Attachment B

Department of Army, Corps of Engineers Memorandum for Record, Environmental Assessment and Statement of Finding (State Route 29 from SR 51 East of the City of Harriman to South of Whetstone Road in Morgan County, Tennessee), October 9, 2014.

CELRN-OP-F
Application LRB-2013-00712

MEMORANDUM FOR RECORD

SUBJECT: Department of the Army Environmental Assessment and Statement of Finding for Above-Numbered Permit Application

This document constitutes the Environmental Assessment, 404(b)(1) Guidelines Evaluation, Public Interest Review, and Statement of Findings.

1. Application as described in the public notice, dated July 8, 2013.
APPLICANT: Tennessee Department of Transportation Environmental Division, Suite 900, James K. Polk Building, 505 Deaderick Street, Nashville, Tennessee 37243-1402

WATERWAY & LOCATION: The project would permanently fill 1.86 acres of wetland, temporarily impact 0.10 acre of wetland, permanently fill 559 linear feet of perennial stream, temporarily impact 80 linear feet of perennial stream, permanently fill 5,026 linear feet of intermittent stream, temporarily impact 320 linear feet of intermittent stream, permanently fill 2,591 linear feet of ephemeral stream, and temporarily impact 220 linear feet of ephemeral stream in association with the road expansion and alignment modification of State Route 29 (US – 27).

LATITUDE & LONGITUDE: The project begins at Latitude N35.9717° W-84.4955° (Station 10+00.00, Ramp B) and ends at Latitude N36.00551° W-84.51407° (Station 295+00).

EXISTING CONDITIONS:
Description of Delineation of Waters of the US: The project review area is along 3.7 miles of State Route 29. 2.508 acres of wetland were delineated within the project review area. In addition, 21,964 linear feet of stream were delineated within the project review area. The Corps confirmed stream and wetland boundaries during a site inspection on November 25, 2013, and January 16, 2014 (Attachment A).

PROPOSED WORK:
The applicant proposes to expand and modify alignments along 3.7 miles of State Route 29. The new construction would consist of a 4-lane divided highway and a 5-lane section with 12 ft. lanes and 12 ft. shoulders and varied guardrail. The proposed work would impact 31 streams and 10 wetlands to facilitate roadway widening. Approximately 5,585 linear feet (lf) of intermittent and perennial streams and 2,591 lf of ephemeral streams would be impacted with the discharge of fill material due to culvert installation, stream relocation and roadway construction slope fill. This project also includes the proposed permanent filling of 1.86 acres of wetland, and the temporary filling of 0.10 acre of wetland during the road widening. Temporary crossings would be required at all stream crossings. Depending on the site conditions, a stream ford or culvert crossing would be used to provide temporary construction access. In both cases, maximum crossing widths are limited to twenty feet. All temporary stream crossing would be required to be restored to preexisting conditions. Two

span bridges would also be replaced. The existing 157 foot (ft) 5-span bridge would be replaced with a 195 ft 3-span bridge with associated riprap around the abutments at Site 2A (Station 142+32) Stream (STR-3), Little Emory River, a navigable waterway. The existing 142 ft 5-span concrete deck girder bridge would be replaced with 200 ft of a 3-span, and 331 ft of a 4-span bridge with associated riprap around the abutments at Site 5 (Station 177+04) STR-6, Bitter Creek. In addition, water and electric utilities would also be relocated to facilitate roadway widening. According to the proposed plans, the electric lines and cable lines would be installed on poles and there is no discharge of fill associated with the installation of these utilities. The proposed waterline would be located within the fill slopes of the road. Aquatic resources impacts have been accounted for in the road widening and additional aquatic resource impacts would not occur as a result of the installation of the water line. The replacement of the bridge at STA 142+32 is over a navigable waterway. The US Coast Guard is responsible for the permitting of bridges of navigable waterways. A US Coast Guard permit is needed to authorize the replacement of the bridge. The Corps would only permit the fills (construction of the piers) associated with the bridge construction.

Table 1. Aquatic Resource Impacts table.

Label	Stream Type	Station Location	Impact length	Mitigation ratio	Mitigation
LSWF-1	-	21+20, Ramp B	132 LF	0	No mitigation required. The feature has minimal aquatic functions and does not contribute to downstream waters. (16 LF of riprap)
EPH-6	**Ephemeral**	114+33 - 116+43	8 LF	0.25	2 stream credits from TSMP for 8LF of encapsulation
STR-1	**Intermittent**	115+38 - 140+09	1342 LF	1	219 Stream Credits from TSMP for 219 LF of encapsulation; 1007 LF of stream replacement (116 LF of riprap will be embedded and covered with native substrate)
EPH-7	**Ephemeral**	120+24	28 LF	0.25	7 Stream Credits from TSMP for 28 LF of encapsulation
EPH-8	**Ephemeral**	123+34	32 LF	0.25	8 Stream Credits from TSMP for 32 LF of encapsulation
EPH-9	**Ephemeral**	121+82 - 123+66	174 LF	0.25	43.5 Stream Credits from TSMP for 174 LF of stream loss
EPH-10	**Ephemeral**	130+11 - 131+16	103 LF	0.25	25.75 Stream Credits from TSMP for 103 LF of encapsulation
STR-3	**Perennial**	142+32 - 168+32	57 LF	0	No mitigation required. Small qty of riprap proposed
EPH-12	**Ephemeral**	144+15 - 156+33	1251 LF	0.25	312.75 Stream Credits from TSMP for 1251 LF of stream loss
EPH-15	**Ephemeral**	157+24 - 159+81	80 LF	0.25	15.5 Stream Credits from TSMP for 62 LF of encapsulation (18 LF of riprap)
STR-4	**Perennial**	159+92 - 162+33	287 LF	1	287 Stream Credits from TSMP for 287 LF of stream loss
STR-5	**Intermittent**	48+60	48 LF	1	16 Stream Credits from TSMP for encapsulation (33 LF of riprap)
STR-6	**Perennial**	177+04 - 183+71	42 LF	0	No mitigation required. Small qty of riprap proposed
STR-6A	**Intermittent**	183+71	126 LF	1	64 Stream Credits from TSMP for 37 LF of encapsulation and 27 LF of stream loss (62 LF of riprap)
STR-7	**Perennial**	192+02 - 197+48	173 LF	1	95 Stream Credits from TSMP for 74 LF of encapsulation and 21 LF of stream loss; 60 LF of stream replacement (18 LF of riprap)

STR-8	**Intermittent**	192+55 - 199+50	285 LF	1	285 Stream Credits from TSMP for 285 LF of stream loss
STR-9	**Intermittent**	204+23 - 204+50	355 LF	1	300 Stream Credits from TSMP for 248 LF of encapsulation and 52 LF of stream loss (55 LF of riprap)
STR-10	**Intermittent**	209+50 - 213+06	518 LF	1 for loss and culvert; 0.75 for riprap	128 Stream Credits for 105 LF encapsulation, 23 LF of stream loss; 59.25 Stream Credits for riprap greater than 50 consecutive feet (79 LF); 311 LF of stream relocation
STR-11	**Intermittent**	216+98 - 218+15	41 LF	1	41 Stream Credits from TSMP fro 41 LF of stream loss
STR-12	**Intermittent**	221+99	381 LF	1	331 Stream Credits from TSMP for 331 LF of encapsulation (50 LF of riprap)
STR-13	**Intermittent**	230+89	174 LF	1	124 Stream Credits from TSMP for 106 LF of encapsulation and 18 LF of stream loss (50 LF of riprap)
STR-13A	**Intermittent**	236+45	139 LF	1	61 Stream Credits from TSMP for 61 LF of encapsulation (78 LF of riprap)
STR-14	**Intermittent**	241+38	311 LF	1	261 Stream Credits from TSMP for 233 LF of encapsulation and 28 LF of stream loss (50 LF of riprap)
STR-14A	**Intermittent**	241+59 - 251+99	987 LF	1	987 Stream Credits from TSMP for 987 LF of stream loss
EPH-21	**Ephemeral**	251+99 - 256+00	386 LF	0.25	96.5 Stream Credits from TSMP for 386 LF of stream loss
STR-15	**Intermittent**	259+66	56 LF	1	38 Stream Credits from TSMP for 38 LF of encapsulation (18 LF of riprap)
EPH-22	**Ephemeral**	266+58 - 266+73	107 LF	0.25	23.5 Stream Credits from TSMP for 94 LF of encapsulation (13 LF of riprap)
STR-16	**Intermittent**	269+60 - 271+42	118 LF	0	118 LF Stream relocation
STR-16A	**Intermittent**	270+29 - 270+31	36 LF	1	36 Stream Credits from TSMP for 36 LF of stream loss
STR-17	**Intermittent**	280+50	109 LF	1	79 Stream Credits from TSMP for 79 LF of encapsulation (30 LF of riprap)
EPH-27	**Ephemeral**	280+75 - 290+00	375 LF	0.25	93.75 Stream Credits from TSMP for 375 LF of stream loss
EPH-28	**Ephemeral**	285+00	47 LF	0.25	11.75 Stream Credits from TSMP for 47 LF of stream loss

Wetland	Wetland Type	Station Location	Permanent Impacts	Temporary (acres)	Mitigation
WTL-1	**Forested**	130+50 - 131+52	0.03	0	Walls Mitigation Site - See Mitigation Plan
WTL-2	**Forested**	192+69 - 198+00	0.3	0	Walls Mitigation Site - See Mitigation Plan
WTL-3	**Scrub-Shrub**	197+90	0.07	0	Walls Mitigation Site - See Mitigation Plan
WTL-5	**Scrub-Shrub**	221+45 - 223+87	0.1	0	Walls Mitigation Site - See Mitigation Plan
WTL-6	**Forested**	230+50 - 232+200	0.07	0.06	Walls Mitigation Site - See Mitigation Plan
WTL-6A	**Emergent**	235+00	0.1	0	Walls Mitigation Site - See Mitigation Plan
WTL-8	**Forested**	241+81 - 244+44	0.03	0.04	Walls Mitigation Site - See Mitigation Plan
WTL-9	**Forested**	245+02 - 250+92	0.92	0	Walls Mitigation Site - See Mitigation Plan
WTL-10	**Forested**	259+25 - 260+12	0.07	0	Walls Mitigation Site - See Mitigation Plan
WTL-11	**Forested**	262+11 - 266+57	0.17	0	Walls Mitigation Site - See Mitigation Plan

LEAD FEDERAL AGENCY ROLES: The Federal Highway Administration (FHWA) is considered the lead federal agency for coordination and conducting of environmental reviews under the National Environmental Policy Act (NEPA). Pursuant to NEPA, FHWA prepared an Environmental Assessment (EA) in January 2003 for the proposed roadway widening from State Route 61 East of Harriman to State Route 62. The EA included the 3.7 mile road segment proposed and discussed in this document. FHWA approved a Findings of No Significant Impact (FONSI) in May 2004. In addition, FHWA performed a re-evaluation of the EA and FONSI in November 2013. FHWA determined that there are no substantial changes in the project's effects or the concept of the project as discussed in the EA and the FONSI. FHWA's EA is hereby incorporated by reference in this Department of the Army EA/Statement of Findings. TVA is a cooperating agency on the EA.

PROJECT PURPOSE:
Basic: To improve a roadway for vehicular traffic
Overall: To improve a portion of SR-29 to provide a safe transportation route from SR 61 in Roane County to Whetstone Road in Morgan County, TN.

Water Dependency Determination: The discharge of fill material into wetlands for the purpose of improving roadway transportation is not a water dependent activity because it does not require access or siting within the special aquatic sites in question to fulfill its basic purpose. Therefore, practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise.

Need for Project: According the Permittee, the purpose of the project is to increase vehicle capacity, improve the movements of goods and emergency services, improve traffic flow to and from commercial areas, correct geometric and structural deficiencies with the existing roadway facility, enhance the safety of SR 29 and provide a 4-lane facility from a county seat (Wartburg) to the nearest interstate (I-40). The proposed project, located in Roane and Morgan counties, serves as the main connecting route between Wartburg and the cities of Harriman and Rockwood, TN, as well as a connecting route to several popular natural resource areas including the Obed Wild and Scenic River, Frozen Head State Park, Lone Mountain State Forest and Catoosa Wildlife Management Area. The permittee has stated that previous traffic studies had shown that existing level of service (LOS) has deteriorated to a sub-standard level and is expected to continue to deteriorate further without action to improve the roadway facility. Additionally, historic accident rates recorded on SR-29 exceed the statewide average for comparable roadway facilities.

Avoidance and Minimization Information: The applicant has considered alignment alternatives and mitigative measures to avoid and minimize impacts to Waters of the US. Below is a list of avoidance and minimization actions the applicant has proposed for the project.

- Roadway fill slopes were steepened as much as possible to minimize the length of the culvert extensions.

- Where practicable, impacts to stream channels would be further minimized by harvesting existing channel substrate (cobbles and gravel) prior to placement of riprap. The native substrates would then be placed over the riprap once installed. This would help maintain surface flow and natural habitat in the riprap placement locations.

- Temporarily impacted waters would be returned to original conditions.

- Where possible, new trees would be planted along relocated channels

Compensatory Mitigation: Table 1 describes the applicants proposed mitigation to offset proposed impacts to streams and wetlands. In summary, the applicant proposes to offset 1.86 acres of permanent impacts to wetlands by purchasing 3.72 wetland credits from the Walls Mitigation Site. To offset 8,176 LF of stream impacts the applicant proposes to purchase 4,052 credits and plant trees along 1,496 LF of relocated stream channel. The stream credits would be purchased from the Tennessee Stream Mitigation Program (LRN-2011-00711).

2. Authority.
☒ Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403).
☒ Section 404 of the Clean Water Act (33 U.S.C. §1344).

3. Scope of Analysis.

a. NEPA. *(Write an explanation of rationale in each section, as appropriate)*

(1) Factors.

(i) Whether or not the regulated activity comprises "merely a link" in a corridor type project.

***Rationale**:* The construction of the subject highway improvement project is one phase of a larger corridor highway improvement project of SR-29 from State Route 61 East of Harriman to State Route 62. The regulated activity is 'merely a link' in a corridor type project.

(ii) Whether there are aspects of the upland facility in the immediate vicinity of the regulated activity which affect the location and configuration of the regulated activity.

***Rationale**:* The location and configuration of the regulated activity is affected by the location and configuration of the existing roadways, intersections, and water resources. The applicant proposes to widen 3.7 miles of the existing 2-lane highway to 4-lane divided highway and a 5-lane section with 12 ft. lanes and 12 ft. shoulders and varied guardrail from SR 61 to Whetstone Road, Morgan County, Tennessee. In this instance, off-site locations, and alternative configurations are limited to the existing SR-29 road alignment. The road widening must occur along the existing SR-29. Otherwise, the applicant would be required to create a new road, which would not satisfy the project purpose.

(iii) The extent to which the entire project would be within the USACE jurisdiction. ***Rationale****:* The majority of the project corridor beyond the roadways themselves contains waters of the United States. The construction of the road widening project would involve impacts to waters of the United States along the majority of the project corridor. The project would permanently impact 1.86 acres of wetland, permanently impact 5,585 linear feet of perennial and intermittent streams, and permanently impact 2,591 linear feet of ephemeral stream to construct the project. Approximately 2.6 miles of the total 3.7 mile roadway project would be affected by the presence of waters of the United States. This represents 70% of the roadway project. The project would not occur but for the work proposed within USACE regulated waters.

(iv) The extent of cumulative Federal control and responsibility. ***Rationale****:* Federal funding is being provided through FHWA. Permits from the Corps are required for impacts to waters of the United States. Permits from TVA are also required for the project.

(2) Determined scope.

☐ Only within the footprint of the regulated activity within the delineated water.

☒ Over entire property. *Explain.* The majority of the roadside areas include waters of the United States. This project could not occur without impacts to those waters. The extensive amount of waters throughout the project corridor results in greater Federal control. Therefore, the Corps scope would be the entire project corridor (3.7 miles).

b. National Historic Preservation Act (NHPA) "Permit Area".

(1) The term "permit area" means those areas comprising the waters of the United States that will be directly affected by the proposed work or structures and uplands directly affected as a result of authorizing work or structures. The following three tests must all be satisfied for an activity undertaken outside the waters of the United States to be included within the "permit area":

Such activity ☐would/☒would not occur but for the authorization of the work or structures within the waters of the United States;

Such activity ☒is/☐is not integrally related to the work or structures to be authorized within waters of the United States (or, conversely, the work or structures to be authorized must be essential to the completeness of the overall project or program)

Such activity ☒is/☐is not directly associated (first order impact) with the work or structures to be authorized.

Activities outside the waters of the United States ☒are/☐are not included because all of the preceding tests ☒are/☐are not satisfied.

(2) If permit area extends beyond impacted waters of the US, determine scope. Describe: The permit area includes all areas proposed to be disturbed along the entire construction corridor consisting of approximately 3.7 miles of State Route 29.

c. Endangered Species Act (ESA) "Action Area".

(1) Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.

(2) Determined scope. *Describe.* The ESA Action Area is the entire area of disturbance along 3.7 miles of SR 29. The impacts to waters of the United States are extensive along the entire project corridor and warrant the expansion of the ESA Action area.

d. Public notice comments. ☒

(1) The public and other agencies also provided comments at ☐ public hearing, ☐ public meeting, and/or ☐ *Explain.* No requests for a public hearing were made.

(2) Commenter's and issued raised. (Attachment B)

Name or Agency	Recommendations / Issues raised
USEPA	In a letter dated September 4, 2013, the USEPA requested that the applicant provide adequate information detailing the project's alternatives analysis, modify the acid producing rock (APR) management plan to incorporate EPA's comments provided in the APR guidelines document created by Golder Associates, Inc in 2007, provide a complete NEPA analysis of the of proposed project, and provide a mitigation plan that complies with the 2008 Compensatory Mitigation Rule.
USFWS	In a letter dated August 7, 2013, USFWS concluded that the proposed project would not adversely affect any federally listed or proposed species. USFWS did not provide any comments under the Fish and Wildlife Coordination Act.
SHPO	In a letter dated July 25, 2013, the Tennessee Historical Commission concluded that there are no national register of historic places listed or eligible properties affected by the proposed undertaking. This is consistent with the Corps determination the project would have No Effect on any property listed, or eligible for listing in the National Register of Historic Places.
The United Keetoowah Band of Cherokee Indians in Oklahoma	In an email dated July 10, 2013, The United Keetoowah Band of Cherokee Indians in Oklahoma concluded that they have no objections or comments.

TCWN	In a letter dated July 29, 2013, TCWN stated that the public notice did not provide adequate information describing proposed wetland mitigation.
TWRA	In a letter dated July 30, 2013 TWRA requested a habitat assessment for *Cambarus deweesae*

Agency Codes (used above and elsewhere in this document):

USEPA -U.S. Environmental Protection Agency
USFWS -U.S. Fish and Wildlife Service
SHPO -State Historic Preservation Officer
TCWN -Tennessee Clean Water Network
TWRA -Tennessee Wildlife Resource Agency

(3) Site ☒was/☐was not visited by the Corps to obtain information in addition to delineating jurisdiction. During the jurisdictional determination site visit, the Corps also evaluated the quality of aquatic resources, project alternatives, and proposed avoidance and minimization measures.

(4) Issues identified by the Corps. *The following issues were raised by the Corps during the Public Comment Period:*

1. The Corps requested TDOT to provide a narrative form of the alternatives considered for the re-alignment/widening project, why/why not an alternative was chosen, and alternative analysis for each impact site.

2. The Corps requested TDOT to provide plans and methods for handling acid producing rock and explain how TDOT would incorporate EPA's comments provided on the "Guideline for Acid Producing Rock Investigation, Testing, Monitoring, and Mitigation" document (published in 2007) into the proposed project.

3. The Corps determined that neither the EA/FONSI nor the reevaluation document represent the current chosen alternative. In addition, the reevaluation does not address alternatives analysis, avoidance and minimization, or the least damaging practicable alternative. The Corps requested this information in narrative Word document form.

4. The Corps stated that the reevaluation of the EA/FONSI did not bring the EA/FONSI up-to-date; it merely references these documents. In addition, the reevaluation does not specifically identify or address wetland and stream impacts and mitigation, does not fully list or address potential impacts of the federally/state-listed T&E species, nor specifically address cultural resources or Environmental Justice.

5. The Corps asked TDOT to correct the reevaluation document to provide an accurate project description. The description of where the project begins and ends was incorrect.

6. The Corps stated that the reevaluation does not mention or address TVA's requirements and/or approval needed. The Corps requested that TDOT provide information relative to TVA's requirements and approvals for both a 26a permit and any

Real Estate Instruments.

7. The Corps requested a full mitigation plan compliant with the 2008 Mitigation Rule.

(5) Issues/comments forwarded to the applicant. ☐NA/☒Yes. Date: September 13, 2013

(6) Applicant replied/provided views. ☐NA/☒Yes.

Public comments: **USEPA** - USEPA provided the following comments:

1. **Section 404.(b)(1) Guidelines (Guidelines) of the Clean Water Act/Alternative Analysis** A. Page 1, Paragraph 2: "The U.S. Environmental Protection Agency has determined that the proposed project does not comply with the Section 404(b)(1) Guidelines (Guidelines) of the Clean Water Act (CWA). Specifically, the PN does not provide adequate information on the applicant's alternatives analysis and the steps taken to avoid, minimize and compensate for the proposed development."
B. Page 1, Paragraph 3: " ... EPA is unable to determine if the applicant has chosen the least environmentally damaging practicable alternative and therefore requests additional information pertaining to the applicant's determination of their preferred alternative.

2. **Acid Producing Rock.** Page 2, Paragraph 1: "The EPA has serious concerns about the potential for water quality impacts that can be associated with the mismanagement of acid producing rock (APR). It is the understanding of the EPA that TDOT would be using the guidelines set forth by the "Guideline for Acid Producing Rock Investigation, Testing, Monitoring, and Mitigation" (Golder Report); which was published by Golder Associates, Inc in October 2007. The EPA has reviewed and provided detailed comments to TDOT with concerns regarding the guidelines presented in this document on April19, 2012. The EPA encourages TDOT to incorporate these comments and concerns into this and other projects with pyritic rock impacts.

