Appendix A – Public and Agency Comments and TVA's Response

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Appendix A – Public and Agency Comments Received on the Draft EA and TVA's Response to Comments

A draft of the EA was released for public review and comment on October 29, 2019. The availability of the Draft EA and request for comments were announced through area media outlets and the Draft EA was posted on TVA's website. TVA also notified local, state, and federal agencies and federally recognized tribes of the availability of the Draft EA. Comments were accepted through November 29, via TVA's website, mail, and e-mail.

TVA received two comment letters from members of the public. TVA carefully reviewed all of the comments and edited the text of the final EA as appropriate. Responses to comments raised during the comment period are provided below. A copy of the comment letters are included at the end of this section.

1. **Comment:** Given the location of the transmission-line right-of-way, the rights of the Land Trust for Tennessee should be considered before taking action. Because of the Land Trust's rights, Mr. Vital requests clarification with regard to a noted effect on the Circle V Farm Conservation Easement, located on property he owns in Hamilton County in which TVA crosses with an existing transmission-line easement. (*Commenter*: *C. Crews Townsend on behalf of Mr. Greg Vital*)

   Response: Mr. Vital's predecessors in title conveyed transmission line easements to TVA that cross the property currently owned by Mr. Vital, and Mr. Vital acquired the land subject to TVA's pre-existing easement rights. Mr. Vital's later grant of conservation easement to The Land Trust for Tennessee, Inc. did not impair TVA's pre-existing easement rights, and the Land Trust's rights under the conservation easements also are subject to TVA's pre-existing easement rights. Because TVA's easements predate the acquisition deeds and the conservation easement, Mr. Vital's property rights under the acquisition deeds and the Land Trust's property rights under the conservation easement are subordinate to TVA's property rights under its earlier-in-time easements.

2. **Comment:** The draft assessment notes that a 0.35-mile section of the transmission-line right of way will cross the Circle V Farm easement and that "[t]wo stands of trees totaling approximately 0.4 acres would require clearing within this area." § 3.14.2.2. The draft assessment does not, however, describe which 0.4 acres will be cleared and why. TVA has done periodic inspections and right-of-way assessments over this transmission line for years and has not noted any infringements or requested any clearings. Accordingly, Mr. Vital requests, in consideration of the rights of the Land Trust for Tennessee, that TVA clarify the scope of the work with regard to clearing any portion of the Circle V Farm Conservation Easement and clarify the environmental impact, if any, on the conservation easement. *(Commenter: C. Crews Townsend on behalf of Mr. Greg Vital)*

   Response: The 0.4 acres which make up both stands of trees are on the edge of TVA's ROW and have been estimated from aerial photography. A figure has been added to Section 3.14.2.2 to show the approximate location of the stands of trees in relation to the TVA ROW and the conservation easement. The actual cleared acreage would be determined once exact ROW easement boundaries have been marked during the siting and construction process. TVA conducts periodic inspections on TVA ROW easements to determine where vegetation management needs to occur. The section of TVA ROW that crosses the Circle V Farm Conservation Easement consists of mostly agricultural

and pasture land and, therefore, has been maintained mostly by the property owner as a low-growing vegetative habitat.

3. **Comment:** The draft environmental assessment notes that the Systems Operation Center will contain a helipad and ancillary structures for maintenance and service, and that a helicopter may be used occasionally to transport visitors, for emergencies, and for periodic inspections of the transmission line. §§ 2.1.2, 2.5.2.1, 3.12.3.2.1. The draft environmental assessment does not, however, contain any estimation of flight frequency or anticipated flight patterns. Accordingly, Mr. Vital also requests clarification with regard to the anticipated operations of the helicopters at the Systems Operation Center. Specifically, Mr. Vital notes that the scope of service of any helicopters is vaguely defined in the environmental assessment, making it impossible to determine its actual impact. As such, TVA should clarify where any helicopters will he based and the scope and frequency of the helicopter service. *(Commenter: C. Crews Townsend on behalf of Mr. Greg Vital)*

   Response: The EA has been updated to state the helicopter pad would be an infrequent or occasional use by TVA owned or leased helicopters. These operations would be expected to transport TVA employees on official business. Non-TVA employees or governmental representatives would also be expected users in an official capacity performing functions directly related to TVA's mission. Consideration was given to the use of the helipad in TVA-related emergency operations by non-TVA helicopters. This use case would be considered rare or very infrequent. Examples could include EMS, TN State, National Guard, etc. in a disaster response role.

4. **Comment:** The draft environmental assessment references the additional rock cairns found on Mr. Vital's property that, along with the original cairn discovered by TVA and New South, form archaeological site 40MG305. The draft environment assessment does not, however, attach or reference the September 2019 report prepared by Lawrence S. Alexander, M.A., which documents and analyzes the additional rock cairns. Accordingly, I attach Mr. Alexander's report to this e-mail for TVA's benefit. *(Commenter: C. Crews Townsend on behalf of Mr. Greg Vital)*

   Response: As TVA has chosen to realign the transmission line, the rock cairns identified in the New South report as well as the artifacts identified in Mr. Lawrence's report are no longer within the project area. TVA is aware of these studies that identified artifacts outside the area of potential effect of TVA's proposed undertaking.

5. **Comment:** Given the presence of the rock cairns and because the draft environmental assessment appears to analyze environmental effects under the assumption that all structures will be confined to the 100-foot-wide right of way, Mr. Vital assumes that all work, towers, structures, and/or guy wires will be confined to the right-of-way, especially with regard to the sections of the transmission lines that are near the rock cairns. Additionally, because site 40MG305 and the presence of over a dozen historically significant rock cairns were only recently discovered, Mr. Vital expects that work will stop immediately should any other potentially historical artifacts be found. *(Commenter: C. Crews Townsend on behalf of Mr. Greg Vital)*

Response: Construction work will remain as much as practicable within the proposed ROW. However, there will be circumstances such as off ROW access roads and equipment operation and set-up for 'danger tree' clearing and structure placement that may extend partially outside the proposed ROW. If historic properties are discovered or unanticipated effects on historic properties found during implementation of the project, work in the location of the discovery would cease and TVA would follow the process as outlined in 36 CFR § 800.13(b)(2)

6. **Comment:** In the first bullet point in section 3.14.1, "Rival Buffalo Farm" should be "Vital Buffalo Farm. *(Commenter: C. Crews Townsend on behalf of Mr. Greg Vital)*

   Response: Thank you. This revision has been made in the EA.

7. **Comment:** Notwithstanding the foregoing, as noted in my September 24, 2019 correspondence, Mr. Vital does not object to the revised route as currently formatted and looks forward to working with TVA to complete the project. *(Commenter: C. Crews Townsend on behalf of Mr. Greg Vital)*

   Response: Comment noted. Thank you.

8. **Comment:** Nonetheless, because the report addresses many issues on an extraordinarily wide range of subject and covers hundreds of pages with seven appendices, Mr. Vital reserves the right to comment on specific issues that may arise as the project progresses. Notwithstanding these issues, we appreciate your open communication and the opportunity to comment, and look forward to your response. *(Commenter: C. Crews Townsend on behalf of Mr. Greg Vital)*

   Response: Thank you for your comments. In order for an issue to be considered by an agency in the NEPA process, the issue must be raised during the comment period. The Section 106 process works the same way with the difference that consultation may need to be reopened if there are inadvertent discoveries while the project is being implemented. However, TVA is committed to working with the landowners to the extent possible to ensure that issues are resolved amicably.

9. **Comment:** I would like to know all environmental problems that could and will come from this... Things such as rf signals and leakage problems.. Any and all possible problems no matter how small or big..... I live in Birchwood on horner hollow rd... I also want to know about the meters you have installed and safety factors from the rf signals and possible harm they can cause humans... *(Commenter: David Clingan)*

   Response: The draft Environmental Assessment details the potential environmental impacts, both positive and negative, resulting from the implementation of the proposed actions. Summarized in Table 2-2, impacts were assessed for a comprehensive list of environmental resources related to both the human and natural environment. Impacts for each resource are then discussed in detail in Chapter 3.

   Electromagnetic fields (EMF) would be generated along the length of the proposed TL. There is some public concern as to the potential for adverse health effects that may be related to long-term exposure to EMF. However, as detailed in 3.17, the consensus of scientific panels reviewing ongoing decades-long research is that the evidence does

not support a cause-and-effect relationship between EMFs and any adverse health outcomes. EMF strength attenuates rapidly with distance from the TL and is usually equal to local ambient levels at the edge of the ROW. Thus, public exposure to EMFs would be minimal, and no significant impacts from EMFs are anticipated.

Radio Frequency (RF) would be emitted from the antennas at the top of the telecommunications tower adjacent to the SOC. The only proven biological effect of RF signals is thermal. This means that RF radiation has the ability to heat biological tissue rapidly. In order for this effect to occur, however, the radiation has to be a very high-power density occurring in close proximity to biological tissue. Multiple studies have shown that the general public are exposed to RF energy levels far below levels necessary to produce any heating and/or increase of body temperature. The highest risk of exposure is for workers working in close proximity to radio or microwave antennas. This means that the worker would have to be in front of a radiating antenna for him or herself to become vulnerable to heating by RF energy. The antennas that will be installed on the TVA telecommunications tower will be irradiating on power levels that would be of concern only to workers performing work in close proximity of transmitting antennas (this means, right in front of the antenna). The risks for residents living in the surrounding area are negligible to non-existent. Further, TVA follows Federal Communications Commission (FCC) and Occupational Safety and Health Administration (OSHA) guidelines on recommended safe levels of exposure for both the general public and for workers.

MILLER & MARTIN PLLC

C. CREWS TOWNSEND
Direct Dial 423-785-8297
Direct Fax 423-321-1571
crews.townsend@millermartin.com

November 27, 2019

VIA US MAIL AND EMAIL
Anita E. Masters
1101 Market Street, BR 4A
Chattanooga, TN 37402
aemasters@tva.gov

Re: ***TVA Systems Operations Center and Power System Supply***; Project No. 2019-1 Response to TVA's October 2019 Draft Environmental Assessment (Bradley, Hamilton, and Meigs Counties, Tennessee)

Dear Ms. Masters:

This correspondence is in response to TVA's October 2019 draft environmental assessment related to the TVA Systems Operations Center and Power System Supply in Bradley, Hamilton, and Meigs Counties, Tennessee. As a property owner in the route of the transmission line and the grantor of the Circle V Farm Easement, my client Greg Vital has an interest in the project at issue and wishes to comment on the draft assessment.

First, given the location of the transmission-line right-of-way, the rights of the Land Trust for Tennessee should be considered before taking action. Because of the Land Trust's rights, Mr. Vital requests clarification with regard to a noted effect on the Circle V Farm Conservation Easement, located on property he owns in Hamilton County in which TVA crosses with an existing transmission-line easement. The draft assessment notes that a .35-mile section of the transmission-line right of way will cross the Circle V Farm easement and that "[t]wo stands of trees totaling approximately 0.4 acres would require clearing within this area." § 3.14.2.2. The draft assessment does not, however, describe which 0.4 acres will be cleared and why. TVA has done periodic inspections and right-of-way assessments over this transmission line for years and has not noted any infringements or requested any clearings. Accordingly, Mr. Vital requests, in consideration of the rights of the Land Trust for Tennessee, that TVA clarify the scope of the work with regard to clearing any portion of the Circle V Farm Conservation Easement and clarify the environmental impact, if any, on the conservation easement.

Second, the draft environmental assessment notes that the Systems Operation Center will contain a helipad and ancillary structures for maintenance and service, and that a helicopter may be used occasionally to transport visitors, for emergencies, and for periodic inspections of the transmission line. §§ 2.1.2, 2.5.2.1, 3.12.3.2.1. The draft environmental assessment does not, however, contain any estimation of flight frequency or anticipated flight patterns. Accordingly, Mr. Vital also requests clarification with regard to the anticipated operations of the helicopters at the Systems Operation Center. Specifically, Mr. Vital notes that the scope of service of any helicopters is vaguely defined in the environmental assessment, making it impossible to

determine its actual impact. As such, TVA should clarify where any helicopters will be based and the scope and frequency of the helicopter service.

Third, the draft environmental assessment references the additional rock cairns found on Mr. Vital's property that, along with the original cairn discovered by TVA and New South, form archaeological site 40MG305. The draft environment assessment does not, however, attach or reference the September 2019 report prepared by Lawrence S. Alexander, M.A., which documents and analyzes the additional rock cairns. Accordingly, I attach Mr. Alexander's report to this e-mail for TVA's benefit. Given the presence of the rock cairns and because the draft environmental assessment appears to analyze environmental effects under the assumption that all structures will be confined to the 100-foot-wide right of way, Mr. Vital assumes that all work, towers, structures, and/or guy wires will be confined to the right-of-way, especially with regard to the sections of the transmission lines that are near the rock cairns. Additionally, because site 40MG305 and the presence of over a dozen historically significant rock cairns were only recently discovered, Mr. Vital expects that work will stop immediately should any other potentially historical artifacts be found.

Finally, in the first bullet point in section 3.14.1, "Rival Buffalo Farm" should be "Vital Buffalo Farm."

Notwithstanding the foregoing, as noted in my September 24, 2019 correspondence, Mr. Vital does not object to the revised route as currently formatted and looks forward to working with TVA to complete the project.

Nonetheless, because the report addresses many issues on an extraordinarily wide range of subject and covers hundreds of pages with seven appendices, Mr. Vital reserves the right to comment on specific issues that may arise as the project progresses. Notwithstanding these issues, we appreciate your open communication and the opportunity to comment, and look forward to your response.

Sincerely,

C. Crews Townsend

CCT/sar

Cc: Greg A. Vital
Jenna Fullerton

An Archaeological Reconnaissance and Assessment of Sites 40MG305 and 40HA534, Hamilton and Meigs County, Tennessee

Prepared by

Lawrence S. Alexander, M.A.

Alexander Archaeological Consultants, Inc.
PO Box 62
Wildwood, GA 30757
706-820-4434

Prepared for

Crews Townsend

Miller & Martin PLLC
Volunteer Building, Suite 1200
832 Georgia Avenue
Chattanooga, Tennessee 37402
423-785-8377

September 2019

Content redacted for public distribution due to sensitive cultural data

From: david clingan [mailto:david.clingan@yahoo.com]
Sent: Wednesday, October 30, 2019 7:45 PM
To: Masters, Anita E
Subject: Georgetown project

I would like to know all environmental problems that could and will come from this... Things such as rf signals and leakage problems.. Any and all possible problems no matter how small or big..... I live in Birchwood on horner hollow rd... I also want to know about the meters you have installed and safety factors from the rf signals and possible harm they can cause humans...
Sent from Yahoo Mail on Android

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Appendix B – Correspondence

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Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

December 11, 2018

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), GUNSTOCKER CREEK DELIVERY POINT, BRADLEY, HAMILTON, AND MEIGS COUNTY

TVA previously consulted with you office regarding a proposed new office complex in Meigs, County Tennessee for use as a future secure office complex. TVA determined in consultation that the proposed undertaking would have no effect to historic properties (letter dated April 11, 2017). TVA is considering additional improvements to its transmission system that would supply power to this complex and provide power system connections to ensure reliability and additional capacity. TVA proposes to build about 5.25 miles of double-circuit transmission line (TL) to provide power to TVA's proposed Gunstocker Creek 161-kV Station which would be located on the 167-acre parcel. The proposed TL would begin at TVA's Sequoyah Nuclear Plant-Hiwassee No. 1 161-kV TL northwest of the Hopewell, Tennessee 161-kV Metering Station near the intersection of Rabbit Valley Road Northwest and State Highway 60 (Georgetown Pike) northwest of Cleveland, Tennessee. The TL would extend northwest for about 5.25 miles (through portions of Bradley, Hamilton, and Meigs Counties) to the proposed Gunstocker Creek 161-kV Station northeast of the intersection of State Highways 58 and 60 in Meigs County. The new line would be built using double-circuit, steel poles centered on existing 100-foot-wide right of way (ROW) and on new 100- to 150-foot-wide right of way.

Approximately 4.25 miles of the new line would be on existing 100-foot-wide ROW of TVA's East Cleveland Primary-Georgetown 69-kV TL. This line would be torn down and rebuilt as double-circuit from Structure 76 to the old Georgetown Substation. The remaining one mile would be on new 100- to 150-foot-wide ROW.

TVA determined that the area of potential effects (APE) for the project to be the approximately 5.25 miles long by 100 foot to 150 foot wide ROW for direct effects and .5 mile radius and within the visual line of sight for indirect effects. Since the remaining 4.25 miles of rebuild is on existing ROW, this portion of the undertaking would not introduce substantial changes to the viewshed (Figure 1).

By this letter, TVA is initiating consultation regarding the proposed undertaking. TVA is proposing to do a Phase I Cultural Resources survey of the APE. Due to ongoing survey and

engineering efforts, TVA proposes to proceed under phases as provided under 36 CFR § 800.4(b)(2) and § 800.5(c)(1).

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

If you have any questions or comments, please contact Michaelyn Harle by telephone, (865) 632-2248 or by email, mharle@tva.gov.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES, NOT INCLUDED WITH OUTBOUND LETTER:

Lana D. Bean, WT 10 C-K
Patricia B. Ezzell, WT 7C-K
Michaelyn S. Harle, WT 11C-K
Susan R. Jacks, WT 11C-K
Paul J. Pearman, BR 4A-C
M. Susan Smelley, BR 4A-C
Emily P. Willard, MR 4G-C
ECM, WT CA-K

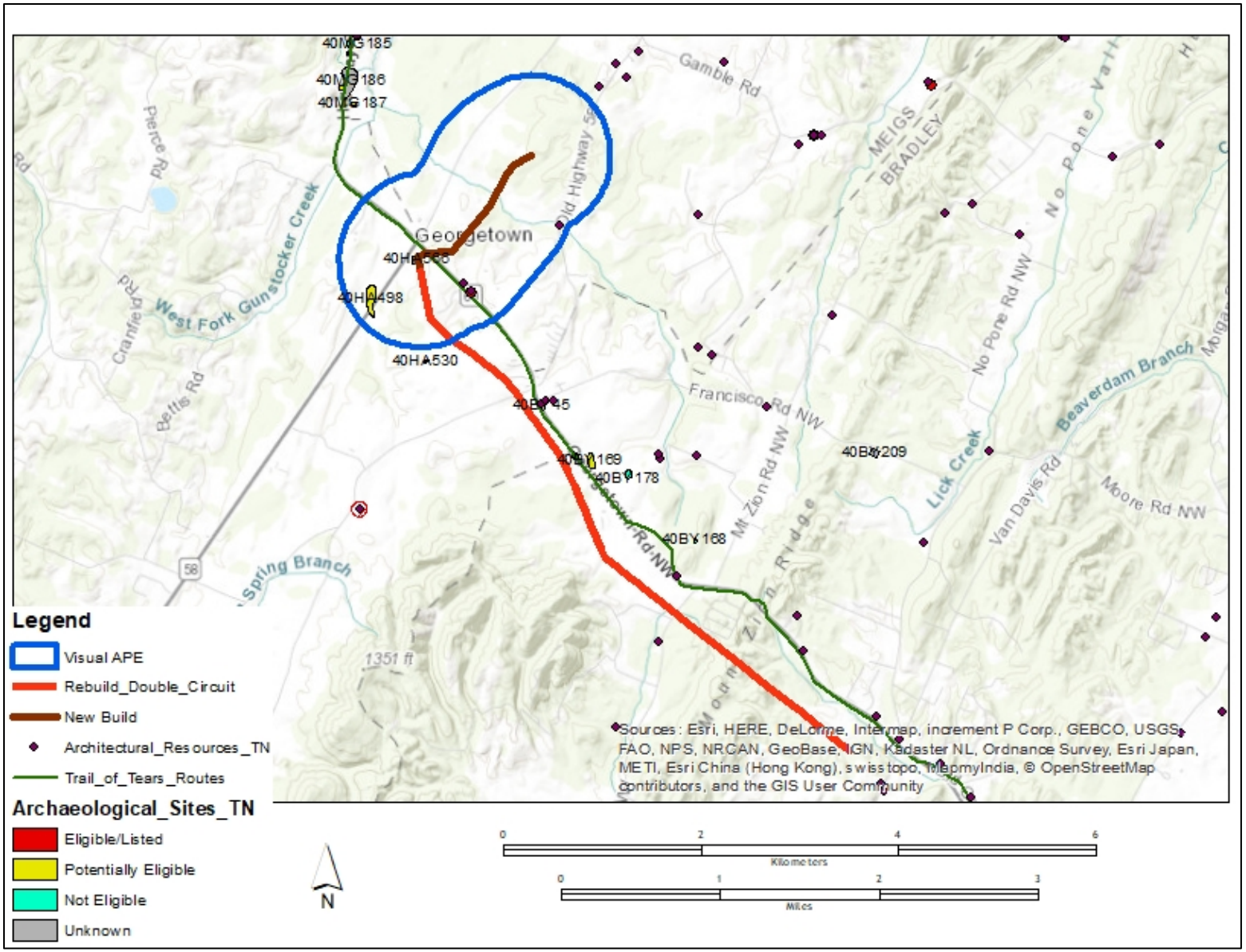

Figure 1: APE (located within 7.5' Birchwood Quadrangle) and previously recorded archaeological and architectural resources

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

January 8, 2019

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Gunstocker Creek Delivery Point, Bradley, Hamilton and Meigs Counties, TN

Dear Mr. Jones:

In response to your request, we have reviewed the documents submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). We concur with your agency that a process of phased compliance is appropriate for this undertaking. As the project progresses, please submit detailed documentation to this office for each phase of the proposed undertaking for our continued review and comment.

If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Justin Heskew at (615) 770-1092 or for archaeology, Jennifer Barnett at (615) 687-4780.

Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
REGION 2 TRAFFIC ENGINEERING
7512 VOLKSWAGEN DRIVE
CHATTANOOGA, TENNESSEE 37416
(423) 892-3430

CLAY BRIGHT
COMMISSIONER

BILL LEE
GOVERNOR

April 10, 2019

Robert E. Lamb, Inc.
Attn: William R. McNaney, P.E.
PO Box 133
Valley Forge, PA 19481

Re: ***Traffic Impact Study***
TVA Facility-Georgetown
State Route 58, Log Mile 0.68RT
Meigs County

Mr. McNaney:

The TDOT Regional Traffic Engineering office in Chattanooga has received the Traffic Impact Study for the TVA Facility in Georgetown to be located along State Route 58 in Meigs County, TN. The study was performed by Ms. Dyan Damron of Volkert, Inc., dated March 2019. TDOT has approved the study and agrees with the recommendations presented.

Before a permit can be issued, a set of site and grading plans will need to be submitted and approved by this office. If you have any questions, please contact me at *Zach.Johnson@tn.gov* or via telephone at 423-510-6914.

Best Regards,

Zach Johnson
Assistant Regional Traffic Engineer

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

April 19, 2019

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), GUNSTOCKER CREEK DELIVERY POINT BRADLEY, HAMILTON, MEIGS COUNTY, TENNESSEE

In a letter dated December 11, 2018, TVA consulted with your office regarding its proposed undertaking to make improvements to its transmission system in order to supply power to a new 166-acre secure office complex in Meigs County, Tennessee. To make these improvements, TVA proposes to build about 5.25 miles of a double-circuit transmission line (TL) to provide power to a proposed substation (Gunstocker Creek 161-kV Substation) located at the new secure office complex. Approximately 4.25 miles of the new line would be on an existing 100-foot wide right-of-way (ROW); the remaining one mile would be on new 100 to 150-foot wide ROW. TVA would also contract with the local water utility to construct a new waterline to the proposed office complex. Additionally, TVA proposes to contract with the local electric utility provider to provide a 26-kV back-up electrical feed from its existing TL alongside the west side of Highway 58 directly to the proposed office complex.

TVA determined the area of potential effects (APE) to be the 4.25 mile long by 100 foot wide existing ROW and all associated access roads (Phase A); and the approximately one mile long by 100-150 feet wide new TL ROW, the approximately 1.42 miles by 20-foot wide access roads (the enclosed report states 100 feet; this is inaccurate and will be changed for the final report), and the 1.4 miles long by 50 feet wide waterline (Phase B). For visual effects, the APE includes areas within a half mile surrounding the TL corridors that are within the visual line of sight to the project area. For the 26- kV back-up electrical feed, TVA determined the APE to be the footprint of ground disturbing activity including the proposed new utility pole and the proposed underground feed to the site (enclosed figure).

TVA contracted with New South Associates (“New South”) to conduct a Phase I Cultural Resources survey of the APE. Enclosed are the resulting reports titled *Phase I Cultural Resources Survey for the Gunstocker Creek Transmission Line Phase A* and *Phase I Cultural Resources Survey for the Gunstocker Creek Transmission Line Phase B.* A portion of the APE for the 26- kV back-up electrical feed is located within the boundaries of Tennessee Department of Transportation’s road easement and was surveyed as part of the waterline portion of the APE

(discussed in the Phase B enclosed report). The portion of the underground feed has been previously surveyed (Van de Kree et al. 2017).

New South identified three previously recorded archaeological sites (40BY167, 40HA534 and 40HA566) and one newly recorded site (40MG305) in the APE. Nance (2001) identified sites 40HA534 and 40BY167 as segments of the Northern Route of the Trail of Tears based on historical documentation. The Northern Route closely follows the modern alignment of Georgetown Road/SR 60 in the vicinity of the project area. The APE crosses Georgetown Road/SR 60 along site 40HA534 just east of its intersection with SR 58 for the new build portion and where proposed access roads intersect SR 60. New South identified no intact portions of the Trail of Tears nor other artifacts or features that may be associated with the Trail of Tears within the APE.

The site boundaries of 40HA566, the Rosenwald, Georgetown School, were previously recorded based on documentary evidence and no ground-truthing was conducted at the time of recordation. The portion of the site within the APE has been heavily disturbed and no intact archaeological deposits were identified. Based on the results of the survey, TVA finds that the portion of the site within the APE is not contributing to the eligibility of site 40HA566.

Site 40MG305 is a single stone pile approximately 135 centimeters in diameter and 50 centimeters tall identified within the Phase B APE (new build portion). While this type of feature can sometimes be the result of historic nonaboriginal or precontact/early historic American Indian occupations, New South identified no clear documentary evidence that this stone pile is historic. Due to the sensitive nature of these type of sites to consulting federally recognized Indian Tribes, TVA shifted the orientation of the proposed line in order to avoid this potentially sensitive resource. The proposed reroute was based on allowing for sufficient buffer to the resource while factoring in other environmental and engineering constraints. TVA finds site 40MG305 to be potentially eligible for the National Register of Historic Places (NRHP). The proposed reroute is approximately 0.64 mile long. The archaeological survey conducted on the proposed reroute identified one isolated find. No other archaeological resources were identified. Based on the survey results, TVA proposes to utilize this reroute to avoid site 40MG305.

Four architectural structures within the visual APE located in Meigs County were previously evaluated in 2018 by Tennessee Valley Archaeological Research (Rosenwinkel et al. 2018). TVA consulted with your office regarding the eligibility of these resources in a letter dated February 15, 2018. And in a letter dated March 1, 2018, your office concurred with these determinations. Table 1 lists the remaining historic architectural resources identified within the visual APE and TVA's NRHP eligibility determinations. All but two of these resources have been recommended by New South to be ineligible for the NRHP, based on lack of integrity, the absence of any association between the structures and historically important persons or events, and/or the lack of architectural distinction.

The NRHP-listed Bradford Rymer Stone Barn (MG-294) was identified within the 0.5 mile visual APE of TVA's undertaking. The proposed undertaking would not result physical alteration of the property, removal of the property, change in the property's use or physical features, or the

neglect of the property. The property is privately owned and would not come under federal ownership of control. The TL for this portion of the undertaking would follow a ROW that was established in the 1950's (please note the report says 1930s; this is in error and will be changed for the final report). MG-294 is located approximately 0.3 miles northeast of the proposed TL and wooded areas of mature trees further buffer the property from the project area. The proposed undertaking would not introduce new visual, atmospheric or audible elements that diminish the integrity of the property's historic features for which it was listed. TVA finds that the proposed undertaking would not have an adverse effect on the NRHP-listed Bradford Rymer Stone Barn.

TVA finds the Beaty Cantilever Barn (BY-390) to be eligible for listing on the NRHP under Criterion C due to the rarity of the barn's single cantilever design. The proposed undertaking would not result in the physical alteration of the property, removal of the property, change in the property's use or physical features, the neglect of the property, or transfer of the property out of federal ownership or control. The Beaty Cantilever Barn is located approximately 0.3 miles northeast of the TL proposed to be rebuilt and is further buffered with wooded areas of mature trees between the property and the TL ROW. Further, the setting of this property has been compromised by the removal of the associated house and the construction of a local power company's transmission metering station. For these reasons, TVA finds that the proposed undertaking would not have an adverse effect on the Beaty Cantilever Barn.

TVA has reviewed the enclosed reports and agrees with New South's recommendations. TVA finds that the proposed undertaking would have no adverse effect on historic properties. TVA is seeking your concurrence with TVA's eligibility determinations and no adverse effect finding.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding properties within the survey area that may be of religious and cultural significance to them and eligible for the NRHP.

If you have any questions, please contact Michaelyn Harle by phone, (865) 632-2248 or by email, mharle@tva.gov.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

Table 1: Historic Structures identified during the survey and TVA's eligibility assessment

Property Number	Property Name	Eligibility Determination
HS-1	LEAMON HOUSE	Not Eligible
HS-2	DAVE'S SPICED RIGHT BBQ	Not Eligible
HS-3	CALDWELL HOUSE	Not Eligible
HS-4	HUBBARD HOUSE	Not Eligible
HS-6	VITAL BUFFALO FARM	Not Eligible
HS-5	VITAL BARN	Not Eligible
HS-7	GOOCH BARNS	Not Eligible
HS-8	FIRST BAPTIST CHURCH OF GEORGETOWN	Not Eligible
HS-9	FORMER STORE	Not Eligible
HS-10	HINKLE-HOUSELEY FARM	Not Eligible
HS-11	CARTER HOUSE	Not Eligible
HS-12	MOUNT ZION REVIVAL CENTER	Not Eligible
HS-13	EPPERSON HOUSE	Not Eligible
HS-14	WILLIAMS SERVICE STATION	Not Eligible
HS-15	MURRAY HOUSE	Not Eligible
HS-16	MOUNT ZION UNITED MEHODIST CHURCH & CEMETERY	Not Eligible
HS-17	LEWIS HOUSE	Not Eligible
HS-18	DON AND DAWANA MCCLANAHAN HOUSE	Not Eligible
HS-19	SNIDER HOUSE	Not Eligible
HS 20	DAVIS HOUSE	Not Eligible
HS 21	LAWS HOUSE	Not Eligible
HS -22	FLANAGAN HOUSE	Not Eligible
HS-23	JESSIE BEATY HOUSE	Not Eligible
HS-24	MCCLANAHAN HOUSE	Not Eligible
HS-25	CHHOUSE	Not Eligible
HS-26	WOMICK HOUSE	Not Eligible
HS-27	SMITH HOUSE	Not Eligible
HS-28	DONALD VASSEY HOUSE	Not Eligible
HS-29	DARNELL HOUSE	Not Eligible
HS-30	CLAYTON BEATY HOUSE A	Not Eligible
HS-31	CLAYTON BEATY HOUSE B	Not Eligible
HS-32	SCROGGINS DUPLEX	Not Eligible
HS-8 (Phase B)	MACK HOUSE	Not Eligible
HS-9 (Phase B)	CRAWFORD HOUSE	Not Eligible
MG.293	RYMER-LONAS HOUSE	Not Eligible
MG-294	BRADFORD RYMER STONE BARN	Listed
BY-389	PENDEGRASS HOUSE	Not Eligible
BY-391	FORMER BEATY FARM	Not Eligible/House no longer extant

BY-390	BEATY CANTILEVER BARN	Eligible
BY-392	BARGER FARM	Not Eligible
BY-455	VASSEY HOUSE	Not Eligible
BY-476	BEAVERS HOUSE	Not Eligible
BY-477	CAPTAIN GEORGE FIELDS HOUSE	Not Eligible
BY-478	HALL HOUSE	No longer extant
BY-479	COLLINS HOUSE	Not Eligible
BY-481	MCCLANAHAN HOUSE	Not Eligible
BY-482	MOWREY HOUSE	No longer extant
TVAR IS-1	Circa 1930 front-gable house	Determined Not Eligible in consultation
TVAR IS-2	Circa 1958 side-gable house	Determined Not Eligible in consultation
TVAR IS-3	Circa 1968 side-gable house	Determined Not Eligible in consultation
MG-276	Early twentieth-century truss bridge	Determined Not Eligible in consultation

References

Nance, Benjamin

2001 *The Trail of Tears in Tennessee: A Study of the Routes Used During the Cherokee Removal of 1838*. Report submitted to the Tennessee Department of Environment and Conservation Division of Archaeology

Rosenwinkel, Heidi, Ted Karpynec, Meghan Weaver, Cassandra Medeiros, Elinor Crook, and Charles Van de Kree

2018 *A Phase I Cultural Resources Survey of Two Additional Tracts of Land Associated with the Tennessee Valley Authority's Viper Economic Development Project in Meigs County, Tennesse*e. Tennessee Valley Archaeological Research, Huntsville, Alabama.

