearance between tall vegetation and transmission line conductors would require trees within the proposed ROW to be cleared. Establishing a transmission line corridor would require vegetation clearing within the full extent of the ROW, and future maintenance of low stature vegetation to accommodate clearance and abate interference with overhead wires.

Of the 5.25 acres of wetland, 3.30 acres is currently low growing scrub-shrub/emergent wetland (Table 3-6). Emergent wetland areas would not require clearing due to the existing low stature of this habitat type. Scrub-shrub wetland would require minimal clearing to accommodate transmission line construction; however, it would be anticipated that this community type would recover quickly due to the fast growing nature of scrub-shrub vegetation.

The clearing and habitat conversion of the remaining 1.95 forested wetland acres within the ROW would be required to accommodate the construction of the proposed transmission line. Forested wetlands, in general, have deeper root systems and contain greater biomass (quantity of living matter) per area than do emergent and scrub-shrub wetlands which do not grow as tall. As a result, forested wetlands tend to be able to provide higher levels of “wetland functions,” such as sediment retention, carbon storage, and pollutant retention and transformation (detoxification), all of which support better water quality. Consequently, the clearing and

conversion of forested wetlands to lower-growing wetlands reduces some wetland functions that support healthier or improved downstream water quality (Wilder and Roberts 2002; Ainslie et al. 1999; Scott et al. 1990). Although the 1.95 acre of forested wetland being converted to emergent and scrub-shrub wetland communities would provide the same sort of wetland functions, it would be at a reduced level.

As such, the proposed conversion of forested wetland to scrub-shrub or emergent habitat is subject to the regulation of the USACE Vicksburg District to ensure no net loss of wetland function across the watershed, in accordance with Clean Water Act Section 404/401. TVA has minimized structure locations in wetlands to the extent practicable. To reduce loss of wetland resources within the project watershed, TVA would comply with any conditions set forth in the USACE permit, including compensatory mitigation if required.

TVA would minimize wetland disturbance during construction via no-mechanized clearing in wetlands, use of low ground pressure equipment, or use of mats during clearing and construction activities to minimization of rutting to <12" to reduce soil compaction, and adherence to wetland best management practices (Muncy 2012) for any and all other work necessary within the delineated wetland boundaries. Wetland habitat within the ROW located in areas proposed for heavy equipment travel would experience minor and temporary impacts during transmission line construction. Vehicular traffic would be limited to narrowed access corridors along the ROW for structure and conductor placement. Similarly, potential structure placement in wetlands would be conducted within the parameters and meet the conditions of the approved USACE permit, resulting in no significant wetland impacts.

Cumulative impact analysis of wetland effects takes into account wetland loss and conversion at a watershed scale currently and within the reasonable and foreseeable future. The proposed wetland impacts would be insignificant on a cumulative scale due to the avoidance, minimization, and mitigation measures in place, in accordance with the Clean Water Act and per the directives of EPA and USACE to ensure no net loss of wetland resources. Similarly, general trends in wetland impact resulting from development within the watershed would be subject to CWA, EPA, and USACE mandates. Therefore, in accordance CWA no-net-loss of wetland resources mandate, no cumulative wetland impacts are anticipated as a result of the proposed new transmission line construction project.

In compliance with the CWA, EO11990, TVA has considered all alternatives to avoid and minimize wetland impacts, resulting in the least wetland disturbance practicable. As a result of proposed protective measures in place during construction, maintenance, and operation and fulfilling USACE permit requirements, the transmission line construction project would have no significant adverse direct, indirect, or cumulative impacts to wetland areas or to the associated wetland functions and values provided within the general watershed.

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