3. **National Environmental Policy Act (NEPA) Analysis**. Page 2, Paragraphs 2-3: "An Environmental Assessment (EA) for this project was completed January 2003 and a Finding of No Significant Impact (FONSI) was issued in May 2004. A ReEvaluation was submitted to the U.S. Army Corps of Engineers in June 2013 and references both the EA and FONSI. The EPA does not feel that the Re-Evaluation analysis is sufficient or complete as required by the CWA and the NEPA. This document does not meet the 2008 Final Rule for compensatory mitigation (2008 Final Rule) (33 CFR Parts 325 and 332 and 40 CFR Part 230 "Compensatory Mitigation for Losses of Aquatic Resources; Final Rule" published in the Federal Register on April 10, 2008); and does not specifically address wetland or stream impacts, current water quality standards for any discharges, jurisdictional criteria, and environmental justice."

4. **Compensatory Mitigation Plan.** EPA stated that the proposal does not comply with the 2008 Compensatory Mitigation Rule. TDOT has indicated preference for permittee-

responsible compensatory mitigation by using the Walls Mitigation Site (Mr. Lynn Bumgardner, Wetland and Environmental Technologies of Tennessee). EPA requests that when proposing permittee-responsible mitigation in a service area where a mitigation bank or ILF program has been approved, TDOT must demonstrate why the permitee-responsible mitigation site is environmentally preferable to other forms of mitigation. In addition, the applicant must also submit a complete (permittee-responsible) mitigation plan in accordance with 33 CFR 332.4(c).

Applicant's response to USEPA Comments: 1. TDOT originally submitted an alternatives analysis with the permit application. The document addresses alternative analysis for each impact site and for the overall roadway project.

2. TDOT provided the following narrative of how APR would be managed during the proposed project. They also provided a monitoring plan that proposes to monitor water quality within the adjacent streams to ensure acid runoff does not affect water quality.

• All APR that requires encapsulation or blending would be disposed of in an approved landfill, estimated at 241,000 CY. A letter from the Rhea Co. landfill has been received stating they have availability to receive the material.
• Approximately 5,670 feet or 8 retaining walls are being used in designated APR locations to prevent exposure of large cut slopes that would potentially contain pyrite.
• In areas where retaining walls are not being used and cut slopes with benches are being proposed, each bench flow line would be constructed out of Class A-1 rip-rap. The bench flow lines would drain to a bench drain that would continue the flow down to the next bench and or roadside ditch/drainage structure. The bench drains would be a 5 foot "T" Class 8 or C rip-rap ditch underlain with a 60 mil geomembrane. One of the reasons for placing the Class A-1 rip-rap in the bench flow lines and bench drains was to provide an oxic limestone channel for any potential APR runoff to pass through during and post construction in areas that were not being protected with retaining walls. This ditch is a "V" ditch, 1 foot deep; with 1.5 feet min depth of Class A-1 rip rap, and 2:1 side slopes which makes it 4 feet wide at the top.
• In areas where there are tiered retaining walls, the bench areas in between the retaining walls are being mitigated with an impermeable clay layer, growth medium (topsoil) and sod for permanent stabilization.
• Drainage from weep holes associated with the upper tiered retaining walls would discharge into limestone ditches located on benches
• Each retaining wall would have a concrete ditch located at the top to capture stormwater runoff. Additionally the slope behind the retaining wall/ditches would not be in cut but would be placed in a fill section to prevent the potential exposure of pyrite. The area beneath the concrete ditch and the top of the wall would be backfilled with limestone rock. See attached
APR notes and detail for more information.
• The shoulder of the road would be paved all the way up to the retaining walls. Therefore there would be no open ditches potentially cut into APR at the retaining wall locations. A

closed storm drainage system would be used to convey stormwater runoff in the retaining wall areas.
• Rip rap inlet and outlet protection has been placed on cross drain pipes located at the end of the retaining walls to provide additional passive treatment of APR prior to discharging offsite.
• During construction all exposed APR slopes are to be covered with polyethylene sheeting if there is the potential to have APR runoff during inclement weather.
• Sediment storage areas and limestone BMP structures (rock check dams, rock sediment dams, enhanced rock check dams, type 1 inlet protection, etc.) are located down gradient of the APR areas to capture and treat stormwater runoff.
• Agricultural lime has been added to the project to be used, if needed, to neutralize acidic soils and aid in the establishment of permanent vegetation.

3. TDOT stated that the approved Environmental Assessment, dated January 16, 2003, covers alternatives studied in the corridor of SR 29 from SR 61 East of Harriman to SR 62 in Roane/Morgan Counties. The subject project is within the studied corridor. The FONSI (Finding of No Significant Impact) dated May 18, 2004, details the selected alternative "A" from the alternatives studied in the EA. The June 2013 reevaluation reaffirms the Finding of No Significant Impact for the project. In addition, the information requested on alternatives analysis is found in the EA on Page 5, Chapter 2. The alternatives considered for this project included two build alternatives and the no-build alternative. The FONSI details the results of the EA and the public hearing. Ultimately, FHWA and TDOT selected alternative "A" from the EA. This alternative was chosen based on the evaluation of social and economic impacts, along with impacts to the environment.

4. According to TDOT, the Tennessee Department of Environment and Conservation (TDEC) has required that the wetlands be mitigated within the HUC 12 watershed. There are no mitigation banks within this area that are able to accommodate TDEC's request for mitigation. The Walls Mitigation Site was required by TDEC to satisfy their requirements because of its close proximity to the wetland impact sites.

A mitigation plan compliant with the 2008 Mitigation Rules has also been provided to address EPA's comments.

Public comments: **Tennessee Clean Water Network** – TCWN states that the public notice does not provide an appropriate description of proposed mitigation to offset impacts to wetlands. They state that the wetland mitigation description is insufficient to comply with federal public notice requirements and prevents the public from being able to adequately review the proposal.

Applicant's response: No response was requested by the Corps.

Public comments: Tennessee Wildlife Resource Agency – In a letter dated July 30, 2013, TWRA stated that suitable habitat for the Valley Flame Crayfish (*Cambarus deweesae*) may

be present within the project corridor. They also strongly suggested that TDOT have a scientist examine the entire route and determine if the crayfish is present within the project corridor. They also stated that if the species was present, then TWRA would require special conditions to be added to the permit.

Applicant's response: TDOT stated that a survey for the Valley Flame Crayfish was conducted by personnel from TWRA and TDOT within the project limits on September 9, 2013. Several burrowing crayfish were collected, but no Valley Flame Crayfish were observed. In addition, the habitat for this species within the project limits appears to be less than suitable. Therefore, no adverse impacts to this species by construction of the proposed project are expected to occur.

Corps' evaluation of comments **Applicant**:

1. The Corps has reviewed the permit application, EA, FONSI, and reevaluation documents used to bring the EA and FONSI up to date, and determined that there has been adequate information provided for the Corps to review the alternatives analysis and the steps taken to avoid, minimize and compensate for the proposed road widening. Additional information was provided by TDOT on April 16, 2014 that provided additional alternative analysis and outlined steps that had been taken to avoid, minimize, and compensate from the proposed road widening.

2. On February 19, 2014, the Corps contacted EPA to review the APR narrative and monitoring plan that was submitted by TDOT in response to EPA's original public comments. On February 27, 2014, EPA determined that the narrative and monitoring plan did not adequately address APR concerns. In addition, EPA stated that the current monitoring plan, if applied as written, would cause State Water Quality Standard violations. These comments were provided to TDOT to address. On April 2, 2014 a revised APR monitoring plan was provided by TDOT. EPA was asked by the Corps to review the revised plan and EPA provided a letter on May 1, 2014 that stated that an adaptive management plan must be incorporated into the monitoring plan. On June 11, 2014, an adaptive management plan was provided by TDOT and forwarded to EPA for final review. In an email dated June 24, 2014, EPA only had two remaining comments as a result of the adaptive management plan review. EPA asked TDOT to clarify when sampling would occur under Section IV. Adaptive Management Plan, and which department in TDEC would TDOT report sampling results to? TDOT responded on July 2, 2014 with a revised adaptive management plan that addressed EPA's comments (Attachment G). The Corps believes that TDOT has satisfied EPA's APR concerns.

3. In the TDOT submittal dated November 26, 2013, TDOT addressed the comments received from public notice. As part of the submittal, TDOT revised the EA/FONSI reevaluation documents to include discussions on impacts to aquatic resources, and an evaluation of census data to reaffirm that the environmental justice analysis performed in the original EA was still valid. According to the information provided, the census data has not changed significantly and the original analysis is still valid. In addition, a mitigation plan,

compliant with the 2008 Mitigation Rule was provided. The Corps believes that TDOT has provided adequate information to perform the NEPA evaluation.

4. The Corps has reviewed the mitigation plan that was submitted with their public notice responses on November 26, 2013. The Corps provided additional comments regarding the mitigation plan on January 14, 2014, February 14, 2014, March 28, 2014, and September 9, 2014. TDOT provided a sufficient mitigation plan on September 10, 2014. The compensatory mitigation plan complies with the 2008 Compensatory Mitigation Rule. The mitigation plan contains satisfactory information on each of the 12 components of the mitigation plan as required by 33 CFR 332.4(c). In accordance with 33 CFR 332.3(b)(2)-(6), TDOT has provided justification for the variance in the mitigation hierarchy preference and demonstrated the proposed mitigation is the most ecologically preferable option. In the justification provided by TDOT, they stated that there are no approved wetland banks that service the watersheds within the project limits. In addition, use of an in-lieu fee program was not pursued due to the fact that the Tennessee Department of Environment and Conservation (TDEC) did not allow TDOT to mitigate impacts in the in-lieu fee program. Additionally, the in-lieu fee program is not environmentally preferable because impacts resulting from the project would not be offset for up to three years from the date the impacts occurred. This is because the in-lieu fee program has three years to replace wetland impacts (credits sold) within a given service area. Use of the Walls Mitigation Site to offset project impacts would result in no temporal loss of wetland function as would be associated with use of the in-lieu fee wetland mitigation program because this is an established mitigation site. In addition, the Walls site is only 5.8 miles from the project impact site and is adjacent to a 303(d) listed stream, Crooked Fork, which is listed as impaired due to sedimentation and siltation; restoration of wetland vegetation and plugging of drainage ditches on the mitigation site should reduce sediment input from this parcel. Restoration of the Walls Mitigation Site began in 2008 with filling of an excavated pond and associated drainage ditches that were designed to dry out the site. In 2008 the site was plowed and a total of 4,600 trees were planted throughout the site. A fifth year monitoring report shows that the Walls Site has wetland hydrology and survival of planted trees exceeds 450 per acre. The Corps agrees that the Walls Site is an environmentally preferable mitigation site for wetland mitigation.

5. The public notice stated that “to compensate for impacts to 1.52 acres of jurisdictional wetlands, the applicant is proposing to mitigate the permanent wetland impacts by purchasing at a 2:1 ratio, 3.04 acres from an approved wetland mitigation site (permittee-responsible) or by purchasing available wetland credits within an established wetland in-lieu-fee program”. The Corps believes that this mitigation statement is adequate for the public to provide meaningful comment. As required by 33 CFR 332.4(b), the statement provides the amount of mitigation and forms of mitigation they are prepared to use. Depending on credit availability, external permitting agency requirements, and other unforeseen circumstances, multiple mitigation options were provided in the public notice. The public was afforded the opportunity to provide opposing comments to either proposed mitigation option that was being considered by the applicant. The public did not provide any comments on the applicant’s proposed mitigation strategy.

6. In the October 2013 Occurrence Surveys for the Valley Flame Crayfish report completed by TWRA, it was determined that no Valley Flame Crayfish reside within the project corridor. However, crayfish were discovered outside the project corridor. TWRA suggests that although no Valley Flame Crayfish were collected within the construction zone proper, the population discovered just southeast of the project warrants strict adherence to BMP's to prevent excessive siltation from impacting that site. The Corps would include permit conditions to ensure erosion control measures are maintained throughout the project.

7. TDOT provided the Corps additional information in regarding aquatic resource impacts within the revised reevaluation document. Additional information was provided in TDOT's November 26, 2013 public notice response document that addressed potential impacts of the federally/state-listed T&E species, cultural resources, and Environmental Justice.

8. TDOT has revised the reevaluation document to accurately describe where the project begins and ends.

9. TDOT directed the Corps to sections in the EA and FONSI that describe TVA's regulatory requirements. The appropriate information has been provided to the Corps.

(7) The following comments are not discussed further in this document as they are outside the Corps purview. ☒ NA/☐ Yes

(8) The project ☒was/☐was not modified as a result of the PN coordination. *Explain.* The project has been modified to take into account impacts to ephemeral streams. Ephemeral stream relocation and mitigation of unavoidable impacts to ephemerals has been incorporated into the project. Rip rap has been proposed to be placed to mimic the existing contours of the stream channel. The top of the proposed rip rap is proposed to be installed at grade with the bottom of the existing channel. Voids within the rip rap are proposed to be filled with creek gravel from the culvert excavation area.

4. Alternatives Analysis.

a. Basic and Overall Project Purpose (as stated by applicant and independent definition by Corps).
☒Same as Project Purpose in Paragraph 1.
☐Revised: *Insert revised project purpose here and explain why it was revised.*

b. Water Dependency Determination *(only if affecting a special aquatic site)*:
☒Same as in Paragraph 1.
☐Revised: *Insert revised water dependency determination here if it has changed due to changing project purpose or new information.*

c. Applicant preferred alternative site and site configuration.

☒Same as Project Description in Paragraph 1.
☐Revised: *Explain any difference from Paragraph 1*

Siting Criteria.

Roadway Safety	Design's ability to meet desired travel speeds
Sufficient capacity	Basic highway segment level of service evaluation
Location	Project must improve safety and capacity along current route
Aquatic resources	Acres or linear feet impacts to aquatic resources

d. Off-site locations and configurations. The applicant proposes to rehabilitate an existing road. In this instance, off-site locations and configurations are limited to either a road realignment or rehabilitation of the road within the current alignment. The extensive amount of waters of the United States on either side of the road makes the realignment alternative impracticable. Due to the rural nature of the project area, a complete alignment change (re-route) would result in impacts to aquatic resources that have not been previously impacted and would result in additional bifurcation of both aquatic and upland habitat. In addition, a realignment would require additional engineering, and construction dollars resulting in no appreciable reduction in impacts to waters of the United States.

e. (☒ NA) Off-Site alternative(s) were not selected for further analysis. *Explain.* The proposed work is to occur on an existing roadway.

f. On-site configurations.

Description	Comparison to criteria
Change road alignment within existing road corridor, expand the 2 lane road to 4 lanes, with reduced shoulder slopes, and determine road alignment based on existing aquatic resources avoidance and minimization at each crossing to increase road capacity and meet AASHTO standards	Changing the road alignment within the current road corridor would avoid and reduce impacts to waters, while allowing for roadway expansion that would result in improved roadway safety and capacity. This option has approximately 10%-55% fewer stream impacts as compared to other realignment options within the roadway corridor. This option is practicable and reasonable and is the applicant's `preferred alternative.
Utilize bridges rather than culverts to expand the 2 lane road to 4 lanes to increase road capacity and meet AASHTO	The use of bridges to span aquatic resources rather than installing culverts would reduce the amount of aquatic resources that would be impacted by the project. However, the estimated cost to install bridges rather than culverts is significant. The estimated increase in project cost would be

standards	$4,328,000 initially. Although operation and maintenance cost were not calculated, it is general engineering knowledge that bridges are more expensive to maintain than culverts and additional funds would be required in the long-term to maintain the bridges. This option is not practicable or reasonable.
Change the road alignment all to the east or west of the current location to expand the 2 lane road to 4 lanes to increase road capacity and meet AASHTO standards	The complete relocation of the road to one side or the other with the valley would result in additional impacts to aquatic resources. If the road was moved to one side of the valley the anticipated stream and wetland impacts could be as much as 14,875 LF and 0.87 acre, respectively. Additionally, if the road was moved to the other side of the valley, the project could impact as much as 9,017 LF of stream and 1.64 acres of wetland. This option would result in aquatic resource impacts that would exceed those proposed in the applicant's preferred alternative. In addition, the complete relocation of the road would result in a considerable increase in construction costs as compared to widening the road along the existing alignment. This option is not practicable or reasonable.

g. Other alternatives not requiring a permit, including No Action.

Description	Comparison to criteria
No Action	Without expanding the roadway and shoulders, the project would not improve road safety, and traffic capacity for the traveling public. The No-Build Alternative does not meet the purpose and need of the project.

h. Alternatives not practicable or reasonable. *Describe/explain:* This is described in items f and g above.

i. Least environmentally damaging practicable alternative. *Describe/explain:* It has been determined that the applicants preferred alternative represents the least environmentally damaging practicable alternative for the reasons identified above.

5. Evaluation of the 404(b)(1) Guidelines. (☐NA)

a. Factual determinations.

Physical Substrate. ☒ See Existing Conditions, paragraph 1. ☐
Water circulation, fluctuation, and salinity.

☒ Addressed in the Water Quality Certification. ☐
Suspended particulate/turbidity. ☒ Turbidity controls in Water Quality Certification and special conditions would be incorporated to reduce or eliminate suspended particulate and turbidity in adjacent waters. ☐
Contaminant availability. ☒ General Condition requires clean fill. ☐
Aquatic ecosystem and organism. ☒ Wetland/wildlife evaluations, paragraphs 5, 6, 7 & 8. ☐
Proposed disposal site. ☒ Public interest, paragraph 6. ☐
Cumulative effects on the aquatic ecosystem. ☒ See Paragraph 7.c. ☐
Secondary effects on the aquatic ecosystem. ☒ See Paragraph 7.c. ☐

b. Restrictions on discharges (230.10).

(1) It ☒has/☐has not been demonstrated in paragraph 4 that there are no practicable nor less damaging alternatives which could satisfy the project's basic purpose. The activity ☒is/☐is not located in a special aquatic site (wetlands, sanctuaries, and refuges, mudflats, vegetated shallows, coral reefs, riffle & pool complexes). The activity ☐does/☒does not need to be located in a special aquatic site to fulfill its basic purpose.

(2) The proposed activity ☐does/☒does not violate applicable State water quality standards or Section 307 prohibitions or effluent standards (☐based on information from the certifying agency that the Corps could proceed with a provisional determination). The proposed activity ☐does/☒does not jeopardize the continued existence of federally listed threatened or endangered species or affects their critical habitat. The proposed activity ☐does/☒does not violate the requirements of a federally designate marine sanctuary.

(3) The activity ☐will/☒will not cause or contribute to significant degradation of waters of the United States, including adverse effects on human health; life stages of aquatic organisms' ecosystem diversity, productivity and stability; and recreation, esthetic, and economic values.

(4) Appropriate and practicable steps ☒have/☐have not been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (see Paragraph 8 for description of mitigative actions).

6. Public Interest Review: All public interest factors have been reviewed as summarized here. Both cumulative and secondary impacts on the public interest were considered. Public interest factors that have had additional information relevant to the decision are discussed in number 7.

+ Beneficial effect
0 Negligible effect
- Adverse effect
M Neutral as result of mitigative action

+	0	-	M	
☐	☐	☐	☒	Conservation.
☐	☒	☐	☐	Economics.
☐	☒	☐	☐	Aesthetics.
☐	☐	☐	☒	General environmental concerns.
☐	☐	☐	☒	Wetlands.
☐	☒	☐	☐	Historic properties.
☐	☐	☐	☒	Fish and wildlife values
☐	☐	☐	☒	Flood hazards.
☐	☐	☐	☒	Floodplain values.
☐	☒	☐	☐	Land use.
☐	☒	☐	☐	Navigation.*
☐	☒	☐	☐	Shore erosion and accretion.*
☐	☒	☐	☐	Recreation.*
☐	☒	☐	☐	Water supply and conservation.*
☐	☒	☐	☐	Water quality.
☐	☒	☐	☐	Energy needs.*
☒	☐	☐	☐	Safety.
☐	☒	☐	☐	Food and fiber production.
☐	☒	☐	☐	Mineral needs.*
☐	☒	☐	☐	Considerations of property ownership.
☒	☐	☐	☐	Needs and welfare of the people.