Van de Kree, Charles, Elinor Crook, and J. Rocco de Gregory

2017 A Phase I Archaeological Survey of 87 Acres in Meigs County, Tennessee. Tennessee Valley Archaeological Research. Submitted to the Tennessee Valley Authority.

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

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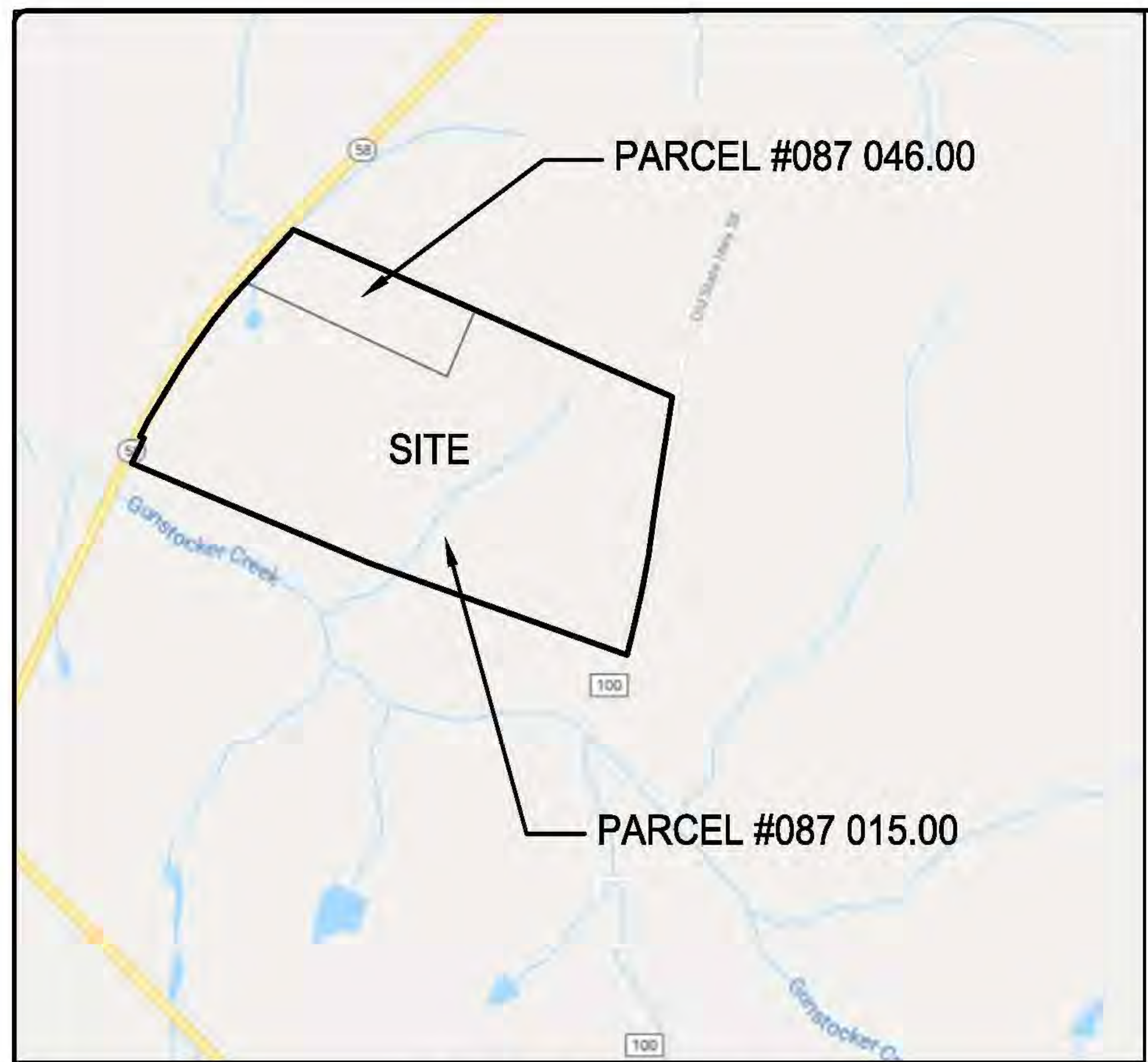
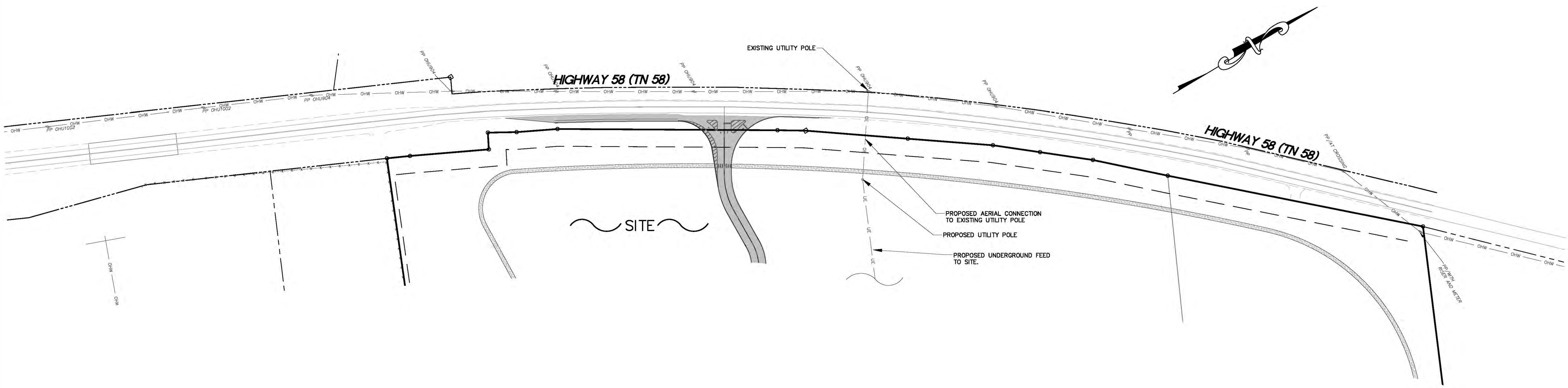
David L. Bowling, WT 11B-K
James S. Chase, WT 6A-K
Michael C. Easley, BRF 1A-CTT
Patricia B. Ezzell, WT 7C-K
Michaelyn S. Harle, WT 11C-K
Susan R. Jacks, WT 11C-K
Khurshid K. Mehta, WT 11A-K
Paul J. Pearman, BR 2C-C
M. Susan Smelley, BR 2C-C
David E. Stinson, SP 4H-C
Emily P. Willard, BR 2C-C
ECM, WT CA-K



LOCATION MAP
1" = 1000'

LEGEND
EXISTING PROPERTY LINE
EXISTING LEGAL RIGHT OF WAY
EXISTING ROAD CENTERLINE
EXISTING ROAD
EXISTING FENCE
EXISTING CONCRETE MONUMENT
EXISTING IRON ROD



GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

ROBERT E. LAMB, INC
PLANNING DESIGN CONSTRUCTION
VALLEY FORGE, PENNSYLVANIA

REV.	DATE	DESCRIPTION
A	02/05/19	ISSUED FOR CLIENT USE

VEC EXHIBIT PLAN

CLIENT: TENNESSEE VALLEY AUTHORITY
PROJECT: SYSTEM OPERATIONS CENTER
LOCATION: GEORGETOWN, MEIGS COUNTY, TN

DRAWN: RAD
A/E: WRM
Q/C:
SCALE: 1" = 100'
WORK ORDER NO.: 1628B
DRAWING NO.: SKC-44

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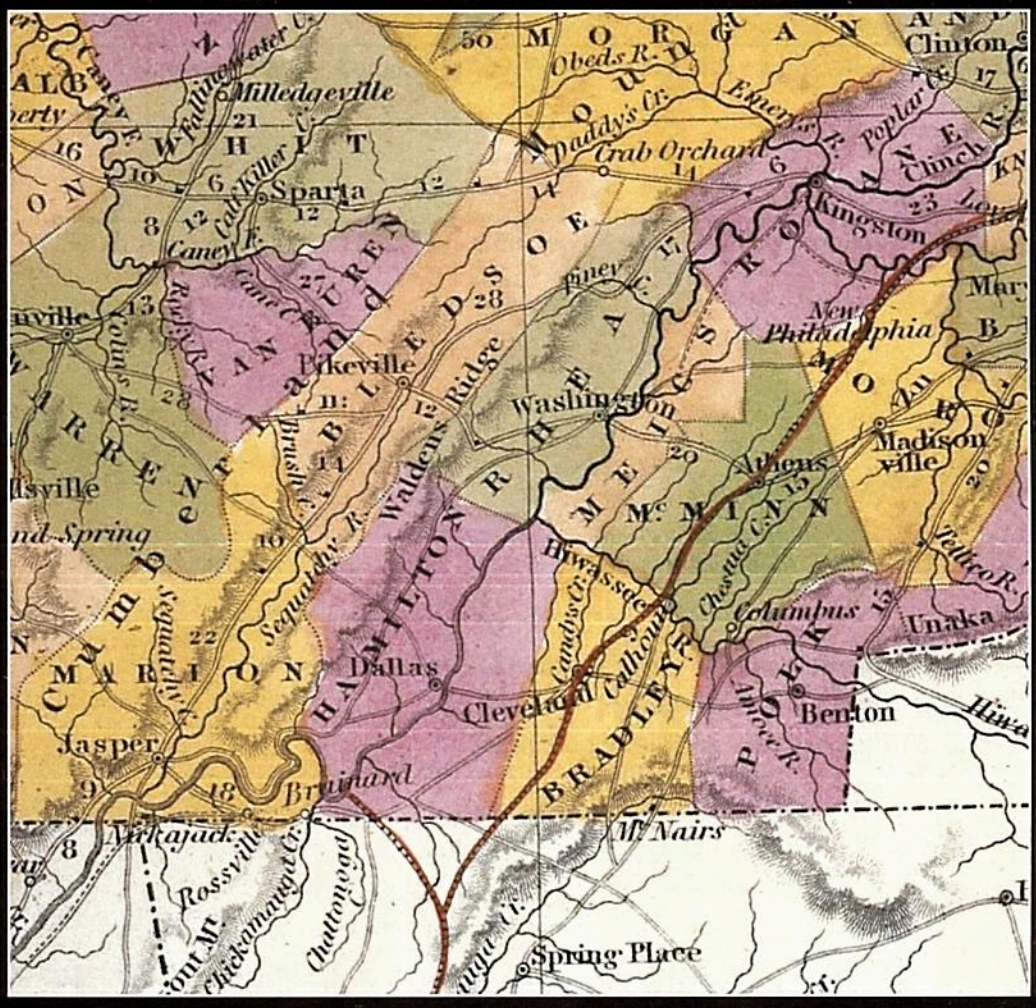
Phase I Cultural Resources Survey for the Gunstocker Creek Transmission Line Phase A

Bradley, Hamilton, and Meigs Counties, Tennessee

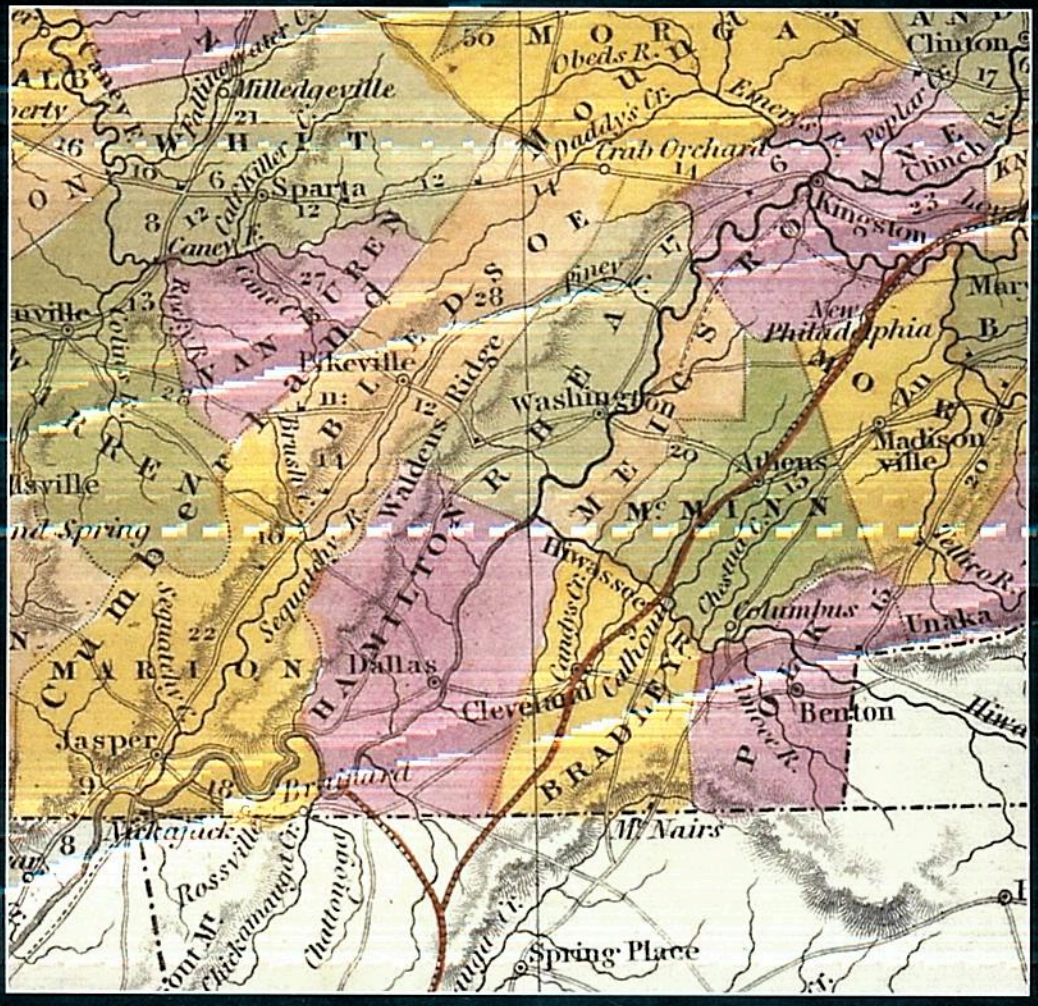


New South Associates, Inc.

Content redacted for public distribution due to sensitive cultural data

Phase I Cultural Resources Survey for the Gunstocker Creek Transmission Line Phase B

Bradley, Hamilton, and Meigs Counties, Tennessee



New South Associates, Inc.

Content redacted for public distribution due to sensitive cultural data

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

May 9, 2019

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

RE: TENNESSEE VALLEY AUTHORITY (TVA), GUNSTOCKER CREEK DELIVERY POINT BRADLEY, HAMILTON, MEIGS COUNTY, TENNESSEE

Per your request in a letter dated May 2, 2019, please find the additional documentation prepared by New South regarding the Hinkle-Houseley Farm including approximate dates for outbuildings, and more context regarding the farm's agricultural history enclosed. TVA agrees with the recommendation of the consultation that the Hinkle Houseley Farm is not eligible for the National Register of Historic Places due to lack of architectural integrity of the primary dwelling and associated outbuildings and is not significant for its association with person(s) or event(s).

With this additional information TVA maintains that the proposed undertaking would have no effects to historic properties, and TVA is seeking your concurrence with our findings. TVA will have New South incorporate this additional information in the final report.

If you have any questions, please contact Michaelyn Harle by phone, (865) 632-2248 or by email, mharle@tva.gov.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosure

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

Lana D. Bean, WT 10C-K
David L. Bowling, WT 11B-K
James S. Chase, WT 6A-K
Michael C. Easley, BRF 1A-CTT
Patricia B. Ezzell, WT 7C-K
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M. Susan Smelley, BR 2C-C
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ECM, WT CA-K

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

August 23, 2019

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), PROPOSED REROUTE GUNSTOCKER CREEK DELIVERY POINT BRADLEY, HAMILTON, AND MEIGS COUNTY, TENNESSEE

In a letter dated April 19, 2019, TVA consulted with your office regarding the proposed improvements to its transmission system in order to support a new 166-acre secure office complex in Meigs County, Tennessee. The undertaking included the construction of approximately 5.25 miles of transmission line (TL) including one mile on new right of way (ROW). In a letter dated May 2 and May 17, 2019, your office concurred with TVA's no adverse effect findings.

Following this consultation, Mr. Vital (property owner and consulting party) provided TVA with additional information regarding possible rock cairns that may be associated with site 40MG305 including within the proposed realignment of the Gunstocker TL ROW. Although these resources have not been formally evaluated, given the potential significance to federally recognized Indian tribes, TVA has chosen to avoid this location and look for a potential reroute to the west. In order to facilitate the new route, TVA needs to construct a tower extension on existing structure 151 and add a prop-structure in the existing 500-kV ROW between structures 151 and 152. TVA has revised the area of potential effects (APE) to include the portion of the 100 foot ride ROW that would be rerouted, the areas where ground disturbance could occur in association with the tower extension (approx. 2.5 acres) and as well as areas within a half-mile radius of the project within which the project would be visible, where visual effects on above-ground [or, historic architectural] resources could occur.

TVA contracted with Tennessee Valley Archaeological Research (TVAR) to conduct a Phase I survey of the portions of the new TL ROW not previously covered by New South's survey. TVA Cultural Compliance staff and TVAR's Principal Investigator also conducted a pedestrian visual survey of the entire portion of the new ROW. As a result of the survey, no new archaeological sites were identified. There will be some visibility of the rock cairn identified by New South, especially in the winter when vegetation cover will be as substantial. The viewshed of site 40MG305 has been previously affected by an existing 500-kV TL located 50 meters north of site 40MG305, and TVA finds that although there will be visual effects to site 40MG305 the effects

of the proposed undertaking would not be adverse. The half mile radius surrounding the revised project area has been previously surveyed in association with New South's original survey and TVAR's survey of the proposed office complex in 2017. The proposed reroute still crosses site 40HA534 (Northern Route of the Trail of Tears) at Georgetown Road/SR 60. Mr. Vital's consultant suggested that the Northern Route is more likely to closely align with a historic road (Old Georgetown Road) that parallels SR 60. Although intact remnants of Old Georgetown road are visible outside the APE, shovel testing conducted by New South identified that the area within the APE has been heavily modified.

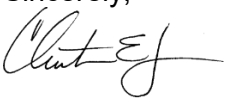
The proposed reroute would not change TVA's finding that the proposed undertaking would not have an adverse effect to the National Register of Historic Places (NRHP)-listed Bradford Rymer Stone Barn.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding properties within the survey area that may be of religious and cultural significance to them and eligible for the NRHP.

Pursuant to 36 CFR Part 800.5(c) we are notifying you of TVA's finding of no adverse effect, providing the documentation specified in § 800.11(e); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will have no adverse effects on historic properties.

If you have any questions, please contact Michaelyn Harle by phone, (865) 632-2248 or by email, mharle@tva.gov.

Sincerely,



Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES NOT TO BE INCLUDED WITH OUTGOING LETTER:

Michael C. Easley, BR 2C-C
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Travis A. Giles, BR 2C-C
Michaelyn S. Harle, WT 11C-K
Susan R. Jacks, WT 11C-K
Paul J. Pearman, BR 2C-C
M. Susan Smelley, BR 2C-C
Rebecca C. Tolene, WT 11C-K
David E. Stinson, SP 4H-C
Emily P. Willard, MR 4G-C
ECM, WT CA-K

Harle, Michaelyn S

Subject: RE: TVA-Gunstocker TL REROUTE-MeigsCoTN-TRIBAL-26Aug2019

TVA External Message. Please use caution when opening.

Dear Marianne:

Regarding the above-mentioned project, the Jena Band of Choctaw Indians' hereby defers to the additional Tribes with interest in this area. This deference does not preclude future consultation with the Jena Band of Choctaw Indians. Thank you.

Sincerely,

Alina J. Shively
Jena Band of Choctaw Indians
Tribal Historic Preservation Officer
P.O. Box 14
Jena, LA 71342
(318) 992-1205
ashively@jenachoctaw.org

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 23, 2019

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

RE: TENNESSEE VALLEY AUTHORITY (TVA), PROPOSED REROUTE GUNSTOCKER CREEK DELIVERY POINT BRADLEY, HAMILTON, AND MEIGS COUNTY, TENNESSEE

Per your August 27, 2019 letter and follow up conversation, please find two revised reports for the subject undertaking enclosed. The revised report clarifies the site boundaries for site 40MG305.

Pursuant to 36 CFR Part 800.5(c) we are notifying you of TVA's finding of no adverse effect, providing the documentation specified in § 800.11(e); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will have no adverse effects on historic properties.

If you have any questions, please contact Michaelyn Harle by phone, (865) 632-2248 or by email, mharle@tva.gov.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
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Susan R. Jacks, WT 11C-K
Paul J. Pearman, BR 2C-C
M. Susan Smelley, BR 2C-C
Rebecca C. Tolene, WT 11B-K
David E. Stinson, SP 4H-C
Emily P. Willard, MR 4G-C
ECM, WT CA-K

MILLER & MARTIN PLLC

C. CREWS TOWNSEND

Direct Dial 423-785-8297
Direct Fax 423-321-1571
crews.townsend@millermartin.com

September 24, 2019

Via FedEx

Clinton E. Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: **TVA's Gunstocker Creek Transmission Line Project, a.k.a "Project Viper" Greg Vital Property – TVA Tract No. ECG-1002-TE; Meigs County Tax Map parcel 087.001.02**

Dear Mr. Jones:

I am in receipt of your August 23, 2019 letter discussing TVA's findings as to the proposed undertaking's revised route. My client Greg Vital appreciates his role as a consulting party under the National Historic Preservation Act ("NHPA") and 36 C.F.R. §§ 800.2 and 800.3 and your cooperation to find a suitable route for the TVA transmission line. Provided the Tennessee State Historic Preservation Office ("SHPO") and the consulting Indian tribes do not object to the revised route, Mr. Vital does not oppose the revised route as currently formulated, subject to the following considerations.

For the sake of brevity, I incorporate by reference the background set out in my May 16, 2019 letter objecting to TVA's original findings. In summary, since TVA's discovery of a rock cairn with possible historical significance within the original area of potential effects ("APE"), seventeen more rock cairns have been identified in proximity to the first rock cairn, all of which are believed to be not only of prehistoric origin, but also historically connected. A report by Lawrence S. Alexander, M.A., of Alexander Archaeological Consultants, Inc., dated September 2019, is enclosed as **Exhibit A**, discusses the location and significance of the eighteen rock cairns (collectively "Site 40MG305").

Given the "potential significance to federally recognized Indian tribes," TVA decided to avoid Site 40MG305 by moving the route west. Although the new route avoids immediate impact to Site 40MG305, it still crosses an area linked to the Northern Route of the Trail of Tears by archival research ("Site 40HA534"). *See* Ex. A, at 8–10. TVA found Site 40HA534 would not be adversely affected because the area within the new APE has already been heavily modified.

Mr. Vital agrees that the new route is the least impactful upon the relevant historical sites. Nevertheless, he requests that the historical nature of the area continue to be considered and protected as follows:

1. Because the archaeological survey report performed by Tennessee Valley Archaeological Research does not address construction staging areas, construction staging areas should be identified for consideration by consulting parties;

2. The impact on known historical sites, including Sites 40MG305 and 40HA534, should be considered and minimized wherever possible during construction;

3. Given the historical significance of the area, TVA should assume responsibility for seeking out, documenting, and preserving additional historical sites in the new APE before and during construction; and

4. A physical barrier should be placed on the southeastern perimeter of the APE the prevent further modification to Site 40HA534.

Notwithstanding the foregoing, Mr. Vital does not object to the revised route as currently formulated and looks forward to working with TVA to complete the project.

Cordially,

C. Crews Townsend

Enclosure: Exhibit A

cc:

Via FedEx
Mr. E. Patrick McIntyre, Jr.
Executive Director and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, TN 37243-0442

Via FedEx and
Via E-mail: achp@achp.gov
Advisory Council on Historic Preservation
Office of Federal Agency Programs
401 F Street, NW, Suite 308
Washington, DC 20001-2637

Via E-Mail: mharle@tva.gov
Dr. Michaelyn Harle
Archaeologist, Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Via E-Mail: jschase@tva.gov
James S. Chase
TVA General Counsel's Office
400 West Summit Hill Drive
Knoxville, TN 37902

Via E-Mail: mmshuler@tva.gov
Marianne M. Shuler
Senior Specialist, Archaeologist &
Tribal Liaison Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902
865.632.2464

Via E-Mail: ntl@tva.gov
Kelly Evans
Siting Engineer– Transmission Siting
Transmission Engineering and Construction
Tennessee Valley Authority
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Via FedEx
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Archaeologist
Tennessee Division of Archaeology
1216 Foster Avenue
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Via FedEx
Rody Blevins, President/CEO
Volunteer Energy Cooperative
18359 Highway 58
Decatur, TN 37322

Via FedEx
Lamar Alexander
U.S. Senator (R-TN)
455 Dirksen Senate Office Building
Washington, DC 20510

Via E-Mail:
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The White House
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Daniel Hale, Policy Advisor
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Chuck Fleischmann
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John Rose
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Via FedEx
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Via FedEx
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Via FedEx
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Via FedEx
Principal Chief Richard Sneed
Eastern Band of Cherokee Indians
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James R. Dalrymple
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Via E-Mail
clclem@tva.gov
Clayton L. Clem
Vice President
Tennessee Valley Authority
1101 Market Street, MR 3F
Chattanooga, TN 37402

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

September 27, 2019

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Gunstocker Creek Delivery Point, Revised, Multiple Counties, TN

Dear Mr. Jones:

Pursuant to your request, this office has reviewed documentation concerning the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we find that the project area contains the National Register listed Bradford Rymer Stone Barn. We further find that the project as currently proposed will not adversely affect this historic property.

This office has no objection to the implementation of this project as currently planned. If project plans are changed or previously unevaluated archaeological resources are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions and comments may be directed to Jennifer M. Barnett (615) 687-4780. We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

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CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948
918-453-5000 • www.cherokee.org

Office of the Chief

Chuck Hoskin Jr.
Principal Chief

Bryan Warner
Deputy Principal Chief

October 17, 2019

Marianne Shuler
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: Proposed Reroute Gunstocker Creek Delivery Point

Ms. Marianne Shuler:

The Cherokee Nation (Nation) is in receipt of your correspondence about and related report for the **Proposed Reroute Gunstocker Creek Delivery Point**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office (Office) reviewed this project, cross referenced the project's legal description against our information, and found instances where this project intersects or adjoins such resources, including the CHEROKEE TRAIL OF TEARS, Northern Route (Site 40HA534). The related report notes, however, intact segments of the Trail of Tears are not within the Area of Potential Effect (APE).

Thus, the Nation does not object to the project proceeding as long as the following stipulations are observed:

1) The Nation requests that Tennessee Valley Authority (TVA) re-contact this Office for additional consultation if there are any changes to the scope of or activities within the APE;

2) The Nation requests that TVA protect Site 40MG305 and 40HA534 from the proposed projects direct and indirect effects, such as offsite staging areas or borrow pits;

3) The Nation requests that TVA halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project; and

4) The Nation requests that TVA conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

Further, while Site 40MG305 is outside the APE for the proposed reroute, the Nation concurs that this Site is eligible potentially for the National Register of Historic Places under Criteria A as a Traditional Cultural Property and D. The Nation requests that TVA re-contact this Office for additional consultation prior to any archeological investigations for this Site.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

From:	Troxler, Jesse Charles
To:	"Robbie Sykes"; "Ross Shaw"
Subject:	MODIFICATION 2 to Project 419886-Gunstocker Creek 161 kV TL - New Transmission - Notification in accordance with TVA Programmatic Consultation for Routine Actions and Federally listed bats
Date:	Tuesday, October 22, 2019 10:12:00 AM
Attachments:	MOD2_COMBINED-Complete_Project-Review-Form_TVA-Bat-Strategy_Sep-2019 Gunstocker Delivery Point & SOC.pdf

Good afternoon,

TVA's programmatic ESA consultation on routine actions and bats was completed in April, 2018. For projects with NLAA or LAA determinations, TVA is providing project-specific notification to relevant Ecological Service Field Offices. This notification also will be stored in the project administrative record. For projects that utilize Take issued through the Biological Opinion, that Take will be tracked and reported in TVA's annual report to the USFWS by March of the following year.

The attached form is serving as TVA's mechanism to determine if project-specific activities are within the scope of TVA's bat programmatic consultation and if there is project-specific potential for impact to covered bat species, necessitating conservation measures, which are identified for the project on pages 6-11. The form also is serving as the primary means of notification to the USFWS and others as needed.

Project: *Second Modification to Project 419886 – New Transmission – Bradley, Hamilton, and Meigs Counties, TN – Note: This notification and review form replaces the notification and form "COMBINED-Complete_Project-Review-Form_TVA-Bat-Strategy_Dec-2018 Gunstocker Delivery Point & SOC.pdf" sent 5/9/2019.*

TVA will use 4.25 miles of existing 100' wide 69-kV ROW to rebuild the existing TL into a double circuit loop. The ROW is maintained but trees growing within the existing ROW will be cleared. TVA will construct 1 mile of new 161-kV TL from the terminus of the existing ROW into the proposed Gunstocker Creek 161-kV Substation. TVA also proposes to construct a new Systems Operation Center (SOC) complex. 35.7acres (9/9-10/25) of forest will be removed for SOC and 4.1 (8/31-10/20) for TL . Acoustic Surveys were completed for SOC and no bats were present.

Use of 4.1 acres of Take was necessary in completion of this project. The quantity of take has changed in this modification from 11.7 to 4.1 acres.

Thank you.

Jesse Troxler
Tennessee Valley Authority
Terrestrial Zoologist
865-632-2285 office
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From: Troxler, Jesse Charles
Sent: Thursday, May 09, 2019 1:07 PM
To: Robbie Sykes <robbie_sykes@fws.gov>; Ross Shaw <ross_shaw@fws.gov>
Subject: MODIFICATION to Project 419886-Gunstocker Creek 161 kV TL - New Transmission - Notification in accordance with TVA Programmatic Consultation for Routine Actions and Federally listed bats

Good afternoon,

TVA's programmatic ESA consultation on routine actions and bats was completed in April, 2018. For projects with NLAA or LAA determinations, TVA is providing project-specific notification to relevant Ecological Service Field Offices. This notification also will be stored in the project administrative record. For projects that utilize Take issued through the Biological Opinion, that Take will be tracked and reported in TVA's annual report to the USFWS by March of the following year.

The attached form is serving as TVA's mechanism to determine if project-specific activities are within the scope of TVA's bat programmatic consultation and if there is project-specific potential for impact to covered bat species, necessitating conservation measures, which are identified for the project on pages 6-11. The form also is serving as the primary means of notification to the USFWS and others as needed.

Project: *Project 419886 – New Transmission – Bradley, Hamilton, and Meigs Counties, TN – Note: This notification and review form replaces the notification and form "Complete_419886_Gunstocker_161kV_TL_New_Trans_TVA-Bat-Strategy_2018-4-25" sent 4/25/2019.*

TVA will use 4.25 miles of existing 100' wide 69-kV ROW to rebuild the existing TL into a double circuit loop. The ROW is maintained but trees growing within the existing ROW will be cleared. TVA will construct 1 mile of new 161-kV TL from the terminus of the existing ROW into the proposed Gunstocker Creek 161-kV Substation. TVA also proposes to construct a new Systems Operation Center (SOC) complex. 35.7acres (9/9-10/25) of forest will be removed for SOC and 11.7 acres (8/31-10/20) for TL . Acoustic Surveys were completed for SOC and no bats were present.

Use of 11.7 acres of Take was necessary in completion of this project. The quantity of take has not changed in this modification but the season of clearing has, resulting in a lower rate of conservation funding.

Thank you.

Project Review Form - TVA Bat Strategy *(12/2018)*

*This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.*[1]

Project Name: Gunstocker Creek 161-kV Delivery Point (Modification 2) **Date:** Sep 5, 2019

Contact(s): Emily Willard **CEC#:** **Project ID:** 419886

Project Location (City, County, State): Tennessee (Meigs, Bradley and Rhea)

Project Description:

TVA proposes to construct a new Systems Operation Center complex. TVA will use 4.25 miles of existing 100' wide 69-kV ROW to rebuild the existing TL into a double circuit loop and complete 1 mi. of new TL to power the facility. 35.7acres (9/9-10/25) of forest will be removed for SOC and 4.1 acres (8/31-10/20) for TL . Acoustic Surveys were completed for SOC and no bats were present.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental staff or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

- ☐ 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands
- ☐ 2 Protect Cultural Resources on TVA-Retained Land
- ☐ 3 Manage Land Use and Disposal of TVA-Retained Land
- ☐ 4 Manage Permitting under Section 26a of the TVA Act
- ☐ 5 Operate, Maintain, Retire, Expand, Construct Power Plants
- ☐ 6 Maintain Existing Electric Transmission Assets
- ☐ 7 Convey Property associated with Electric Transmission
- ■ 8 Expand or Construct New Electric Transmission Assets
- ☐ 9 Promote Economic Development
- ☐ 10 Promote Mid-Scale Solar Generation

STEP 2) Select all activities from Tables 1, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.