Public Interest Factors. **Note that the review of the following public interest review factors are not applicable to this project, and therefore are not discussed below: navigation, shore erosion and accretion, recreation, water supply and conservation, energy needs, and mineral needs. Note that an "X" is indicated in the Negligible Effects box in the table. However, the checkmark actually should be in a box labeled as N/A.*

Factor	Discussion
Conservation; General Environmental	The wetlands and streams that are proposed to be impacted as a result of the road widening, are located in or adjacent to existing

Concerns; Wetlands; Fish and wildlife values; Water Quality:	right-of-ways (ROWs), and have been historically impacted by the existing road. The wetlands located in existing ROWs are mowed and maintained on a frequency that prevents the natural succession of the wetlands to high quality forested wetlands. The streams that are proposed to be impacted as a result of the road widening appear to have been historically channelized. Many on the streams flow along the edges of the road and cross the road through existing culverts. Existing culverts are aging and deteriorating. The addition of new culverts would ensure that the hydrologic regimes of the streams would be maintained in future years. ROW maintenance in some areas has eliminated buffers and vegetative cover along some stream reaches (Ephemeral Stream 12, 21, and Perennial Stream 11). The loss of 1.86 acres of wetland and permanent impact to 8,176 linear feet of streams would result in minor negative impacts to wildlife habitat as well as water quality. Temporary construction activities could result in sedimentation. However, should a permit be issued, it would be conditioned to minimize sedimentation and erosion. The habitat loss resulting from the proposed work can be compensated with the following: the purchase of 3.72 wetland credits from the Walls Mitigation Site, purchase of 4,052 stream credits from the Tennessee Stream Mitigation Program, and 1,496 LF of relocated stream channel with riparian plantings. The amount of impermeable surface within the project area would increase. Increased runoff resulting from the project could degrade receiving waters. These water quality impacts would be offset through roadway design, implementation of BMPs, use of erosion and sediment control measures, and special conditions required by the TDEC's individual water quality certification. As a result of the proposed mitigative actions described above, the listed public interest review factors would result in a negligible effect.
Economics.	As provided in FHWA's 2004 FONSI, the project would remove land and improvements from the local tax base. This impact would be short-term since business and residential developments should relocate within the local area. It is anticipated that initial construction activities would result in the employment of local contractors to build the road widening

	project. The project would result in a safer road that would facilitate transportation and commerce. The project would have a negligible effect on economics.
Aesthetics; Land use; Considerations of property ownership:	The proposed project would result of the widening of an existing roadway. Areas along the roadway have been historically impacted by the construction of the existing road, and residential and commercial developments. A portion of the proposed project is located within an existing ROW. It is not anticipated that the additional expansion would result in negative aesthetical or land use impacts. As for the consideration of property ownership, it is the applicant's responsibility to acquire additional ROW and ensure the landowners are properly compensated should additional land be acquired. The project would have a negligible effect on aesthetics, land use, and considerations of property ownership public interest review factors.
Historic properties.	In a letter dated July 25, 2013, the Tennessee Historical Commission concluded that there are no national register of historic places listed or eligible properties affected by the proposed undertaking. This is consistent with the Corps determination the project would have No Effect on any property listed, eligible for listing, or appear to meet the criteria for listing in the National Register of Historic Places.
Safety; Needs and welfare of the people:	The widening of the road and shoulders would help the applicant meet AASHTO road safety standards. It would improve overall road safety and improve the welfare of people traveling along SR-29. The project would have a beneficial effect on safety, needs and welfare of the people public interest review factors.
Flood hazards; Floodplain values:	As referenced in the June 2013 FHWA NEPA re-evaluation, TDOT and FHWA determined that the project was within the FEMA floodway, floodplain, or study area, within three locations (two locations on STR-1 and one location on STR-3). One area in which the roadway crosses over these stream STR-1 is in an "AE" flood zone. To address the flood zone at the crossing over STR-1, TDOT provided a letter to the local official and a "No-Rise" certification stating that "this project would not adversely impact the 100 year flood elevations, floodway elevations and floodway widths". The remaining two roadway crossings over Streams STR-1 and STR-3 are in a zone

	"A" FEMA designated floodplain but no detailed study has been done by FEMA. TDOT has conducted a study on the project area and determined that the project would not increase the pre-project flood elevations by more than one foot. The remainder of the project site is within an "X" flood zone. As stated by TDOT and FHWA, the design of the roadway system is in compliance with the floodplain management criteria set forth in the National Flood Insurance Regulations of Title 44 of the Code of Federal Regulations (CFR). It is also consistent with requirements of floodplain management guidelines for implementing Executive Order 11988 and Federal Highway Administration guidelines 23 CFR 650A. The floodplain wetlands and streams that are proposed to be impacted as a result of the road widening would be compensated with the following mitigation: the purchase of 3.72 wetland credits from the Walls Mitigation Site, purchase of 4,052 stream credits from the Tennessee Stream Mitigation Program, and 1,496 LF of relocated stream channel. The proposed mitigation would increase the amount of floodplain wetlands available for flood water retention, nutrient removal, and groundwater infiltration within the 12 digit HUC. As a result of the proposed mitigative actions described above, the listed public interest review factors would result in a negligible effect.
Food and Fiber Production	According to FHWA's EA, an assessment was performed in accordance with 7 CFR, Part 658, of the Farmland Protection Policy Act. It was determined by FHWA and NRCS that the project would not have a substantial impact to farmland. The project would impact approximately 18 acres of forest/farmland. This only represents 0.00003% of the forest/farmland within Emory watershed. The project is expected to have a negligible effect on food and fiber production.

7. Effects, policies and other laws.

   a. Endangered Species Act. ☐ NA
   The proposed project:

      (1) Will have "No Effect" on the following threatened or endangered species:
      Gray bat (*Myotis grisescens*): No Effect – No suitable caves were found within the project limits that would support gray bats.

Cumberland bean (*Villosa trabalis*): No Effect – The species is limited to the South Fork Watershed. The project is located in the Emory watershed.

Cumberland sandwort (*Arenaria cumberlandensis*): No Effect – The species is limited to the South Fork Watershed. The project is located in the Emory watershed.

(2) "May affect, but is not likely to adversely affect":

Species: As lead federal agency for this project, the FHWA, in coordination with the applicant, prepared a Biological Assessment (BA) for those species where suitable habitat is and/or species are present, or potentially present, or known to occur within the county. FHWA and the applicant made the following determinations:

Alabama lampmussel (*Lampsilis virescens*): Not likely to adversely affect – No suitable habitat was documented for this species within the construction limits of the project.

Finerayed pigtoe (*Fusconaia cuneolus*): Not likely to adversely affect – No suitable habitat was documented for this species within the construction limits of the project.

Purple bean (*Villosa perpurpurea*): Not likely to adversely affect – No suitable habitat was documented for this species within the construction limits of the project.

Cumberland elktoe (*Alasmidonta atropurpurea*): Not likely to adversely affect – No suitable habitat was documented for this species within the construction limits of the project.

Virginia spiraea (*Spiraea virginiana*): Not likely to adversely affect – No suitable habitat was documented for this species within the construction limits of the project.

Spotfin chub (*Cyprinella monacha*): Not likely to adversely affect – No suitable habitat was documented for this species within the construction limits of the project.

Cumberland rosemary (*Conradina verticillata*): Not likely to adversely affect – No suitable habitat was documented for this species within the construction limits of the project.

Indiana Bat (*Myotis sodalist*) – Not likely to adversely affect
In a letter dated March 31, 2003, USFWS concurred that the proposed project would not likely to adversely affect the above listed species. On July 23, 2007 and August 7, 2013, USFWS re-verified that the project is not likely to adversely affect the above listed species. In 2008, Tennessee Wildlife Resources Agency requested the applicant to consider potential impacts to the state and federally endangered Alabama lampmussel (*Lampsilis virescens*). A survey was performed by the applicant on the

Little Emory River and no individuals were recovered during the surveying effort. In addition, the substrate was heavily silted and was not suitable for the mussel species. The USFWS concurred that the project would not likely to adversely affect the Alabama lampmussel.

FHWA and the applicant determined that potential habitat for the Indiana bat (*Myotis sodalist*) exists within the project corridor. In July 2011, the FHWA and the applicant performed joint misting netting and acoustical studies to determine the presence or absence of the Indiana bat. No Indiana bats were discovered or recorded during the study. FHWA determined that the project would not likely adversely affect the Indiana bat. In a letter dated February 22, 2012, USFWS concurred that the project would not likely adversely affect the Indiana bat based on the negative survey results.

On May 15, 2014, FHWA provided a Biological Assessment to USFWS for Indiana bat and northern long-eared bat. FHWA determined that the project would likely adversely affect the Indiana and have No Jeopardy on the northern long-eared bat. FHWA made a determination of likely to adversely affect the Indiana bat, because survey results from 2011 were not longer valid. USFWS considers survey results for Indiana bat only valid for two years. Through an intra-agency consultation process between FHWA/TDOT and USFWS, USFWS has concurred that the project would "likely to adversely affect" the Indiana bat. To mitigate for their impacts the applicant was required to pay $201,400 to the Indiana Bat Conservation fund to mitigate for the removal of 53 acres of potential habitat.

The requirement to pay into the Indiana Bat Conservation fund could not have been accomplished by TDOT due to administrative/funding reasons. As a result, another survey was performed during the period of August 2 – August 13, 2014 to determine the presence of Indiana bat and northern long-eared bat. No Indiana bats or northern-longer-eared bats were recorded within the project corridor during the survey. As a result, FHWA determined that the project would not likely adversely affect the Indiana bat and northern long-eared bat. In a letter dated September 16, 2014, USFWS concurred that the project would not likely adversely affect the Indiana bat and northern long-eared bat. Although not required, the USFWS asked that the removal of trees with a DBH of three inches or greater be considered from October 15 through March 31 to further minimize potential harm. In an email dated September 29, 2014, TDOT stated that they cannot commit to a cutting restriction suggested (not required) by USFWS.

The Corps has reviewed the findings provided by FHWA, the applicant, and USFWS and agrees with the effects determinations described above. The Corps would include permit conditions to ensure that all Section 7 ESA obligations are met by the applicant.

(3) ☐Will/☒Will not adversely modify designated critical habitat for any listed species.

(4) ☐Is/☒Is not likely to jeopardize the continued existence of any listed species.

(5) The Services ☒concurred/☐provided a Biological Opinion(s). *Explain.* The USFWS acknowledged that the project would not likely adversely affect the Purple bean, Cumberland elktoe, Virginia spiraea, Spotfin chub, Cumberland rosemary, Alabama lampmussel, Finerayed pigtoe, and Indiana bat on August 7, 2013.

On September 16, 2014, USFWS concurred that the project would not likely adversely affect the Indiana bat and northern long-eared bat (Attachment D).

b. Historic Properties. The proposed project will have ☒ no effect ☐ no adverse effect ☐ adverse effect on any property listed, eligible for listing, or appear to meet the criteria for listing in the National Register of Historic Places, based on concurrence letter from SHPO/THPO.

In 2002, the applicant performed a Phase I survey of the overall proposed project route to determine if any archaeological resources, listed or eligible for listing in the National Register of Historic Places (NRHP) would be affected. In cooperation with the State Historic Preservation Officer (SHPO), the applicant determined that the proposed project would have no effect on any resources listed or eligible for listing in the NRHP. By letter dated April 9, 2002, the SHPO concurred with the applicant.

In response to the Corps' public notice, the Tennessee Historical Commission provided a letter dated July 25, 2013, that concluded that there are no national register of historic places listed or eligible properties affected by the proposed undertaking. This is consistent with the Corps determination the project will have No Effect on any property listed, eligible for listing, or appear to meet the criteria for listing in the National Register of Historic Places (Attachment E).

c. Cumulative & Secondary Impacts. The geographic area for this assessment is the (06010208 Emory River) watershed *(i.e. use 8 digit HUC code, etc).*

(1) Baseline. Information describing this watershed was taken from the final TMDL for pH in Crab Orchard Creek, prepared by TDEC on September 21, 2001. The Emory River Watershed lies within 3 Level III ecoregions (Ridge and Valley, Southwestern Appalachians, and Central Appalachians) and contains 2 Level IV ecoregions as described below.

- Cumberland Plateau (68a) is described in the South Fork Cumberland watershed data

(05130104).

- Plateau Escarpment (68c) is described in the South Fork Cumberland watershed data (05130104).

Table 2. 2006 National Land Coverage Dataset for the Emory Watershed (06010208).

Land Use	**Area**		
	Acres	Square Miles	% of Watershed
OPEN WATER	5,153.83	8.05	0.93
DEVELOPED, OPEN SURFACE	32,683.41	51.07	5.88
DEVELOPED, LOW INTENSITY	11,711.58	18.30	2.11
DEVELOPED, MEDIUM INTENSITY	3,705.81	5.79	0.67
DEVELOPED, HIGH INTENSITY	961.84	1.50	0.17
BARREN LAND (ROCK/SAND/CLAY)	3,488.23	5.45	0.63
DECIDUOUS FOREST	282,270.93	441.05	50.75
EVERGREEN FOREST	12,712.59	19.86	2.29
MIXED FOREST	79,806.58	124.70	14.35
SHRUB/SCRUB	2,942.13	4.60	0.53
GRASSLAND/HERBACEOUS	58,224.14	90.98	10.47
PASTURE/HAY	60,481.27	94.50	10.87
CULTIVATED CROPS	829.51	1.30	0.15
WOODY WETLANDS	1,197.20	1.87	0.22
EMERGENT HERBACEOUS WETLANDS	18.10	0.03	0.00
Total	**556,187.17**	**869.04**	**100**

According to TDECs Final 303(d) Listing for impaired waters, approximately 1,101 acres and 176.5 miles of impaired waters are within the Emory watershed. The major contributors are: high mercury, PCBs, Chlordane, Arsenic, coal ash deposits, aluminum, alteration in stream-side or littoral vegetation cover, nitrate, physical substrate habitat alterations, loss of biological integrity due to siltation, low dissolve oxygen, oil, *Escherichia coli*, total phosphorus, pH, manganese, and flow alteration. These result from a variety of sources such as: abandoned mines, stream impoundments, land development, mining, discharges from MS4 areas, municipal point source discharge, petroleum activities, channelization, permitted small flows, pasture grazing, contaminated sediments, and industrial point source.

(2) Predominant land use in the watershed is forest (68%) followed by pasture (10.9%). Developed areas represent approximately 8.8% of the total drainage area of the watershed. This is an increase in development within the watershed of approximately 7.6 % from 1993. Corps permits for the period April 2009 to April 2014 has authorized the fill of 4.62 acres of wetland and permanent

impacts to 14,219 linear feet of stream (based upon ORM data). The 14,219 linear feet of stream impacts represent less than 0.18% of the streams within the watershed and impacts to wetlands represents less than 0.04% of the mapped wetlands within the watershed. Corps permits also have required 59.2 acres of mitigation for wetland impacts and 15,700 linear feet of stream mitigation. Approximately 97 percent of the permit actions issued during the last five years were Nationwide Permits. In order of the above referenced impacts to be authorized by Nationwide Permits the impacts must have minimal individual and cumulative adverse effects on the aquatic environment. The projection is that authorizations will continue ☒at the current rate. Various activities affecting aquatic resources were identified in the watershed descriptions. Many of the sources contributing to degradation of aquatic resources within the aforementioned watershed are a result of activities in uplands that do not require DA permits, because they are outside of our jurisdiction or are exempt from Section 404 and Section 10 permit requirements.

(3) Context. The proposed project is ☒typical of /☐a precedent /☐very large compared to /☐ other activities in the watershed. Development similar to the proposal have occurred since prior to the Clean Water Act. Future conditions are expected to be continued slow growth and expansion. Besides Corps authorized projects, other activities include agriculture, residential and commercial development. Resulting natural resource changes and stresses include the changes in land use, increases in impervious surfaces, and increased runoff. A key issue of concern in this watershed is the loss of habitat through land use change. The project would be located along an existing road. This would minimize the loss of high quality habitat.

(4) Mitigation and Monitoring. The project affects the following key issue(s): loss of wetlands and streams. The magnitude of the proposed effect is minor within the watershed. Avoidance and minimization methods are addressed above. Compensatory mitigation, namely 1. Relocation of 1,492 LF of roadside stream at a 1:1 ratio; 2. Purchase of 4,052 stream credits from the Tennessee Stream Mitigation Program; 3. Purchase 3.72 wetland acres from the Walls Mitigation Site and monitoring described herein would result in increased wetland and stream functions.

(5) Summary: Based on the information submitted by the applicant and the Corps evaluation, the project would not result in unacceptable individual or cumulative impacts to the environment. Impacts are occurring to previously altered streams and wetlands that are located directly adjacent to the existing roadway. The expansion of the roadway would impact the aquatic resources within the project limits, however downstream, or watershed impacts would remain minimal. In addition, the mitigation proposed would result in restored streams and wetlands that are contiguous in size and are located in areas where

impacts from anthropocentric sources are minimized through the sighting of the mitigation project and buffer requirements. In the end, the mitigation should provide better functioning resources as compared to the resources being impacted. The project's cumulative impacts on the environment resulting from the incremental impact of this project when added to the past, present, and reasonably foreseeable future actions are negligible given the current requirements of federal laws including the Clean Water Act, the Corps Regulatory Program regulations, and the special conditions of the DA permit. This project's cumulative aquatic habitat impacts would be negligible since the applicant would be required to completely offset the functions of the impacted habitat with appropriate in-kind compensatory mitigation. Cumulative water quality impacts would be negligible given the permit erosion control conditions, State permitting requirements with respect to the water quality certification, and the stream/wetland compensatory mitigation requirements. Cumulative wildlife and fisheries impacts would also be negligible given the location and impacted nature of the project site and the compensatory mitigation proposed for the project impacts. No other measurable cumulative impacts are expected for any other resource.

Secondary Impacts. The project would not result in any measurable secondary impacts to the aquatic environment given the nature and proposed use of the project components and the fact that the project area is already impacted by major roadways and other development.

d. Corps Wetland Policy. Based on the public interest review herein, the beneficial effects of the project outweigh the detrimental impacts of the project.

e. (☐NA) Water Quality Certification under Section 401 of the Clean Water Act ☒ has/☐has not yet been issued by TDEC. Date issued: 9-11-2014 (Attachment F)

f. (☒NA) Coastal Zone Management (CZM) consistency/permit☐has/☐has not yet been issued by . Date issued:

g. (☒NA) Other authorizations.

h. (☒NA) Significant Issues of Overriding National Importance. *Explain.*

8. Compensation and other mitigation actions.

a. Compensatory Mitigation
(1) Is compensatory mitigation required? ☒ yes ☐ no [If "no," do not complete the rest of this section]
If "yes", has the applicant provided a mitigation plan? ☒ yes ☐ no
If "yes", describe applicant's mitigation proposal: Originally, the applicant proposed to mitigate for the proposed permanent impacts to 1.52 acres of

wetlands, with 3.04 acres of wetland purchased from the Walls Mitigation Site. As mitigation for the proposed permanent impacts to 1,936 linear feet of streams, the applicant proposed to purchase 1,936 stream credits from TSMP. The applicant also proposed relocated 1,318 linear feet of stream as in-kind, on site mitigation (Attachment H).

During the evaluation process, the Corps used the 2004 Tennessee Stream Mitigation Guidelines document to determine the appropriate amount of stream mitigation necessary to offset proposed impacts to intermittent and perennial streams. For ephemeral streams that are not addressed in the Tennessee Stream Mitigation Guidelines, mitigation was assessed based on the quality of the streams. The ephemeral streams located on the project, were considered low quality based on a Rapid Bioassessment Protocol assessment. As a result, the ephemeral streams would be mitigated at a 0.25 ratio which is reflective of the functions lost by impacting the ephemeral streams on site.

Following the initial project submittal and associated mitigation was proposed, a site visit was conducted by the Corps and it was determined that the project would permanently impact 1.86 acres of wetland, temporarily impact 0.10 acre of wetland, permanently impact 559 linear feet of perennial stream, temporarily impact 80 linear feet of perennial stream, permanently impact 5,026 linear feet of intermittent stream, temporarily impact 320 linear feet of intermittent stream, permanently impact 2,591 linear feet of ephemeral stream, and temporarily impact 220 linear feet of ephemeral stream. The additional impacts that were discovered because the applicant had not accurately mapped the existing aquatic resources on site, and thus the impacts to those aquatic resources were not calculated. TDOT was asked to provide mitigation statements for the additional impacts on January 28, 2014. On March 18, 2014, TDOT provided a revised mitigation plan for Corps review. The plan still did not address the following issues:

1. The revised mitigation plan does not include the impacts that would be generated as a result of the additional waters that were identified during the site visit on November 14, 2013.

2. The mitigation plan must address the Walls Mitigation Site as permittee responsible mitigation because the site never went through the formal mitigation bank review process. If the wetland areas associated with the credit purchase fail, the permittee would be responsible for ensuring adequate mitigation is provided to offset project impacts.

3. TDOT states that “the undisturbed riparian vegetative buffer should be 50 feet in width on both sides of the stream channel, measured from top of bank.” The detail drawing for riparian plantings indicates that trees would only be planted from toe of slope to top of bank. TDOT needs to clarify where trees

would be planted.

4. A reference of the approved planting list must be included in the mitigation plan.

5. Although invasive species treatment of 10% has been used in the past, the Corps intends to utilize the following standard special condition for all compensatory mitigation: No more than five (5) percent (%) cumulative areal cover of the mitigation area and no contiguous areas greater than 200 square feet shall be vegetated at the end of the 5-year monitoring period with invasive species.

6. If TDOT chooses to use the Walls Site as mitigation to offset the project's impacts, 2 years of annual monitoring would be required for the mitigation area that would be used to offset the project's impacts.

7. If mitigation is going to be provided from the Walls Site, then the permittee is responsible for providing long-term management of the mitigation area that is associated with their project.

8.An adaptive management statement should be provided for the Walls Site.

On September 10, 2014 TDOT provided a revised mitigation plan that would adequately offset the stream and wetland functions that would be lost as a result of the road modification. The applicant submitted a revised proposal to the Corps consisting of: 1. Relocation of 1,492 LF of roadside stream at a 1:1 ratio; 2. Purchase of 4,052 stream credits from the Tennessee Stream Mitigation Program; 3. Purchase 3.72 wetland acres from the Walls Mitigation Site. The Corps believes that the mitigation proposed above would offset their proposed impacts.

(2) Is the impact in the service area of an approved mitigation bank? ☒ yes ☐ no
(i) Does the mitigation bank have appropriate number and resource type of credits available? ☐ yes ☒ no

(3) Is the impact in the service area of an approved in-lieu fee program?
☒ yes ☐ no
(i) Does the in-lieu fee program have appropriate number and resource type of credits available? ☒ yes ☐ no

Stream impacts would be mitigated at the Tennessee Stream Mitigation Program. 1,492 LF of stream would be mitigated on-site through the relocation of stream channel on-site. The Tennessee Wetland Fund is available to provide credits for the wetland impacts. However, wetland impacts would be mitigated for that the Walls Mitigation Site.

(4) Check the selected compensatory mitigation option(s):
☐ mitigation bank credits
☒ in-lieu fee program credits
☒ permittee-responsible mitigation under a watershed approach
☐ permittee-responsible mitigation, on-site and in-kind
☐ permittee-responsible mitigation, off-site and/or out-of-kind

(5) If a selected compensatory mitigation option deviates from the order of the options presented in §332.3(b)(2)-(6), explain why the selected compensatory mitigation option is environmentally preferable. Address the criteria provided in §332.3(a)(1) as follows:

a. *the likelihood for ecological success and sustainability:* The in-lieu fee is not environmentally preferable for the wetland impacts because impacts resulting from the project would not be offset for up to three years from the date the impacts occurred. This is because the in-lieu fee program has three years to replace wetland impacts (credits sold) within a given service area. Use of the Walls Mitigation Site to offset project impacts would result in no temporal loss of wetland function as would be associated with use of the in-lieu fee wetland mitigation program because this is an established mitigation site. Restoration of the Walls Mitigation Site began in 2008 with filling of an excavated pond and associated drainage ditches that were designed to dry out the site. In 2008 the site was plowed and a total of 4,600 trees were planted throughout the site. A fifth year monitoring report shows that the Walls Site has wetland hydrology and survival of planted trees exceeds 450 per acre. The ecological success of the site has been demonstrated over the last five years. The applicant would be responsible for the long term management of the site. Should the site fail, the applicant would be responsible to provide mitigation at another location.

   The streams would be created as a result of stream relocations. Since these are relocations of existing channels, site hydrology is known and established. These relocated streams are believed to be sustainable in the long term, because the existing streams currently exist along the road and do not appear to be impacted. They would be located within the TDOT right-of-way which would provide protection to the resources. The on-site stream relocations have been determined to be ecologically sustainable and successful.

b. *the location of the compensation site relative to the impact site and their significance within the watershed*: It is anticipated that aquatic resources such as the ones impacted by this project will continue to occur within the watershed. Replacing some of these resources back into the watershed would ensure that not all of the aquatic functions would be eliminated from the watershed over time. As a result, the Corps believes that the mitigation approach used for this project will be environmentally preferable.

The Walls site is 5.8 miles from the project impact site and is adjacent to a 303(d) listed stream, Crooked Fork, which is listed as impaired due to sedimentation and siltation; restoration of wetland vegetation and plugging of drainage ditches on the mitigation site should reduce sediment input from this parcel. The Walls Mitigation Site is located within the same 8 digit HUC (Emory River Basin 06010208) as the impacts. Mitigation would still be provided within the same watershed as the impact site.

The stream relocations have been determined to be appropriate mitigation because replacing the streams next to their current locations would ensure a portion of impacted streams and riparian corridors would not be removed from the HUC 12 watershed. These streams would provide aquatic habitat that would otherwise be removed if from the project limits if all the streams were mitigated for off-site.

c. *the costs of the compensatory mitigation project*: An in-lieu fee was not pursued by the applicant because Tennessee Department of Environment and Conservation (TDEC) would not allow TDOT to mitigate impacts in the in-lieu fee system. The cost of mitigation for wetland impacts would be doubled if TDEC requires mitigation at a different site than the Corps. It would make wetland mitigation requirements go from 3.72 acres to 7.44 acres of wetland in order to satisfy mitigation needs of both the state and federal agency.

If the streams were not relocated they would have to be placed into culverts to facilitate the construction of the road in addition to the purchase of credits from a mitigation bank. In addition to the additional cost of installing 1,492 additional feet of unnecessary culvert, the applicant would be required to perform long-term maintenance of the culverts for the life of the road.

(6) Other Mitigative Actions
(7) Special Conditions Required (include rationale for required conditions): In order to ensure that the project would result in no more than minimal individual and cumulative adverse environmental effects and would not be contrary to the public interest, mitigation, invasive plant management and monitoring special conditions would be required.

1. **Permit Drawings:** The work must be completed in accordance with the plans and information submitted in support of the proposed work, as attached (sheets 1 through 79, titled SR-29, PIN 101411.04).

2. **Fill Material**: The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, debris, asphalt, construction materials, concrete block with exposed reinforcement bars, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act.

3. **Erosion Control:** Prior to the initiation of any work authorized by this permit, the Permittee shall install

erosion control measures along the perimeter of all work areas to prevent the displacement of fill material outside the work area. Immediately after completion of the final grading of the land surface, all slopes, land surfaces, and filled areas shall be stabilized using sod, degradable mats, barriers, or a combination of similar stabilizing materials to prevent erosion. The erosion control measures shall remain in place and be maintained until all authorized work has been completed and the site has been stabilized.

4. **Acid Producing Rock:** During and post-construction, the Permittee shall follow the "Adaptive Management and APR Water Quality Monitoring Plan for SR-29 (US-27) From SR-61 Near Harriman in Roane County to South of Whetstone Road in Morgan County PIN 101411.04; Project No. 65001-3266-14, 73008-3243-14; and Adaptive Management and APR Water Quality Monitoring Plan for SR-29 (US-27) From South of Whetstone Road to North of SR-328 in Morgan County PIN 101411.05; Project No. 65001-3268-14".

5. **Temporary Stream Impacts:** Within 14days from the date of completing the authorized work the Permittee shall restore all temporary stream impacts to pre-existing contours, elevations, vegetation, habitat type, and hydrology.

6. **Temporary Wetland Impacts**: Within 14 days from the date of completing the authorized work the Permittee shall restore 0.13 acre of temporary wetland impacts (as detailed on Drawings 26, 27, 28, and, 41 of 71) to pre-existing contours, elevations, vegetation, habitat type, and hydrology. The following shall be monitored to ensure Temporary Wetland Impacts are restored:

a. Temporary Wetland Impacts: Wetland 6 and 8 - At the end of the monitoring period (5 years) the temporary wetland impact sites shall have a predominance of wetland vegetation and shall meet the definition of a wetland as outlined in the 1987 US Army Corps of Engineers Wetland Delineation Manual and the Eastern Mountains and Piedmont Region supplement (1987 Manual and Regional Supplement).

b. Reporting: Perform a year 1, year 3, and year 5 monitoring event of the temporary wetland impact areas. Post-construction monitoring reports shall include collecting data on the vegetation, soils, and indicators of wetland hydrology associated with wetlands 6 and 8 in accordance with the 1987 Manual and Regional Supplement. The reports shall be submitted at the same time as the stream compensatory mitigation reporting.

7. **In-Lieu Fee Credit Purchase:** a. In-Lieu Fee Program (ILF) Credit Purchase: Prior to impacting waters of the United States, the Permittee shall provide verification to the Corps that 4,052 federal ILF credits have been purchased from the Tennessee Stream Mitigation Program ILF (LRN-2011-00711). The required verification shall reference this project's permit number (LRN-2013-00712).

8. **Compensatory Mitigation:** a. The Permittee shall complete the relocations of streams 1, 7, 10, and 16 following the compensatory mitigation plan titled "Compensatory Mitigation and Monitoring Plan – SR-29" dated September 10, 2014. For the relocation of streams 1, 7, 10, and 16 the stream channel shall be constructed as detailed on attached Sheets 15-23, 31-33, 36-41, and 55-56 of 79.

b. The Permittee shall provide written documentation to this office from Mr. Lynn Bumgardner, WETT LLC, that you have purchased 3.72 acres of restored wetlands at the Walls Mitigation Site in Morgan County, Tennessee. You shall also provide a survey indicating the specific 3.72 acre portion of the Walls Mitigation site that is compensating for 1.86 acres of wetland impacts associated with this project. GPS coordinates, in NAD 83 Lat/Long format must be submitted showing the corners of the purchased area. This confirmation shall be provided prior to any wetland impacts associated with this permit. The Permittee

shall remain responsible for ensuring the 3.72-acre mitigation area complies with the approved compensatory mitigation plan.

9. **Performance Standards: Stream 1 and 10** - To meet the objectives of the approved compensatory mitigation plan, the Permittee shall achieve the following performance standards:

a. Vegetation: At the end of the monitoring period all stream planting areas shall have a minimum of 300 stems per acre. Native volunteer species can also be counted towards meeting the vegetative performance standard.

b. Cover of invasive exotic plant species, pursuant to the most current list established by Tennessee Exotic Pest Plant Council shall total less than 5 percent relative aerial coverage of the mitigation area and no contiguous areas greater than 200 square feet shall be vegetated with more than 50% relative aerial coverage of invasive species at the end of the 5-year monitoring period.

c. Channel stability shall be visually assessed and photo documented annually. The channel shall be stable and not actively eroding at the end of monitoring. A stable channel would not show evidence of significant bank erosion, head cutting, or other signs of instability. The Pfankuch stability rating for the stream channels shall be classified as "good" during each monitoring year.

d. Streams 1 and 10 shall have channel hydrology consistent with existing preconstruction conditions.

e. Bankfull events shall occur at a minimum of 2 of the 5 years of monitoring.

f. Stream 1 and 10 channel dimensions must fall within target ranges specified in the success criteria for each stream as shown in Appendix A of the Compensatory Mitigation and Monitoring Plan – SR-29, dated September 10, 2014.

g. The RBP (Rapid Bioassessment Protocols) habitat assessment score for the mitigation project by year 5 of monitoring must be greater than 75% of the regional habitat assessment guideline score as found in the 2011 TDEC standard operating procedure for macroinvertebrate stream surveys.

Streams 7 and 16 (*reduced monitoring requirement due to limited size of stream replacements (60' and 18'*)):

a. Vegetation: At the end of the monitoring period all stream planting areas shall have a minimum of 300 stems per acre. Native volunteer species can also be counted towards meeting the vegetative performance standard.

b. Cover of invasive exotic plant species, pursuant to the most current list established by Tennessee Exotic Pest Plant Council shall total less than 5 percent relative aerial coverage of the mitigation area and no contiguous areas greater than 200 square feet shall be vegetated with more than 50% relative aerial coverage of invasive species at the end of the 5-year monitoring period.

c. Channel stability shall be visually assessed and photo documented annually. The channel shall be stable and not actively eroding at the end of monitoring. A stable channel would not show evidence of significant bank erosion, head cutting, or other signs of instability. The Pfankuch stability rating for the stream channels shall be classified as "good" during each monitoring year.

d. Streams 7 and 16 shall have channel hydrology consistent with existing preconstruction conditions.

e. The RBP (Rapid Bioassessment Protocols) habitat assessment score for the mitigation project by year 5 of monitoring must be greater than 75% of the regional habitat assessment guideline score as found in the 2011 TDEC standard operating procedure for macroinvertebrate stream surveys.

Walls Mitigation Site:

a. Monitoring of the permittee responsible offsite mitigation at the Walls site shall be performed annually for a minimum of 2 years to ensure mitigation site success as referenced in the Compensatory Mitigation and Monitoring Plan, dated September 10, 2014. The final monitoring report to be prepared during the 2nd year of monitoring shall include a wetland delineation and a survey of the delineated area to determine wetland success and final acreage. The Permittee shall remain responsible for ensuring the 3.72-acre mitigation area complies with these monitoring requirements.

The Permittee shall achieve all performance standards by the end of the 5-year monitoring period. In the event that the above performance standards have not been achieved, the Permittee shall undertake adaptive management approved by the Corps in accordance with the **Adaptive Management** Special Condition of this permit.

10. **Monitoring and Reporting Timeframes:** To show compliance with the performance standards the Permittee shall complete the following:

a. Perform a time-zero monitoring event of the stream relocation areas. This information shall be provided to the Corps by October 31st of the year the mitigation work is completed, as identified in the **Compensatory Mitigation** Special Condition of this permit.

b. Submit the time-zero report to the Corps by October 31st of the year the monitoring event is completed. The report would include at least one paragraph depicting baseline conditions of the mitigation site(s) prior to initiation of the compensatory mitigation objectives and a detailed plan view drawing of all created, enhanced and/or restored mitigation areas.

c. Subsequent to completion of the compensatory mitigation, perform 5 years of annual monitoring.

d. Submit annual monitoring reports to the Corps by October 31st of each monitoring year.

e. Monitor the mitigation area(s) and submit annual monitoring reports to the Corps until released in accordance with the **Mitigation Release** Special Condition of this permit.

11. **Reporting Format:** Annual monitoring reports shall follow a 10-page maximum report format for assessing compensatory mitigation sites. The Permittee shall submit all documentation to the Corps on 8½-inch by 11-inch paper, and include the following:

a. Project Overview (1 Page):

(1) Department of the Army Permit Number

(2) Name and contact information of Permittee and consultant

(3) Name of party responsible for conducting the monitoring and the date(s) the inspection was conducted

(4) A brief paragraph describing the purpose of the approved project, acreage and type of aquatic resources impacted, and mitigation acreage and type of aquatic resources authorized to compensate for the aquatic impacts.

(5) Written description of the location, any identifiable landmarks of the compensatory mitigation project including information to locate the site perimeter(s), and coordinates of the mitigation site (expressed as latitude, longitudes, UTMs, state plane coordinate system, etc.).

(6) Dates compensatory mitigation commenced and/or was completed

(7) Short statement on whether the performance standards are being met

(8) Dates of any recent corrective or maintenance activities conducted since the previous report submission

(9) Specific recommendations for any additional corrective or remedial actions.

b. Requirements (1 page): List the monitoring requirements and performance standards, as specified in the approved mitigation plan and special conditions of this permit, and evaluate whether the compensatory mitigation project site is successfully achieving the approved performance standards or trending towards success. A table is a recommended option for comparing the performance standards to the conditions and status of the developing mitigation site.

c. Summary Data (maximum of 4 pages): Summary data should be provided to substantiate the success and/or potential challenges associated with the compensatory mitigation project. Photo documentation may be provided to support the findings and recommendations referenced in the monitoring report and to assist the Corps in assessing whether the compensatory mitigation project is meeting applicable performance standards for that monitoring period. Submitted photos should be formatted to print on a standard 8 ½" x 11" piece of paper, dated, and clearly labeled with the direction from which the photo was taken. The photo location points should also be identified on the appropriate maps. The summary data shall include the following:

(1) Planting survival data, invasive exotic plant relative aerial coverage, channel hydrology, visual assessment of channel stability, Pfankuch stability rating, stream channel morphological assessment (Streams 1 and 10), and RBP scores.

d. Maps and Plans (maximum of 3 pages): Maps shall be provided to show the location of the compensatory mitigation site relative to other landscape features, habitat types, locations of photographic reference points, transects, sampling data points, and/or other features pertinent to the mitigation plan. In addition, the submitted maps and plans should clearly delineate the mitigation site perimeter(s). Each map or diagram should be formatted to print on a standard 8 ½" x 11" piece of paper and include a legend and the location of any photos submitted for review. As-built plans may be included.

e. Conclusions (1 page): A general statement shall be included that describes the conditions of the compensatory mitigation project. If performance standards are not being met, a brief explanation of the difficulties and potential remedial actions proposed by the Permittee or sponsor, including a timetable, shall be provided. The Corps would ultimately determine if the mitigation site is successful for a given monitoring period.

12. **Adaptive Management:** If the compensatory mitigation fails to meet the performance standards 5 years after completion of the compensatory mitigation objectives, the compensatory mitigation would be deemed unsuccessful. Within 60 days of notification by the Corps that the compensatory mitigation is unsuccessful, the Permittee shall submit to the Corps an alternate compensatory mitigation proposal sufficient to create the functional lift required under this permit. The alternate compensatory mitigation proposal may be required to include additional mitigation to compensate for the stream function associated with the unsuccessful compensatory mitigation activities. Alternate compensatory mitigation may require the purchase of Mitigation Bank or In-Lieu Fee Program credits. The Corps reserves the right to fully evaluate, amend, and approve or reject the alternate compensatory mitigation proposal. Within 120 days of Corps approval, the Permittee would complete the alternate compensatory mitigation proposal.

13. **Mitigation Release:** The Permittee's responsibility to complete the required compensatory mitigation, as set forth in the **Compensatory Mitigation** Special Condition of this permit would not be considered fulfilled until mitigation success has been demonstrated and written verification has been provided by the Corps. A mitigation area which has been released would require no further monitoring or reporting by the Permittee; however the Permittee, Successors and subsequent Transferees remain perpetually responsible to ensure that the mitigation area(s) remain in a condition appropriate to offset the authorized impacts in accordance with General Condition 6 of this permit.

14. **Perpetual Conservation**: The Permittee shall maintain the areas referenced in the **Compensatory Mitigation** Special Condition in their natural state in perpetuity. The Permittee agrees that the only future utilization of these areas would be as a purely natural area and the following uses and/or activities would be prohibited except as required or authorized by this permit:

a. Construction or placing buildings, roads, signs, billboards or other advertising, utilities or other structures on or above the ground. Elevated boardwalks, hiking trails and camping areas would be permitted as long as they do not involve any of the other prohibited uses listed below:
b. Dumping or placing soil or other substance or material as landfill or dumping or placing of trash, waste or unsightly or offensive material.
c. Removal or destruction of trees, shrubs, or other vegetation.
d. Excavation, dredging or removal of loam, peat, gravel, soil, rock, or other material substance in such a manner as to affect the surface.
e. Surface use, except for purposes that permit the land or water area to remain predominantly in its natural condition.
f. Activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation.
g. Acts or uses detrimental to such retention of land or water areas.
h. Acts or uses detrimental to the preservation of the structural integrity or the physical appearance of sites or properties of historical, architectural, or cultural significance.

15. **Endangered Species Act**: The Section 7 Endangered Species Act effects determination for this project was based on the negative survey results for the Indiana bat and northern long-eared bat. If the project has not completed tree clearing by April 1, 2017, the Permittee is required to reinitiate consultation under Section 7 of the Endangered Species Act.

16. **Regulatory Agency Changes**: Should any other regulatory agency require changes to the work authorized or obligated by this permit, the Permittee is advised that a modification to this permit instrument is required prior to initiation of those changes. It is the Permittee's responsibility to request a modification

of this permit from the Nashville District Regulatory Office.

17. **Compliance Certification:** Upon completion of the authorized work, the Permittee shall sign the enclosed "compliance certification" and return it to our office. If you fail to comply with any of the conditions, this authorization may be modified, suspended, or revoked pursuant to 33 CFR 325.7.

9. General evaluation criteria under the public interest review. We considered the following within this document:

   a. The relative extent of the public and private need for the proposed structure or work. (e.g. Public benefits include employment opportunities and a potential increase in the local tax base. Private benefits include land use and economic return on the property; for transportation projects benefits include safety, capacity and congestion issues.) *Explain.* The road rehabilitation project would improve the overall safety of vehicle travel. The widen road and shoulders would help support current and future vehicle travel capacities.

   b. ☒There are no unresolved conflicts as to resource use. (☐ There are unresolved conflicts as to resource use. One or more of the alternative locations and methods described above are reasonable or practicable to accomplish the objectives of the proposed structure or work but are not being accepted by the applicant.) (☐ There are unresolved conflicts as to resource use however there are no practicable reasonable alternative locations and methods to accomplish the objective of the purposed work.)

   c. The extent and permanence of the beneficial and/or detrimental effects, which the proposed work is likely to have on the public, and private uses to which the area is suited. ☒Detrimental impacts are expected to be minimal although they would be permanent in the construction area. The beneficial effects associated with utilization of the property would be permanent. *Explain. The road currently exists through the project area. The widening of the road would allow traffic to move more safely and efficiently.*

10. Determinations.
   a. Public Hearing Request: ☒NA
   ☐ I have reviewed and evaluated the requests for a public hearing. There is sufficient information available to evaluate the proposed project; therefore, the requests for a public hearing are denied.
   ☐ I have reviewed and evaluated the requests for a public hearing. There is insufficient information available to evaluate the proposed project; therefore, the requests for a public hearing are granted. Date of hearing ; Information gathered at the public hearing:

   b. Section 176(c) of the Clean Air Act General Conformity Rule Review: The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit would not exceed de minimis levels of direct or

indirect emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons a conformity determination is not required for this permit action.

c. Relevant Presidential Executive Orders.

(1) EO 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians. ☒This action has no substantial direct effect on one or more Indian tribes. *Explain,if appropriate.*

(2) EO 11988, Floodplain Management. ☐Not in a floodplain. (☒Alternatives to location within the floodplain, minimization, and compensation of the effects were considered above.) *Explain,if appropriate.* As referenced in the June 2013 FHWA NEPA re-evaluation, TDOT and FHWA determined that the project was within the FEMA floodway, floodplain, or study area, within three locations (two locations on STR-1 and one location on STR-3). One area in which the roadway crosses over these stream STR-1 is in an "AE" flood zone. To address the flood zone at the crossing over STR-1, TDOT provided a letter to the local official and a "No-Rise" certification stating that "this project would not adversely impact the 100 year flood elevations, floodway elevations and floodway widths". The remaining two roadway crossings over Streams STR-1 and STR-3 are in a zone "A" FEMA designated flood plain but no detailed study has been done by FEMA. TDOT has conducted a study on the project area and determined that the project would not increase the pre-project flood elevations by more than one foot. The remainder of the project site is within an "X" flood zone (Attachment C). As stated by TDOT and FHWA, the design of the roadway system is in compliance with the floodplain management criteria set forth in the National Flood Insurance Regulations of Title 44 of the Code of Federal Regulations (CFR). It is also consistent with requirements of floodplain management guidelines for implementing Executive Order 11988 and Federal Highway Administration guidelines 23 CFR 650A.

(3) EO 12898, Environmental Justice. In accordance with Title III of the Civil Right Act of 1964 and Executive Order 12898, it has been determined that the project would not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin nor would it have a disproportionate effect on minority or low-income communities. Refer to the Environmental Assessment performed by FHWA in 2003, and updated in 2013 for additional information on environmental justice in relation to the proposed project.

(4) EO 13112, Invasive Species.
☐There were no invasive species issues involved.
☒The evaluation above included invasive species concerns in the analysis of impacts at the project site and associated compensatory mitigation projects.

☒Through special conditions, the permittee will be required to control the introduction and spread of exotic species.

(5) EO 13212 and 13302, Energy Supply and Availability. ☒The project was not one that will increase the production, transmission, or conservation of energy, or strengthen pipeline safety. (☐The review was expedited and/or other actions were taken to the extent permitted by law and regulation to accelerate completion of this energy-related (including pipeline safety) project while maintaining safety, public health, and environmental protections.)

b. Finding of No Significant Impact (FONSI). Having reviewed the information provided by the applicant and all interested parties and an assessment of the environmental impacts, I find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement will not be required.

c. Compliance with 404(b)(1) guidelines. ☐NA
Having completed the evaluation in paragraph 5, I have determined that the proposed discharge ☒complies/☐does not comply with the 404(b)(1) guidelines.

d. Public Interest Determination: I find that issuance of a Department of the Army permit ☒ is not/☐is contrary to the public interest.