☐ 1. Loans and/or grant awards	☐ 8. Sale of TVA property	☐ 19. Site-specific enhancements in streams and reservoirs for aquatic animals
☐ 2. Purchase of property	☐ 9. Lease of TVA property	☐ 20. Nesting platforms
☐ 3. Purchase of equipment for industrial facilities	☐ 10. Deed modification associated with TVA rights or TVA property	☐ 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
☐ 4. Environmental education	☐ 11. Abandonment of TVA retained rights	☐ 42. Internal renovation or internal expansion of an existing facility
☐ 5. Transfer of ROW easement and/or ROW equipment	☐ 12. Sufferance agreement	■ 43. Replacement or removal of TL poles
☐ 6. Property and/or equipment transfer	☐ 13. Engineering or environmental planning or studies	■ 44. Conductor and overhead ground wire installation and replacement
☐ 7. Easement on TVA property	☐ 14. Harbor limits	☐ 49. Non-navigable houseboats

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.

■ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	☐ 58. Wastewater outfalls	☐ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
☐ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	☐ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	☐ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	☐ 67. Siting of temporary office trailers	☐ 90. Pond closure
☐ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	☐ 75. Utility lines/light poles	☐ 96. Land Use Permit
☐ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.

■ 15. Windshield and ground surveys for archaeological resources	■ 34. Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	☐ 69. Renovation of existing structures
☐ 16. Drilling	☐ 35. Stabilization (major erosion control)	☐ 70. Lock maintenance/ construction
☐ 17. Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	■ 36. Grading	☐ 71. Concrete dam modification
☐ 21. Herbicide use	☐ 37. Installation of soil improvements	☐ 73. Boat launching ramps
☐ 22. Grubbing	☐ 38. Drain installations for ponds	☐ 77. Construction or expansion of land-based buildings
☐ 23. Prescribed burns	■ 47. Conduit installation	■ 78. Wastewater treatment plants
☐ 25. Maintenance, improvement or construction of pedestrian or vehicular access corridors	☐ 52. Floating buildings	☐ 80. Barge fleeting areas
☐ 26. Maintenance/construction of access control measures	☐ 54. Maintenance of water control structures (dewatering units, spillways, levees)	☐ 82. Construction of dam/weirs/ levees
☐ 27. Restoration of sites following human use and abuse	☐ 55. Solar panels	☐ 83. Submarine pipeline, directional boring operations
☐ 28. Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	☐ 62. Blasting	☐ 86. Landfill construction
☐ 29. Acquisition and use of fill/borrow material	■ 63. Foundation installation for transmission support	☐ 89. Structure demolition
■ 31. Stream/wetland crossings	■ 64. Installation of steel structure, overhead bus, equipment, etc.	☐ 91. Bridge replacement
☐ 32. Clean-up following storm damage	■ 65. Pole and/or tower installation and/or extension	☐ 92. Return of archaeological remains to former burial sites
■ 33. Removal of hazardous trees/tree branches		

STEP 3) Project includes one or more activities in Table 3? ◉ **YES (Go to Step 4)** ○ **NO (Go to Step 13)**

STEP 4) Answer questions a through e below (applies to projects with activities from Table 3 ONLY)

a) Will project project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?

- (•) **NO** (NV2 does not apply)
- ( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave, bridge, other structure (potential bat roost)?

- (•) **NO** (HP1/HP2 do not apply)
- ( ) **YES** (HP1/HP2 applies, subject to review of bat records)

c) If conducting **prescribed burning** (**activity 23)**, estimated acreage**:** [ ] and timeframe(s) below; [■] **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 31	[ ] Apr 1 - May 31, Aug 1- Oct 14	[ ] Jun 1 - Jul 31
VA	[ ] Sep 16 - Nov 15	[ ] Nov 16 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 15	[ ] Jun 1 - Jul 31
AL	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 15	[ ] Mar 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
NC	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Apr 15	[ ] Apr 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
MS	[ ] Oct 1 - Nov 14	[ ] Nov 15 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 30	[ ] Jun 1 - Jul 31

d) Will the project involve vegetation piling/burning?

- (•) **NO** (SSPC4/ SHF7/SHF8 do not apply)
- ( ) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: 39.8 (•) **ac** ( ) **trees** ( ) **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	[■] Oct 15 - Nov 14	[ ] Nov 15 - Mar 31	[■] Apr 1 - May 31, Aug 1- Oct 14	[ ] Jun 1 - Jul 31
VA	[ ] Sep 16 - Nov 15	[ ] Nov 16 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 15	[ ] Jun 1 - Jul 31
AL	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 15	[ ] Mar 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
NC	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Apr 15	[ ] Apr 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
MS	[ ] Oct 1 - Nov 14	[ ] Nov 15 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 30	[ ] Jun 1 - Jul 31

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): ( ) **MAYBE** (•) **YES** ( ) **NO**

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

( ) **YES** (•) **NO** (If NO and includes Table 3 activities, submit project / relevant information [e.g., maps] for review by Terrestrial Zoologist.)

Info below completed by:

[ ] **Heritage Reviewer**	(name)		Date	
[ ] **OSAR Reviewer**	(name)		Date	
[■] **Terrestrial Zoologist**	(name)	Jesse Troxler	Date	Apr 25, 2019

Gray bat records: [ ] None [☒] Within 3 miles* [ ] Within a cave* [ ] Within the County

Indiana bat records: [☒] None [ ] Within 10 miles* [ ] Within a cave* [ ] Capture/roost tree* [ ] Within the County

Northern long-eared bat records: [ ] None [ ] Within 5 miles* [ ] Within a cave* [ ] Capture/roost tree* [☒] Within the County

Virginia big-eared bat records: [☒] None [ ] Within 10 miles* [ ] Within the County

Caves: [ ] None within 3 mi [ ] Within 3 miles but > 0.5 mi [ ] Within 0.5 mi but > 0.25 mi* [ ] Within 0.25 mi but > 200 feet* [☒] Within 200 feet*

Bat Habitat Inspection Sheet completed? (•) **NO** ( ) **YES**

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): 4.1 **(**(•) **ac** ( ) **trees)*** ( ) **N/A**

STEP 6) If reviewed by Heritage/OSAR reviewer, does records review trigger need for additional review by Terrestrial Zoologist (noted by * in Step 5)?

○ **NO (Go to Step 13)** ◉ **YES (Submit for Terrestrial Zoology review)** ○ **YES, however, based on Heritage Data review guidelines (or discussion with Terrestrial Zoology), project does not need to be submitted to Terrestrial Zoology for review. (Go to Step 13)**

Notes (additional information from field review or explanation of no impact):

167.5 acre office complex footprint assessed in Nov.2016 and Dec.2017. Presence absence surveys performed June 2018 with negative results. 34.7 acres of forest will be removed within 167.5 acre footprint. Project to upgrade 4.25 miles of existing 69-kV transmission line & 100' wide ROW to a double circuit loop and construct 1 mile of new 161-kV TL clearing 4.1 acres suitable habitat.

STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

☐ Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.

☐ Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.

☒ Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.

☐ Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.

☐ Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.

☒ Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.

☐ Removal of documented Indiana bat or NLEB roost tree, if still suitable.

☐ N/A

STEP 8) Presence/absence surveys were/will be conducted: ◉ **YES** ○ **NO** ○ **TBD**

STEP 9) Presence/absence survey results, on 6/5/18-6/7/18 ◉ **NEGATIVE** ○ **POSITIVE** ○ **N/A**

STEP 10) Project ◉ **WILL** ○ **WILL NOT** require use of Incidental Take in the amount of 4.1 ◉ **acres or** ○ **trees** proposed to be used during the ○ **WINTER** ◉ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ○ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of May 8, 2019

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
8: Expand/Construct New TL Assets	11,900	7,027.92	2,371.17	2,379.06

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ 2,050 OR ◉ **N/A**

SECTION 3: REQUIRED CONSERVATION MEASURES

STEP 13a) If answer to STEP 3 is NO, (*Project Lead* or *OSAR/Heritage Reviewer*) is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck. **Go to Step 14**

STEP 13b) If answer to STEP 3 is YES, and answer to STEP 6 is NO, *OSAR/Heritage Reviewer* is to review Conservation Measures in Table 4 that and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck. **Go to Step 14**

STEP 13c) If answer to STEP 3 is YES, and answer to STEP 6 is YES, *Terrestrial Zoologist* is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck. **Go to Step 15**

Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Jesse Troxler

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
☑	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	**NV1** - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
☐	15, 26, 92	**HP1** - Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost) will be closely coordinated with staff bat biologists to avoid/ minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
☑	33, 34	**TR1*** - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☑	33, 34	**TR4*** - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☑	33, 34	**TR7** (**Existing Transmission ROW only**) - **Tree removal within 100 feet of existing transmission ROWs will be limited to hazard trees**. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
☑	33, 34	**TR9** - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
☐	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 56, 61, 62, 63, 64, 65, 67, 69, 84, 89	**SSPC1** (**Transmission only**) - Transmission actions and activities will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: o BMPs minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: • Plan clearing, grading, and construction to minimize area and duration of soil exposure. • Maintain existing vegetation wherever and whenever possible. • Minimize disturbance of natural contours and drains. • As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. • Limit vehicular and equipment traffic in disturbed areas. Keep equipment paths dispersed or designate single traffic flow paths with appropriate road BMPs to manage runoff. • Divert runoff away from disturbed areas. • Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. • Prepare drainage ways and outlets to handle concentrated/increased runoff. • Minimize length and steepness of slopes. Interrupt long slopes frequently. • Keep runoff velocities low and/or check flows. • Trap sediment on-site. • Inspect/maintain control measures regularly & after significant rain. • Re-vegetate and mulch disturbed areas as soon as practical. o Specific guidelines regarding sensitive resources and buffer zones: • Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. • BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. • Standard requirements exist to avoid adverse impacts to caves, protected animals, unique/ important habitat (e.g., cave buffers, restricted herbicide use, seasonal clearing of suitable habitat).
☐	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	**SSPC2** - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
☐	17, 22, 32, 33, 34, 35, 36	**SSPC4** (**Transmission only**) - Woody vegetation burn piles associated with transmission construction will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a **minimum of 0.25 miles from documented caves** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☐	17, 21, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 54, 55	**SSPC7** - Clearing of vegetation **within a 200-ft radius of documented caves** will be limited to hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.

[1]Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat

(listed in 2015), and Virginia big-eared bat (listed in 1979).

Hide All Unchecked Conservation Measures

- (•) HIDE
- ( ) UNHIDE

STEP 14) Save completed form in project environmental documentation (e.g., CEC, Appendix to EA) AND send a copy of form to **batstrategy@tva.gov.** Submission of this form indicates that Project Lead/Applicant:

Emily Willard (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

STEP 15) ***For Use by Terrestrial Zoologist if Project and Form are Submitted for Review***

☒ Terrestrial Zoologist acknowledges that Project Lead/Contact (name) Emily Willard has been informed on Sep 5, 2019 (date) of any relevant conservation measures and/or provided a copy of this form.

☒ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take 4.1 ◉ ac ○ trees and that use of Take will require 2,050 contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

Finalize and Print to Noneditable PDF. Changes to form cannot be made after this button is selected.

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Appendix C – Summary of Property Owner Discussion and Interaction Along Proposed One Mile of New 161-kV TL

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Appendix C - Summary of Property Owner Discussion and Interaction Along Proposed One Mile of New 161-kV TL

Two of the owners were contacted as a part of the SRP for the proposed new one-mile of 161-kV TL but chose not to meet or allow survey on their property. One of these properties is located adjacent to the old Georgetown 69-kV Substation. The other property is adjacent to the TVA-owned property where the proposed SOC and Gunstocker Creek 161-kV Substation would be located. Two other owners met with TVA several times to discuss adjustments to the TL route located on their property. However, final agreement regarding the proposed route was not met and these owners also denied access for surveys. These two properties adjoin each other and are located between State Highway 60 and the TVA Sequoyah-Hiwassee 500-kV TL. Two other owners along the proposed new one mile of 161-kV TL met with TVA and allowed for the survey. VEC was the final owner and they were contacted via e-mail with a proposed adjustment that would place more ROW along the northwest property line. VEC agreed to this adjustment. TVA filed court documents for temporary access to perform surveys on the four owners who would not provide permission for the surveys. The court ruled in TVA's favor and granted TVA rights to survey and ultimately each of the property owners chose to settle the suit.

The property owner adjacent to the old Georgetown 69-kV Substation had concern about potential property devaluation. This owner also leased the property for a BBQ stand that is currently operating along State Highway 58 and leases a billboard. The location of the proposed new TL route and ROW would not affect the operation of the BBQ stand but would require removal of the billboard for electrical clearance requirements. The route was moved further onto the VEC property in an effort to reduce some of the TL ROW on the property. As stated above, VEC was contacted and agreed with the adjustment. However, this owner did not provide permission for the survey.

The property owner adjacent to the TVA-owned property had concern with both the proposed TVA SOC facility adjacent to his property and an additional TL on his property. This owner declined to meet or allow survey for the project on his property. Although little adjustment to the proposed TL could be made on the property, TVA did make adjustments to the SOC facility perimeter road design to allow for a greater tree buffer to help shield viewshed from this property owner's home.

TVA met with the two owners with properties located between State Highway 60 and the TVA Sequoyah-Hiwassee 500-kV TL that parallels the TVA-owned property where the proposed Gunstocker Creek substation would be located. One of these parcels is larger and is located to the east of the other parcel. This parcel is approximately 72 acres with portions of road frontage along State Highway 60 and other portions bordering the existing TVA 500-kV TL. This parcel has a single owner. The other parcel is adjacent to the west of the one just described. This parcel is about 56 acres and has road frontage along State Highway 58 and also borders the existing TVA 500-kV TL. This parcel is held in partnership with the property owner of the 72-acre parcel. Several TL route options were discussed and reviewed with these owners. Most options were some variation of the proposed route; however, there was one option that paralleled State Highway 58 after entering their properties, but then turned and paralleled the existing TVA 500-kV TL to the original proposed route point crossing under the existing TVA 500-kV TL. The sole owner of the 72-acre parcel expressed concern about clearing trees and requested that the new TL be moved west further into the adjacent 56-acre parcel which had fewer trees. The owner requested all structures to be self-supporting without guy-wires as well as additional adjustment to move some of the initial ROW onto property that borders State

Highway 60. TVA is completing engineering analysis to confirm the suitability of self-supporting structures.

TVA met with the landowner that would be affected by the requested adjustment; however, the owner was not agreeable to the adjustment, so the adjustment was not made. The proposed route was then adjusted again based on the closest route that most accommodated the other two owner's requests. This route is shown in Figure 2-5 and was utilized for initial environmental field surveys. These two owners declined permission for the survey.

As stated in the above paragraph, TVA met with the owner of property with road frontage on the northeast side of State Highway 60. The proposed TL route would cross a small portion of this parcel as it crossed the highway and TVA was granted permission to survey. This owner asked why the TL route could not cross the highway further to the southeast just before the Georgetown 69-kV Substation and would miss his parcel entirely. This was not considered due to the residences present on the southwest side of State Highway 60. It must be noted that the final proposed western re-route did move some additional ROW on this owner. This owner was not totally in agreement with the adjustment but still cooperated with the survey.

TVA also met with the owner on the southwest side of State Highway 60. His parcel contained both existing TVA TL ROW and the start of the proposed new TL ROW. There are two TVA 69-kV TL ROWs currently on this property. These have been described previously and are the TVA East Cleveland Primary-Georgetown 69-kV TL and the TVA Georgetown-McDonald 69-kV TL. Since the Georgetown 69-kV Substation is not operational, a portion of the infrastructure of these two TLs has been removed. Poles and conductors were previously removed to a point where the two TLs met and paralleled each other about 1,990 feet southeast of the Georgetown 69-kV Substation. This removed all of the TL infrastructure from this owner's parcel. The owner had concern that there were currently no TL structures on his property and under the proposed action there would be a new double-circuit TL which would extend past the old ROW and encroach on more of his property. TVA explained that the proposed new double-circuit TL would occupy less space than when both of the 69-kV TLs had been present. The owner had assumed that once the old 69-kV TLs were removed, his property would be free of any TL. TVA explained that even when TLs are removed, TVA keeps the ROW easement, and maintains the option to utilize the ROW for future use. This owner also asked why the proposed TL did not cross State Highway 60 just before the old Georgetown 69-kV Substation. TVA relayed the same explanation provided to the owner across State Highway 60. This owner expressed concern over the slight turn in the field on his property due to the guy wires that would be needed. As such, TVA proposed an adjustment that would eliminate the turn but would require additional new ROW outside the existing TL ROW being utilized on his property. The owner declined that alternative.

Another owner associated with the existing ROW informed TVA of a private airstrip that he owns. This airstrip is located about 1.3 miles from the proposed Gunstocker Creek substation. The private airstrip is on property off Francisco road NW about 0.7 miles northwest of the unincorporated community of Georgetown. This owner was concerned about the new TL being on his property. However, he received a letter regarding a parcel he owned on the existing TL rebuild portion. There would be no new TL on his property that would affect his airstrip.

Appendix D – Stream Crossings Along the Proposed Transmission Line Right-of-Way

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Table D-1. Stream Crossings Along the Proposed Transmission Line Route in Meigs County, Tennessee

Stream ID	Stream Type	Streamside Management Zone (SMZ) Category	Stream Name	Field Notes
S001	Perennial	SMZ Category A (50 feet)	Unnamed Tributary to Greasy Creek	Approximately 4-foot-wide x 3-foot-deep channel with bedrock/ gravel substrate.
S002	Intermittent	SMZ Category A (50 feet)	Unnamed Tributary to Greasy Creek	Approximately 3-foot-wide x 2-foot-deep channel with clay/ silt substrate.
S003	Intermittent	SMZ Category A (50 feet)	Unnamed Tributary to Greasy Creek	3-foot-wide x 2-foot-deep channel with clay/ gravel substrate.
S004	Intermittent	SMZ Category A (50 feet)	Bigsby Creek (headwaters)	3-foot-wide x 3-foot-deep channel with clay/ gravel/ sand substrate.
S005	Intermittent	SMZ Category A (50 feet)	Unnamed Tributary to Gunstocker Creek	Heavily degraded channel with sections showing signs of subsurface flow.
S006	Intermittent	SMZ Category A (50 feet)	Unnamed Tributary to Gunstocker Creek	Bedrock substrate with concrete bridge at access road crossing.
S007	Perennial	SMZ Category A (50 feet)	Unnamed Tributary to Gunstocker Creek	6-foot-wide x 3-foot-deep channel with clay/ bedrock/ sand substrate.
S008	Intermittent	SMZ Category A (50 feet)	Unnamed Tributary to Gunstocker Creek	Small channel with macroinvertebrate observed at time of survey.

Stream ID	Stream Type	Streamside Management Zone (SMZ) Category	Stream Name	Field Notes
S009	Intermittent	SMZ Category A (50 feet)	Unnamed Tributary to Gunstocker Creek	Small channel in wooded area with gravel substrate.
S010	Perennial	SMZ Category A (50 feet)	Gunstocker Creek	Large creek with bedrock, cobble, gravel substrate.
S011	Perennial	SMZ Category A (50 feet)	Unnamed Tributary to Gunstocker Creek	3-foot-wide x 2-foot-deep channel with clay/ cobble/ bedrock substrate. Crayfish and salamanders observed
S012	Intermittent	SMZ Category A (50 feet)	Unnamed Tributary to Gunstocker Creek	4-foot-wide x 2-foot-deep channel with bedrock/ cobble substrate.
P001	Other	SMZ Category A (50 feet)	NA	Pond

Table D-2. Streams Identified Within the System Operations Center Parcel in Meigs County, Tennessee.

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
S001	Intermittent	Streamside Management Zone-SMZ Category A (50ft)	Unnamed Tributary to Gunstocker Creek	2-foot-wide channel with muddy/ rocky substrate along road.
S002	Intermittent	Streamside Management Zone-SMZ Category A (50ft)	Unnamed Tributary to Gunstocker Creek	Small channel with muddy substrate and sections of subsurface flow.
S003	Intermittent	Streamside Management Zone-SMZ Category A (50ft)	Unnamed Tributary to Gunstocker Creek	4-foot-wide x 2-foot-deep channel with bedrock substrate. Crayfish observed.

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Appendix E – SQT Report, April 2019

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Stream Mitigation Assessment for The TVA Meigs County

Systems Operation Center File No. NRS17.322
Meigs County, Tennessee

September 25, 2019

AECOM

1000 Corporate Centre Drive
Suite 250
Franklin, Tennessee 37067
(615) 771-2480

1.0 INTRODUCTION

AECOM conducted an assessment of jurisdictional streams on the 167-acre project site in Meigs County, TN. Construction of roads and new facilities would impact stream segments on the property identified as SMZ 02 and SMZ 03. Hydrologic Determinations of each stream were conducted by TVA. SMZ 02 was documented as an intermittent stream in December 2017 with impacts to 621 feet of stream. The stream flow will be relocated to the north of a new building on the property as part of on-site permitee responsible mitigation (PRM). SMZ 03 will be impacted at three locations each with single span bridges. SMZ 03 was also documented intermittent flow. Figure 1 shows the location of the project and study area of each reach. Attachment 1 includes Appendix III of the permit application which indicates the impact location on each stream and the channel design data dated 5/19/2019 for SMZ 02 and bridge span designs over the 3 reaches of SMZ 03. Each span of SMZ 03 will have some impact the flood-plain and may impact woody plant growth and are considered Tier 4 impacts.

The purpose of this study was to calculate mitigation debits and credits in accordance with the May 2019 Tennessee Stream Quantification Tool (SQT). AECOM conducted the SQT field survey in April 2019 and was assisted in the field by TVA personnel familiar with the site and hydrologic determinations (HD).

1.1 PROJECT DESCRIPTION

The project area is located on TVA property east of Highway 58 in Meigs County approximately 1 mile north of Georgetown, Tennessee. TVA conducted a stream assessment of the property in December 2017 and requested confirmation of the HD in September 2018 by the United States Corps of Engineers. Tennessee Department of Conservation (TDEC) personnel conducted a site visit August 9, 2019. TDEC reviewed the aquatic habitat of SMZ 02 since it is a relocated stream and completed a habitat assessment. SMZ 02 was dry during the August site visit and no biological sampling was conducted. According to the survey and proposed design plan, permanent impacts are anticipated to two of the streams, see Table 1.

Table 1. Proposed Streams Impacts

Stream ID	Flow Type	Length of Impact	HD Score	Watershed Area	Impact Type
SMZ 02	Intermittent	621	25	0.03 sq mi	Reroute
SMZ 03	Intermittent	328	29.5	0.18 sq mi	Span

Span: Crossing with single span bridges over the flood plain but within the 50-foot buffer and leaving a natural bottom.

2.0 METHODOLOGY

2.1 SITE CHARACTERIZATION

The first step in evaluating the stream reaches using the SQT was to determine the character of the watershed and the project site using available data. Existing sources of information included the following:

- TVA Geographical Information System (GIS) and project site data
- Aerial photography of project area from Google Maps
- Soil Survey of Meigs County (Natural Resources Conservation Service [NRCS] 1997)
- Urban cover maps from Meigs County.

The data collected from these sources was used to assess the watershed hydrology and stream characteristics. Field data were collected on the TN-SQT Debit Tool Rapid Assessment Form for each reach. In the field a 300-foot tape, survey rod and level were used to collect the measurements for the forms.

2.2 FIELD SURVEY

A field survey of the existing stream channels and surrounding floodplain was conducted on April 4, 2019. The week prior to the survey 0.81 inches of rain fell (Chickamauga Dam Rain Gauge). Signs of recent high-water events were evident due to the very wet winter months. Flow was present in SMZ 02 and SMZ 03. This flow was also estimated to represent the bank full event. Numerous seeps were observed flowing at the time at the survey. Streams reaches of approximately 200 feet were assessed for each stream and included numerous pools and riffles for scoring with the SQT. Each section included a minimum of 2 pools and 2 riffles. The assessment forms are included in Attachment 2.

While conducting the field survey, visual observations were made regarding stream condition, and other unique features of the stream and surrounding floodplain, site restrictions, invasive species, etc. Photographs were taken of these features and are included in the Photo Log in Attachment 3.

3.0 EXISTING CONDITIONS

3.1 WATERSHED

The site is located in southern Meigs County in the Valley and Ridge ecoregion of Tennessee (ecoregion 67f). The streams on site are tributaries of Gunstocker Creek in the Tennessee River Basin. The streams originate north of the property and flow southwest and south.

The watershed of SMZ 02 is approximately 18 acres, or 0.03 square miles, while SMZ 03 is 74 acres or 0.18 square miles. The topography of the area is rolling hills with some sink holes and mostly forested land. The entire watershed of each stream is forest or open land. The watershed is currently forested for SMZ 03 with approximately half of the watershed for SMZ 02 pasture.

3.2 PROJECT SITE

SMZ 03 originates on the north side of the property as intermittent flow and increases in a downstream direction to an intermittent bedrock and boulder stream which flows south to Gunstocker Creek, Figure 2. The watershed is entirely forested and substrate is primarily flat boulder rock, bedrock and gravel. Forest along the stream is primarily eastern red cedar. The channel is not incised and appears to be a functional stream.

SMZ 02 is an intermittent to ephemeral stream that flows westward, Figure 3. The channel makes several distinct bends and at times flows through a small wetland previously delineated. The channel is incised with the top of the bank about 0.75- to 1-foot high and about 1-2 feet wide (top of bank to top of bank). The banks are currently overgrown with pasture grasses. Many of the trees and shrubs have been removed and the area has been bush-hogged. Channel substrate consists of silt and clay with some gravel and tree roots.

Summary statistics for cross-sections of representative riffle sections of SMZ 02 and SMZ 03 are presented in Table 2.

Table 2. Morphological Characterization of Cross-Sections, Existing Conditions.

	SMZ 02	SMZ 02 Regional Curve	SMZ 03	SMZ 03 Regional Curve
Watershed (sq mi)	0.03	0.03	0.18	0.18
Bankfull Cross-Sectional Area (sq. ft.)	0.3	1.71	1.2	5.82
Bankfull Width (ft.)	1	4.4	2.3	6.8
Bankfull Mean Depth (ft.)	0.024	0.38	0.3	0.58
Flood Prone Width (sq.ft.)	1.12	NA	13	NA
Bank Height Ratio (ft./ft.)	8.4	NA	3.1	NA
Average Stream Slope	0.012	NA	0.014	NA
Entrenchment Ratio	1.1	NA	5.7	NA
Bank Erosion Potential	Low	NA	Low	NA
Substrate Type	SMZ 02 = silt clay; SMZ 03 = rock, boulder			

NA: not applicable

4.0 Proposed Conditions and Results

Mitigation credits required for proposed impacts to the two streams were calculated using the SQT Debit Tool Spreadsheet for SMZ 03 and SMZ 02, Version 1, May 2019. Table 3 provides a summary of the calculation of existing functional feet of stream in each stream impacted. For the SMZ 02 reroute, the debit tool was utilized to determine the existing condition score for the 621 feet of proposed impact. The existing condition score was calculated to be 0.29. This results in 180.1 functional feet of loss. While SMZ 02 will be relocated into an engineered grass channel with a biodegradable husk liner; however, the vegetation buffer will only partially meet the functional value of the existing conditions. Therefore, the impact to SMZ 02 is considered fill and a Tier 6 impact.

SMZ 03 would be impacted at three locations by crossing with a single span bridge. The single span bridges include piers or bents (that cumulatively exceed 200 linear feet) that do not encapsulate the stream channel and floodway but terminate in the floodplain. The stream channel will remain natural material and its geomorphology will not be impacted other than woody vegetation. Based on this type of bridge design (Attachment 3), it is assumed that the impacts are a Tier 4 impact. Activities in this tier represent a 68% functional loss. SMZ 03 was assessed as 3 reaches with all reaches having intermittent flow. The SQT Debit Tool was utilized to calculate the existing condition score and function feet lost. The total function feet lost to span bridges over SMZ 03 is calculated to be -150.8.