CELRB-R (Application LRN-2013-00712)
SUBJECT: Department of the Army Environmental Assessment and Statement of Findings for the Above-Numbered Permit Application

Prepared By: _____ Date: 10·9·2014
Joshua Frost, Project Manager

Reviewed By: _____ Date: 9 Oct 2014
Eric Reusch
Chief, Eastern Regulatory Section

7. In view of the above findings, I have decided to issue a Department of the Army permit for this work and to include where appropriate certain conditions which will safeguard the environment. This decision is not contrary to any state or local decisions as specified in 33 CFR 320.4(j)(2) and (4). Special Conditions to which the project will be subject are attached to this document.

Approved By: _____ Date: 9 Oct 2014
for Tammy Turley
Branch Chief, Regulatory Branch

Attachment A. Jurisdictional Determination

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): 11-Jul-14

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:
TDOT
505 Deadrick Street, Suite 900
JK Polk Bdg
Nashville, TN 37243

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:
Nashville District, File Name: LRN-2014-00239 TDOT SR 29 PIN 101411.05

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: Unnamed Tributaries and Wetlands of Bitter Creek Mile 1.7, Little Emory River Mile 4.5L, Emory River Mile 5.1L, Morgan County, Tennessee (SR-29; PIN 101411.05)
(SEE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES)
State: TN County/parish/borough: Morgan City: Oliver Springs
Center coordinates of site (lat/long in degree decimal format):
Lat. 36.0098° **N**, Long. -84.5177° **W**.
Universal Transverse Mercator: NAD83
Name of nearest waterbody: Bitter Creek
Identify (estimate) amount of waters in the review area:
Non-wetland waters: linear feet: width (ft) and/or acres.
Cowardin Class:
Stream Flow:
Wetlands:
Cowardin Class:

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal: N/A
Non-Tidal: N/A

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: 11-Jul-14
☒ Field Determination. Date(s): 25-Nov-13

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.
This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

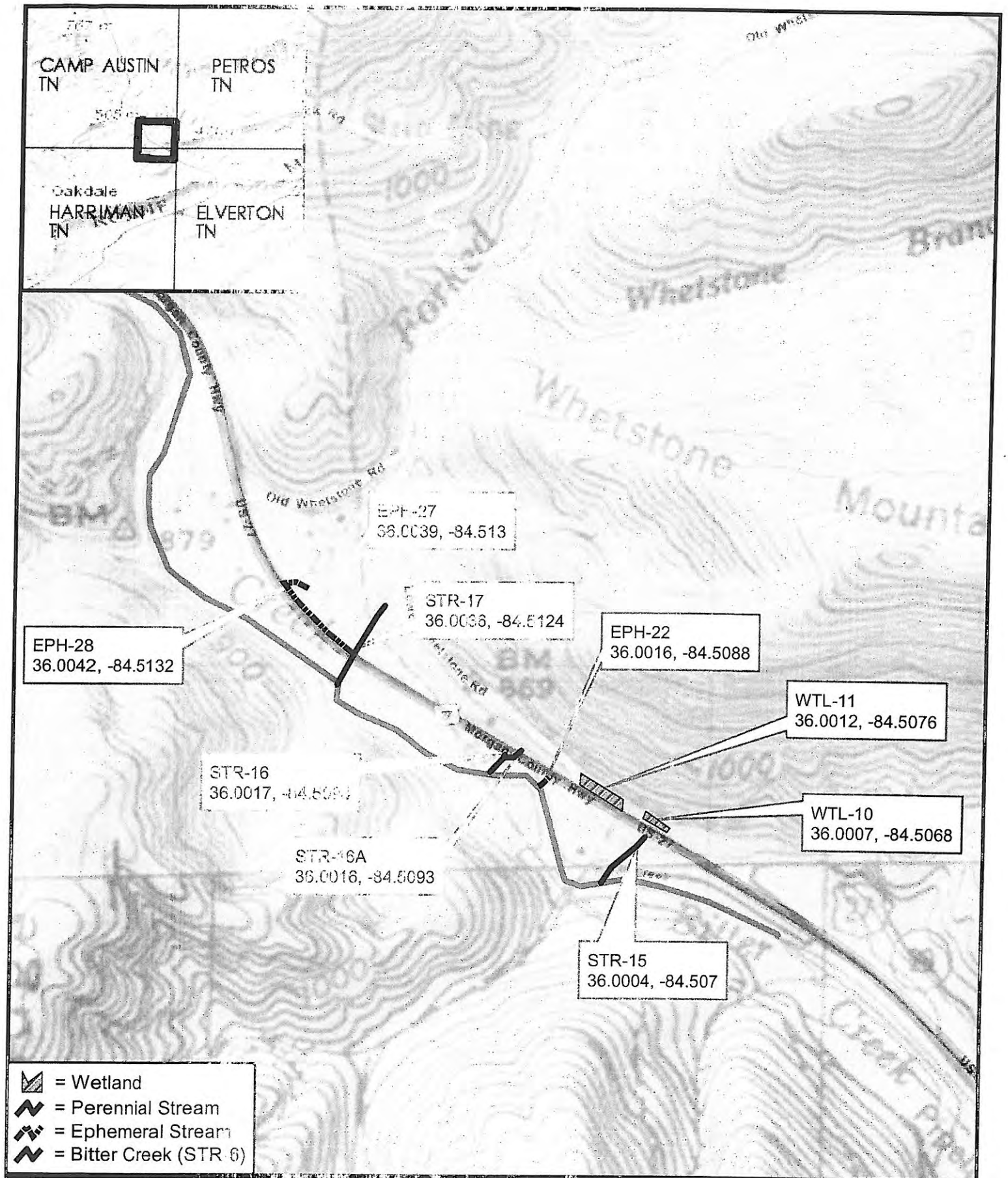
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Delineation/ Survey received 20-Nov-13 & 11-Mar-13.
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  ☒ Office concurs with data sheets/delineation report.
  ☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☒ Corps navigable waters' study: Bitter Creek is a 2nd order tributary to Emory River, a Navigable waters as listed in Nashville District Public Notice #86-23, dated 8 May 1986 .
☒ U.S. Geological Survey Hydrologic Atlas: .
  ☐ USGS NHD data.
  ☒ USGS 8 and 12 digit HUC maps. 60102080405, Little Emory River
☒ U.S. Geological Survey map(s). Cite scale & quad name: Camp Austin 1:24,000
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/ accessed [11-Jul-2014].
☐ National wetlands inventory map(s). Cite name:.
☐ State/Local wetland inventory map(s):.
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):NAIP 1m 2012.
  or ☒ Other (Name & Date): Taken by TDOT March 2013
☐ Previous determination(s). File no. and date of response letter:.
☐ Other information (please specify):.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Eric G Reusch
Chief, Eastern Regulatory Section

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining the
signature is impracticable)

Site number	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
WTL-11	36.0012	-84.5076	PEM	0.075 a	404- Wetland
ESTR-22	36.0016	-84.5088	Ephemeral	110'	404- Stream
STR-16	36.0017	-84.5093	Perennial	118'	404- Stream
STR-16A	36.0016	-84.5083	Intermittent	36'	404- Stream
STR-17	36.0036	-84.5124	Perennial	290'	404- Stream
ESTR-27	36.0039	-84.513	Ephemeral	1280'	404- Stream
ESTR-28	36.0042	-84.5132	Ephemeral	155'	404- Stream
STR-6 (Bitter Creek)	36.01	-84.5188	Perennial	5280'	404- Stream
STR-18 (SPR-3)	36.012	-84.522	Intermittent	35'	404- Stream
STR-19	36.013	-84.5214	Perennial	571'	404- Stream
WTL-12	36.0132	-84.5225	PSS	0.18 a	404- Wetland
ESTR-36	36.0133	-84.5228	Ephemeral	566'	404- Stream
ESTR-37	36.0139	-84.5235	Ephemeral	418'	404- Stream
ESTR-37A	36.0146	-84.5244	Ephemeral	306'	404- Stream
WTL-13	36.0141	-84.5238	PFO	0.251 a	404- Wetland
STR-23	36.0157	-84.5266	Perennial	291'	404- Wetland
ESTR-39	36.0157	-84.526	Ephemeral	153'	404- Stream
STR-20 (Muddy Branch)	36.0174	-84.5268	Perennial	268'	404- Stream
STR-21	36.0181	-84.5265	Perennial	580'	404- Stream
WTL-14	36.019	-84.5267	PSS	0.33 a	404- Wetland
STR-22	36.0191	-84.5266	Intermittent	574'	404- Stream

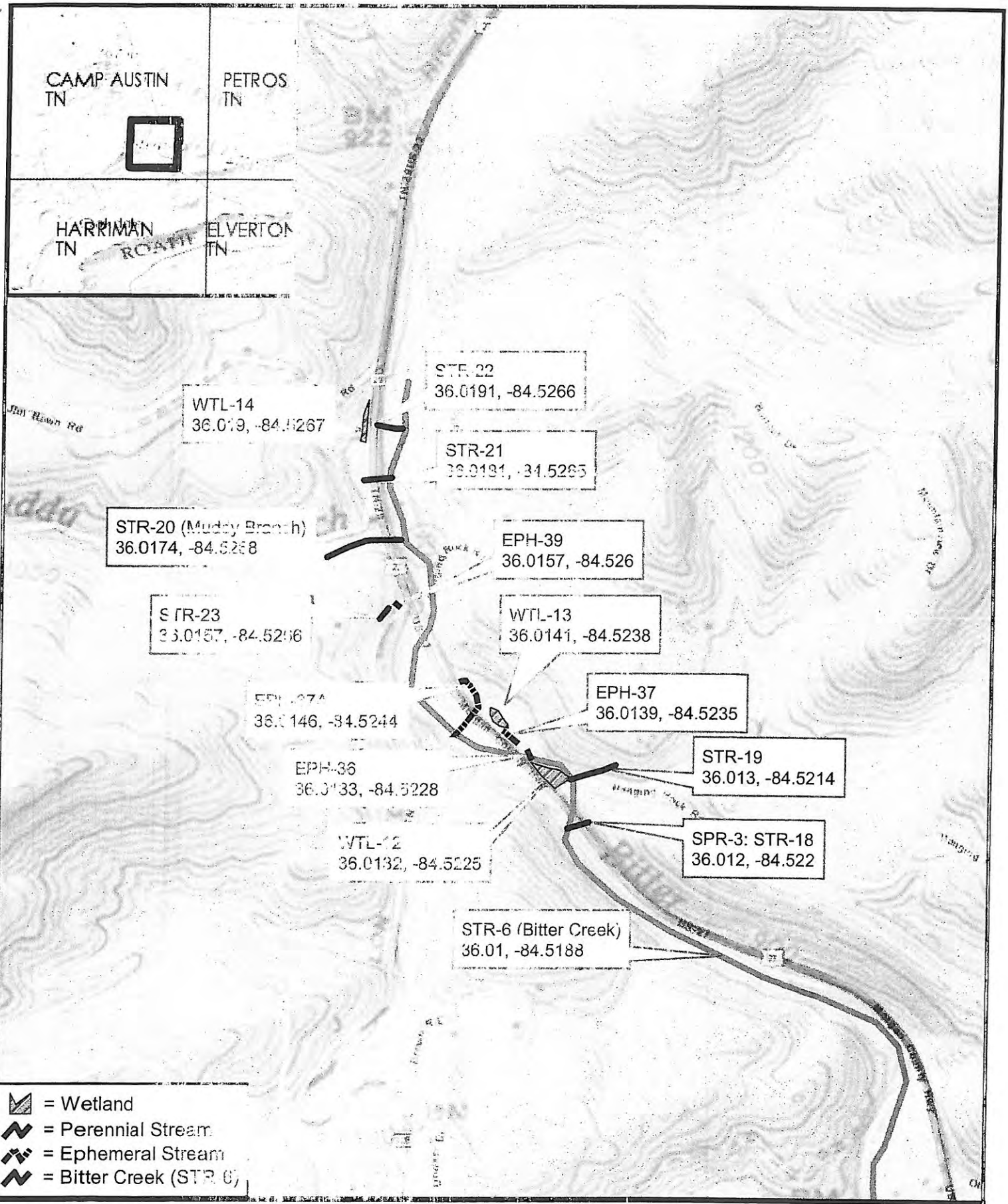


LRN-2014-00239
TDOT SR-29
PIN 101411.05
Tributaries and Wetlands of Bitter Creek Mile 1.7, Little Emory River Mile 4.5L, Emory River Mile 5.1L

0 220 440 660 880 Feet

N

US Army Corps of Engineers
Nashville District



LRN-2014-00239
TDOT SR-29
PIN 101411.05
Tributaries and Wetlands of Bitter Creek Mile 1.7, Little Emory River Mile 4.5L, Emory River Mile 5.1L

0 270 540 810 1,080 Feet

N

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Nashville District

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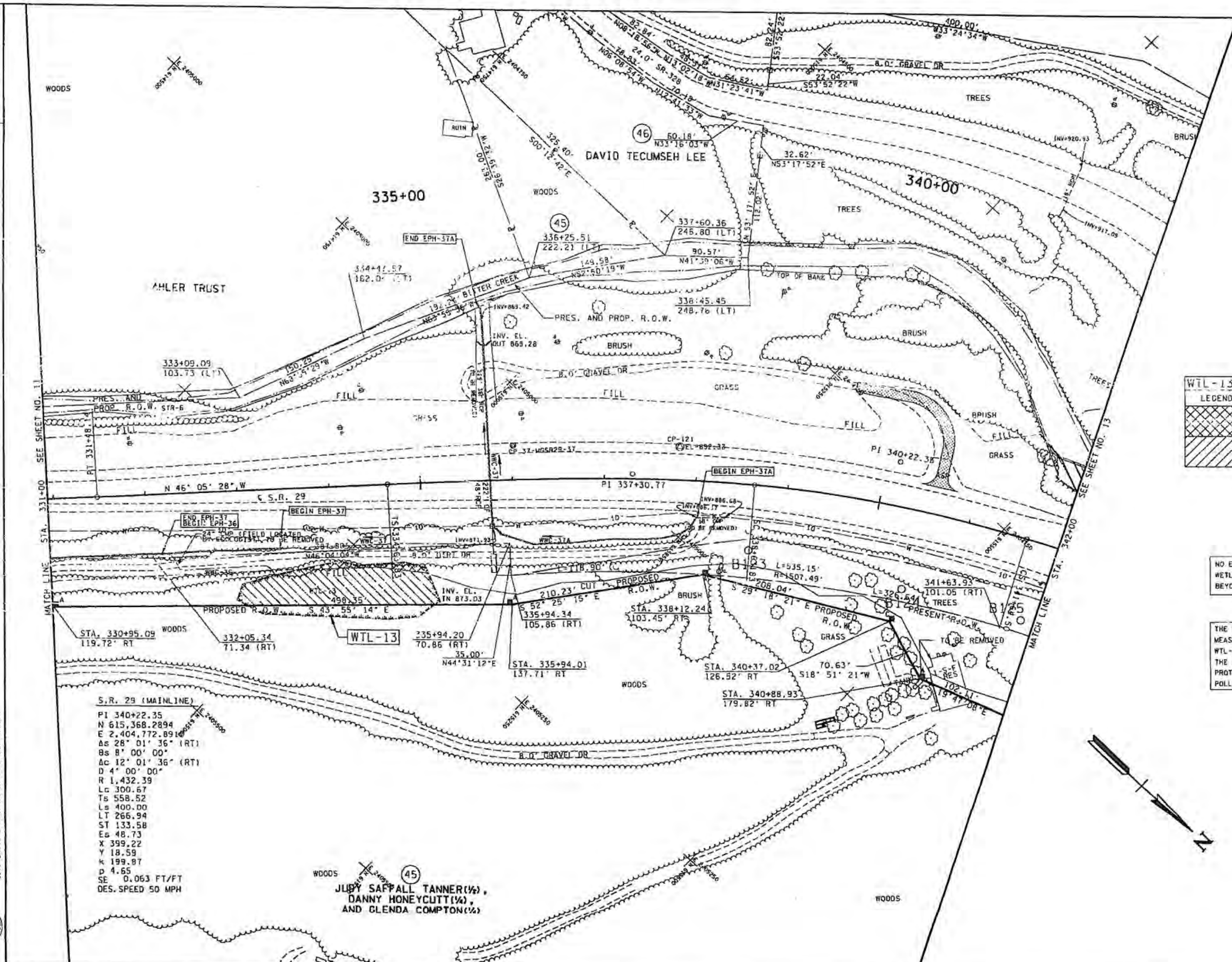
TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	25
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2014	NH-29(86)	12

06/18/2010: REVISED PRESENT ROW LINE AND PROPERTY LINES FOR TRACTS 45 & 46 LEFT OF STA 338+45.45 TO 342+00 AND REVISED OWNER NAME FOR TRACT 45.



WTL-13 STA 333+00 TO 335+14	
LEGEND	WETLAND IMPACTS
(cross-hatch)	AREA OF PERMANENT IMPACT = 0.017 AC.
(cross-hatch)	VOLUME OF PERMANENT IMPACT = 28 C.Y.
(hatch)	AREA OF TEMPORARY IMPACT = 0.18 AC.
(hatch)	VOLUME OF TEMPORARY IMPACT = 289 C.Y.

NO EQUIPMENT IS TO BE OPERATED IN WETLAND AREAS AND STREAMS LOCATED BEYOND THE PERMITTED LIMITS.

THE CONTRACTOR SHALL USE ANY MEASURE NECESSARY TO ENSURE THAT WTL-13 WILL NOT BE DISTURBED BEYOND THE LIMITS OF DISTURBANCE AND IS PROTECTED FROM SEDIMENT AND OTHER POLLUTANTS.

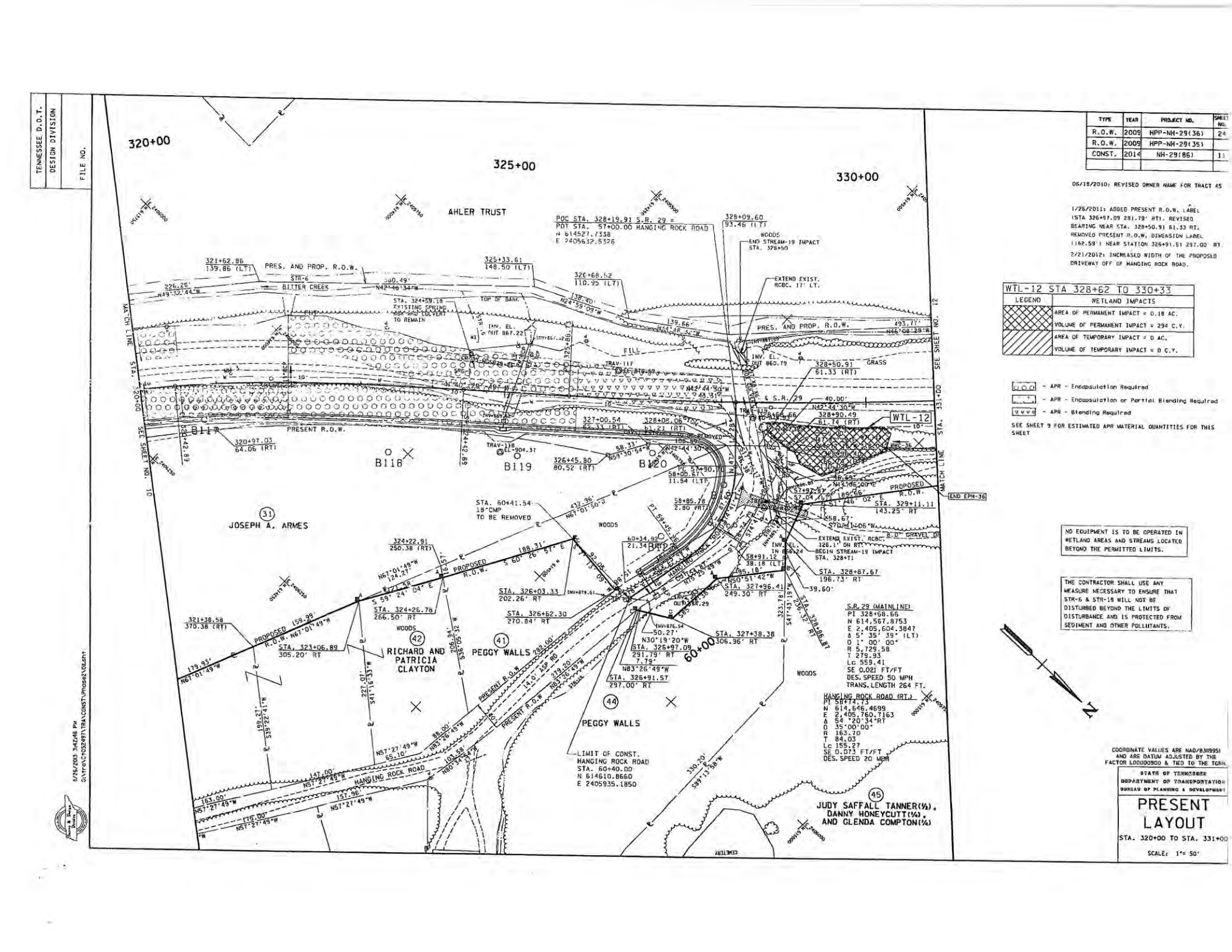
COORDINATE VALUES ARE NAD/83(1995) AND ARE DATUM ADJUSTED BY THE FACTOR 1.00000900 & TIED TO THE TGRN.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

PRESENT LAYOUT

STA. 331+00 TO STA. 342+00

SCALE: 1"= 50'



TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	24
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2014	NH-29(86)	11

05/18/2010: REVISED OWNER NAME FOR TRACT 45

1/26/2011: ADDED PRESENT R.O.W. LABEL (STA 326+97.09 281.79' RT). REVISED BEARING NEAR STA. 328+50.91 61.33 RT. REMOVED PRESENT R.O.W. DIMENSION LABEL (182.59') NEAR STATION 326+91.51 297.00' RT

2/21/2012: INCREASED WIDTH OF THE PROPOSED DRIVEWAY OFF OF HANGING ROCK ROAD.

WTL-12 STA 328+62 TO 330+33	
LEGEND	WETLAND IMPACTS
	AREA OF PERMANENT IMPACT = 0.18 AC.
	VOLUME OF PERMANENT IMPACT = 294 C.Y.
	AREA OF TEMPORARY IMPACT = 0 AC.
	VOLUME OF TEMPORARY IMPACT = 0 C.Y.

- APR - Encapsulation Required
- APR - Encapsulation or Partial Blending Required
- APR - Blending Required

SEE SHEET 9 FOR ESTIMATED APR MATERIAL QUANTITIES FOR THIS SHEET

NO EQUIPMENT IS TO BE OPERATED IN WETLAND AREAS AND STREAMS LOCATED BEYOND THE PERMITTED LIMITS.

THE CONTRACTOR SHALL USE ANY MEASURE NECESSARY TO ENSURE THAT STR-5 & STR-19 WILL NOT BE DISTURBED BEYOND THE LIMITS OF DISTURBANCE AND IS PROTECTED FROM SEDIMENT AND OTHER POLLUTANTS.

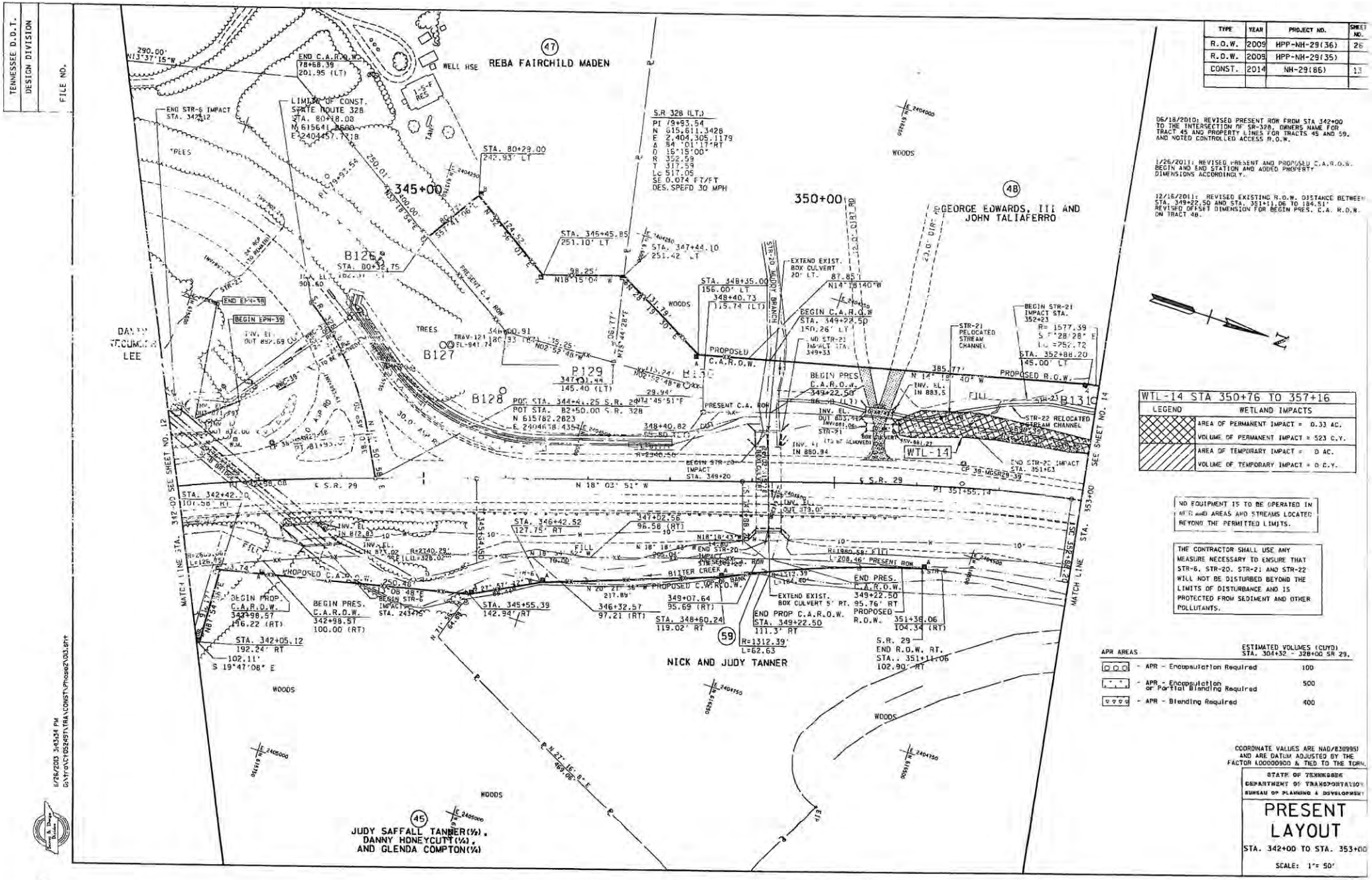
COORDINATE VALUES ARE NAD/83(1995) AND ARE DATUM ADJUSTED BY THE FACTOR 1.000000900 & TIED TO THE TCRN.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

PRESENT LAYOUT

STA. 320+00 TO STA. 331+00

SCALE: 1"= 50'

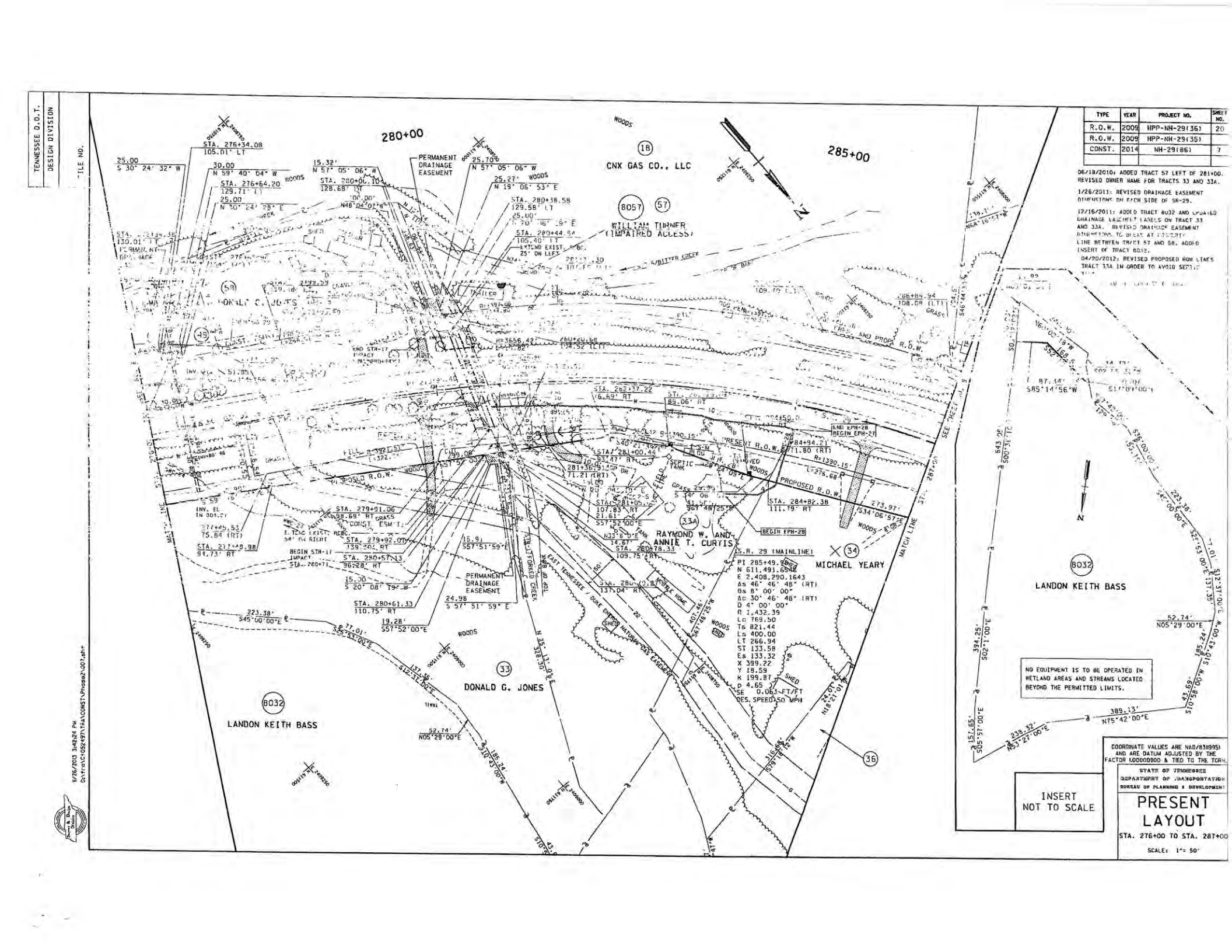


TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	26
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2014	NH-29(86)	13

06/18/2010: REVISED PRESENT ROW FROM STA 342+00 TO THE INTERSECTION OF SR-328, OWNERS NAME FOR TRACT 45 AND PROPERTY LINES FOR TRACTS 45 AND 59, AND NOTED CONTROLLED ACCESS R.O.W.

1/26/2011: REVISED PRESENT AND PROPOSED C.A.R.O.W. BEGIN AND END STATION AND ADDED PROPERTY DIMENSIONS ACCORDINGLY.

12/16/2011: REVISED EXISTING R.O.W. DISTANCE BETWEEN STA. 349+22.50 AND STA. 351+11.06 TO 184.51' REVISED OFFSET DIMENSION FOR BEGIN PRES. C.A. R.O.W. ON TRACT 48.



TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	20
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2014	NH-29(86)	7

06/18/2010: ADDED TRACT 57 LEFT OF 281+00. REVISED OWNER NAME FOR TRACTS 33 AND 33A.

1/26/2011: REVISED DRAINAGE EASEMENT DIMENSIONS ON EACH SIDE OF SR-29.

12/16/2011: ADDED TRACT 8032 AND UPDATED DRAINAGE EASEMENT LABELS ON TRACT 33 AND 33A. REVISED DRAINAGE EASEMENT DIMENSIONS TO BASE AT PROPERTY LINE BETWEEN TRACT 57 AND 58. ADDED INSERT OF TRACT 8032.

04/20/2012: REVISED PROPOSED ROW LINES TRACT 33A IN ORDER TO AVOID SEPTIC

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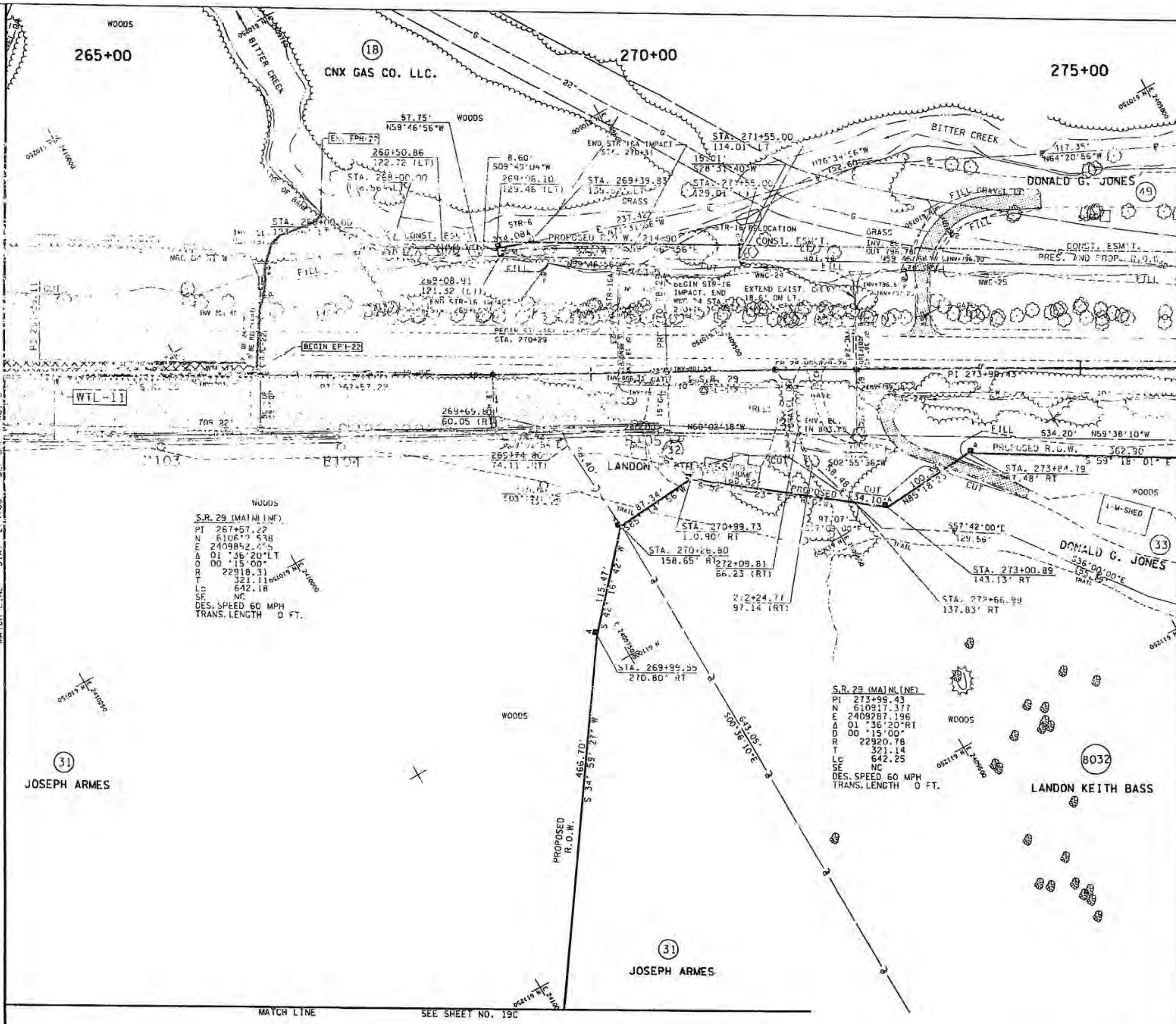


TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	19
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2014	NH-29(86)	6

06/18/2010: REVISED OWNER NAME FOR TRACT 33.

1/26/2011: ADDED BEARING AND DISTANCE LABEL FOR PRESENT AND PROPOSED R.O.W. FROM STA. 269+08.91 121.32 (LT) TO STA. 277+15.55 104.28 (LT)

12/16/2011: REVISED PROPERTY LINES ON TRACT 32 AND ADDED TRACT 8032.

- APR - Encapsulation Required
- APR - Encapsulation or Partial Blending Required
- APR - Blending Required

SEE SHEET 3 FOR ESTIMATED APR MATERIAL QUANTITIES FOR THIS SHEET

WTL-11 STA 262+11 TO 26[illegible]

LEGEND	WETLAND IMPACTS
(cross-hatch)	AREA OF PERMANENT IMPACT = 0.17 AC.
(cross-hatch)	VOLUME OF PERMANENT IMPACT = 276 C.Y.
(hatch)	AREA OF TEMPORARY IMPACT = 0 AC.
(hatch)	VOLUME OF TEMPORARY IMPACT = [illegible]

THE CONTRACTOR SHALL USE ANY MEASURE NECESSARY TO ENSURE THAT STR-6 AND STR-16 WILL NOT BE DISTURBED BEYOND THE LIMITS OF DISTURBANCE AND IS PROTECTED FROM SEDIMENT AND OTHER POLLUTANTS.

NO EQUIPMENT IS TO BE OPERATED IN WETLAND AREAS AND STREAMS LOCATED BEYOND THE PERMITTED LIMITS.

N

COORDINATE VALUES ARE NAD/83(1995) AND ARE DATUM ADJUSTED BY THE FACTOR 1.00000900 & TIED TO THE TGRN.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

PRESENT LAYOUT

STA. 264+00 TO STA. 276+00

SCALE: 1" = 50'

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): February 21, 2014

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:
Tennessee Department of Transportation
505 Deaderick Street
Suite 900 J.K. Polk Bldg.
Nashville, TN 37243

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:
Nashville, TDOT PIN 101411.04 SR-29, 2013-00712

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
The area of investigation is located along the existing alignment of SR-29, from SR-61 intersection north in Roane County near Harriman, Tennessee, extending to Whetstone Road in Morgan County.

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: TN County/parish/borough: Roane County City: Harriman
Center coordinates of site (lat/long in degree decimal format):
35.98542 N Lat., -84.48220W Long.
Universal Transverse Mercator: NAD 83
Name of nearest waterbody: Little Emory River

Identify (estimate) amount of waters in the review area:
Non-wetland waters: 19,975 linear feet
Cowardin Class: Riverine
Stream Flow: Ephemeral, Intermittent, and Perennial.
Wetlands: 2.508 acres.
Cowardin Class: PEM, PSS, and PFO.

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal:
Non-Tidal:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date :
☒ **Field Determination. Date(s): 1-16-2014**

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Wetland delineation report dated September 15, 2008.

☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

☒ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report.

☐ Data sheets prepared by the Corps: .

☐ Corps navigable waters' study: .

☐ U.S. Geological Survey Hydrologic Atlas: .

☐ USGS NHD data.

☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite scale & quad name: USGS 7.5 minute topographical map. Elverton Quadrangle.

☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.

☒ National wetlands inventory map(s). Cite name:U.S. Fish and Wildlife Service. National Wetlands Inventory http://www.fws.gov/wetlands/Data/Mapper.html

☐ State/Local wetland inventory map(s): .

☐ FEMA/FIRM maps: .

☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)

☒ Photographs: ☒ Aerial (Name & Date): 2004-2005 orthoimagery, available on ORM2, 2008 U.S. Geological Survey.

or ☒ Other: Field Photos submitted with permit application.

Previous determination(s). File no. and date of response letter: .

☐ Other information (please specify): .

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

7/29/14

Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining
the signature is impracticable)

Resource Name	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
STR-1	R4	3,141 LF 18,846 SF	Section 404
STR-2	R4	77 LF 192.5 SF	Section 404
STR-3	R3	2720 LF 121,395 SF	Section 404
STR-4	R5	359 LF 897.5 SF	Section 404
STR-5	R4	384 LF 2,496 SF	Section 404
STR-6	R3	3900 LF 95,563 SF	Section 404
STR-6A	R4	385 LF 577.5 SF	Section 404
STR-7	R5	391 LF 586.5 SF	Section 404
STR-8	R4	286 LF 429 SF	Section 404
STR-9	R4	618 LF 2,163 SF	Section 404
STR-10	R4	846 LF 3,384 SF	Section 404
STR-11	R4	507 LF 1,774.5 SF	Section 404
STR-12	R4	740 LF 1,295 SF	Section 404
STR-13	R4	393 LF 1,179 SF	Section 404
STR-13A	R4	160 LF 400 SF	Section 404
STR-14	R4	727 LF 1,454 SF	Section 404
STR-14A	R4	1,066 LF 4,264 SF	Section 404
STR-15	R4	178 LF 267 SF	Section 404
EPH-6	R6	186 LF 744 SF	Section 404
EPH-7	R6	28 LF 98 SF	Section 404

EPH-8	R6	33 LF 115.5 SF	Section 404
EPH-9	R6	380 LF 950 SF	Section 404
EPH-10	R6	103 LF 154.5 SF	Section 404
EPH-12	R6	1251 LF 5,004 SF	Section 404
EPH-15	R6	441 LF 661.5 SF	Section 404
EPH-21	R6	386 LF 772 SF	Section 404
WTL-1	PFO	0.030 AC	Section 404
WTL-2	PFO	0.300 AC	Section 404
WTL-3	PSS	0.070 AC	Section 404
WTL-4	PFO/PSS	0.230 AC	Section 404
WTL-5	PSS	0.100 AC	Section 404
WTL-6	PFO/PEM	0.400 AC	Section 404
WTL-6A	PEM	0.100 AC	Section 404
WTL-7	PSS/PEM	0.067 AC	Section 404
WTL-8	PFO	0.197 AC	Section 404
WTL-9	PFO	0.870 AC	Section 404
WTL-10	PEM	0.069 AC	Section 404
WTL-11	PEM	0.075 AC	Section 404
Linear surface water feature (LSWF)	-	467 LF 1,401 SF	Section 404

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

FOR INDEX SEE SHEET IA

TENN.	YEAR	SHEET NO.
	2013	1
ROANE COUNTY FED. AID PROJ. NO.	NH-29(84)	
ROANE COUNTY STATE PROJ. NO.	73008-3243-14	
MORGAN COUNTY FED. AID PROJ. NO.	NH-29(84)	
MORGAN COUNTY STATE PROJ. NO.	65001-3266-14	

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

ROANE / MORGAN COUNTIES

STATE ROUTE 29 (US-27)
FROM STATE ROUTE 61 NEAR HARRIMAN IN ROANE COUNTY TO
SOUTH OF WHETSTONE ROAD IN MORGAN COUNTY
ROANE AND MORGAN COUNTIES