The complete SQT Debit Tool for SMZ 02 and SMZ 03 is provided in Attachment 4. The total number of functional feet lost (debits) for the two streams is ***(150.8 + 180.1) = 331.***

Table 3. Functional Lift Summary

Functional Lift Summary	**SMZ 02-Existing**	**SMZ 03-1 Existing**	**SMZ 03-2 Existing**	**SMZ 03-3 Existing**
Condition Score (ECS)	0.29	0.68	0.68	0.68
Stream Length (feet)	621	82	142	104
Impact Factor	0	0.22	0.22	0.22
Functional Change (FF)	-180	-37.7	-65.3	-47.8

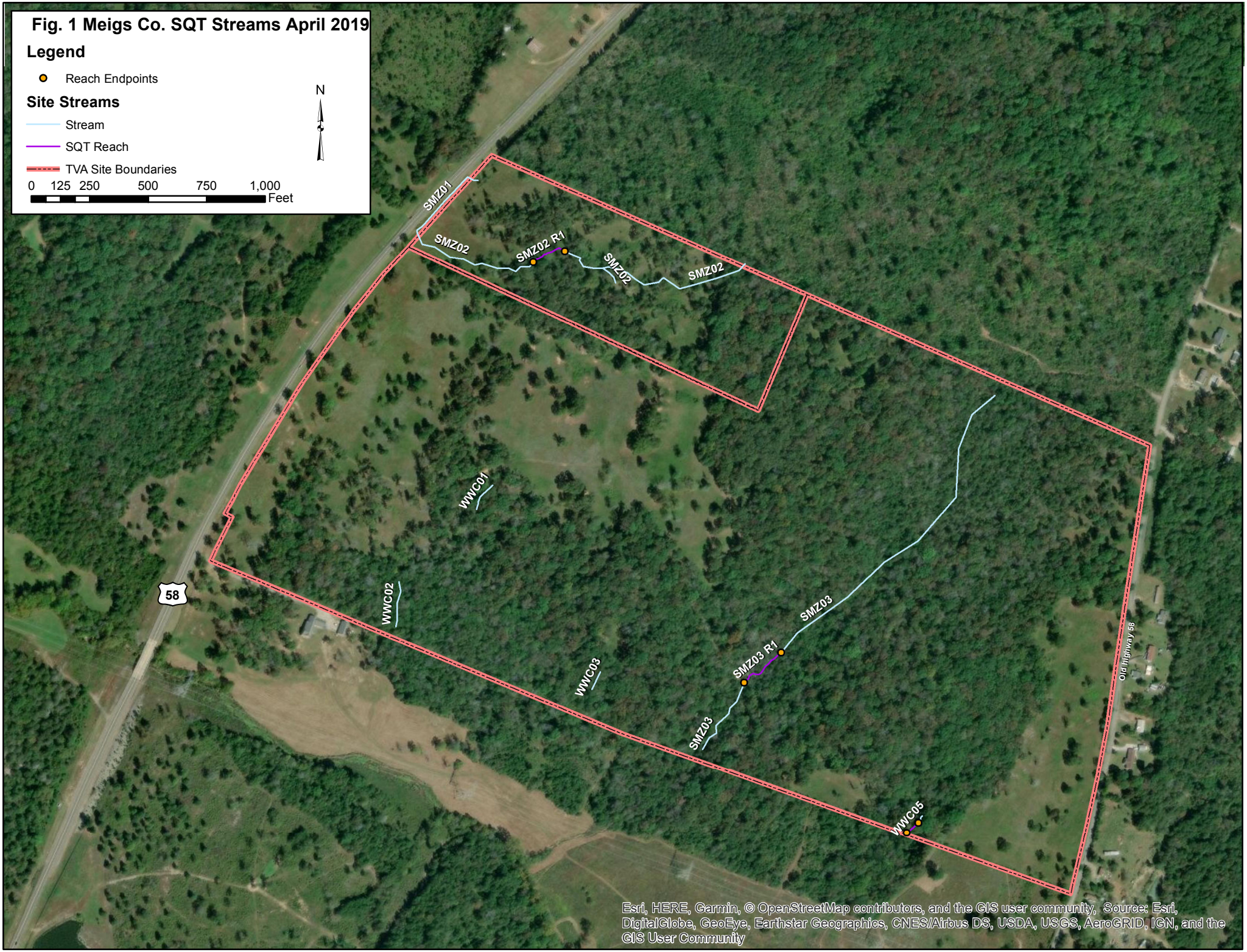


Fig. 1 Meigs Co. SQT Streams April 2019
Legend
Reach Endpoints
Site Streams
Stream
SQT Reach
TVA Site Boundaries
0 125 250 500 750 1,000
Feet
N
SMZ01
SMZ02
SMZ02 R1
SMZ02
SMZ02
WWC01
WWC02
WWC03
SMZ03
SMZ03 R1
SMZ03
WWC05
58
Old Highway 58
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

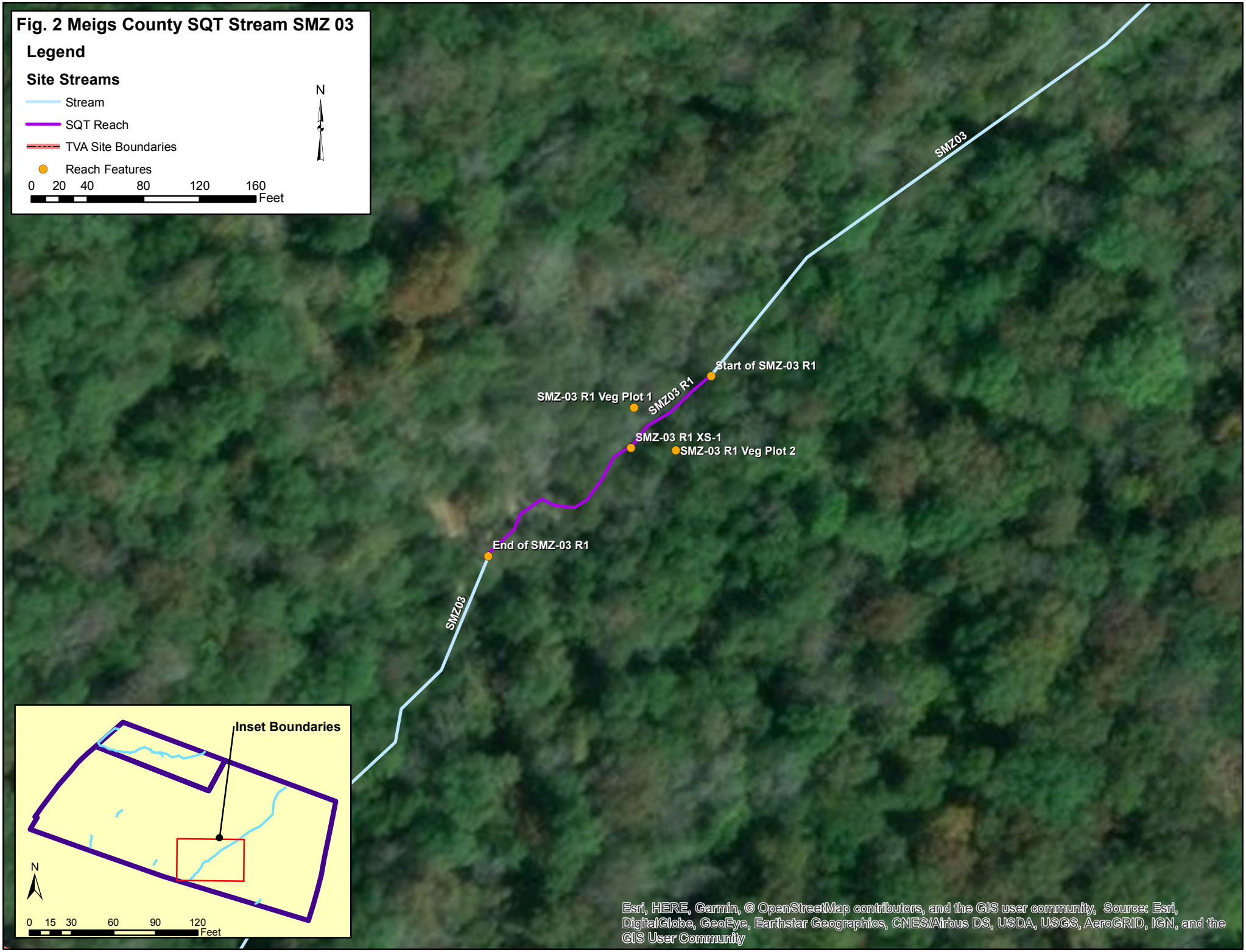


Fig. 2 Meigs County SQT Stream SMZ 03
Legend
Site Streams
Stream
SQT Reach
TVA Site Boundaries
Reach Features
0 20 40 80 120 160
Feet
N
SMZ03
Start of SMZ-03 R1
SMZ-03 R1 Veg Plot 1
SMZ03 R1
SMZ-03 R1 XS-1
SMZ-03 R1 Veg Plot 2
End of SMZ-03 R1
SMZ03
Inset Boundaries
N
0 15 30 60 90 120
Feet
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

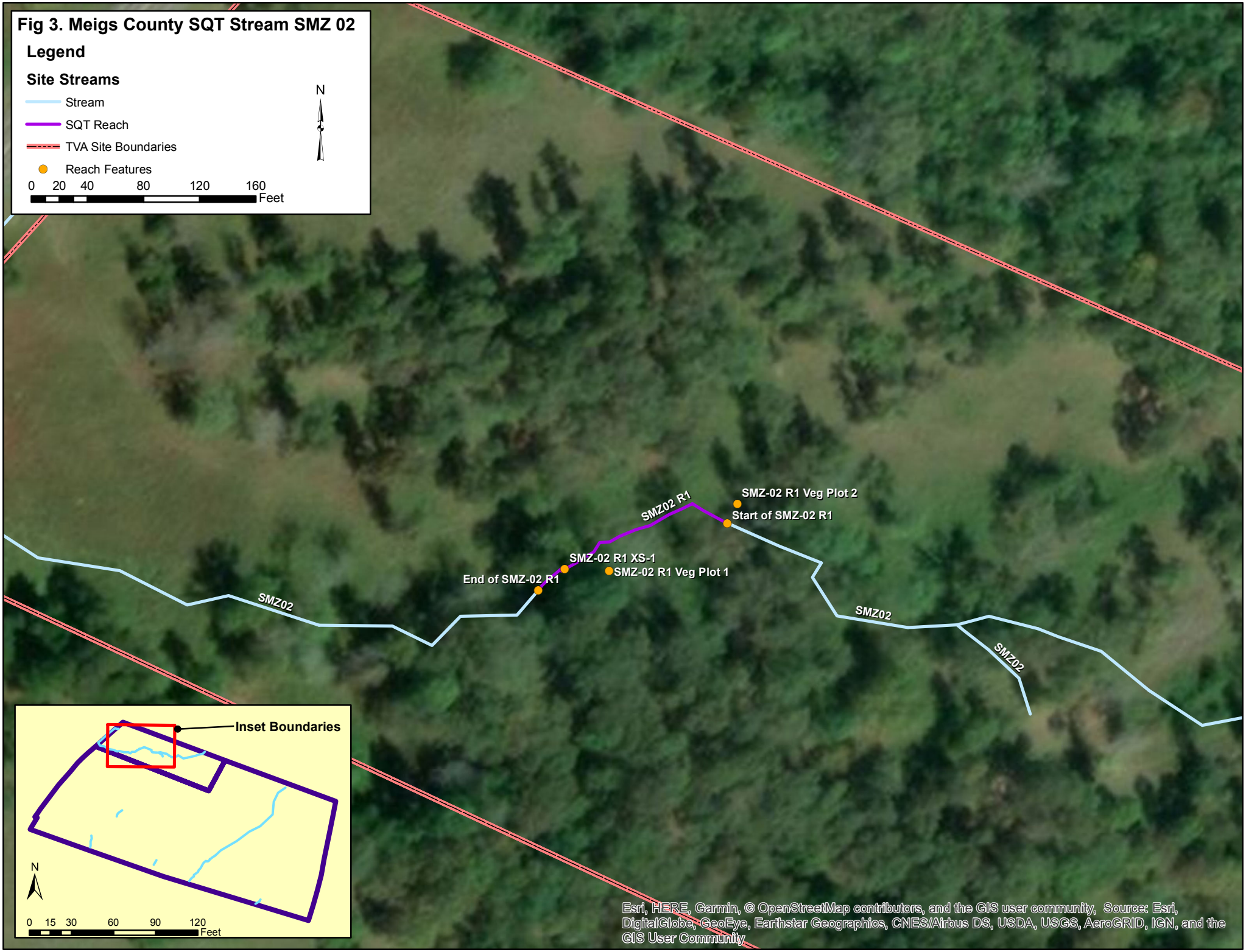


Fig 3. Meigs County SQT Stream SMZ 02
Legend
Site Streams
Stream
SQT Reach
TVA Site Boundaries
Reach Features
0 20 40 80 120 160
Feet
N
SMZ02 R1
SMZ-02 R1 Veg Plot 2
Start of SMZ-02 R1
SMZ-02 R1 XS-1
SMZ-02 R1 Veg Plot 1
End of SMZ-02 R1
SMZ02
SMZ02
SMZ02
Inset Boundaries
N
0 15 30 60 90 120
Feet
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Attachment 1

Appendix 3 – Aquatic Resource Impact Drawings

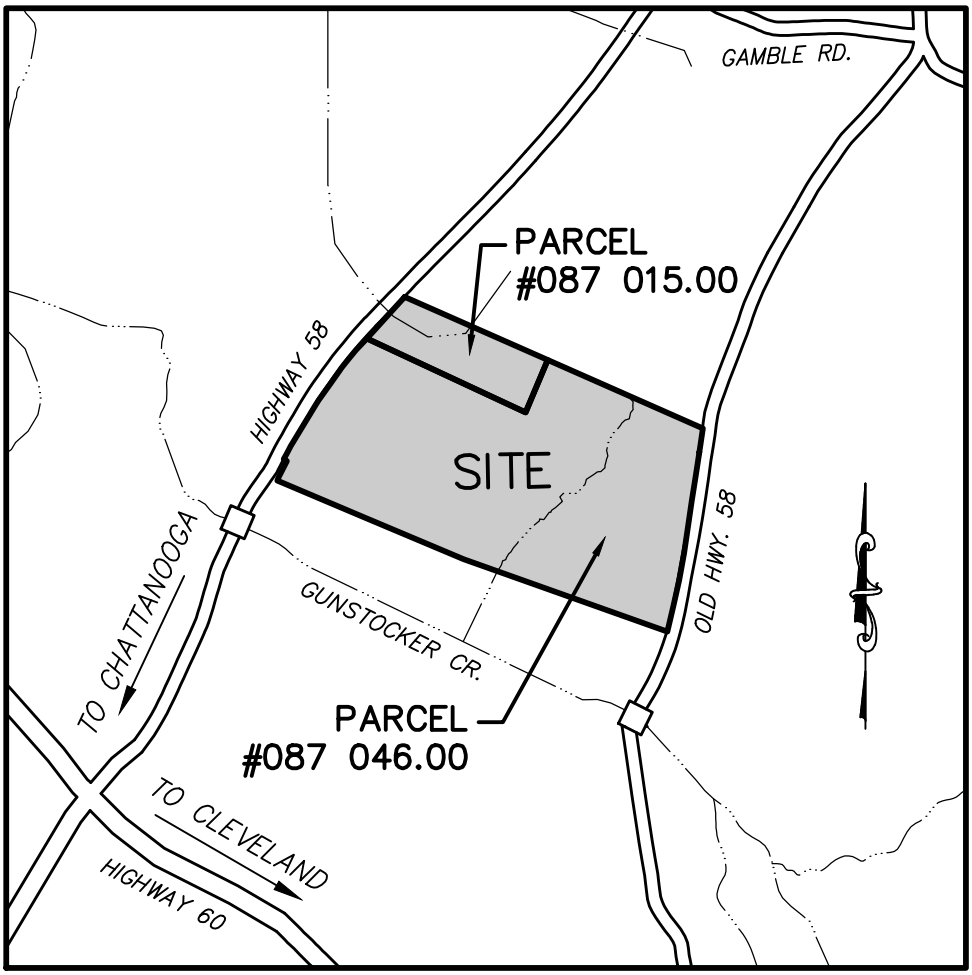
Appendix III. Aquatic resource impact drawings.

TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-13 REV. B
DATE: 03-11-2019

WRM

LOCATION MAP



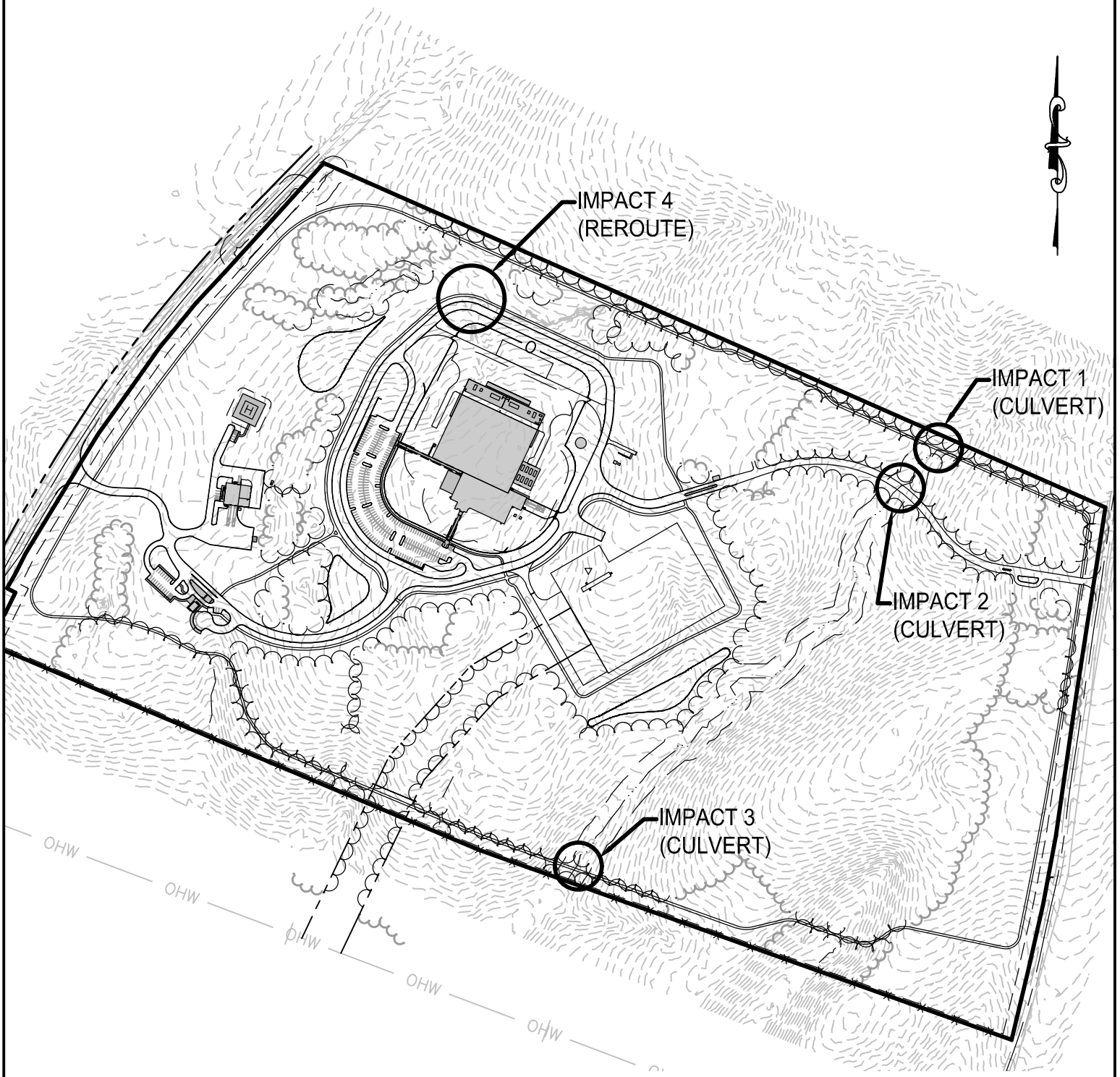
LOCATION MAP
SCALE: 1" = 1,500'

TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-14 REV. E
DATE: 05-03-2019

WRM

IMPACT MAP
(CULVERTS)



SCALE: 1" = 500'

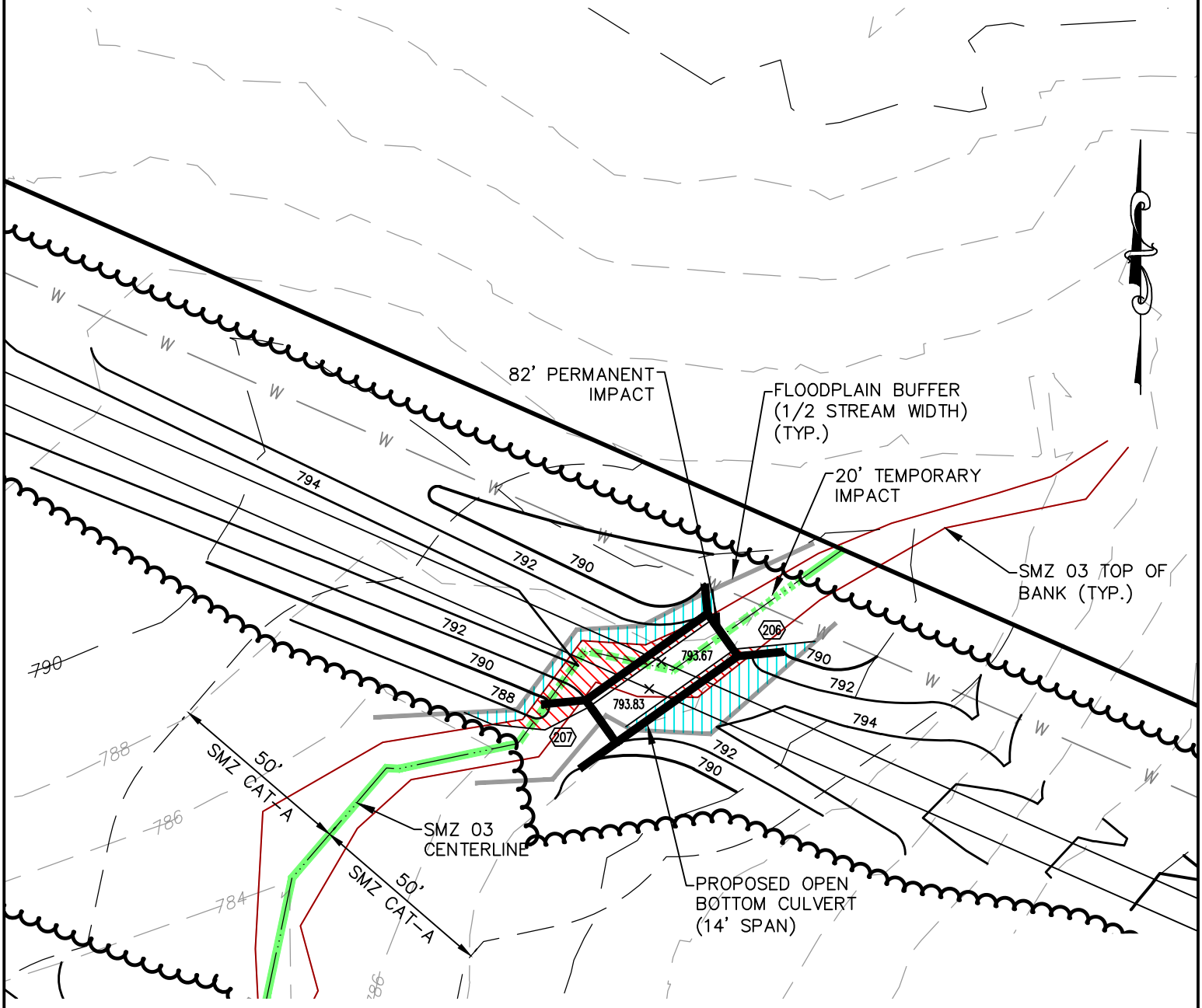
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-15 REV. D
DATE: 09-24-2019

WRM

WATERCOURSE ENCROACHMENT
PERIMETER PATH
CULVERT CROSSING
(PLAN VIEW)

IMPACT 1



SMZ 03 PERMANENT IMPACT

525 S.F. STREAM AREA

712 S.F. FLOODPLAIN BUFFER AREA

82 LF CENTERLINE

SMZ 03 TEMPORARY IMPACT

20 LF CENTERLINE

SCALE: 1" = 40'

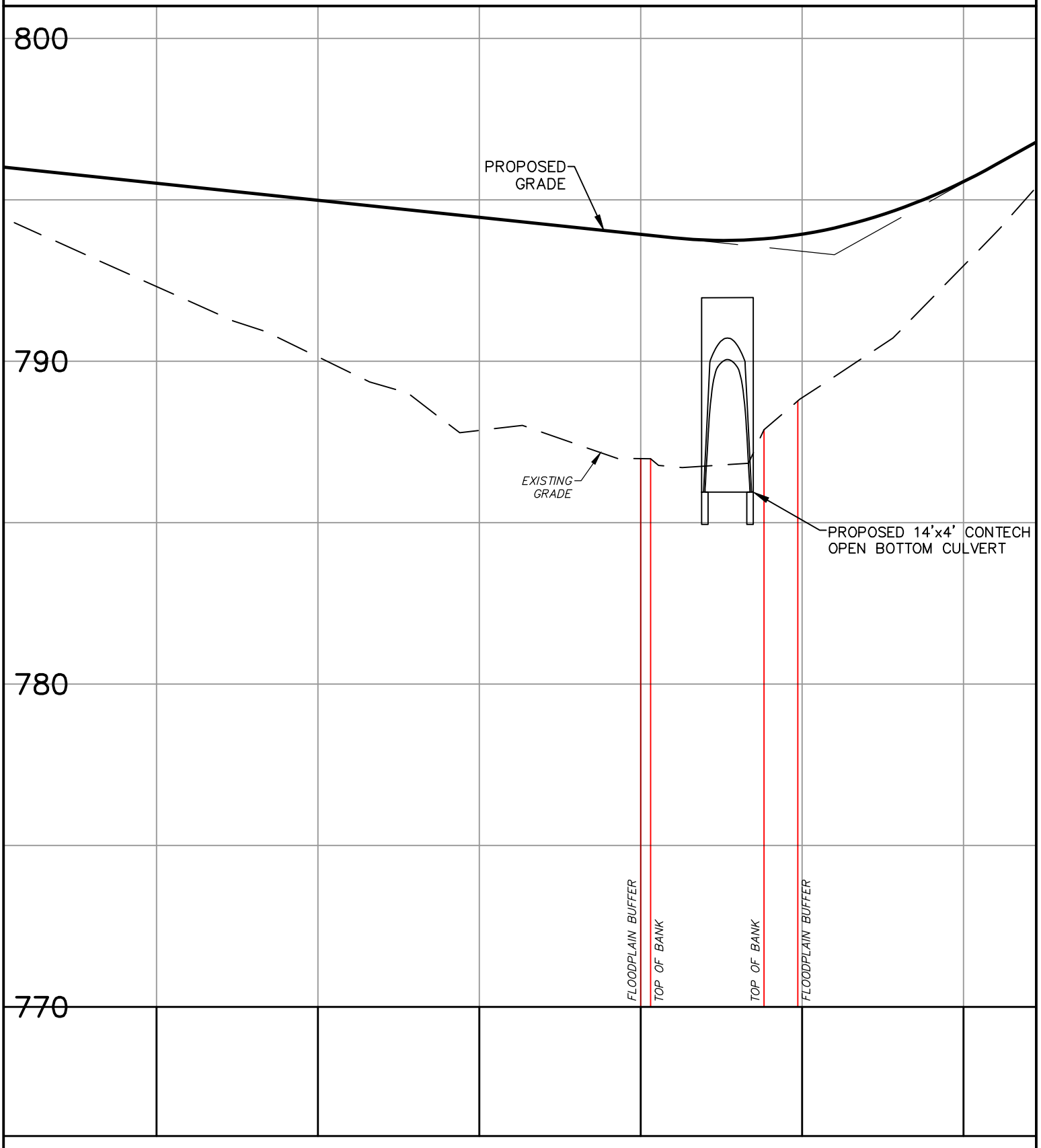
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-16 REV. D
DATE: 09-24-2019

WRM

WATERCOURSE ENCROACHMENT
ACCESS DRIVE
CULVERT CROSSING
(CROSS-SECTION VIEW)

IMPACT 1



SCALE: 1" = 40'

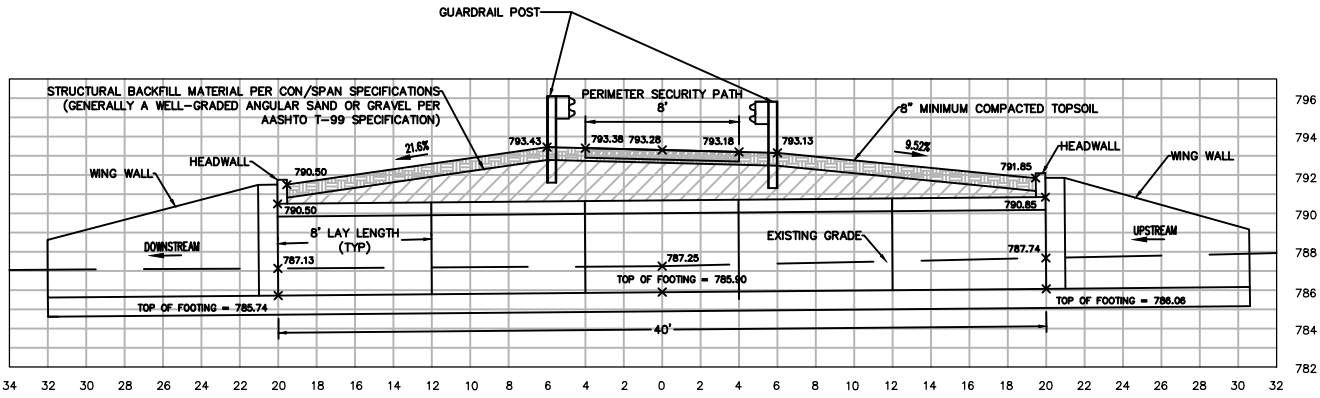
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-17 REV. C
DATE: 08-14-2019

WRM

WATERCOURSE ENCROACHMENT
ACCESS DRIVE
CULVERT CROSSING
(PROFILE VIEW)

IMPACT 1



SCALE: 1" = 10'

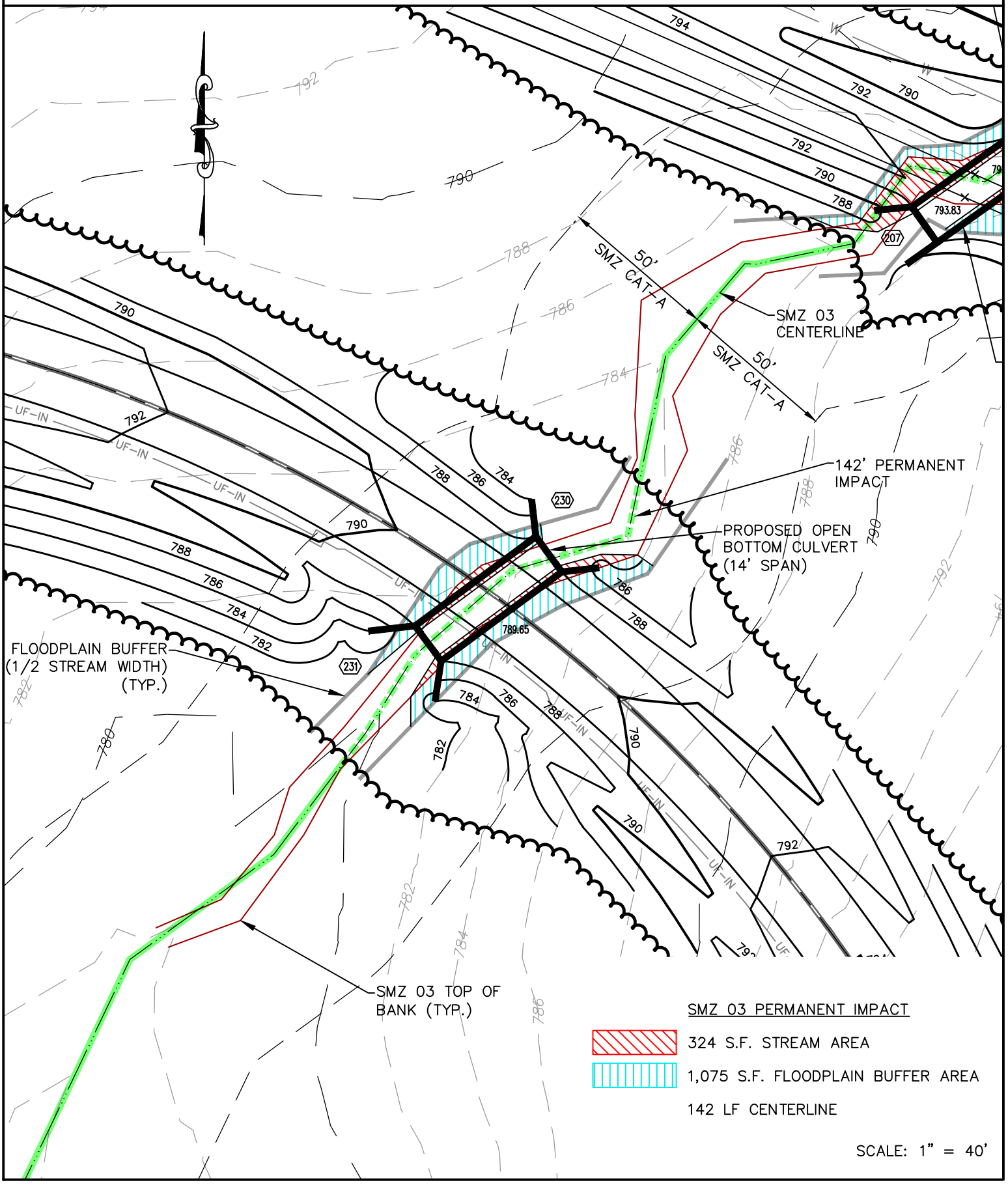
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-18 REV. D
DATE: 09-24-2019

WRM

WATERCOURSE ENCROACHMENT
ACCESS DRIVE
CULVERT CROSSING
(PLAN VIEW)

IMPACT 2



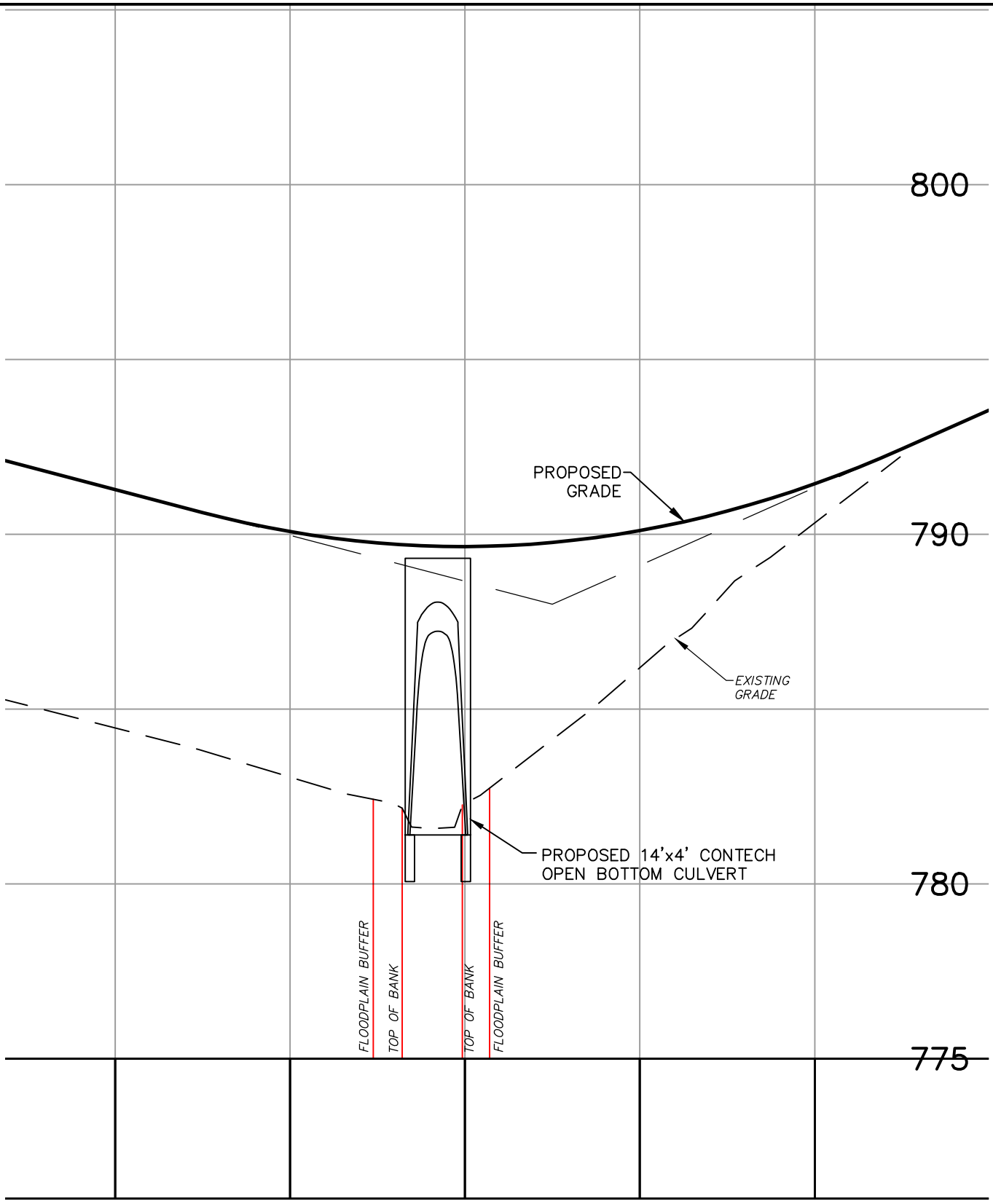
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-19 REV. D
DATE: 09-24-2019

WRM

WATERCOURSE ENCROACHMENT
ACCESS DRIVE
CULVERT CROSSING
(CROSS-SECTION VIEW)

IMPACT 2



SCALE: 1" = 40'

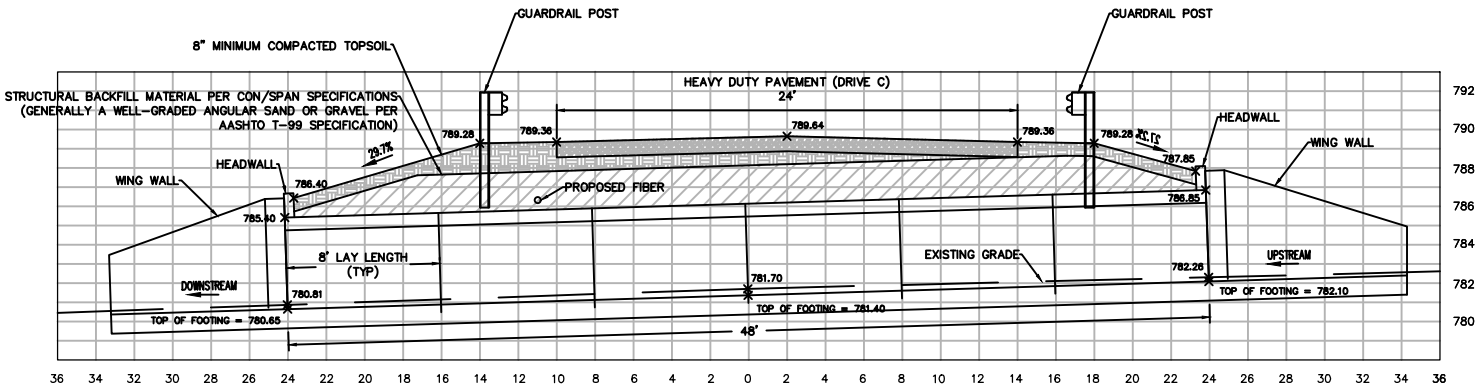
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-20 REV. C
DATE: 08-14-2019

WRM

WATERCOURSE ENCROACHMENT
ACCESS DRIVE
CULVERT CROSSING
(PROFILE VIEW)

IMPACT 2



SCALE: 1" = 10'

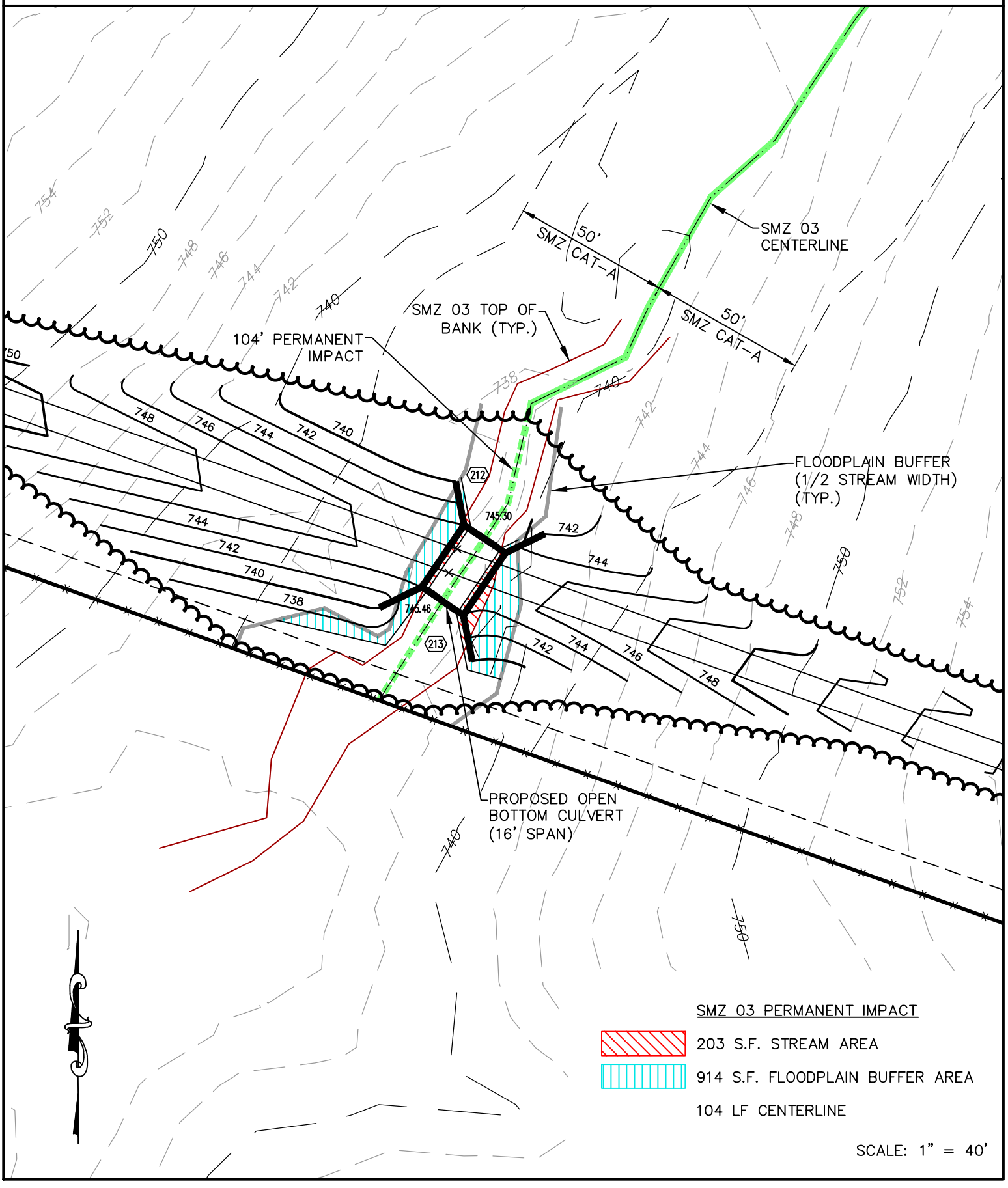
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-21 REV. D
DATE: 09-24-2019

WRM

WATERCOURSE ENCROACHMENT
PERIMETER PATH
CULVERT CROSSING
(PLAN VIEW)

IMPACT 3



SMZ 03 PERMANENT IMPACT

203 S.F. STREAM AREA

914 S.F. FLOODPLAIN BUFFER AREA

104 LF CENTERLINE

SCALE: 1" = 40'

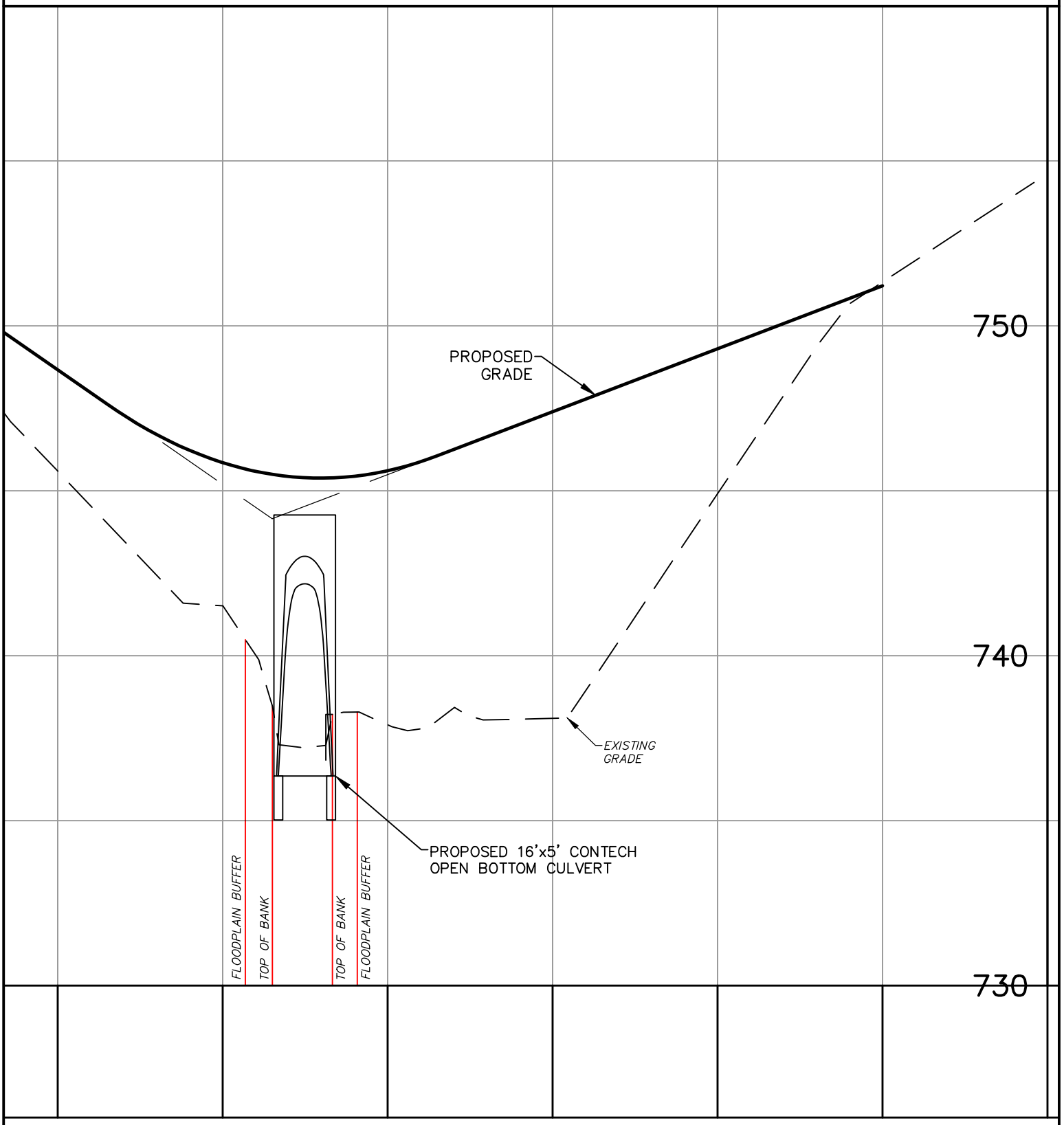
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-22 REV. D
DATE: 09-24-2019

WRM

WATERCOURSE ENCROACHMENT
PERIMETER PATH
CULVERT CROSSING
(CROSS-SECTION VIEW)

IMPACT 3



SCALE: 1" = 40'

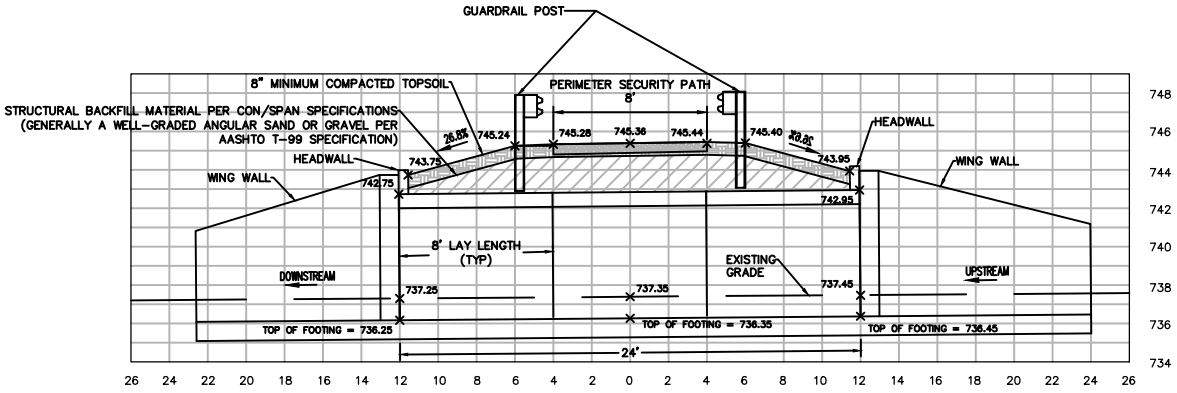
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-23 REV. C
DATE: 08-14-2019

WRM

WATERCOURSE ENCROACHMENT
PERIMETER PATH
CULVERT CROSSING
(PROFILE VIEW)

IMPACT 3



SCALE: 1" = 10'

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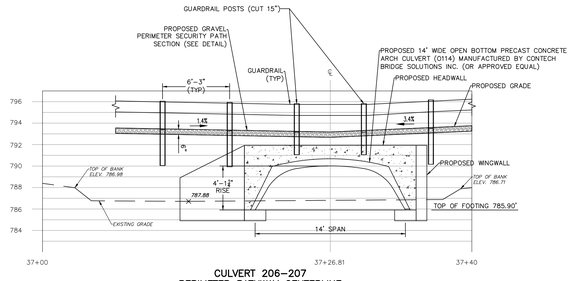
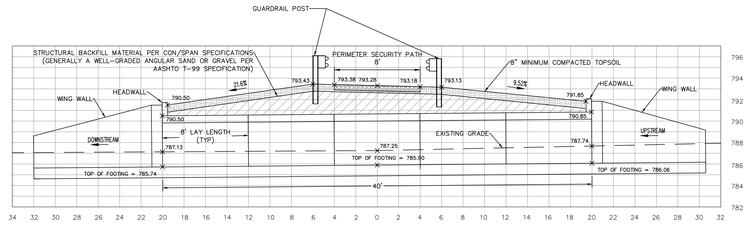
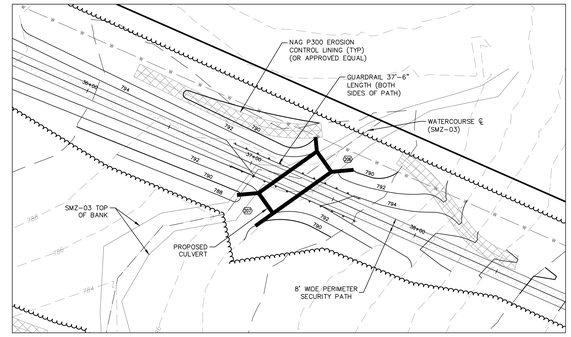


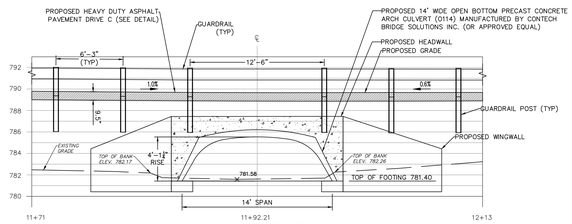
CULVERT 206–207
PERIMETER PATHWAY CENTERLINE
(SCALE 1" = 5')



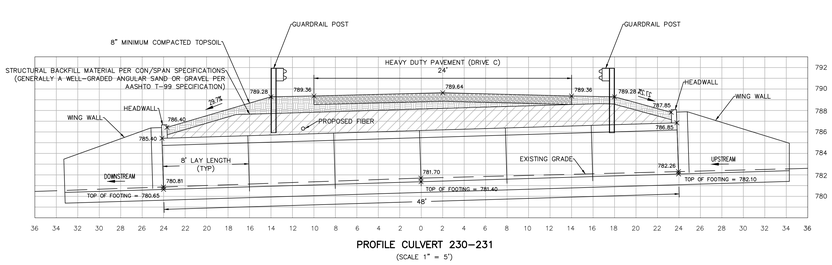
PROFILE CULVERT 206–207
(SCALE 1" = 5')



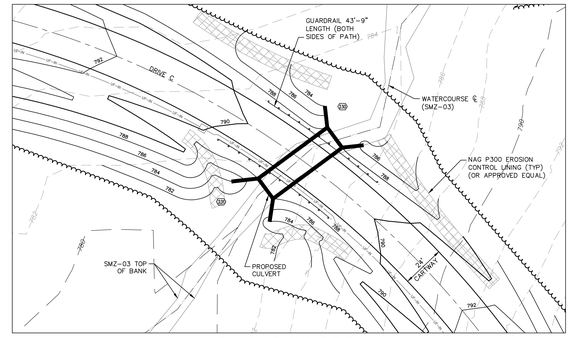
PLAN VIEW CULVERT 206–207
(SCALE 1" = 30')



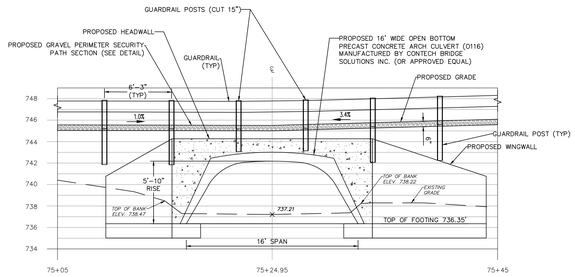
CULVERT 230–231
DRIVE C CENTERLINE
(SCALE 1" = 4')



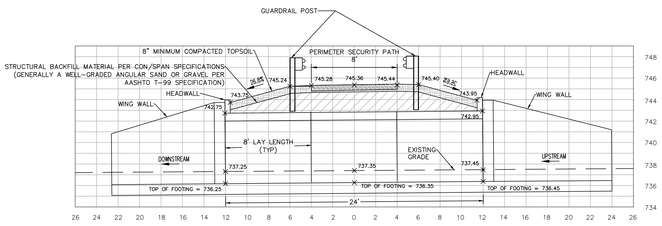
PROFILE CULVERT 230–231
(SCALE 1" = 5')



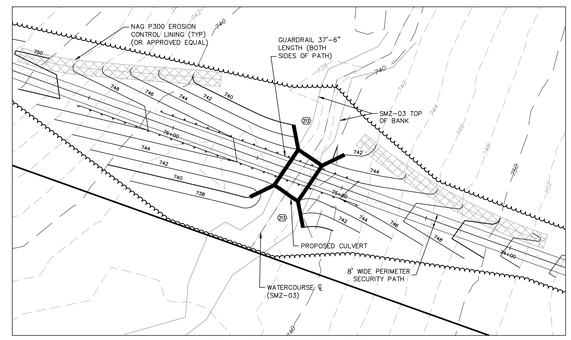
PLAN VIEW CULVERT 230–231
(SCALE 1" = 30')



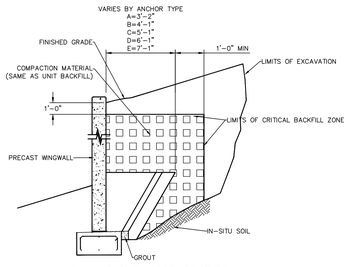
CULVERT 212–213
PERIMETER PATHWAY CENTERLINE
(SCALE 1" = 5')



PROFILE CULVERT 212–213
(SCALE 1" = 5')



PLAN VIEW CULVERT 212–213
(SCALE 1" = 30')



WINGWALL BACKFILL REQUIREMENTS
NOT TO SCALE

NOTES:
1. SEE SHEET C-907 FOR GUARDRAIL AND END TERMINAL DETAILS
2. SEE SHEET C-907 FOR GUARDRAIL POST DETAIL (ABOVE CULVERT)

Tennessee 811
Know what's below. Call before you dig.
1-800-351-1111

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

REV.	DATE	DESCRIPTION
A	07/01/19	PROGRESS SET
B	08/02/19	ISSUED FOR FINAL REVIEW
C	09/20/19	ISSUED FOR CLIENT USE

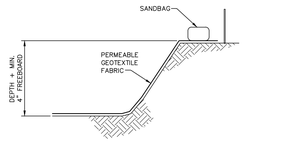
ROBERT E. LAMB, INC LAMB
PLANNING DESIGN CONSTRUCTION
VALLEY FORGE, PENNSYLVANIA

PRELIMINARY
NOT FOR CONSTRUCTION

OPEN BOTTOM CULVERTS

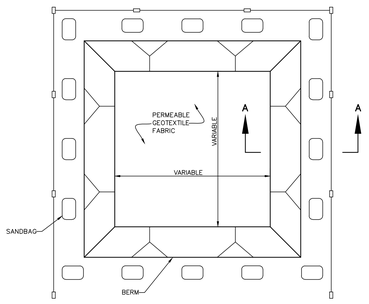
CLIENT: TENNESSEE VALLEY AUTHORITY
PROJECT: SYSTEM OPERATIONS CENTER
LOCATION: GEORGETOWN, MEIGS COUNTY, TN

DRAWN:	RAD
A/E:	WRM
Q/C:	WRM
SCALE:	1" = 30'
WORK ORDER NO.:	1628B
DRAWING NO.:	C-324



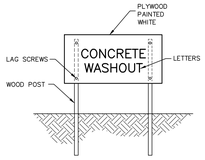
SECTION A–A

SECTION B–B

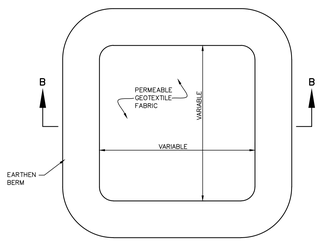


PLAN VIEW

TYPE "BELOW GRADE"



CONCRETE WASHOUT SIGN (OR EQUIVALENT)



PLAN VIEW

TYPE "ABOVE GRADE" WITH EATHERN BERMS

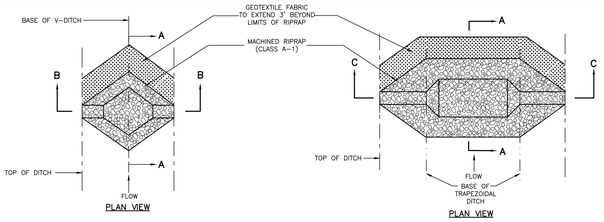
NOTES:

1. ACTUAL LAYOUT DETERMINED IN THE FIELD.
2. SIGNAGE IDENTIFYING THE CONCRETE WASHOUT AREA SHALL BE INSTALLED WITHIN 5' OF THE WASHOUT FACILITY.

CONCRETE WASHOUT DETAIL (TDEC)

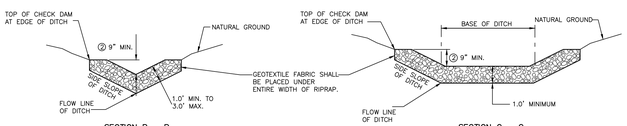
(NOT TO SCALE)

11/C–771



PLAN VIEW

PLAN VIEW

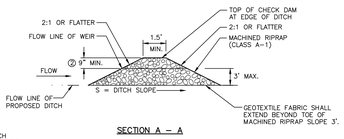


SECTION B – B

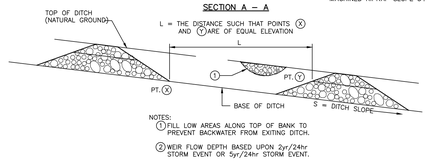
DETAIL FOR V–DITCH

SECTION C – C

DETAIL FOR TRAPEZOIDAL DITCH



SECTION A – A



NOTES:

① FILL LOW AREAS ALONG TOP OF BANK TO PREVENT BACKWATER FROM EXITING DITCH.

② WEIR FLOW DEPTH BASED UPON 2yr/24hr STORM EVENT OR 5yr/24hr STORM EVENT.

DETAIL FOR SPACING BETWEEN CHECK DAMS

NO.	TYPE	RIP–RAP TYPE	CHECK DAM LENGTH (FT)	DEPTH OF FLOW (FT)	FREEBOARD (FT)	HEIGHT ABOVE RIP–RAP (FT)	DRAINAGE AREA (AC)
1	TRAPEZOIDAL	A–1	0.75	0.86	0.64	1.50	3.2
2	TRAPEZOIDAL	A–1	1.75	0.94	0.56	1.50	10.4
3	TRAPEZOIDAL	A–1	3.75	0.89	0.61	1.50	2.9
4	TRAPEZOIDAL	A–1	0.75	0.75	0.50	1.25	5.9
5	TRAPEZOIDAL	A–1	3.25	0.86	0.64	1.50	2.4
6	TRAPEZOIDAL	A–1	9.00	0.89	0.61	1.50	7.3
7	TRAPEZOIDAL	A–1	2.50	0.76	0.74	1.50	5.6
8	TRAPEZOIDAL	A–1	2.00	0.80	0.70	1.50	2.6
9	TRAPEZOIDAL	A–1	1.75	0.99	0.51	1.50	8.1
10	TRAPEZOIDAL	A–1	2.50	0.81	0.69	1.50	3.4
11	TRAPEZOIDAL	A–1	2.25	1.00	0.50	1.50	9.6
12	TRAPEZOIDAL	A–1	1.50	0.97	0.53	1.50	1.5
13	TRAPEZOIDAL	A–1	1.00	0.82	0.68	1.50	1.5

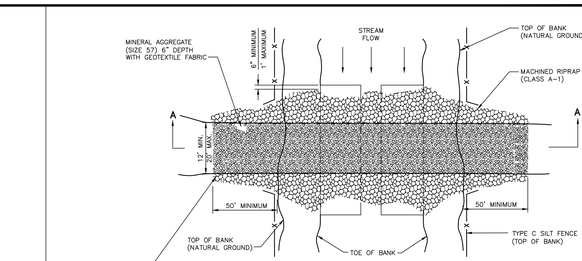
NOTES:

1. THE CENTER OF THE ROCK CHECK DAM MUST BE AT LEAST ONE (1) FOOT LOWER THAN THE OUTER EDGES.
2. FLOW RATE GENERATED BY 2 YEAR, 24 HOUR STORM.
3. SIDE SLOPES SHOULD BE 2:1 OR FLATTER.
4. THE HEIGHT OF THE CHECK DAM FROM THE BOTTOM OF THE CHANNEL TO THE BOTTOM OF THE WEIR SHOULD BE A MINIMUM OF 1 FOOT ABOVE THE DITCH BOTTOM.

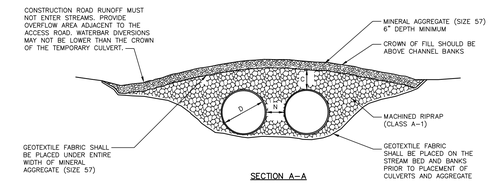
TEMPORARY ROCK CHECK DAM (TDEC)

(NOT TO SCALE)

12/C–771



PLAN VIEW OF TEMPORARY CULVERT CROSSING



SECTION A–A

C = 1/2 DIAMETER OF PIPE OR 18" WHICHEVER IS GREATER
N = 1/2 DIAMETER OF PIPE OR 12" WHICHEVER IS GREATER
D = PIPE DIAMETER

TEMPORARY STREAM CROSSING SELECTION

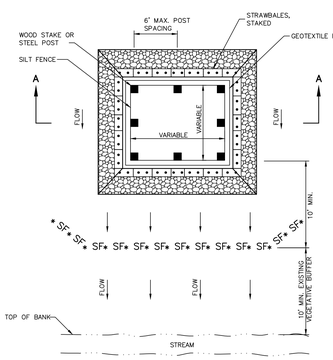
PIPE DIAMETER (INCHES)	AVERAGE CHANNEL SLOPE					
	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
18	8.5	9.1	9.8	10.4	11.0	11.3
24	17.4	18.8	20.0	21.4	21.5	21.7
30	30.1	32.3	33.9	34.1	33.5	33.0
36	46.8	50.4	49.5	47.8	46.6	45.8
42	67.7	69.0	65.5	62.8	61.0	59.6
48	92.6	88.1	76.8	78.6	75.8	73.7
54	127.2	107.0	91.9	94.9	91.1	88.1
60	146.5	121.1	118.4	111.1	106.1	101.9
72	194.9	142.2	153.6	141.3	133.3	127.9
RIPRAP	B	B	B	B	B/C	B/C

USE TWO (2) 30"ø PIPES (60 CFS MAX FLOW FOR SMZ 03)

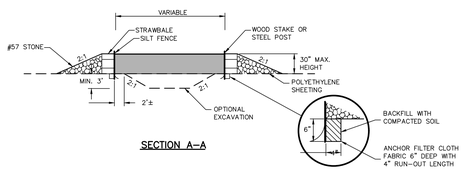
TEMPORARY STREAM CROSSING DETAIL (TDEC)

(NOT TO SCALE)

13/C–771



PLAN VIEW



SECTION A–A

TRENCHING DETAIL

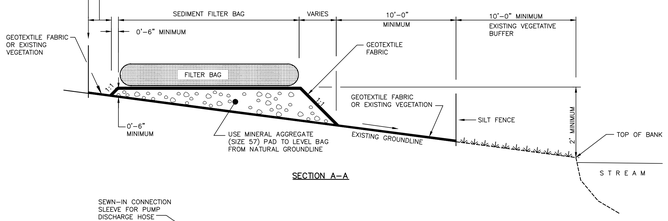
DEWATERING STRUCTURE VOLUMES AND DIMENSIONS			
PUMP DIAMETER (INCHES)	PUMP RATE (GALLONS PER MINUTE)	STORAGE VOLUME REQD (CUBIC YARDS)	INTERIOR DIMENSIONS
2	140	83	30" X 30"
3	260	154	41" X 41"
4	500	296	57" X 57"
6	1,100	652	85' X 85'

1. DIMENSIONS BASED ON THE MAXIMUM STRUCTURE HEIGHT OF 30" AND THE LENGTH BEING EQUAL TO THE WIDTH. OPTIONAL EXCAVATION IS NOT INCLUDED.
2. ADJUSTMENTS SHOULD BE MADE TO THE DIMENSIONS TO OBTAIN THE BEST CONFIGURATION FOR THE PROJECT SITE. DIMENSIONS ARE BASED ON THE DEWATERING STRUCTURE BEING HORIZONTAL.

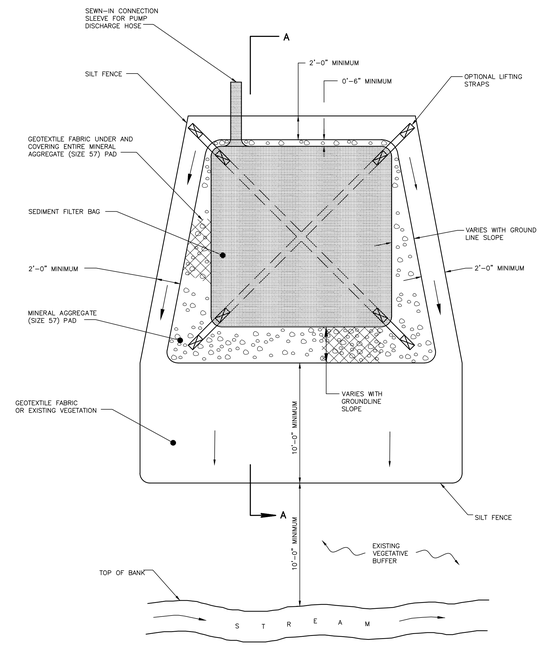
SILT FENCE AND STRAW DEWATERING DETAIL (TDEC)

(NOT TO SCALE)

14/C–771



SECTION A–A



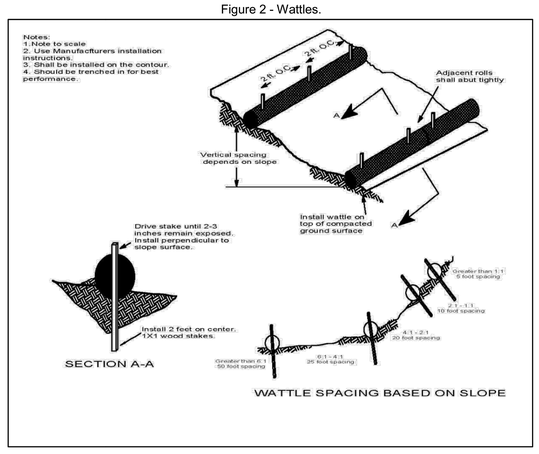
PLAN VIEW

SEDIMENT FILTER BAG DEWATERING DETAIL (TDEC)

(NOT TO SCALE)

15/C–771

Figure 2 - Wattles.