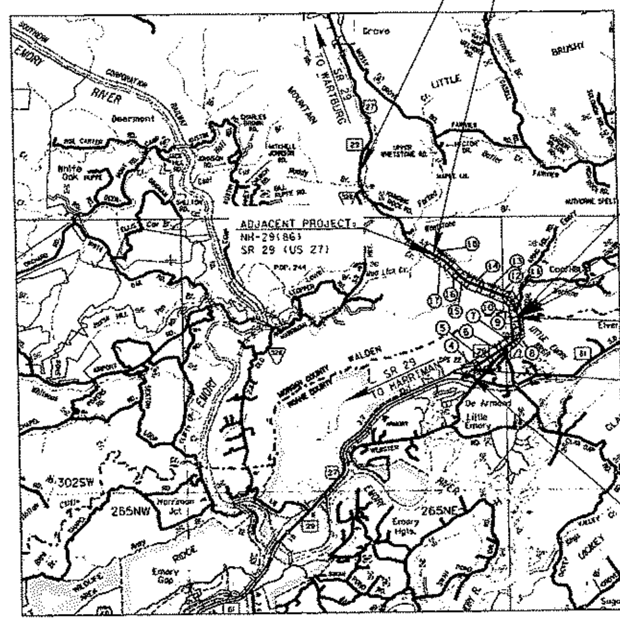
CONSTRUCTION

STATE HIGHWAY NO. 29 F.A.H.S. NO. 29

ROANE COUNTY PROJECT NO. 73008-3243-14
MORGAN COUNTY PROJECT NO. 65001-3266-14

END RIGHT-OF-WAY FEDERAL PROJECT
NO. HPP-NH-29(35)
STATE PROJECT NO. 65001-2257-14
PIN 101411.01
STA. 357+48.09 S.R. 29

END CONSTRUCTION FEDERAL PROJECT
NO. NH-29(84)
STATE PROJECT NO. 65001-3266-14
STA. 259+00.00 S.R. 29



SCALE: 1" = 1 MILE

EQUATION	
DESCRIPTION	NET EFFECT ON ENUMERATION
STA. 22+61.84 BK. = STA. 100+00.00 AH.	-7738.16
STA. 155+20.64 BK. = STA. 155+25.45 AH.	-4.81
TOTAL	-7742.97

BEGIN CONSTRUCTION FEDERAL PROJECT
NO. NH-29(84)
STATE PROJECT NO. 65001-3266-14
STA. 162+71.46 S.R. 29

BEGIN RIGHT-OF-WAY FEDERAL PROJECT
NO. HPP-NH-29(35)
STATE PROJECT NO. 65001-2257-14
PIN 101411.01
STA. 162+35.01 S.R. 29

END RIGHT-OF-WAY FEDERAL PROJECT
NO. HPP-NH-29(36)
STATE PROJECT NO. 73008-2238-14
PIN 101411.01
STA. 162+35.01 S.R. 29

END CONSTRUCTION FEDERAL PROJECT
NO. NH-29(84)
STATE PROJECT NO. 73008-3243-14
STA. 162+71.46 S.R. 29

BEGIN RIGHT-OF-WAY FEDERAL PROJECT
NO. HPP-NH-29(36)
STATE PROJECT NO. 73008-2238-14
PIN 101411.01
STA. 17+41.77 S.R. 29 RAMP B

NO EXCEPTION
NO EXCLUSION

BEGIN CONSTRUCTION FEDERAL PROJECT
NO. NH-29(84)
STATE PROJECT NO. 73008-3243-14
STA. 10+00.00 S.R. 29 RAMP B

ESTIMATED LIMITS OF FIELD INVESTIGATION
STREAM
WWC
EPHEMERAL STREAM
LINEAR SURFACE WATER FEATURE

APPROVED: PAUL D. DEGGES, CHIEF ENGINEER
DATE:
APPROVED: JOHN SCHROER, COMMISSIONER

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED MARCH 1, 2006 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT

TDOT TRANSPORTATION MANAGER FREDERICK MILLER, P.E.
DESIGNED BY ARCADIS U.S.
DESIGNER CLINT BUTLER, P.E. CHECKED BY CHARLES WRIGHT, P.E.
P.E. NO. 65001-1256-14, 73008-1237-14
PIN 101411.04

g:\tro\ct052497\tro\const\phase\TKL_29.dgn
6/13/2013 10:15:13 AM

ARCADIS
Infrastructure · Water · Environment · Buildings

CONSTRUCTION PROJECT LENGTH

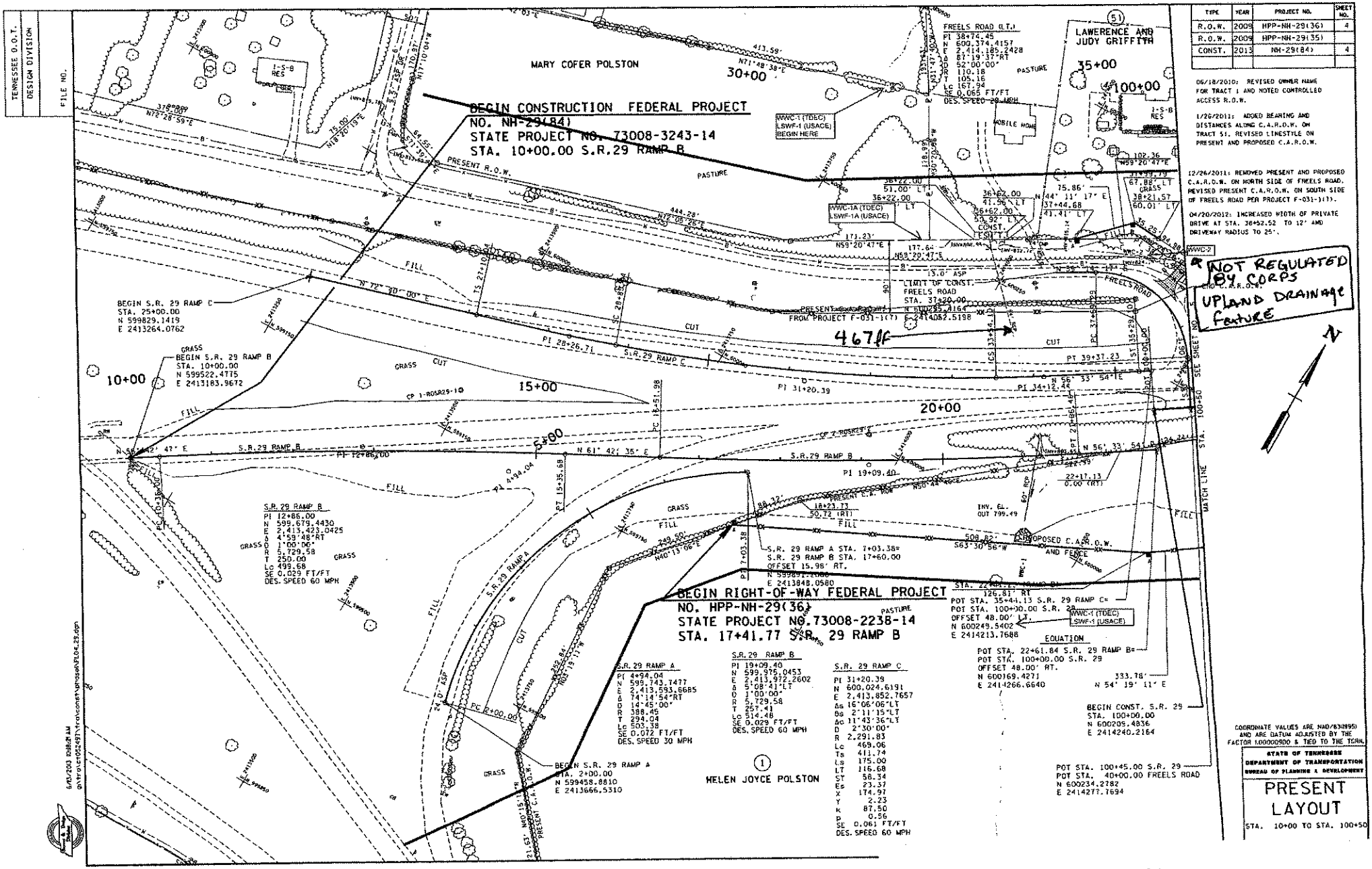
ROANE ROADWAY LENGTH	1.250 MILES	MORGAN ROADWAY LENGTH	1.718 MILES
ROANE BRIDGE LENGTH	0.037 MILES	MORGAN BRIDGE LENGTH	0.106 MILES
ROANE BOX BRIDGE LENGTH	0.000 MILES	MORGAN BOX BRIDGE LENGTH	0.000 MILES
ROANE PROJECT LENGTH	1.290 MILES	MORGAN PROJECT LENGTH	1.824 MILES

TOTAL PROJECT LENGTH 3.114 MILES

TRAFFIC DATA	
ADT (2013)	4,270
ADT (2033)	5,130
DHV (2033)	564
D	65 - 35
T (ADT)	6 %
T (DHV)	4 %
V	60 mph

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED:
DIVISION ADMINISTRATOR DATE

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN
Sheet 1 of 17



TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	4
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2013	NH-29(84)	4

06/18/2010: REVISED OWNER NAME FOR TRACT 1 AND NOTED CONTROLLED ACCESS R.O.W.

1/26/2011: ADDED BEARING AND DISTANCES ALONG C.A.R.O.W. ON TRACT 51. REVISED LINESTYLE ON PRESENT AND PROPOSED C.A.R.O.W.

12/26/2011: REMOVED PRESENT AND PROPOSED C.A.R.O.W. ON NORTH SIDE OF FREELS ROAD. REVISED PRESENT C.A.R.O.W. ON SOUTH SIDE OF FREELS ROAD PER PROJECT F-031-1(7).

04/20/2012: INCREASED WIDTH OF PRIVATE DRIVE AT STA. 38+52.52 TO 12' AND DRIVEWAY RADIUS TO 25'.

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN
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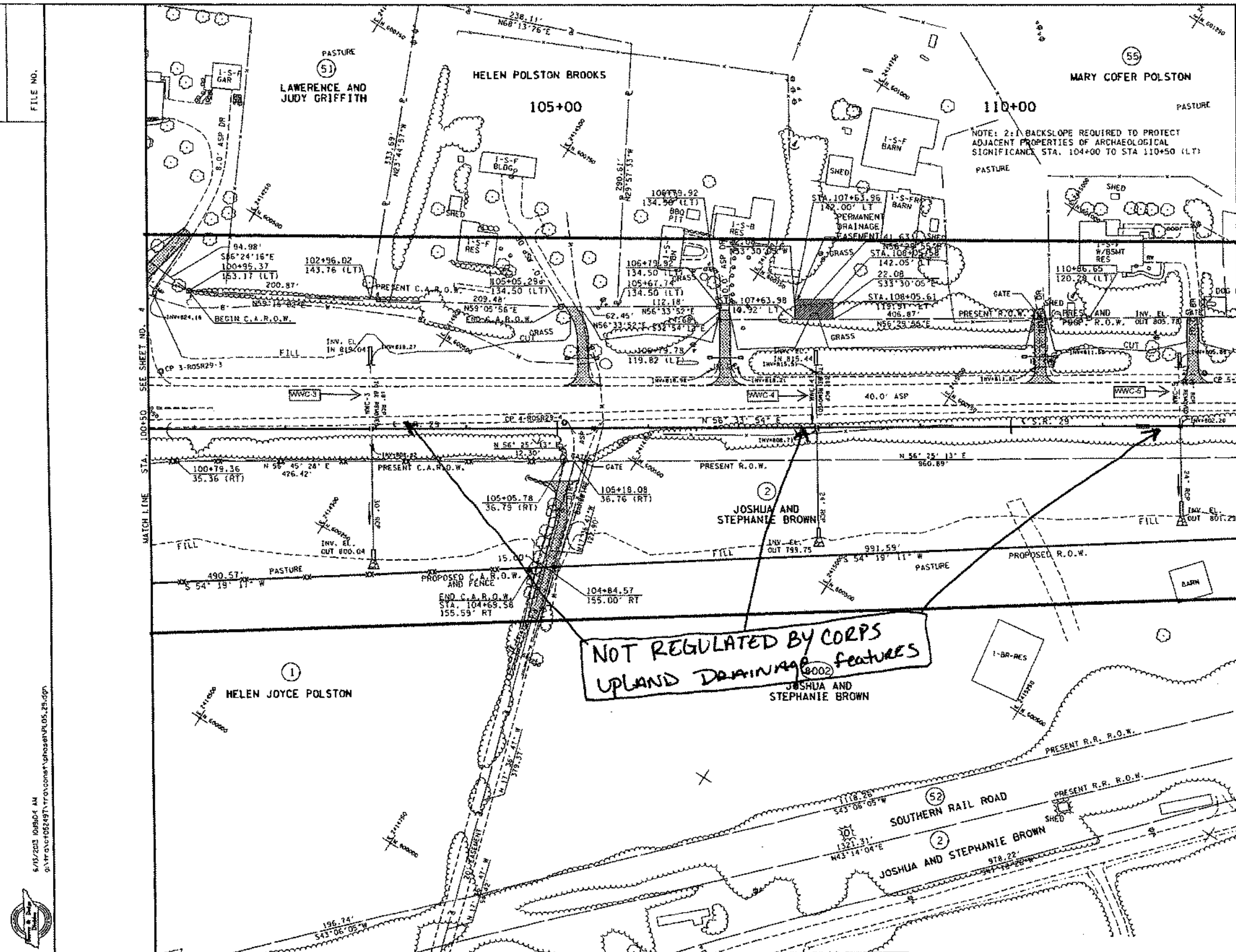
TENNESSEE D.O.T.
DESIGN DIVISION

FILE NO.



TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	5
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2013	NH-29(84)	5

06/18/2010: REVISED OWNER NAME FOR TRACTS 1 & 2. RELOCATED PROPERTY LINE BETWEEN TRACTS 1 & 2. ADDED CONST EASEMENT AROUND STRUCTURE ON TRACT 2 AND ADDED CONTROLLED ACCESS R.O.W.

1/26/2011: REVISED LINESTYLE ON PRESENT AND PROPOSED C.A.R.O.W.

12/16/2011: ADDED TRACT 8002. REVISED DISTANCE ALONG PROPERTY LINE BETWEEN TRACTS 1 & 8002. REMOVED 2 BAR CONNECTING TRACT 2 ACROSS RAILROAD AND DISTANCE ALONG TRACT 2 BETWEEN TRACTS 1 & 3.

04/20/2012: INCREASED WIDTH OF PRIVATE DRIVE AT STA. 38+52.52 TO 12' AND DRIVEWAY RADIUS TO 25'.

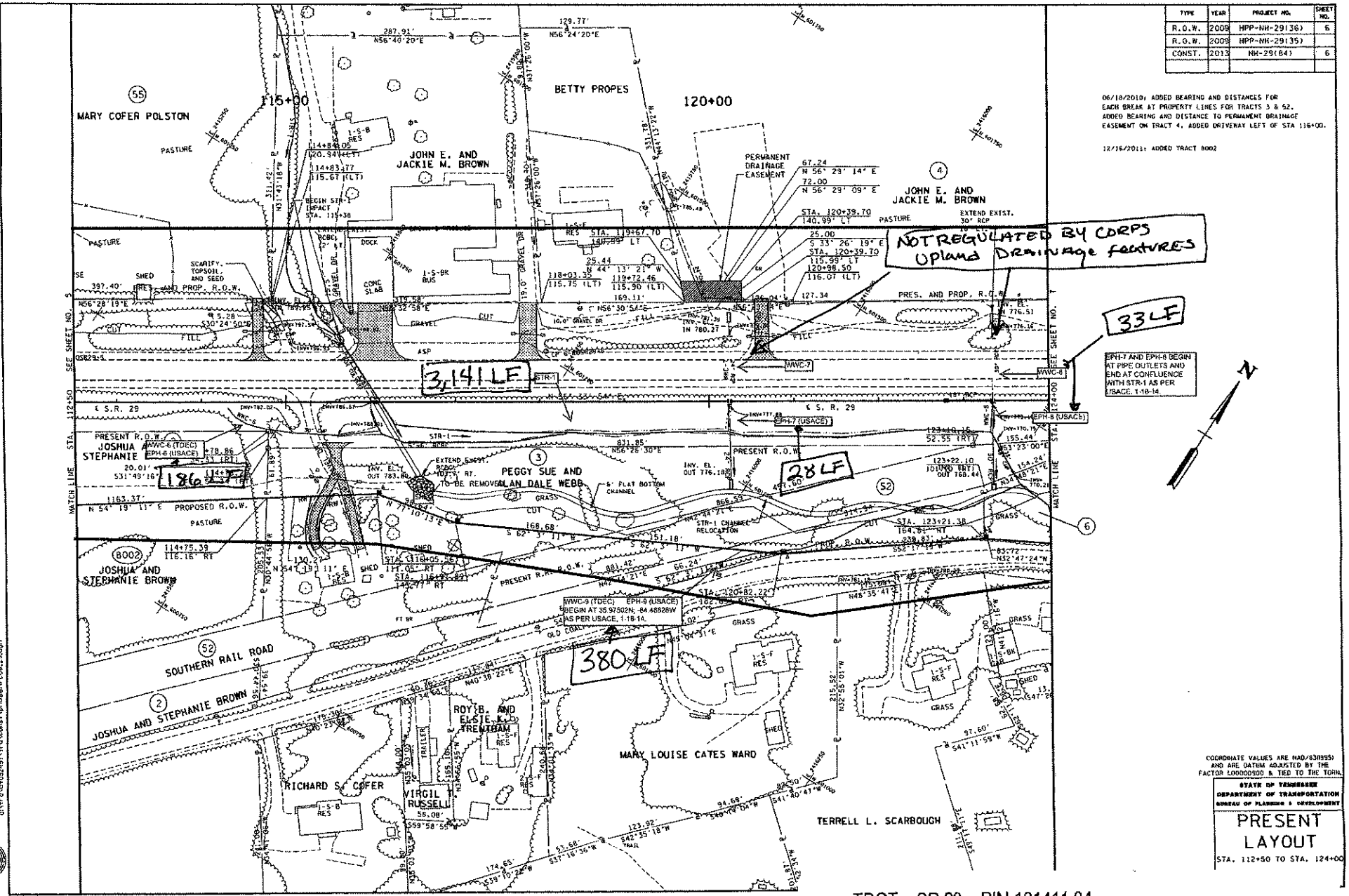
COORDINATE VALUES ARE NAD/83(95) AND ARE DATUM ADJUSTED BY THE FACTOR 1.00000900 & TIED TO THE TGRN.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

PRESENT LAYOUT

STA. 100+50 TO STA. 112+50

TDOT-SR 29- PIN 101411.04
Processing No. 2013-00712
Roane / Morgan County, TN
Sheet 3 of 17



TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
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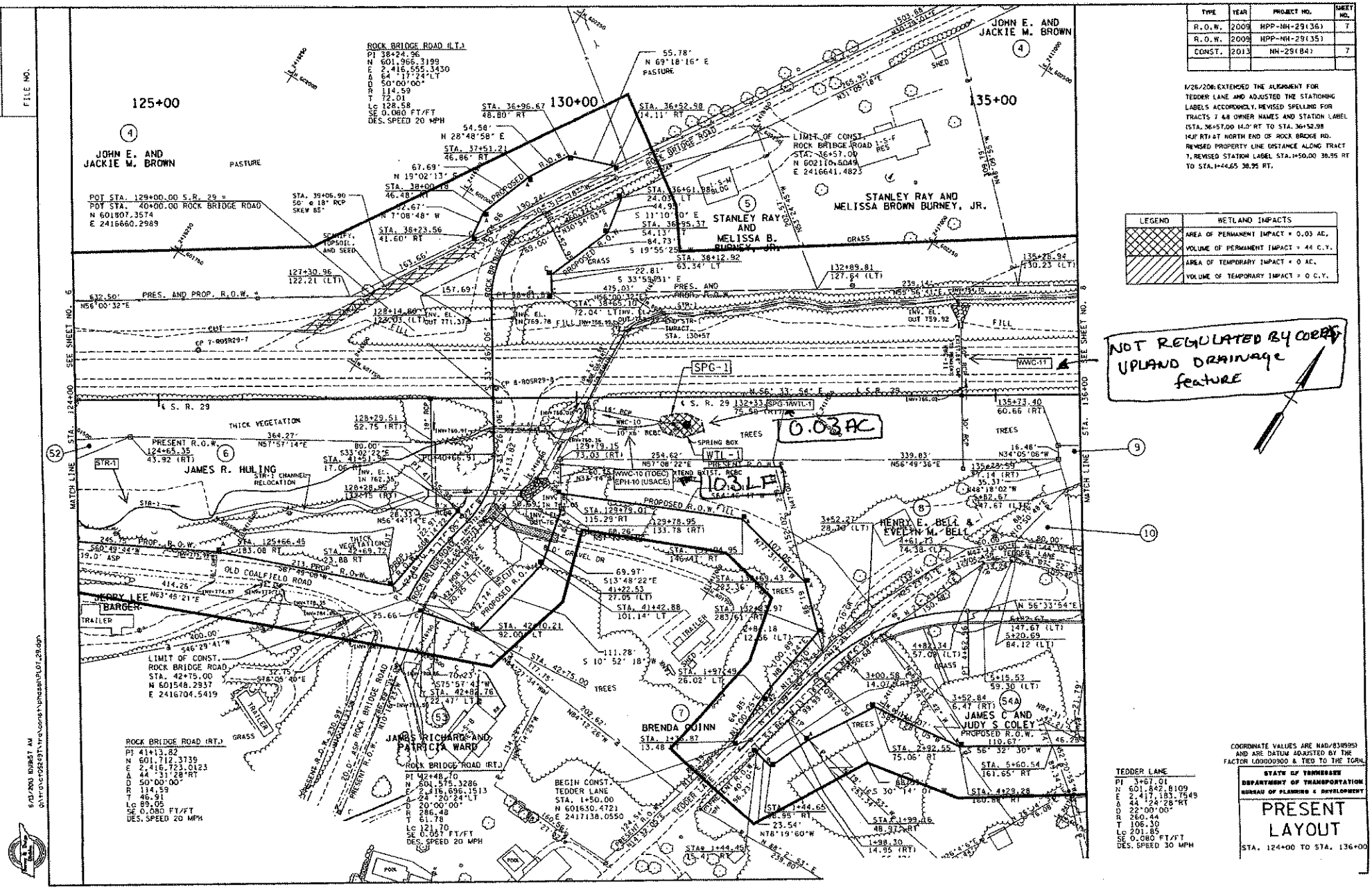

TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	7
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2013	NH-29(84)	7

1/28/2014: EXTENDED THE ALIGNMENT FOR TEDDER LANE AND ADJUSTED THE STATIONING LABELS ACCORDINGLY. REVISED SPELLING FOR TRACTS 7 & 8 OWNER NAMES AND STATION LABEL (STA. 36+57.00 14.0' RT TO STA. 36+52.98 14.0' RT) AT NORTH END OF ROCK BRIDGE RD. REVISED PROPERTY LINE DISTANCE ALONG TRACT 7, REVISED STATION LABEL STA. 1+50.00 38.95 RT TO STA. 1+44.65 38.95 RT.