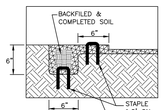


TUBES AND WATTLES DETAIL (TVA)

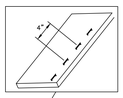
(NOT TO SCALE)

16/C–771

ANCHOR TRENCH DETAIL



ALTERNATE ANCHOR



SLOPE INTERRUPTION CHECK SLOT

CONSTRUCTION PHASE	CHANNEL NO.	LOCATION	BOTTOM WIDTH (FT)	DEPTH (FT)	TOP WIDTH (FT)	SIDE SLOPE (FT)	SIDE SLOPE (FT)	LINING	SEEDING SPEC.
PHASE 2	TS–1A	SW OF BUILDING "B"	0.50	1.00	8.00	3	3	S75BN	TEMPORARY
	TS–1B	SW OF SGC DOWNSTREAM TS–1A	3.00	1.00	9.00	3	3	S75BN	TEMPORARY
	TS–2	ALONG PS–1 TO NORTH	2.00	1.00	8.00	3	3	S75BN	TEMPORARY
	TS–3	WEST OF SUBSTATION – BECOMES PS–4	3.00	1.75	13.50	3	3	S150BN	TEMPORARY
PHASE 3	TS–4	ALONG NORTH OF COMPLEX – SOUTH OF PS–1	5.00	1.00	11.00	3	3	S75BN	TEMPORARY
	TS–5	UPSTREAM SEDIMENT BASIN 3 – SE BUILDING B	2.00	0.75	6.50	3	3	S75BN	TEMPORARY
PHASE 2	PS–1	UPSTREAM SEDIMENT BASIN 1 – NORTH BUILDING "B"	3.00	1.50	12.00	3	3	C700BN	TEMPORARY
PHASE 3	PS–2	UPSTREAM SEDIMENT BASIN 1 – WEST BUILDING "B"	3.00	1.00	8.00	3	3	SOD	–
	PS–3A	UPSTREAM PS–1 – NE BUILDING "B"	4.00	1.25	11.50	3	3	P300	PERMANENT
	PS–3B	UPSTREAM PS–3A	4.00	1.25	11.50	3	3	P300	PERMANENT
PHASE 2	PS–4	UPSTREAM SEDIMENT BASIN 2 – WEST OF SUBSTATION	2.00	1.75	12.50	3	3	P300	PERMANENT
	PS–5	EAST OF SUBSTATION	4.00	1.00	10.00	3	3	P300	PERMANENT
	PS–6	WRAPS AROUND EAST SUBSTATION	2.00	1.75	12.50	3	3	P300	PERMANENT
	PS–7	WRAPS AROUND SE SUBSTATION	2.00	1.00	8.00	3	3	P300	PERMANENT
	PS–8	WRAPS AROUND SW SUBSTATION	2.00	1.00	8.00	3	3	P300	PERMANENT
PHASE 4	PS–9	ALONG SOUTH SECURITY PATH BY WEST ENTRANCE	2.00	1.00	8.00	3	3	SOD	–
	PS–10	ALONG NORTH SECURITY PATH BY WEST ENTRANCE	2.00	1.00	8.00	3	3	SOD	–

NOTES:

1. LINING SPECIFICATION REFERS TO NORTH AMERICAN GREEN PRODUCT. SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, VEGETATIVE STABILIZATION, SOIL AMENDMENTS, SEED MIXTURES AND MULCHING INFORMATION.
2. ALL PERMANENT SWALES SHALL HAVE UNDERDRAIN INSTALLED. REFER TO DETAIL ON SHEET C–901 AND GRADING PLAN FOR LOCATION OF UNDERDRAIN.
3. SEE LANDSCAPE PLANS FOR LOCATION OF SOD IN–LEI OF PERMANENT SEEDING.

CHANNEL DETAIL (TDEC)

(NOT TO SCALE)

17/C–771

Tennessee 811
Know what's below. Call before you dig.
1–800–351–1111

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

ROBERT E. LAMB, INC
LAMB
PLANNING DESIGN CONSTRUCTION
VALLEY FORGE, PENNSYLVANIA

PRELIMINARY
NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION
G	08/13/19	ISSUED FOR TDEC REVIEW
F	08/02/19	ISSUED FOR FINAL REVIEW
E	07/01/19	PROGRESS SET
D	05/16/19	ISSUED FOR TDEC SUBMISSION
C	04/26/19	PROGRESS SET
B	02/22/19	PROGRESS SET
A	12/10/18	PROGRESS SET

EROSION & SEDIMENT CONTROL DETAILS

CLIENT: TENNESSEE VALLEY AUTHORITY
PROJECT: SYSTEM OPERATIONS CENTER
LOCATION: GEORGETOWN, MEIGS COUNTY, TN

DRAWN: RAD
A/E: WRM
Q/C: WRM
SCALE: AS SHOWN
WORK ORDER NO.: 1628B
DRAWING NO.: C-771

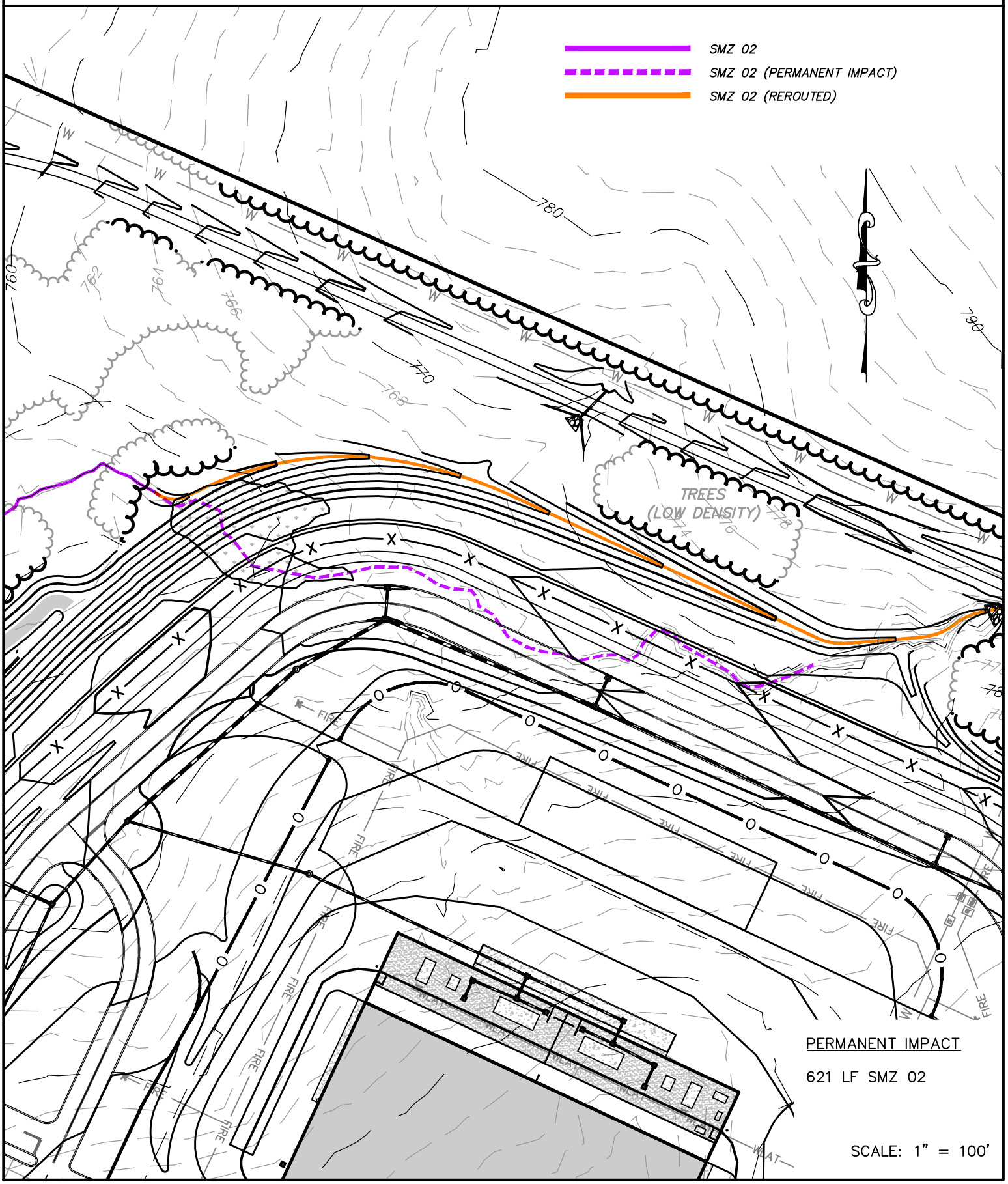
TENNESSEE VALLEY AUTHORITY
SYSTEM OPERATIONS CENTER
MEIGS COUNTY, TENNESSEE
PROJECT NO. 1628B

DRAWING NO. SKC-24 REV. C
DATE: 05-03-2019

WRM

WATERCOURSE ENCROACHMENT
WATERCOURSE REROUTE
(PLAN VIEW)

IMPACT 4



PERMANENT IMPACT

621 LF SMZ 02

SCALE: 1" = 100'

CHANNEL DESIGN DATA

PROJECT NAME: TVA
LOCATION: GEORGETOWN, TENNESSEE
PREPARED BY: SJC DATE: 5/10/2019
CHECKED BY: WRM/RAD DATE: 5/10/2019

OPEN CHANNEL DESIGN

CHANNEL	DRAINAGE AREA (AC)	SWALE LENGTH (FT)	INVERT UPSTREAM (FT)	INVERT DOWNSTREAM (FT)	BOTTOM WIDTH (FT)	ELEV DROP (FT)	BED SLOPE (%)	C*	TC (HR)	TC (MIN)	RAINFALL INTENSITY (IN/HR)**	Q (CFS)	LINER
TS-1A	0.70	303	788.50	782.10	0.50	6.40	2.1%	0.70	0.08	5.0	5.14	2.54	S75BN
TS-1B	1.50	506	781.50	764.00	3.00	17.50	3.5%	0.70	0.10	5.8	4.98	5.28	S75BN
TS-2	1.06	543	788.50	778.00	2.00	10.50	1.9%	0.71	0.11	6.8	4.76	3.61	SOD
TS-3	10.37	578	780.00	768.00	3.00	12.00	2.1%	0.71	0.20	12.1	3.83	28.41	S150BN
TS-4	2.62	840	782.00	762.00	5.00	20.00	2.4%	0.70	0.24	14.3	3.53	6.53	S75BN
TS-5	0.26	212	782.00	778.00	2.00	4.00	1.9%	0.70	0.24	14.2	3.55	0.65	S75BN
PS-1	18.96	724	773.00	758.00	5.00	15.00	2.1%	0.32	0.48	28.7	5.17	39.55	P300
PS-2	0.38	509	783.00	775.00	3.00	8.00	1.6%	0.70	0.08	5.0	9.82	3.29	P300
PS-3A	1.51	331	803.00	791.00	4.00	12.00	3.6%	0.70	0.08	5.0	9.82	13.08	P300
PS-3B	1.89	402	791.00	773.00	4.00	18.00	4.5%	0.70	0.09	5.2	9.74	16.24	P300
PS-4	3.14	371	784.00	778.00	2.00	6.00	1.6%	0.84	0.22	13.4	6.95	23.14	P300
PS-5	1.06	526	798.00	772.00	4.00	26.00	4.9%	0.70	0.08	5.0	9.82	9.18	P300
PS-6	2.78	561	786.00	778.00	2.00	8.00	1.4%	0.82	0.15	8.8	8.27	23.64	P300
PS-7	0.30	230	784.00	778.00	2.00	6.00	2.6%	0.72	0.08	5.0	9.82	2.68	P300
PS-8	0.39	330	784.00	778.00	2.00	6.00	1.8%	0.72	0.08	5.0	9.82	3.50	P300
PS-9	0.51	585	783.00	766.00	2.00	17.00	2.9%	0.73	0.08	5.0	9.82	4.64	SOD
PS-10	0.66	374	780.00	766.00	2.00	14.00	3.7%	0.70	0.08	5.0	9.82	5.72	SOD

NOTES:

1. * C VALUES TAKEN FROM KNOXVILLE BMP MANUAL TABLE ST-13-1 WITH RESPECT TO HYDROLOGIC SOIL GROUP
2. ** RAINFALL INTENSITY TAKEN FROM NOAA ATLAS 14, VOLUME 2, VERSION 3 AND INTERPOLATED BASED ON TC
3. ** RAINFALL INTENSITY BASED ON 100 YEAR STORM FOR PERMANENT SWALES, 2 YEAR STORM FOR TEMPORARY SWALES
4. Q CALCULATED WITH RATIONAL METHOD Q = (CF)CIA
5. PERMANENT SWALES (100 YEAR STORM) CF=1.25; TEMPORARY SWALES (2 YEAR STORM) CF=1.00

North American Green
5401 St. Wendel-Cynthiana Rd.
Poseyville, Indiana 47633
Tel. 800.772.2040
>Fax 812.867.0247
www.nagreen.com
ECMDS v7.0

CHANNEL ANALYSIS

> > > PS-1

Name	PS-1
Discharge	39.55
Peak Flow Period	0.48
Channel Slope	0.021
Channel Bottom Width	5
Left Side Slope	3
Right Side Slope	3
Low Flow Liner	
Retardence Class	C 6-12 in
Vegetation Type	None
Vegetation Density	None
Soil Type	Clay (GC)

P550

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissable Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
P550 Unvegetated	Straight	39.55 cfs	5.05 ft/s	0.98 ft	0.034	3.2 lbs/ft2	1.29 lbs/ft2	2.48	STABLE	E
Underlying Substrate	Straight	39.55 cfs	5.05 ft/s	0.98 ft	0.034	3.94 lbs/ft2	0.91 lbs/ft2	4.32	STABLE	E
P550 Reinforced Vegetation	Straight	39.55 cfs	4.02 ft/s	1.16 ft	0.046	14 lbs/ft2	1.52 lbs/ft2	9.21	STABLE	E
Underlying Substrate	Straight	39.55 cfs	4.02 ft/s	1.16 ft	0.046	3.2 lbs/ft2	1.04 lbs/ft2	3.06	STABLE	E

P300

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissable Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
P300 Unvegetated	Straight	39.55 cfs	5.53 ft/s	0.92 ft	0.03	2.3 lbs/ft2	1.21 lbs/ft2	1.91	STABLE	E
Underlying Substrate	Straight	39.55 cfs	5.53 ft/s	0.92 ft	0.03	2.83 lbs/ft2	0.87 lbs/ft2	3.28	STABLE	E
P300 Reinforced Vegetation	Straight	39.55 cfs	4.02 ft/s	1.16 ft	0.046	10 lbs/ft2	1.52 lbs/ft2	6.58	STABLE	E
Underlying Substrate	Straight	39.55 cfs	4.02 ft/s	1.16 ft	0.046	2.3 lbs/ft2	1.04 lbs/ft2	2.2	STABLE	E

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, May 2 2019

PS-1

Trapezoidal

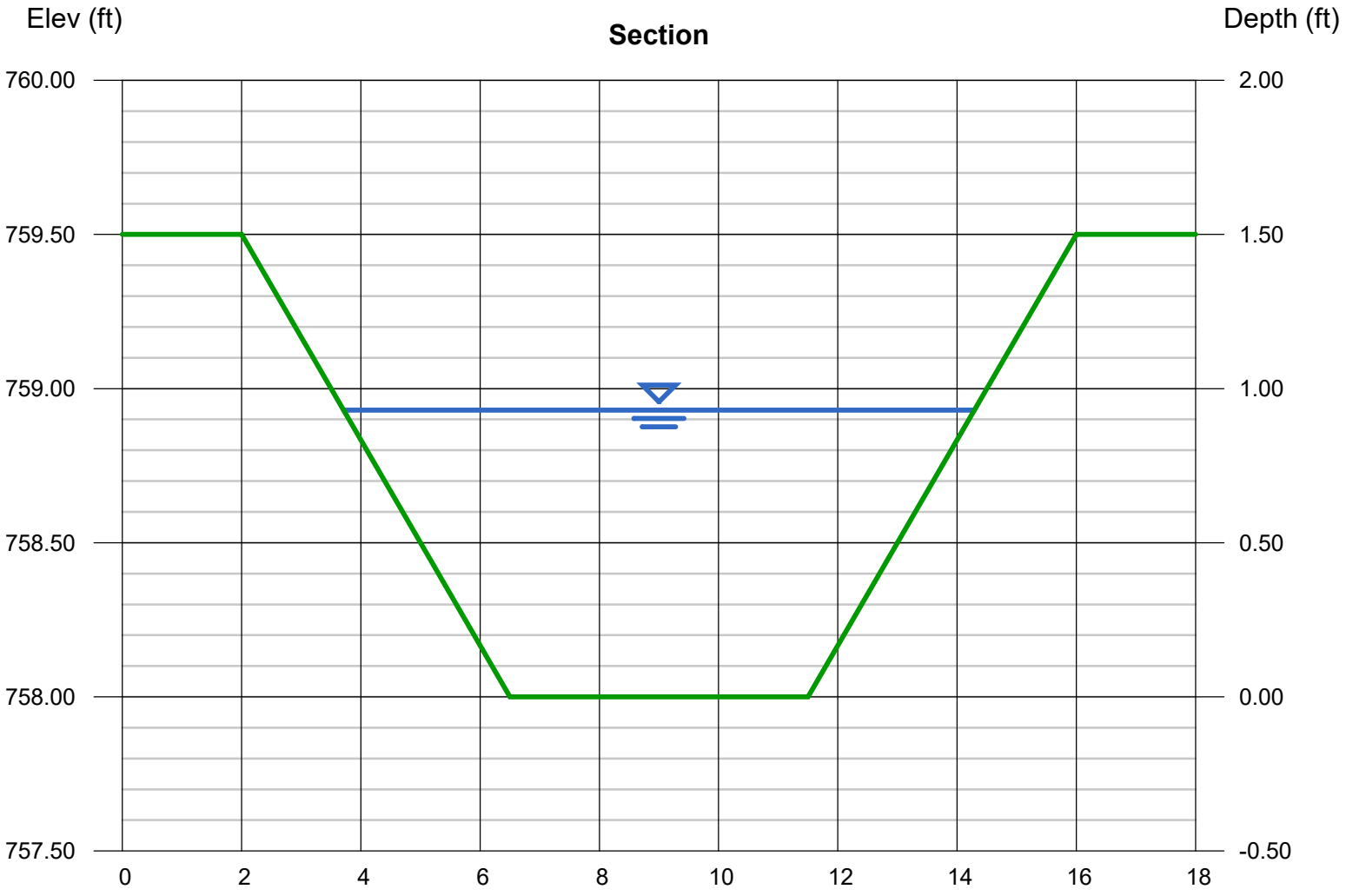
Bottom Width (ft)	= 5.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 758.00
Slope (%)	= 2.10
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 39.55

Highlighted

Depth (ft)	= 0.93
Q (cfs)	= 39.55
Area (sqft)	= 7.24
Velocity (ft/s)	= 5.46
Wetted Perim (ft)	= 10.88
Crit Depth, Yc (ft)	= 1.02
Top Width (ft)	= 10.58
EGL (ft)	= 1.39



Attachment 2
TN SQT and Debit Tool Rapid Assessment Form

Date: 04/04/2019
Investigators: JRO

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

I. Reach Information and Stratification

Project Name:	Meigs County
Reach ID:	SMZ 02 Existing Condition
Upstream Latitude:	35.311548
Upstream Longitude:	-84.948784
Downstream Latitude:	35.311618
Downstream Longitude:	-84.949502
Ecoregion:	67
Drainage Area (sq. mi.):	0.03
Stream Reach Length (ft):	621
Flow Type:	intermittent
Valley Type:	unconfined alluvial

Shading Key
Desktop Value
Field Value
Calculation

II. Reach Walk

A.

Length of Armoring on banks (ft)		0					
Total (ft)	163.0	163					
Percent Armoring (%)	0%						

B.

Difference between BKF stage and WS (ft)	Describe the bankfull indicator
0	deposition of sediment at edge of upland vegetation on channel banks. Stream very small, upland veg on sides of channel at water edge.

Date: 04/04/2019
Investigators: JRO

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

III. Bankfull Verification and Stable Riffle Cross Section

A.	Difference between BKF stage and WS (ft) *Average or consensus value from reach walk.*	0
B.	Bankfull Width (ft)	1
C.	Bankfull Mean Depth (ft) = Average of depth measurements	0.3
D.	Bankfull Area (sq. ft.) Width * Mean Depth	0.3
E.	Regional Curve Bankfull Width (ft)	4.4
F.	Regional Curve Bankfull Mean Depth (ft)	0.38
G.	Regional Curve Bankfull Area (sq. ft.)	1.71
H.	Curve Used	67

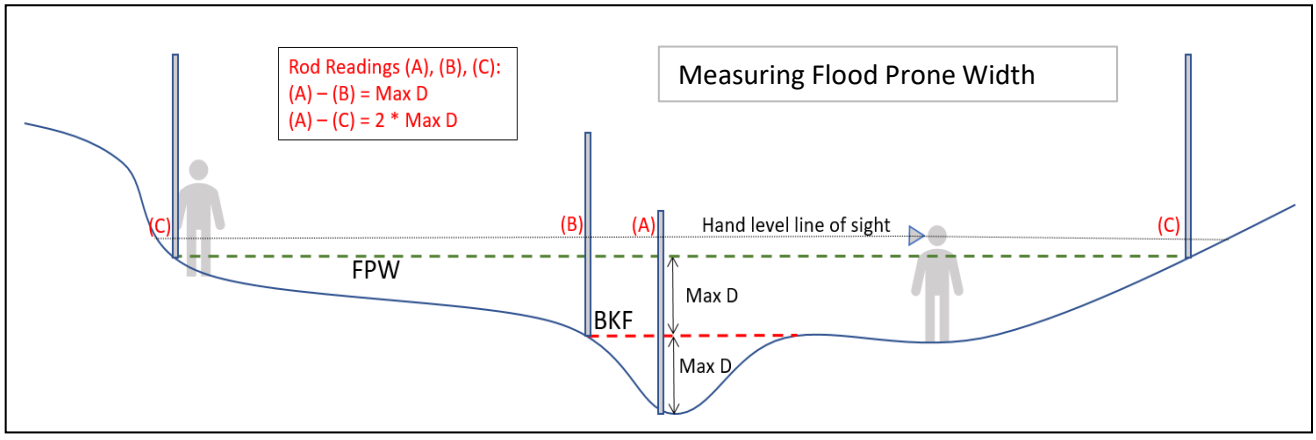
I.	Flood Prone Width (FPW; ft)	1.12
J.	Entrenchment Ratio (ER)	1.1
K.	Width Depth Ratio (WDR)	3.3
L.	Stream Type	A

Cross Section Measurements
Depth measured from bankfull

Station	Depth	Station	Depth
0	0		
0.25	0.04		
0.5	0.025		
0.75	0.008		
1	0		

Quick Rosgen Stream Classification Guide (Rosgen, 1996)				
ER < 1.4		1.4 < ER < 2.2	ER > 2.2	
WDR < 12	WDR > 12	WDR > 12	WDR < 12	WDR > 12
A or G	F	B	E	C

Rosgen, D.L., 1996. Applied River Morphology, Wildland Hydrology Books, Pagosa Springs, Colorado.



TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

IV. Riffle Data (Floodplain Connectivity & Bed Form Diversity)

A.

Assessment Segment Length At least 20 x the Bankfull Width	216		20*Bankfull Width	20.0

B. Bank Height & Riffle Data

	R1	R2	R3	R4	R5	R6	R7	R8
Begin Station (Distance along tape)	20	36	82	132	146			
End Station (Distance along tape)	23.5	63	129	139	163			
Low Bank Height (ft)	0.45	0.45	0.45	0.33	0.45			
Bankfull Max Depth (ft)	0.08	0.08	0.04	0.04	0.08			
Bankfull Width (ft)	1	1	0.6	0.75	0.75			
Flood Prone Width (ft)	1.8	1.25	1	1.1	1.25			
Bankfull Mean Depth (ft)	0.08	0.08	0.04	0.04	0.08			
Riffle Length (ft) *Including Run*	3.5	27	47	7	17			
Bank Height Ratio (BHR) Low Bank H / BKF Max D	5.6	5.6	11.3	8.3	5.6			
BHR * Riffle Length (ft)	19.7	151.9	528.8	57.8	95.6			
Entrenchment Ratio (ER)	1.8	1.3	1.7	1.5	1.7			
ER * Riffle Length (ft)	6.3	33.8	78.3	10.3	28.3			
WDR BKF Width / BKF Mean D	12.5	12.5	15.0	18.8	9.4			

Date: 04/04/2019
Investigators: JRO

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

IV. Riffle Data (Continued)

C.	Total Riffle Length (ft)	101.5
D.	**Weighted BHR** $\frac{\Sigma(Bank\ Height\ Ratio_i \times \text{Riffle Length}_i)}{\Sigma Riffle\ Length}$	8.4
E.	**Weighted ER**	1.5
F.	**Maximum WDR**	18.8
G.	**Percent Riffle (%)**	47%

V. Slope

A.

	Begin	End	Difference	Slope (ft/ft)
Station along tape (ft)	0	163	163.0	0.012
Stadia Rod Reading (ft)	8	6	2.0	

VI. Stream Type Classification

		Assessment Segment
A.	Entrenchment Ratio (ft/ft)	1.1
B.	Width Depth Ratio (ft/ft)	3.3/1
C.	Channel Material Estimate	silt loam clay
D.	Stream Type (Rosgen, 1996)	A

VII. Pool Data (Bed Form Diversity)

A.

	P1	P2	P3	P4	P5	P6	P7	P8
Geomorphic Pool?	G	G	G	G	G			
Station At maximum pool depth	13	27	67	131	142			
P-P Spacing (ft)	X	14.0	40.0	54.0	11.0			
Pool Spacing Ratio Pool Spacing / BKF Width	X	14.0	40.0	54.0	11.0			
Pool Depth (ft) Measured from Bankfull	0.25	0.33	0.45	0.33	0.45			
Pool Depth Ratio Pool depth/BKF mean D	0.8	1.1	1.5	1.1	1.5			

B.	Average Pool Depth Ratio	1.2	C.	Median Pool Spacing Ratio	27.0

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

VIII. Large Woody Debris

A.	Number of Pieces per 100m	1

IX. Lateral Migration

A. Bank Data

BEHI/NBS Score	Bank Length (ft)	BEHI/NBS Score	Bank Length (ft)
L/L	326		

B.	Dominant BEHI/NBS Score	L/L
C.	Total Eroding Bank Length (ft)	80
D.	Total Bank Length (ft)	326.0
E.	Percent Streambank Erosion (%) Total Eroding Bank Length/ Total Bank Length	25%

X. Riparian Vegetation

A.

Buffer Width	Buffer Width Measurements (ft)							Avg.
	1	2	3	4	5	6	7	
Left (looking downstream)	5							5.0
Right (looking downstream)	5							5.0

XI. Sinuosity

A.	Stream Length (ft)	163
B.	Valley Length (ft)	157
C.	Sinuosity	1.04

TN SQT and Debit Tool Rapid Assessment Form

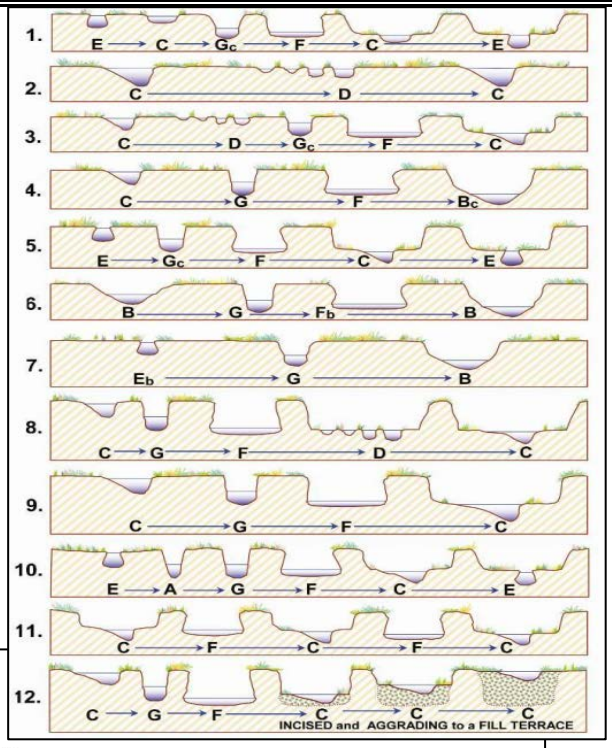
Version 1.0 November 2018

XII. Channel Evolution

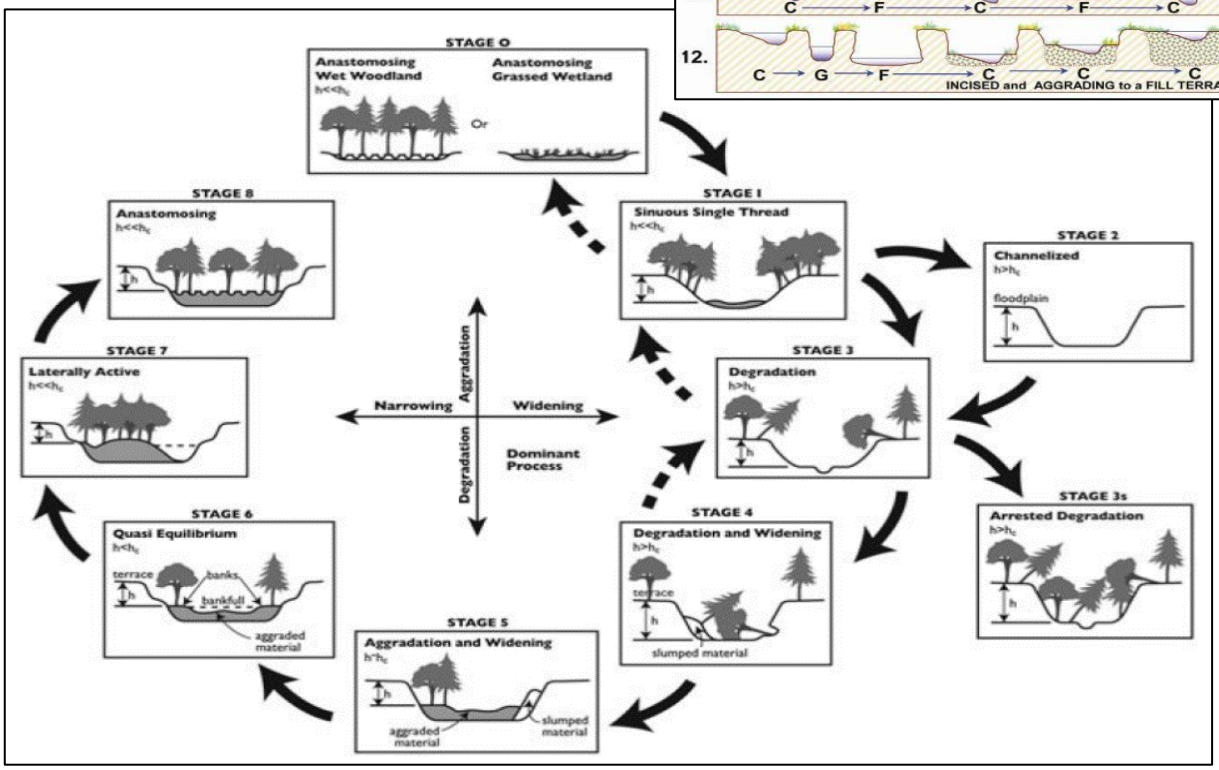
A.

Rosgen Channel Type Succession	5
Simon Channel Evolution Model (Stage)	0

Rosgen Channel Type



Stream Evolution Model



1 *Figure 7-48, Watershed Assessment of River Stability and Sediment Supply (WARSSS),* by David L. Rosgen, Wildland Hydrology, 2009, p. 7-175.

2 B. Cluer, C. Thorne. "A Stream Evolution Model Integrating Habitat and Ecosystem Benefits." *River Research and Applications.* 2013.

Date: 04/04/2019
Investigators: JRO

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

I. Reach Information and Stratification

Project Name:	Meigs County
Reach ID:	SMZ 03
Upstream Latitude:	35.30698
Upstream Longitude:	-84.946564
Downstream Latitude:	35.307272
Downstream Longitude:	-84.946179
Ecoregion:	67
Drainage Area (sq. mi.):	0.18
Stream Reach Length (ft):	216
Flow Type:	intermittent
Valley Type:	unconfined alluvial

Shading Key
Desktop Value
Field Value
Calculation

II. Reach Walk

A.

Length of Armoring on banks (ft)		0					
Total (ft)	216.0	216					
Percent Armoring (%)	0%						

B.

Difference between BKF stage and WS (ft)	Describe the bankfull indicator
0	deposition of sediment at edge of upland vegetation on channel banks. Stream very small, upland veg on sides of channel at water edge.

Date: 04/04/2019
Investigators: JRO

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

III. Bankfull Verification and Stable Riffle Cross Section

A.	Difference between BKF stage and WS (ft) *Average or consensus value from reach walk.*	0.25
B.	Bankfull Width (ft)	2.3
C.	Bankfull Mean Depth (ft) = Average of depth measurements	0.3
D.	Bankfull Area (sq. ft.) Width * Mean Depth	5.3
E.	Regional Curve Bankfull Width (ft)	8.6
F.	Regional Curve Bankfull Mean Depth (ft)	0.68
G.	Regional Curve Bankfull Area (sq. ft.)	5.82
H.	Curve Used	67

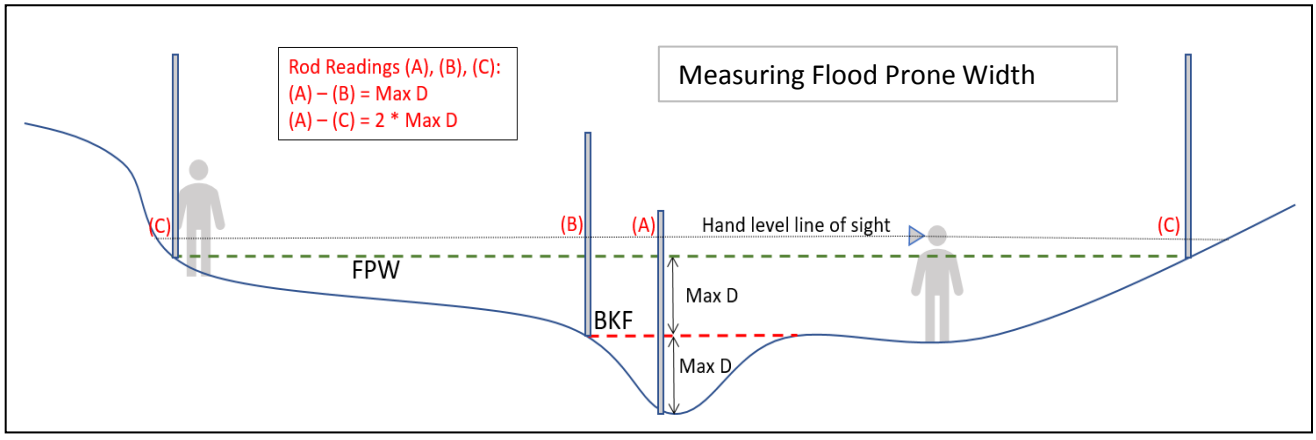
I.	Flood Prone Width (FPW; ft)	13
J.	Entrenchment Ratio (ER)	5.7
K.	Width Depth Ratio (WDR)	1
L.	Stream Type	C

Cross Section Measurements
Depth measured from bankfull

Station	Depth	Station	Depth
0	0	12	0
1	0	13	0
2	0		
3.7	0.35		
4	0.33		
5	0.29		
6	0.25		
7	0		
8	0		
9	0		
10	0		
11	0		

Quick Rosgen Stream Classification Guide (Rosgen, 1996)				
ER < 1.4		1.4 < ER < 2.2	ER > 2.2	
WDR < 12	WDR > 12	WDR > 12	WDR < 12	WDR > 12
A or G	F	B	E	C

Rosgen, D.L., 1996. Applied River Morphology, Wildland Hydrology Books, Pagosa Springs, Colorado.



TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

IV. Riffle Data (Floodplain Connectivity & Bed Form Diversity)

A.

Assessment Segment Length At least 20 x the Bankfull Width	216		20*Bankfull Width	46.0

B. Bank Height & Riffle Data

	R1	R2	R3	R4	R5	R6	R7	R8
Begin Station (Distance along tape)	0	47	72	105	173			
End Station (Distance along tape)	41	65	87	156	216			
Low Bank Height (ft)	0.5	0.33	0.33	0.33	0.33			
Bankfull Max Depth (ft)	0.125	0.08	0.125	0.17	0.1			
Bankfull Width (ft)	1.75	6	6.5	3	4			
Flood Prone Width (ft)	11	8.5	9	8	7			
Bankfull Mean Depth (ft)	0.125	0.08	0.125	0.17	0.1			
Riffle Length (ft) *Including Run*	41	18	15	51	43			
Bank Height Ratio (BHR) Low Bank H / BKF Max D	4.0	4.1	2.6	1.9	3.3			
BHR * Riffle Length (ft)	164.0	74.3	39.6	99.0	141.9			
Entrenchment Ratio (ER)	6.3	1.4	1.4	2.7	1.8			
ER * Riffle Length (ft)	257.7	25.5	20.8	136.0	75.3			
WDR BKF Width / BKF Mean D	14.0	75.0	52.0	17.6	40.0			

Date: 04/04/2019
Investigators: JRO

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

IV. Riffle Data (Continued)

C.	Total Riffle Length (ft)	168.0
D.	**Weighted BHR** $\frac{\Sigma(Bank\ Height\ Ratio_i \times \text{Riffle Length}_i)}{\Sigma Riffle\ Length}$	3.1
E.	**Weighted ER**	3.1
F.	**Maximum WDR**	75.0
G.	**Percent Riffle (%)**	78%

V. Slope

A.

	Begin	End	Difference	Slope (ft/ft)
Station along tape (ft)	0	216	216.0	0.014
Stadia Rod Reading (ft)	9	6	3.0	

VI. Stream Type Classification

		Assessment Segment
A.	Entrenchment Ratio (ft/ft)	5.7
B.	Width Depth Ratio (ft/ft)	26.5/1
C.	Channel Material Estimate	boulder
D.	Stream Type (Rosgen, 1996)	C

VII. Pool Data (Bed Form Diversity)

A.

	P1	P2	P3	P4	P5	P6	P7	P8
Geomorphic Pool?	G	G	G					
Station At maximum pool depth	46	68	97	158				
P-P Spacing (ft)	X	22.0	29.0	54.0				
Pool Spacing Ratio Pool Spacing / BKF Width	X	9.6	12.6	23.5	0.0			
Pool Depth (ft) Measured from Bankfull	0.33	0.42	0.42	0.42				
Pool Depth Ratio Pool depth/BKF mean D	0.1	0.2	0.2	0.2				

B.	Average Pool Depth Ratio	0.2	C.	Median Pool Spacing Ratio	11.1

TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

VIII. Large Woody Debris

A.	Number of Pieces per 100m	9

IX. Lateral Migration

A. Bank Data

BEHI/NBS Score	Bank Length (ft)	BEHI/NBS Score	Bank Length (ft)
L/L	436		

B.	Dominant BEHI/NBS Score	L/L
C.	Total Eroding Bank Length (ft)	20
D.	Total Bank Length (ft)	432.0
E.	Percent Streambank Erosion (%) Total Eroding Bank Length/ Total Bank Length	5%

X. Riparian Vegetation

A.

Buffer Width	Buffer Width Measurements (ft)							Avg.
	1	2	3	4	5	6	7	
Left (looking downstream)	100							100.0
Right (looking downstream)	100							100.0

XI. Sinuosity

A.	Stream Length (ft)	216
B.	Valley Length (ft)	204
C.	Sinuosity	1.06

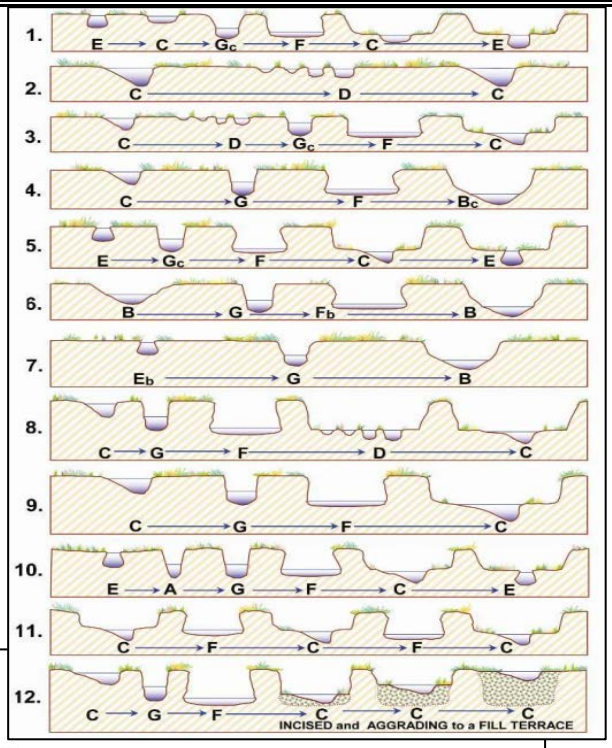
TN SQT and Debit Tool Rapid Assessment Form

Version 1.0 November 2018

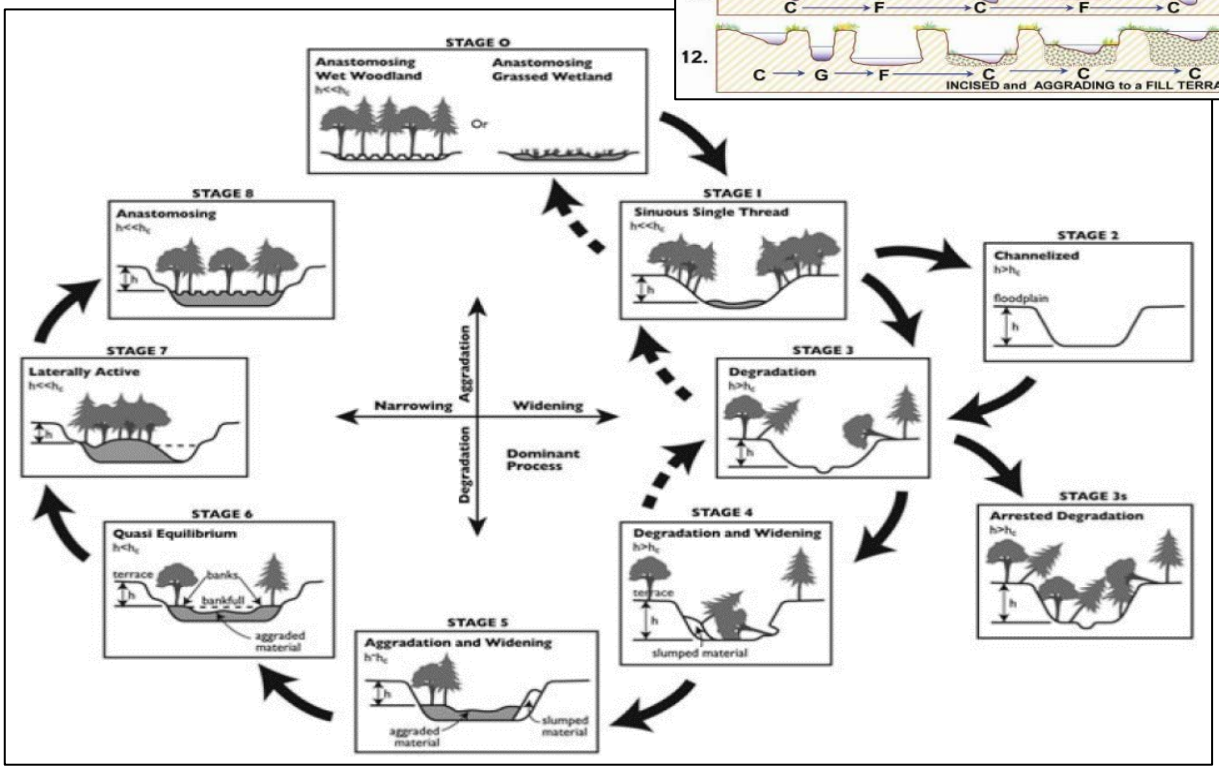
XII. Channel Evolution

A.	Rosgen Channel Type Succession	8
	Simon Channel Evolution Model (Stage)	6

Rosgen Channel Type



Stream Evolution Model



1 *Figure 7-48, Watershed Assessment of River Stability and Sediment Supply (WARSSS),* by David L. Rosgen, Wildland Hydrology, 2009, p. 7-175.

2 B. Cluer, C. Thorne. "A Stream Evolution Model Integrating Habitat and Ecosystem Benefits." *River Research and Applications.* 2013.

Date: 04/04/2019
Investigators: JRO

TN SQT and Debit Tool
BEHI/NBS Field Form

Reach ID: **SMZ 03**
Valley Type:
Bed Material: **boulder gravel**

			Bank Erosion Hazard Index (BEHI)										
Station ID	Bank Length (Ft)	Study Bank Height (ft)	BKF Height (ft)	Root Depth (ft)	Root Density (%)	Bank Angle (degrees)	Surface Protection (%)	Bank Material Adjustment	Stratification Adjustment	BEHI Total/ Category	NBS Ranking	Notes
0-216	436	0.67	0.15	0.67	75	15	95	boulder				

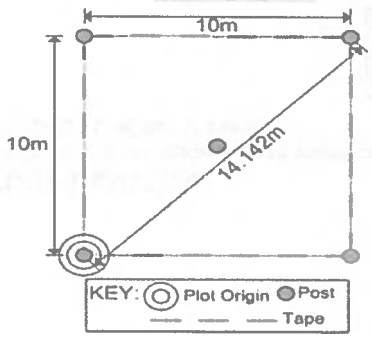
Date:
Investigators:
Project Name:

TN SQT and Debit Tool
Riparian Vegetation Rapid Plots

Plot ID	Native Cover: Herbaceous Strata	Native Cover: Shrub Strata	Saplings DBH (cm): 0 - 1	Saplings DBH (cm): 1 - 2.5	Trees DBH (cm): 2.5 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	≥40
R-1 RB	95	80	15	11	3	5	2	2					
Latitude: 35.307121, -84.946429 Long:	Notes: Herbs: violets, ferns, sedges grasses, shrubs - white ash, redbud, Trees - eastern red cedar, redbud and white ash												
R-1 LB	95	80	52	18		5	2	1	1		1		
Latitude: 35.307046, -84.946233 Long:	Notes: Herbs: same as above but including Virginia Pine.												
Latitude: Long:	Notes:												
Latitude: Long:	Notes:												

Strata	Height Range (m)	Description
Herb	0-1	Can also include shrubs within height class
Shrub	1 to 5	Shrubs only, no tree saplings

Tally Method						
	= 1	= 2	= 3	= 4	= 5	= 6
	= 7	= 8	= 9	= 10	= 11	= 12. etc.



Note: Latitude and Longitude should be recorded for the point of origin (double circle) fro each plot in decimal degrees

Data forms and protocol are modified from the Carolina Vegetation Survey (CVS) protocol (Lee et al. 2008)
Plot IDs must correspond to plots indentified on a map of the project area.

Attachment 3

Meigs County Photolog
April 2019

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
TVA	Meigs County Project	

Photo No.	Date:
1	04042019

Direction Photo Taken:

Northeast

Description:

Upper portion of SMZ 02 SQT assessment reach

Photo No.	Date:
2	04042019

Direction Photo Taken:

Ssouthwest

Description:

Lower portion of SMZ 02 SQT assessment reach

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
TVA	Meigs County Project	

Photo No.	Date:
3	04042019

Direction Photo Taken:

South

Description:

Riparian zone adjacent to left bank SMZ 02.

Photo No.	Date:
4	April 2019

Direction Photo Taken:

North

Description:

Upper portion of SMZ 03 SQT assessment reach

PHOTOGRAPHIC LOG

Client Name: TVA	**Site Location:**	**Project No.**

Photo No.	**Date:**
5	April 2019

Direction Photo Taken:

Facing south

Description:

Lower portion of SMZ 03 SQT assessment reach

Photo No.	**Date:**
6	April 2019

Direction Photo Taken:

west

Description:

Riparian area of SMZ 03 RB

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
TVA		

Photo No.	Date:
7	April 2019

Direction Photo Taken:

Facing north

Description:

Riparian area of SMZ 03 LB adjacent to riffle cross-section

Photo No.	Date:
8	April 2019

Direction Photo Taken:

east

Description:

Riparian area SMZ 03 LB

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
TVA		

Photo No.	Date:
9	April 2019

Direction Photo Taken:

North

Description:

WWC 05 upper section within impact area

Photo No.	Date:
10	April 2019

Direction Photo Taken:

South

Description:

WWC 05 Lower section within impact area.

Fence line is property line

Attachment 4

Tennessee Stream Debit Tool Summary
SMZ02 and SMZ 03

Name: Jim Orr - AECOM
Date: 9-24-2019

TN SQT DEBIT TOOL v1.0

Project ID/ Permit Number:	0

Users Input Values
Users select values from a pull-down menu

DEBIT TOOL TABLE

Stream ID by Reach	Impact Description	Option	Existing Stream Length	Existing Condition Score	Proposed Length	Impact Severity Tier	Proposed Condition Score	Change in Functional Feet
SMZ 03 - 1	span		82	0.68	82	Tier 4	0.22	-37.7
SMZ 03 - 2	span		142	0.68	142	Tier 4	0.22	-65.3
SMZ 03 - 3	span		104	0.68	104	Tier 4	0.22	-47.8
SMZ -02	fill		621	0.29	621	Tier 6	0.00	-180.1
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
0	0							
						Total Functional Loss (Debits in FF):		**-331.0**

Tennessee SQT Debit Tool (Draft)

Project Name	TVA Meigs County			Total Debits (FF)
Applicant	TVA Meigs County			
Project ID/Permit Number(s)		Date	8/1/19	-330.97
Project Description	site development			

Stream ID By Reach	Impact Description	Latitude	Longitude
SMZ 03 - 1	span	35.310508	-84.942803
SMZ 03 - 2	span	35.309949	-84.943489
SMZ 03 - 3	span	35.306305	-84.947607
SMZ -02	fill	35.311548	-84.948784

The Tennessee Stream Quantification Tool Credits:

Lead Agency: Tennessee Department of Environment and Conservation (TDEC)

Contributing Agencies: U.S. Environmental Protection Agency
U.S. Army Corps of Engineers
Tennessee Interagency Review Team

Contractors:

Stream Mechanics
Ecosystem Planning and Restoration (EPR)

Version 1.1
Version Last Updated 5/20/2019

Reach Information and Reference Standard Stratification

Reach ID:	SMZ 03 - 3	Drainage Area (sqmi):	0.18	ETW/ONRW:	No	Upstream Latitude:	35.306305
Existing Stream Type:	E	Existing Bed Material:	Silt/Clay	Data Collection Season:	January - June	Upstream Longitude:	-84.947607
Reference Stream Type:	E	Existing Stream Slope (%):	1.4	Macro Collection Method:	SQBANK	Downstream Latitude:	
Ecoregion:	67fhi	Flow Type:	Perennial/Intermittent	Valley Type:	Unconfined Alluvial	Downstream Longitude:	

EXISTING CONDITION ASSESSMENT					Roll Up Scoring			
Functional Category	**Function-Based Parameters**	**Measurement Method**	**Field Value**	**Index Value**	**Parameter**	**Category**	**Category**	**ECS**
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	1	1.00	1.00	0.90	Functioning	
	Reach Runoff	Stormwater Infiltration		0.80	0.80			
Hydraulics	Floodplain Connectivity	Bank Height Ratio	3.1	0.00	0.50	0.50	Functioning At Risk	
		Entrenchment Ratio	5.7	1.00				
Geomorphology	Large Woody Debris	Large Woody Debris Index			0.08	0.40	Functioning At Risk	0.68
		# Pieces	1	0.08				
	Lateral Migration	Erosion Rate (ft/yr)			1.00			
		Dominant BEHI/NBS	L/L	1.00				
		Percent Streambank Erosion (%)	5	1.00				
		Percent Armoring (%)	0	1.00				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in)	6.5	0.70	0.67			
		Right - Average DBH (in)	5	0.54				
		Left - Buffer Width (feet)	100	0.80				
		Right - Buffer Width (feet)	100	0.80				
		Left - Tree Density (#/acre)	480	0.50				
		Right - Tree Density (#/acre)	680	0.50				
		Left - Native Herbaceous Cover (%)	95	1.00				
		Right - Native Herbaceous Cover (%)	95	1.00				
		Left - Native Shrub Cover (%)	80	0.42				
		Right - Native Shrub Cover (%)	80	0.42				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)						
	Bed Form Diversity	Pool Spacing Ratio	11	0.00	0.25			
		Pool Depth Ratio	1.4	0.28				
		Percent Riffle (%)	78	0.48				
		Aggradation Ratio						
	Plan Form	Sinuosity	1.06	0.00	0.00			
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)		0.80	0.80	0.80	Functioning	
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)						
	Nitrogen	Nitrate-Nitrite (mg/L)		0.80	0.80			
	Phosphorus	Total Phosphorus (mg/L)		0.80	0.80			
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index		0.80	0.80	0.80	Functioning	
		Percent Clingers (%)						
		Percent EPT - Cheumatopsyche (%)						
		Percent Oligochaeta and Chironomidae (%)						
	Fish	Native Fish Score Index						
		Catch per Unit Effort Score						

Reach Information and Reference Standard Stratification

Reach ID:	SMZ 03 - 2	Drainage Area (sqmi):	0.08	ETW/ONRW:	No	Upstream Latitude:	35.309949
Existing Stream Type:	E	Existing Bed Material:	Cobble	Data Collection Season:	January - June	Upstream Longitude:	-84.942803
Reference Stream Type:	E	Existing Stream Slope (%):	1.4	Macro Collection Method:	SQKICK	Downstream Latitude:	
Ecoregion:	67fhi	Flow Type:	Perennial/Intermittent	Valley Type:	Unconfined Alluvial	Downstream Longitude:	

EXISTING CONDITION ASSESSMENT					Roll Up Scoring			
Functional Category	**Function-Based Parameters**	**Measurement Method**	**Field Value**	**Index Value**	**Parameter**	**Category**	**Category**	**ECS**
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	1	1.00	1.00	0.90	Functioning	
	Reach Runoff	Stormwater Infiltration		0.80	0.80			
Hydraulics	Floodplain Connectivity	Bank Height Ratio	3.1	0.00	0.50	0.50	Functioning At Risk	
		Entrenchment Ratio	5.7	1.00				
Geomorphology	Large Woody Debris	Large Woody Debris Index			0.08	0.40	Functioning At Risk	0.68
		# Pieces	1	0.08				
	Lateral Migration	Erosion Rate (ft/yr)			1.00			
		Dominant BEHI/NBS	L/L	1.00				
		Percent Streambank Erosion (%)	5	1.00				
		Percent Armoring (%)	0	1.00				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in)	5	0.54	0.65			
		Right - Average DBH (in)	5	0.54				
		Left - Buffer Width (feet)	100	0.80				
		Right - Buffer Width (feet)	100	0.80				
		Left - Tree Density (#/acre)	500	0.50				
		Right - Tree Density (#/acre)	500	0.50				
		Left - Native Herbaceous Cover (%)	90	1.00				
		Right - Native Herbaceous Cover (%)	90	1.00				
		Left - Native Shrub Cover (%)	80	0.42				
		Right - Native Shrub Cover (%)	80	0.42				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)						
	Bed Form Diversity	Pool Spacing Ratio	11	0.00	0.25			
		Pool Depth Ratio	1.4	0.28				
		Percent Riffle (%)	78	0.48				
		Aggradation Ratio						
	Plan Form	Sinuosity	1.06	0.00	0.00			
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)		0.80	0.80	0.80	Functioning	
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)						
	Nitrogen	Nitrate-Nitrite (mg/L)		0.80	0.80			
	Phosphorus	Total Phosphorus (mg/L)		0.80	0.80			
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index		0.80	0.80	0.80	Functioning	
		Percent Clingers (%)						
		Percent EPT - Cheumatopsyche (%)						
		Percent Oligochaeta and Chironomidae (%)						
	Fish	Native Fish Score Index						
		Catch per Unit Effort Score						

Reach Information and Reference Standard Stratification

Reach ID:	SMZ 03 -1	Drainage Area (sqmi):	0.08	ETW/ONRW:	No	Upstream Latitude:	35.310508
Existing Stream Type:	E	Existing Bed Material:	Gravel	Data Collection Season:	July - December	Upstream Longitude:	-84.942803
Reference Stream Type:	E	Existing Stream Slope (%):	1.4	Macro Collection Method:	SQKICK	Downstream Latitude:	
Ecoregion:	67fhi	Flow Type:	Perennial/Intermittent	Valley Type:	Unconfined Alluvial	Downstream Longitude:	

EXISTING CONDITION ASSESSMENT					Roll Up Scoring			
Functional Category	**Function-Based Parameters**	**Measurement Method**	**Field Value**	**Index Value**	**Parameter**	**Category**	**Category**	**ECS**
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	1	1.00	1.00	0.90	Functioning	
	Reach Runoff	Stormwater Infiltration		0.80	0.80			
Hydraulics	Floodplain Connectivity	Bank Height Ratio	3.1	0.00	0.50	0.50	Functioning At Risk	
		Entrenchment Ratio	5.7	1.00				
Geomorphology	Large Woody Debris	Large Woody Debris Index			0.08	0.40	Functioning At Risk	0.68
		# Pieces	1	0.08				
	Lateral Migration	Erosion Rate (ft/yr)			1.00			
		Dominant BEHI/NBS	L/L	1.00				
		Percent Streambank Erosion (%)	5	1.00				
		Percent Armoring (%)	0	1.00				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in)	5	0.54	0.65			
		Right - Average DBH (in)	5	0.54				
		Left - Buffer Width (feet)	100	0.80				
		Right - Buffer Width (feet)	100	0.80				
		Left - Tree Density (#/acre)	500	0.50				
		Right - Tree Density (#/acre)	500	0.50				
		Left - Native Herbaceous Cover (%)	90	1.00				
		Right - Native Herbaceous Cover (%)	90	1.00				
		Left - Native Shrub Cover (%)	80	0.42				
		Right - Native Shrub Cover (%)	80	0.42				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)						
	Bed Form Diversity	Pool Spacing Ratio	11	0.00	0.25			
		Pool Depth Ratio	1.4	0.28				
		Percent Riffle (%)	78	0.48				
		Aggradation Ratio						
	Plan Form	Sinuosity	1.06	0.00	0.00			
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)		0.80	0.80	0.80	Functioning	
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)						
	Nitrogen	Nitrate-Nitrite (mg/L)		0.80	0.80			
	Phosphorus	Total Phosphorus (mg/L)		0.80	0.80			
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index		0.80	0.80	0.80	Functioning	
		Percent Clingers (%)						
		Percent EPT - Cheumatopsyche (%)						
		Percent Oligochaeta and Chironomidae (%)						
	Fish	Native Fish Score Index						
		Catch per Unit Effort Score						

Reach Information and Reference Standard Stratification

Reach ID:	SMZ-02	Drainage Area (sqmi):	0.03	ETW/ONRW:	No	Upstream Latitude:	35.311548
Existing Stream Type:	A	Existing Bed Material:	Silt/Clay	Data Collection Season:	January - June	Upstream Longitude:	-84.948784
Reference Stream Type:	E	Existing Stream Slope (%):	2.1	Macro Collection Method:		Downstream Latitude:	35.311618
Ecoregion:	67fhi	Flow Type:	Perennial/Intermittent	Valley Type:	Unconfined Alluvial	Downstream Longitude:	-84.949502

EXISTING CONDITION ASSESSMENT					Roll Up Scoring			
Functional Category	**Function-Based Parameters**	**Measurement Method**	**Field Value**	**Index Value**	**Parameter**	**Category**	**Category**	**ECS**
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.74	0.78	0.78	0.79	Functioning	
	Reach Runoff	Stormwater Infiltration		0.80	0.80			
Hydraulics	Floodplain Connectivity	Bank Height Ratio	8.4	0.00	0.00	0.00	Not Functioning	
		Entrenchment Ratio	1.1	0.00				
Geomorphology	Large Woody Debris	Large Woody Debris Index			0.08	0.36	Functioning At Risk	0.29
		# Pieces	1	0.08				
	Lateral Migration	Erosion Rate (ft/yr)			0.77			
		Dominant BEHI/NBS	L/L	1.00				
		Percent Streambank Erosion (%)	25	0.30				
		Percent Armoring (%)	0	1.00				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in)	6.5	0.70	0.58			
		Right - Average DBH (in)	5	0.54				
		Left - Buffer Width (feet)	25	0.23				
		Right - Buffer Width (feet)	25	0.23				
		Left - Tree Density (#/acre)	192	1.00				
		Right - Tree Density (#/acre)	240	1.00				
		Left - Native Herbaceous Cover (%)	75	1.00				
		Right - Native Herbaceous Cover (%)	60	0.80				
		Left - Native Shrub Cover (%)	10	0.14				
		Right - Native Shrub Cover (%)	10	0.14				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)						
	Bed Form Diversity	Pool Spacing Ratio	27	0.00	0.38			
		Pool Depth Ratio	1.2	0.14				
		Percent Riffle (%)	47	1.00				
		Aggradation Ratio						
	Plan Form	Sinuosity	1.04	0.00	0.00			
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)	600	0.60	0.60	0.31	Functioning At Risk	
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)	90	0.01	0.01			
	Nitrogen	Nitrate-Nitrite (mg/L)						
	Phosphorus	Total Phosphorus (mg/L)						
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index	0	0.00	0.00	0.00	Not Functioning	
		Percent Clingers (%)						
		Percent EPT - Cheumatopsyche (%)						
		Percent Oligochaeta and Chironomidae (%)						
	Fish	Native Fish Score Index						
		Catch per Unit Effort Score						

Appendix F – Bat Strategy Project Screening Form

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Project Review Form - TVA Bat Strategy *(12/2018)*

*This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.*[1]

Project Name: Gunstocker Creek 161-kV Delivery Point (Modification 2) **Date:** Sep 5, 2019

Contact(s): Emily Willard **CEC#:** **Project ID:** 419886

Project Location (City, County, State): Tennessee (Meigs, Bradley and Rhea)

Project Description:

TVA proposes to construct a new Systems Operation Center complex. TVA will use 4.25 miles of existing 100' wide 69-kV ROW to rebuild the existing TL into a double circuit loop and complete 1 mi. of new TL to power the facility. 35.7acres (9/9-10/25) of forest will be removed for SOC and 4.1 acres (8/31-10/20) for TL . Acoustic Surveys were completed for SOC and no bats were present.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental staff or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

- ☐ 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands
- ☐ 2 Protect Cultural Resources on TVA-Retained Land
- ☐ 3 Manage Land Use and Disposal of TVA-Retained Land
- ☐ 4 Manage Permitting under Section 26a of the TVA Act
- ☐ 5 Operate, Maintain, Retire, Expand, Construct Power Plants
- ☐ 6 Maintain Existing Electric Transmission Assets
- ☐ 7 Convey Property associated with Electric Transmission
- ■ 8 Expand or Construct New Electric Transmission Assets
- ☐ 9 Promote Economic Development
- ☐ 10 Promote Mid-Scale Solar Generation

STEP 2) Select all activities from Tables 1, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.

☐ 1. Loans and/or grant awards	☐ 8. Sale of TVA property	☐ 19. Site-specific enhancements in streams and reservoirs for aquatic animals
☐ 2. Purchase of property	☐ 9. Lease of TVA property	☐ 20. Nesting platforms
☐ 3. Purchase of equipment for industrial facilities	☐ 10. Deed modification associated with TVA rights or TVA property	☐ 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
☐ 4. Environmental education	☐ 11. Abandonment of TVA retained rights	☐ 42. Internal renovation or internal expansion of an existing facility
☐ 5. Transfer of ROW easement and/or ROW equipment	☐ 12. Sufferance agreement	■ 43. Replacement or removal of TL poles
☐ 6. Property and/or equipment transfer	☐ 13. Engineering or environmental planning or studies	■ 44. Conductor and overhead ground wire installation and replacement
☐ 7. Easement on TVA property	☐ 14. Harbor limits	☐ 49. Non-navigable houseboats

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.

■ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	☐ 58. Wastewater outfalls	☐ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
☐ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	☐ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	☐ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	☐ 67. Siting of temporary office trailers	☐ 90. Pond closure
☐ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	☐ 75. Utility lines/light poles	☐ 96. Land Use Permit
☐ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.

■ 15. Windshield and ground surveys for archaeological resources	■ 34. Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	☐ 69. Renovation of existing structures
☐ 16. Drilling	☐ 35. Stabilization (major erosion control)	☐ 70. Lock maintenance/ construction
☐ 17. Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	■ 36. Grading	☐ 71. Concrete dam modification
☐ 21. Herbicide use	☐ 37. Installation of soil improvements	☐ 73. Boat launching ramps
☐ 22. Grubbing	☐ 38. Drain installations for ponds	☐ 77. Construction or expansion of land-based buildings
☐ 23. Prescribed burns	■ 47. Conduit installation	■ 78. Wastewater treatment plants
☐ 25. Maintenance, improvement or construction of pedestrian or vehicular access corridors	☐ 52. Floating buildings	☐ 80. Barge fleeting areas
☐ 26. Maintenance/construction of access control measures	☐ 54. Maintenance of water control structures (dewatering units, spillways, levees)	☐ 82. Construction of dam/weirs/ levees
☐ 27. Restoration of sites following human use and abuse	☐ 55. Solar panels	☐ 83. Submarine pipeline, directional boring operations
☐ 28. Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	☐ 62. Blasting	☐ 86. Landfill construction
☐ 29. Acquisition and use of fill/borrow material	■ 63. Foundation installation for transmission support	☐ 89. Structure demolition
■ 31. Stream/wetland crossings	■ 64. Installation of steel structure, overhead bus, equipment, etc.	☐ 91. Bridge replacement
☐ 32. Clean-up following storm damage	■ 65. Pole and/or tower installation and/or extension	☐ 92. Return of archaeological remains to former burial sites
■ 33. Removal of hazardous trees/tree branches		

STEP 3) Project includes one or more activities in Table 3? ◉ **YES (Go to Step 4)** ○ **NO (Go to Step 13)**

STEP 4) Answer questions a through e below (applies to projects with activities from Table 3 ONLY)

a) Will project project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?

- (•) **NO** (NV2 does not apply)
- ( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave, bridge, other structure (potential bat roost)?

- (•) **NO** (HP1/HP2 do not apply)
- ( ) **YES** (HP1/HP2 applies, subject to review of bat records)

c) If conducting **prescribed burning** (**activity 23)**, estimated acreage**:** [ ] and timeframe(s) below; [■] **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 31	[ ] Apr 1 - May 31, Aug 1- Oct 14	[ ] Jun 1 - Jul 31
VA	[ ] Sep 16 - Nov 15	[ ] Nov 16 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 15	[ ] Jun 1 - Jul 31
AL	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 15	[ ] Mar 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
NC	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Apr 15	[ ] Apr 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
MS	[ ] Oct 1 - Nov 14	[ ] Nov 15 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 30	[ ] Jun 1 - Jul 31

d) Will the project involve vegetation piling/burning?

- (•) **NO** (SSPC4/ SHF7/SHF8 do not apply)
- ( ) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: 39.8 (•) **ac** ( ) **trees** ( ) **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	[■] Oct 15 - Nov 14	[ ] Nov 15 - Mar 31	[■] Apr 1 - May 31, Aug 1- Oct 14	[ ] Jun 1 - Jul 31
VA	[ ] Sep 16 - Nov 15	[ ] Nov 16 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 15	[ ] Jun 1 - Jul 31
AL	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 15	[ ] Mar 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
NC	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Apr 15	[ ] Apr 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
MS	[ ] Oct 1 - Nov 14	[ ] Nov 15 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 30	[ ] Jun 1 - Jul 31

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): ( ) **MAYBE** (•) **YES** ( ) **NO**

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

( ) **YES** (•) **NO** (If NO and includes Table 3 activities, submit project / relevant information [e.g., maps] for review by Terrestrial Zoologist.)

Info below completed by:

[ ] **Heritage Reviewer**	(name)		Date	
[ ] **OSAR Reviewer**	(name)		Date	
[■] **Terrestrial Zoologist**	(name)	Jesse Troxler	Date	Apr 25, 2019

Gray bat records: [ ] None [☒] Within 3 miles* [ ] Within a cave* [ ] Within the County

Indiana bat records: [☒] None [ ] Within 10 miles* [ ] Within a cave* [ ] Capture/roost tree* [ ] Within the County

Northern long-eared bat records: [ ] None [ ] Within 5 miles* [ ] Within a cave* [ ] Capture/roost tree* [☒] Within the County

Virginia big-eared bat records: [☒] None [ ] Within 10 miles* [ ] Within the County

Caves: [ ] None within 3 mi [ ] Within 3 miles but > 0.5 mi [ ] Within 0.5 mi but > 0.25 mi* [ ] Within 0.25 mi but > 200 feet* [☒] Within 200 feet*

Bat Habitat Inspection Sheet completed? (•) **NO** ( ) **YES**

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): 4.1 **(**(•) **ac** ( ) **trees)*** ( ) **N/A**

STEP 6) If reviewed by Heritage/OSAR reviewer, does records review trigger need for additional review by Terrestrial Zoologist (noted by * in Step 5)?

○ **NO (Go to Step 13)** ◉ **YES (Submit for Terrestrial Zoology review)** ○ **YES, however, based on Heritage Data review guidelines (or discussion with Terrestrial Zoology), project does not need to be submitted to Terrestrial Zoology for review. (Go to Step 13)**

Notes (additional information from field review or explanation of no impact):

167.5 acre office complex footprint assessed in Nov.2016 and Dec.2017. Presence absence surveys performed June 2018 with negative results. 34.7 acres of forest will be removed within 167.5 acre footprint. Project to upgrade 4.25 miles of existing 69-kV transmission line & 100' wide ROW to a double circuit loop and construct 1 mile of new 161-kV TL clearing 4.1 acres suitable habitat.

STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

☐ Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.

☐ Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.

☒ Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.

☐ Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.

☐ Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.

☒ Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.

☐ Removal of documented Indiana bat or NLEB roost tree, if still suitable.

☐ N/A

STEP 8) Presence/absence surveys were/will be conducted: ◉ **YES** ○ **NO** ○ **TBD**

STEP 9) Presence/absence survey results, on 6/5/18-6/7/18 ◉ **NEGATIVE** ○ **POSITIVE** ○ **N/A**

STEP 10) Project ◉ **WILL** ○ **WILL NOT** require use of Incidental Take in the amount of 4.1 ◉ **acres or** ○ **trees** proposed to be used during the ○ **WINTER** ◉ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ○ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of May 8, 2019

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
8: Expand/Construct New TL Assets	11,900	7,027.92	2,371.17	2,379.06

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ 2,050 OR ◉ **N/A**

SECTION 3: REQUIRED CONSERVATION MEASURES

STEP 13a) If answer to STEP 3 is NO, (*Project Lead* or *OSAR/Heritage Reviewer*) is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck. **Go to Step 14**

STEP 13b) If answer to STEP 3 is YES, and answer to STEP 6 is NO, *OSAR/Heritage Reviewer* is to review Conservation Measures in Table 4 that and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck. **Go to Step 14**

STEP 13c) If answer to STEP 3 is YES, and answer to STEP 6 is YES, *Terrestrial Zoologist* is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck. **Go to Step 15**

Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Jesse Troxler

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
☑	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	**NV1** - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
☐	15, 26, 92	**HP1** - Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost) will be closely coordinated with staff bat biologists to avoid/ minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
☑	33, 34	**TR1*** - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☑	33, 34	**TR4*** - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☑	33, 34	**TR7** (**Existing Transmission ROW only**) - **Tree removal within 100 feet of existing transmission ROWs will be limited to hazard trees**. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
☑	33, 34	**TR9** - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
☐	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 56, 61, 62, 63, 64, 65, 67, 69, 84, 89	**SSPC1** (**Transmission only**) - Transmission actions and activities will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: o BMPs minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: • Plan clearing, grading, and construction to minimize area and duration of soil exposure. • Maintain existing vegetation wherever and whenever possible. • Minimize disturbance of natural contours and drains. • As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. • Limit vehicular and equipment traffic in disturbed areas. Keep equipment paths dispersed or designate single traffic flow paths with appropriate road BMPs to manage runoff. • Divert runoff away from disturbed areas. • Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. • Prepare drainage ways and outlets to handle concentrated/increased runoff. • Minimize length and steepness of slopes. Interrupt long slopes frequently. • Keep runoff velocities low and/or check flows. • Trap sediment on-site. • Inspect/maintain control measures regularly & after significant rain. • Re-vegetate and mulch disturbed areas as soon as practical. o Specific guidelines regarding sensitive resources and buffer zones: • Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. • BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. • Standard requirements exist to avoid adverse impacts to caves, protected animals, unique/ important habitat (e.g., cave buffers, restricted herbicide use, seasonal clearing of suitable habitat).
☐	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	**SSPC2** - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
☐	17, 22, 32, 33, 34, 35, 36	**SSPC4** (**Transmission only**) - Woody vegetation burn piles associated with transmission construction will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a **minimum of 0.25 miles from documented caves** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☐	17, 21, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 54, 55	**SSPC7** - Clearing of vegetation **within a 200-ft radius of documented caves** will be limited to hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.

[1]Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat

(listed in 2015), and Virginia big-eared bat (listed in 1979).

Hide All Unchecked Conservation Measures

- (•) HIDE
- ( ) UNHIDE

STEP 14) Save completed form in project environmental documentation (e.g., CEC, Appendix to EA) AND send a copy of form to **batstrategy@tva.gov.** Submission of this form indicates that Project Lead/Applicant:

Emily Willard (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

STEP 15) ***For Use by Terrestrial Zoologist if Project and Form are Submitted for Review***

☒ Terrestrial Zoologist acknowledges that Project Lead/Contact (name) Emily Willard has been informed on Sep 5, 2019 (date) of any relevant conservation measures and/or provided a copy of this form.

☒ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take 4.1 ◉ ac ○ trees and that use of Take will require 2,050 contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

Finalize and Print to Noneditable PDF. Changes to form cannot be made after this button is selected.

Appendix G – Detailed Wetland Descriptions

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WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Project Viper **City/County:** Georgetown/Meigs **Sampling Date:** 21-Dec-17

Applicant/Owner: TVA **State:** TN **Sampling Point:** **W001-SOC**

Investigator(s): Britta Lees, Zach Buecker **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** flat **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.312008 **Long.:** -84.948708 **Datum:**

Soil Map Unit Name: TkD - Talbott rock outcrop complex **NWI classification:** PFO1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

W001 consists of a small floodplain wetland surrounding a intermittent channel with poor bank definition. W001 flows west where the stream channel reforms and drains towards the road.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 1	
Water Table Present?	Yes ◉	No ○	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Receives hydrology from the abutting stream.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W001-SOC

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1. Fraxinus pennsylvanica	30	☑	60.0%	FACW
2. Platanus occidentalis	20	☑	40.0%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	50	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1. Juniperus virginiana	10	☑	100.0%	FACU
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	10	= Total Cover		
Shrub Stratum (Plot size:)				
1. Salix nigra	15	☑	75.0%	OBL
2. Ligustrum sinense	5	☑	25.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size:)				
1. Scirpus atrovirens	10	☐	11.1%	OBL
2. Carex frankii	20	☑	22.2%	OBL
3. Juncus coriaceus	20	☑	22.2%	FACW
4. Microstegium vimineum	10	☐	11.1%	FAC
5. Festuca arundinacea	30	☑	33.3%	FACU
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 62.5% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45	
FACW species	70	x 2 =	140	
FAC species	10	x 3 =	30	
FACU species	40	x 4 =	160	
UPL species	5	x 5 =	25	
Column Totals:	170	(A)	400	(B)

Prevalence Index = B/A = 2.353

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W001-SOC

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-12	10YR	4/2	85	5YR	5/6	5	C	M	Silt Loam	
+mottle				10YR	2/2	10	D	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☑ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Bradley County **Sampling Date:** 15-Jan-19

Applicant/Owner: TVA ROW - Existing Easement **State:** TN **Sampling Point:** **W001**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide drain/Floodplain **Local relief (concave, convex, none):** concave **Slope:** 3.0% / 1.7 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.25486 **Long.:** -84.91249 **Datum:** NAD83

Soil Map Unit Name: Cotaco Loam, 8% Melvin Hydric; Partially Hydric; Moderately Well Drained **NWI classification:** PEM1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉ No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Hydric Soil Present?	Yes ◉ No ○	
Wetland Hydrology Present?	Yes ◉ No ○	

Remarks:

0.06 acre on ROW (<.25 acre total);wide flat and drain near confluence with unnamed tributary of Greasy Creek; located on existing transmission line ROW; between structures, no impacts proposed; portion extends into field; TRAM condition is moderate; photos BPL15_3537, 46-53.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): 6

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W001

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Leersia oryzoides	40	☑	37.7%	OBL
2. Carex frankii	10	☑	9.4%	OBL
3. Ludwigia alternifolia	5	☐	4.7%	FACW
4. Lycopus virginicus	1	☐	0.9%	OBL
5. Solidago gigantea	10	☑	9.34	FACW
6. Persicaria pensylvanica	5	☐	4.7%	FACW
7. Arthraxon hispidus	4	☐	3.8%	FAC
8. Cyperus strigosus	10	☑	9.4%	FACW
9. Rumex crispus	1	☐	0.9%	FAC
10. Juncus effusus	10	☑	9.34	FACW
11. Ranunculus sardous	10	☑	9.4%	FAC
12.	0	☐	0.0%	
	106	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	51	x 1 =	51	
FACW species	40	x 2 =	80	
FAC species	16	x 3 =	48	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	107	(A)	179	(B)

Prevalence Index = B/A = 1.673

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	3/3	100						Silt Loam	
6-9	10YR	4/2	100						Sandy Silt Loam	
9-12+	10YR	5/2	80	10YR	4/6	20	D	M	Sandy Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Bradley County **Sampling Date:** 15-Jan-19

Applicant/Owner: TVA ROW - Existing Easement **State:** TN **Sampling Point:** **W002**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Pond inlet/shallows **Local relief (concave, convex, none):** concave **Slope:** 2.0% / 1.1 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.25932 **Long.:** -84.9191 **Datum:** NAD83

Soil Map Unit Name: Water **NWI classification:** PEM/PSS/PUBHx

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.09 acre on ROW (<.25 acre total); flat/shallows at man-made pond inlet; located on existing transmission line ROW; between structures, no impacts proposed;TRAM condition is moderate; photos BPL15_3558-9.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 12	
Water Table Present?	Yes ◉	No ○	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

influenced by hydrology of man-made pond because wetland is located at shallows of inlet to pond.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W002

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1. Cephalanthus occidentalis	20	☑	90.9%	OBL
2. Cornus amomum	2	☐	9.1%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	22	= Total Cover		
Herb Stratum (Plot size:)				
1. Juncus effusus	50	☑	61.0%	FACW
2. Typha latifolia	30	☑	36.6%	OBL
3. Helianthus angustifolius	1	☐	1.2%	FACW
4. Eupatorium perfoliatum	1	☐	1.2%	FACW
5.		☐	0.0%	
6.		☐	0.0%	
7.		☐	0.0%	
8.		☐	0.0%	
9.		☐	0.0%	
10.		☐	0.0%	
11.		☐	0.0%	
12.		☐	0.0%	
	82	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	50	x 1 =	50
FACW species	54	x 2 =	108
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	104 (A)		158 (B)

Prevalence Index = B/A = 1.519

Hydrophytic Vegetation Indicators:

- ☑ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-12+	10YR	5/2	80	10YR	5/6	20	D	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Bradley County **Sampling Date:** 15-Jan-19

Applicant/Owner: TVA ROW - Existing Easement **State:** TN **Sampling Point:** **W003**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide wetland drain **Local relief (concave, convex, none):** concave **Slope:** 2.0% / 1.1 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.26122 **Long.:** -84.92198 **Datum:** NAD83

Soil Map Unit Name: Lehew-Montevallo loams, steep phases, not hydric **NWI classification:** PEM1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.06 acre on ROW (<.25 acre total); wide wetland drain in bottom of natural valley; emergent habitat on existing ROW; crossed by AR03; TRAM condition is moderate; photos BPL15_3560-66.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 1	
Water Table Present?	Yes ○	No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ponded water in braided channels through small wide linear wetland feature.

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W003

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Microstegium vimineum	50	☑	45.9%	FAC
2. Solidago gigantea	10	☐	9.2%	FACW
3. Juncus effusus	5	☐	4.6%	FACW
4. Dichanthelium clandestinum	10	☐	9.2%	FAC
5. Helianthus angustifolius	5	☐	4.6%	FACW
6. Eupatorium perfoliatum	5	☐	4.6%	FACW
7. Rubus argutus	20	☑	18.3%	FACU
8. Lonicera japonica	4	☐	3.6%	FACU
9.		☐	0.0%	
10.		☐	0.0%	
11.		☐	0.0%	
12.		☐	0.0%	
	109	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.		☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	25	x 2 =	50	
FAC species	60	x 3 =	180	
FACU species	25	x 4 =	100	
UPL species	0	x 5 =	0	
Column Totals:	110	(A)	330	(B)

Prevalence Index = B/A = 3.000

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☐ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-12+	10YR	5/2	80	10YR	5/6	20	D	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Bradley County **Sampling Date:** 15-Jan-19

Applicant/Owner: TVA ROW - Existing Easement **State:** TN **Sampling Point:** **W004**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide wetland drain **Local relief (concave, convex, none):** concave **Slope:** 2.0% / 1.1 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.2673 **Long.:** -84.93142 **Datum:** NAD83

Soil Map Unit Name: Cotaco Loam, 8% Melvin Hydric; Partially Hydric; Moderately Well Drained **NWI classification:** PEM1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.04 acre on ROW; entirely on existing ROW; wetalnd swale feeding drainage feature; no impacts proposed; TRAM condition is low; photos BPL15_3568-72.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ◉	No ○	Depth (inches): 6	**Wetland Hydrology Present?** Yes ◉ No ○
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W004

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Festuca arundinacea	5	☐	7.6%	FACU
2. Viola sororia	5	☐	7.6%	FAC
3. Digitaria sanguinalis	15	☑	22.7%	FACU
4. Juncus tenuis	20	☑	30.3%	FAC
5. Cardamine bulbosa	5	☐	7.6%	OBL
6. Rumex crispus	1	☐	1.5%	FAC
7. Cyperus strigosus	15	☑	22.7%	FACW
8.		☐	0.0%	
9.		☐	0.0%	
10.		☐	0.0%	
11.		☐	0.0%	
12.		☐	0.0%	
	66	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.		☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5	
FACW species	15	x 2 =	30	
FAC species	26	x 3 =	78	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column Totals:	66	(A)	193	(B)

Prevalence Index = B/A = 2.924

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

Mowed and weathered/dead vegetation due to time of year and located in a residential lawn; species ID difficult.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W004

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-5	10YR	4/3	100						Silt Loam	
5-12+	10YR	5/2	80	10YR	5/6	20	D	M	Silty Clay Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Bradley County **Sampling Date:** 26-Feb-19

Applicant/Owner: TVA ROW - Existing Easement **State:** TN **Sampling Point:** **W005**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide wetland drain **Local relief (concave, convex, none):** concave **Slope:** 2.0% / 1.1 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.26855 **Long.:** -84.93315 **Datum:** NAD83

Soil Map Unit Name: Linside Loam, 8% Melvin Hydric; Partially Hydric; Moderately Well Drained **NWI classification:** PEM1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.26 acre on existing ROW (extends north and south to total <1 acre); wetalnd swale feeding drainage feature; traversed by AR04; TRAM condition is low; photo BPL02262019_41.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 1	
Water Table Present?	Yes ◉	No ○	Depth (inches): 8	**Wetland Hydrology Present?** Yes ◉ No ○
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W005

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Festuca arundinacea	15	☑	16.5%	FACU
2. Juncus effusus	30	☑	33.0%	FACW
3. Trifolium repens	5	☐	5.5%	FACU
4. Trifolium pratense	5	☐	5.5%	FACU
5. Coleataenia rigidula	15	☑	16.5%	FACW
6. Rumex crispus	1	☐	1.1%	FAC
7. Cyperus strigosus	5	☐	5.5%	FACW
8. Ranunculus sardous	10	☐	11.0%	FAC
9. Packera glabella	5	☐	5.5%	OBL
10.		☐	0.0%	
11.		☐	0.0%	
12.		☐	0.0%	
	91	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.		☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:		
OBL species	5	x 1 =	5	
FACW species	50	x 2 =	100	
FAC species	11	x 3 =	33	
FACU species	25	x 4 =	100	
UPL species	0	x 5 =	0	
Column Totals:	91	(A)	238	(B)

Prevalence Index = B/A = 2.615

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W005

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-5	10YR	5/4	100						Silt Loam	
5-12+	10YR	5/2	80	10YR	4/6	20	D	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Meigs County **Sampling Date:** 15-Jan-19

Applicant/Owner: TVA ROW - Existing Easement **State:** TN **Sampling Point:** **W006**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide wetland drain **Local relief (concave, convex, none):** concave **Slope:** 3.0% / 1.7 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.29857 **Long.:** -84.95881 **Datum:** NAD83

Soil Map Unit Name: Colbert Rock Outcrop, 5-20% slope, moderately well drained, not hydric **NWI classification:** PEM1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.02 acre on existing ROW, less than doubles in size off ROW; wetalnd swale draining from man made pond to channel; located in cattle field on existing ROW, but ROW has no poles/wires; new TL span to be located overhead; TRAM condition is low; photo BPL15_3607-8.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 1	
Water Table Present?	Yes ◉	No ○	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W006

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Carex tribuloides	15	☐	16.7%	FACW
2. Juncus effusus	50	☑	55.6%	FACW
3. Arthraxon hispidus	10	☐	11.1%	FAC
4. Festuca arundinacea	10	☐	11.1%	FACU
5. Bidens aristosa	5	☐	5.6%	FACW
6.		☐	0.0%	
7.		☐	0.0%	
8.		☐	0.0%	
9.		☐	0.0%	
10.		☐	0.0%	
11.		☐	0.0%	
12.		☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.		☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	70	x 2 =	140	
FAC species	10	x 3 =	30	
FACU species	10	x 4 =	40	
UPL species	0	x 5 =	0	
Column Totals:	90	(A)	210	(B)

Prevalence Index = B/A = 2.333

Hydrophytic Vegetation Indicators:

- ☑ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W006

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	3/2	100						Silt Loam	
6-12+	10YR	5/1	80	10YR	4/6	20	D	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Meigs County **Sampling Date:** 26-Feb-19

Applicant/Owner: TVA ROW - New Construction Easement **State:** TN **Sampling Point:** **W007**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide wetland drain **Local relief (concave, convex, none):** concave **Slope:** 3.0% / 1.7 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.30054 **Long.:** -84.9558 **Datum:** NAD83

Soil Map Unit Name: Talbot Silt Loam, 2-5% slopes, moderately well drained, not hydric **NWI classification:** PFO1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.07 acre on new ROW; forested wetland along a linear drain, includes depressional feature adjacent to drain along existing old woods road; TRAM condition is low; photos BPL22_3643-45&48-50, BPL02262019_3720-22.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 1	
Water Table Present?	Yes ◉	No ○	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W007

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1. Fraxinus pennsylvanica	30	☑	43.5%	FACW
2. Ulmus americana	39	☑	56.5%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	69	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1. Liquidambar styraciflua	15	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	15	= Total Cover		
Shrub Stratum (Plot size:)				
1. Symphoricarpos orbiculatus	10	☑	100.0%	FACU
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size:)				
1. Cyperus strigosus	15	☑	100.0%	FACW
2.		☐	0.0%	
3.		☐	0.0%	
4.		☐	0.0%	
5.		☐	0.0%	
6.		☐	0.0%	
7.		☐	0.0%	
8.		☐	0.0%	
9.		☐	0.0%	
10.		☐	0.0%	
11.		☐	0.0%	
12.		☐	0.0%	
	15	= Total Cover		
Woody Vine Stratum (Plot size:)				
1. Toxicodendron radicans	15	☑	60.0%	FAC
2. Lonicera japonica	10	☑	40.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	25	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 71.4% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	84	x 2 =	168	
FAC species	30	x 3 =	90	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column Totals:	134	(A)	338	(B)

Prevalence Index = B/A = 2.522

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W007

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	4/2	80	10YR	4/6	20	D	M	Silt Loam	
6-16	10YR	5/2	80	10YR	4/6	15	D	M	Silt Loam	
				10YR	3/1	5	C	M		Manganese concretions

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Meigs County **Sampling Date:** 22-Jan-19

Applicant/Owner: TVA ROW - New Construction Easement **State:** TN **Sampling Point:** **W008**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide wetland drain **Local relief (concave, convex, none):** concave **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.30561 **Long.:** -84.95032 **Datum:** NAD83

Soil Map Unit Name: Newark Silt Loam (hydric) and Linside Silt Loam (not hydric) **NWI classification:** PEM1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.39 acre on new ROW; emergent wetland in floodplain of Gunstocker Creek; furthest west side extends further west (west boundary not delineated/out of project footprint) to total ~0.5 acre; crossed by AR13 TRAM condition is low; photos BPL22_3667-74.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 2	
Water Table Present?	Yes ◉	No ○	Depth (inches): 3	
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W008

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.		☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0		= Total Cover	
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.		☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0		= Total Cover	
Shrub Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0		= Total Cover	
Herb Stratum (Plot size:)				
1. Juncus effusus	20	☑	21.3%	FACW
2. Festuca arundinacea	20	☑	21.3%	FACU
3. Symphyotrichum lateriflorum var. lateriflorum	10	☑	10.6%	FACW
4. Helenium autumnale	5	☐	5.3%	FACW
5. Vernonia gigantea	5	☐	5.3%	FAC
6. Rumex crispus	1	☐	1.1%	FAC
7. Penthorum sedoides	1	☐	1.1%	OBL
8. Coleataenia rigidula	10	☑	10.6%	FACW
9. Scirpus atrovirens	5	☐	5.3%	OBL
10. Dichanthelium dichotomum	10	☑	10.6%	FAC
11. Apios americana	2	☐	2.1%	FACW
12. Ranunculus sardous	5	☐	5.3%	FAC
	94		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	6	x 1 =	6	
FACW species	47	x 2 =	94	
FAC species	21	x 3 =	63	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column Totals:	94	(A)	243	(B)

Prevalence Index = B/A = 2.585

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W008

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-8	10YR	5/3	100						Silt Loam	
8-12+	10YR	5/2	80	10YR	4/6	20	D	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Gunstocker 161kV TL **City/County:** Meigs County **Sampling Date:** 22-Jan-19

Applicant/Owner: TVA ROW - New Construction Easement **State:** TN **Sampling Point:** **W009**

Investigator(s): Britta Lees **Section, Township, Range:** **S** **T** **R**

Landform (hillslope, terrace, etc.): Wide wetland drain **Local relief (concave, convex, none):** concave **Slope:** 2.0% / 1.1 °

Subregion (LRR or MLRA): LRR N **Lat.:** 35.30494 **Long.:** -84.95676 **Datum:** NAD83

Soil Map Unit Name: Talbot Silt Loam, 2-5% slopes, moderately well drained, not hydric **NWI classification:** PEM1E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:

0.01 acre (total size) @ waterline route; emergent wetland adjacent to drain along Hwy 58; TRAM condition is low; photos BPL22_3678-79.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☑ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches): 2	
Water Table Present?	Yes ○	No ◉	Depth (inches): 3	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches): 0	**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: W009

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.		☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.		☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1. Juniperus virginiana	2	☐	50.0%	FACU
2. Cornus amomum	2	☐	50.0%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	4	= Total Cover		
Herb Stratum (Plot size:)				
1. Typha latifolia	25	☑	27.8%	OBL
2. Coleataenia rigidula	25	☑	27.8%	FACW
3. Bidens aristosa	10	☐	11.1%	FACW
4. Juncus coriaceus	10	☐	11.1%	FACW
5. Arthraxon hispidus	10	☐	11.1%	FAC
6. Scirpus cyperinus	10	☐	11.1%	FACW
7.		☐	0.0%	
8.		☐	0.0%	
9.		☐	0.0%	
10.		☐	0.0%	
11.		☐	0.0%	
12.		☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.		☐	0.0%	
2.		☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25	
FACW species	57	x 2 =	114	
FAC species	10	x 3 =	30	
FACU species	2	x 4 =	8	
UPL species	0	x 5 =	0	
Column Totals:	94	(A)	177	(B)

Prevalence Index = B/A = 1.883

Hydrophytic Vegetation Indicators:

- ☑ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Definition of Vegetation Strata:

Four Vegetation Strata:

Tree stratum – Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb stratum – Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks: (Include photo numbers here or on a separate sheet.)

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W009

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type [1]	Loc²	Texture	Remarks
0-6	10YR	4/3	100						Silt Loam	
6-16+	10YR	5/1	80	10YR	4/6	20	D	M	Silt Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147,148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147,148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Appendix H – Noise During Transmission Line Construction and Operation

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Appendix H - Noise During Transmission Line Construction and Operation

At high levels, noise can cause hearing loss; at moderate levels, noise can interfere with communication, disrupt sleep, and cause stress; and at low levels, noise can cause annoyance. Noise is measured in decibels (dB), a logarithmic unit, so an increase of 3 dB is just noticeable, and an increase of 10 dB is perceived as a doubling of sound level. Because not all noise frequencies are perceptible to the human ear, A-weighted decibels (dBA), which filter out sound in frequencies above and below human hearing, are typically used in noise assessments.

Both the U.S. Environmental Protection Agency (USEPA) and the Department of Housing and Urban Development (HUD) have established noise guidelines. USEPA guidelines are based on an equivalent day/night average sound level (DNL), which is a 24-hour average sound level with 10 dB added to hours between 10 p.m. and 7 a.m., since people are more sensitive to nighttime noise. USEPA recommends a guideline of DNL less than 55 dBA to protect the health and well-being of the public with an adequate margin of safety. HUD guidelines use an upper limit DNL of 65 dBA for acceptable residential development and an upper limit DNL of 75 dBA for acceptable commercial development. TVA generally uses the USEPA guideline of 55 dBA DNL at the nearest residence and 65 dBA at the property line in industrial areas to assess the noise impact of a project. In addition, TVA gives consideration to the Federal Interagency Committee on Noise (FICON) 1992 recommendation that a 3-dB increase indicates possible impact, requiring further analysis when the existing DNL is 65 dBA or less.

Annoyance from noise is highly subjective. The FICON used population surveys to correlate annoyance and noise exposure (FICON 1992). Table G-1 gives estimates of the percentage of typical residential populations that would be highly annoyed from a range of background noise and the average community reaction description that would be expected.

Table H-1. Estimated Annoyance from Background Noise (FICON 1992)

Day/Night Level (dBA)	Percent Highly Annoyed	Average Community Reaction
75 and above	37	Very severe
70	25	Severe
65	15	Significant
60	9	Moderate
55 and below	4	Slight

For comparative purposes, typical background DNLs for rural areas range from about 40 dBA in undeveloped areas to 48 dBA in mixed residential/agricultural areas (Cowan 1993). Noise levels are typically higher in higher-density residential and urban areas. Background noise levels greater than 65 dBA can interfere with normal conversations, requiring people to speak in a raised voice in order to carry on a normal conversation.

Construction Noise

Construction noise impacts would vary with the number and specific types of equipment on the job, the construction methods, the scheduling of the work, and the distance to sensitive noise receptors such as houses. Maximum noise levels generated by the various pieces of construction equipment typically range from about 70 to 85 dBA at 50 feet (Bolt et al. 1971). An exception would be the use of track drills for building roads and installing foundations in rocky areas; track drills have a typical maximum noise level of 98 dBA at 50 feet. Use of track drills is not expected to be widespread.

Project-related construction noise levels would likely exceed background noise levels by more than 10 dBA at distances from within 500 feet in developed areas to over 1,000 feet in rural areas with little development. These distances are without the use of track drills; drilling activities could increase the distances by an additional 500 feet. A 10-dBA increase would be perceived as a large increase over the existing noise level and could result in annoyance to adjacent residents. The residential noise level guideline of 55 dBA could also be temporarily exceeded for residences near construction activities.

Construction activities would be limited to daylight hours. Because of the sequence of construction activities, construction noise at a given point along the TL connections would be limited to a few periods of a few days each. The temporary nature of construction would reduce the duration of noise impacts on nearby residents.

Operational Noise

Transmission lines can produce noise from corona discharge, which is the electrical breakdown of air into charged particles. Corona noise is composed of both broadband noise, characterized as a crackling noise, and pure tones, characterized as a humming noise. Corona noise is greater with increased voltage and is also affected by weather. It occurs during all types of weather when air ionizes near irregularities, such as nicks, scrapes, dirt, and insects on the conductors. During dry weather, the noise level is low and often indistinguishable off the ROW from background noise. In wet conditions, water drops collecting on the conductors can cause louder corona discharges.

For 500-kV TLs, this corona noise when present, is usually about 40-55 dBA. The maximum recorded corona noise has been 60-61 dBA (TVA unpublished data). During rain showers, the corona noise would likely not be readily distinguishable from background noise. During very moist, non-rainy conditions, such as heavy fog, the resulting small increase in the background noise levels is not expected to result in annoyance to adjacent residents.

Periodic maintenance activities, particularly vegetation management, would produce noise comparable to that of some phases of transmission line construction. This noise, particularly from bush-hogging or helicopter operation, would be loud enough to cause some annoyance. It would, however, be of very short duration and very infrequent occurrence.

Literature Cited

Bolt, Beranek, and Newman Inc. 1971. *Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances.* U.S. Environmental Protection Agency Report NTID300.1.

Cowan, J. P. 1993. *Handbook of Environmental Acoustics*. Wiley, New York.

Federal Interagency Committee on Noise (FICON). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues.* Fort Walton Beach, Fla.: Spectrum Sciences and Software Inc.

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