LEGEND	WETLAND IMPACTS
	AREA OF PERMANENT IMPACT = 0.03 AC.
	VOLUME OF PERMANENT IMPACT = 44 C.Y.
	AREA OF TEMPORARY IMPACT = 0 AC.
	VOLUME OF TEMPORARY IMPACT = 0 C.Y.

COORDINATE VALUES ARE NAD/83(1995) AND ARE DATUM ADJUSTED BY THE FACTOR 1.00000900 & TIED TO THE TGRN.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

PRESENT LAYOUT

STA. 124+00 TO STA. 136+00

TDOT – SR 29 – PIN 101411.04
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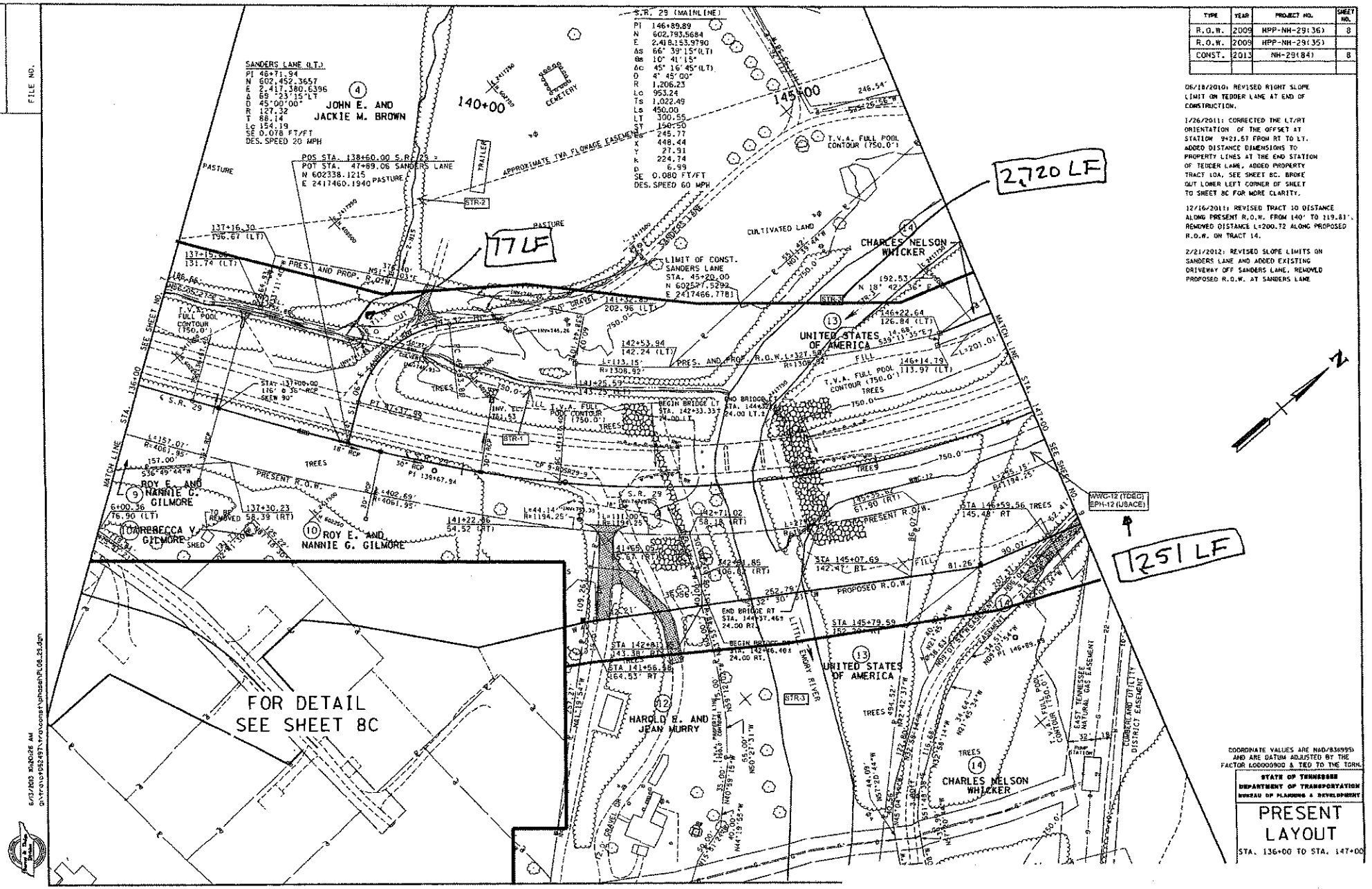

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
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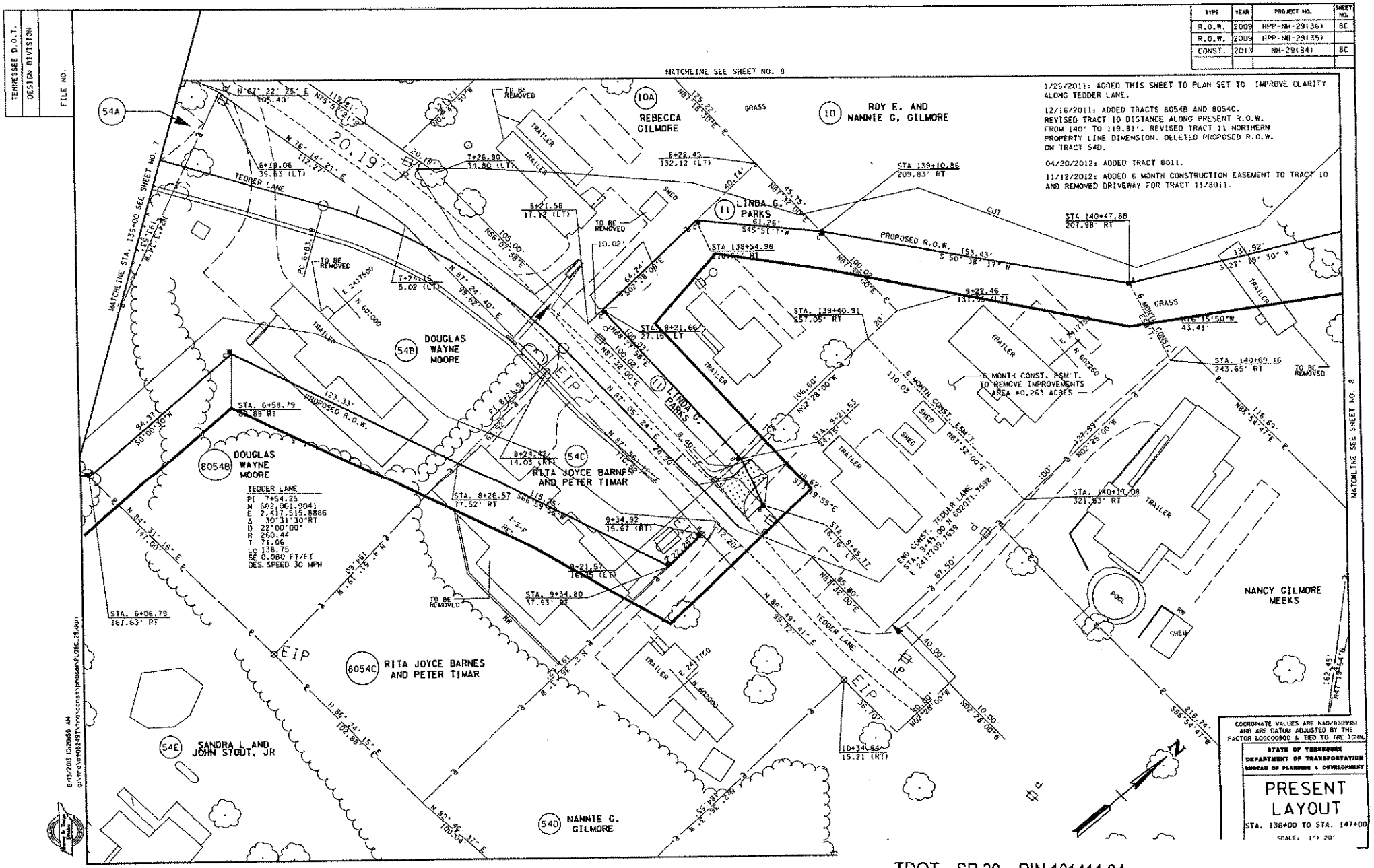

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN
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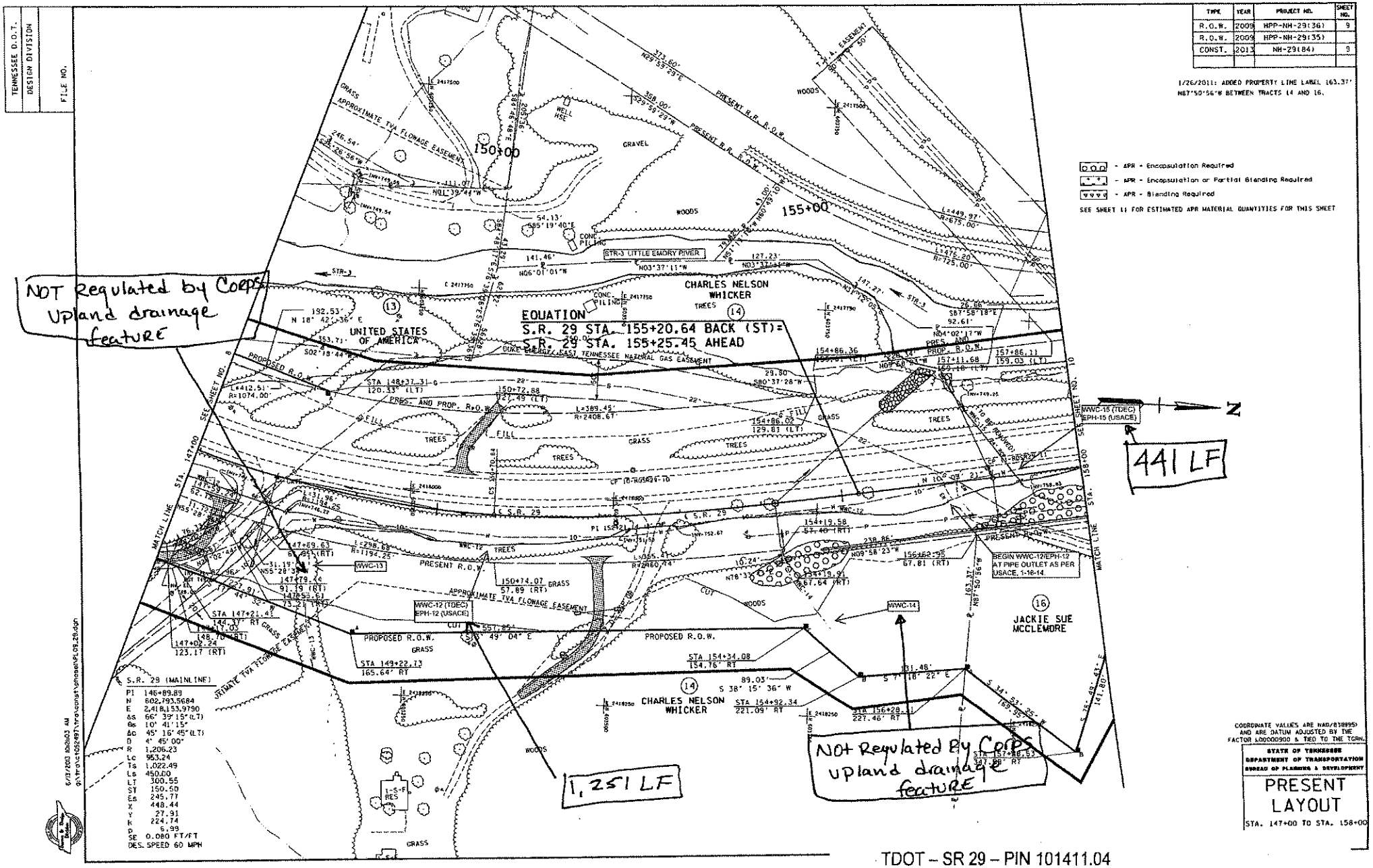

TDOT – SR 29 – PIN 101411.04
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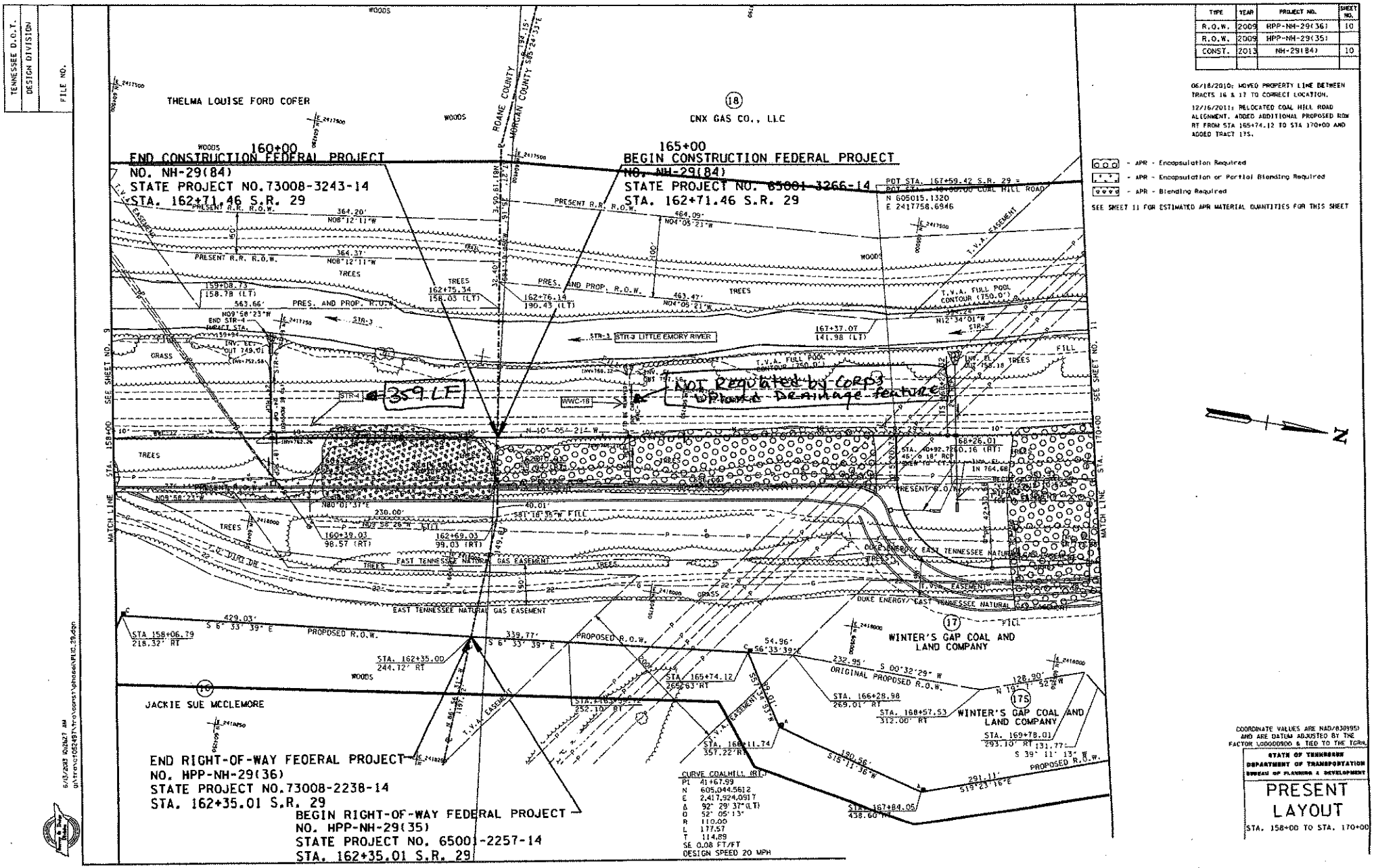

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
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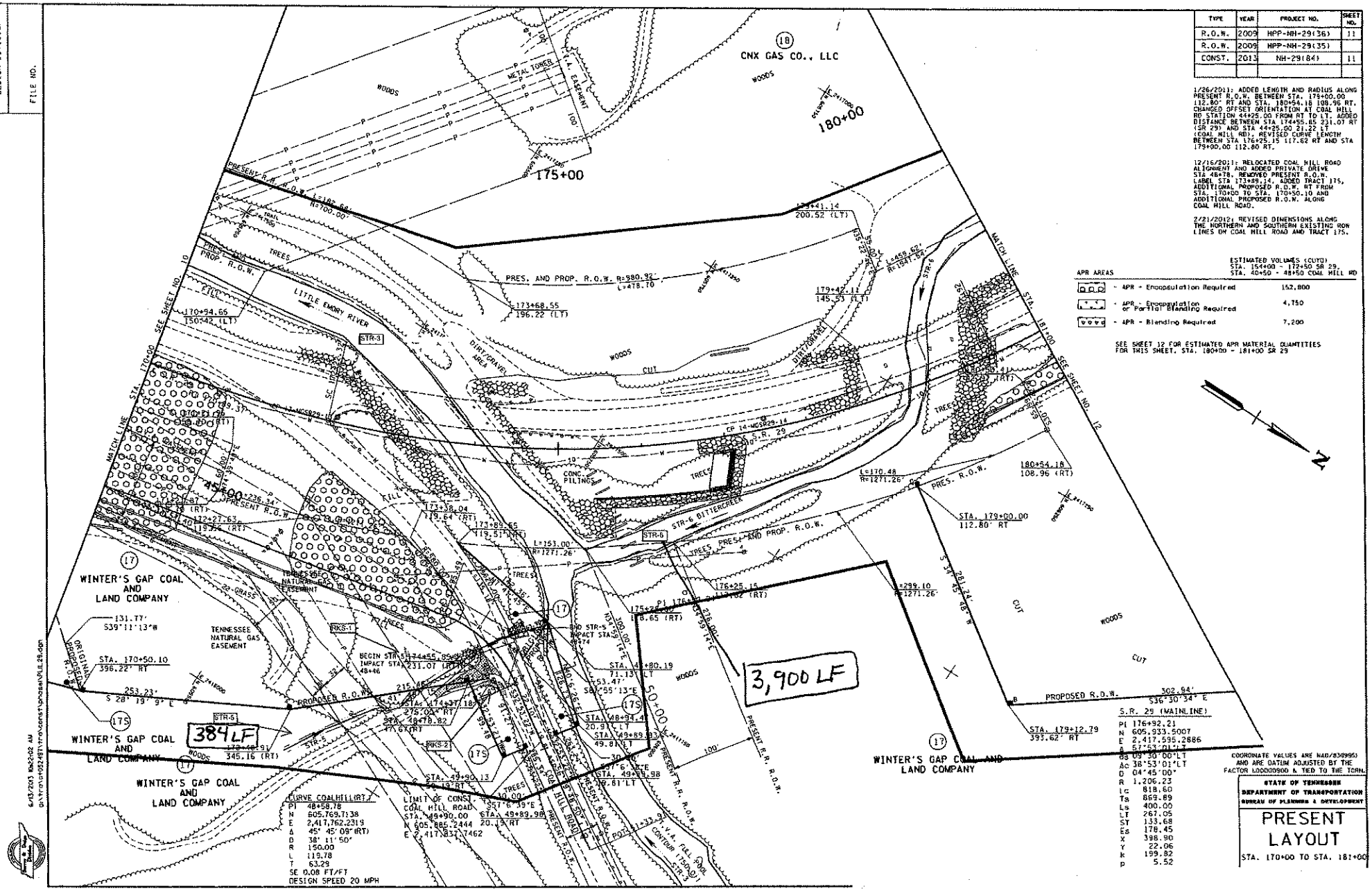

TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	11
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2013	NH-29(84)	11

1/26/2011: ADDED LENGTH AND RADIUS ALONG PRESENT R.O.W. BETWEEN STA. 179+00.00 112.80' RT AND STA. 180+54.18 108.96 RT. CHANGED OFFSET ORIENTATION AT COAL HILL RD STATION 44+25.00 FROM RT TO LT. ADDED DISTANCE BETWEEN STA 176+55.85 231.07 RT (SR 29) AND STA 44+25.00 31.22 LT (COAL HILL RD). REVISED CURVE LENGTH BETWEEN STA 176+25.15 117.62 RT AND STA 179+00.00 112.80 RT.

12/15/2011: RELOCATED COAL HILL ROAD ALIGNMENT AND ADDED PRIVATE DRIVE STA 48+78. REMOVED PRESENT R.O.W. LABEL STA 173+89.14. ADDED TRACT 175, ADDITIONAL PROPOSED R.O.W. RT FROM STA. 170+00 TO STA. 170+50.10 AND ADDITIONAL PROPOSED R.O.W. ALONG COAL HILL ROAD.

2/21/2012: REVISED DIMENSIONS ALONG THE NORTHERN AND SOUTHERN EXISTING ROW LINES ON COAL HILL ROAD AND TRACT 175.

ESTIMATED VOLUMES (CUYD)
STA. 154+00 - 172+50 SR 29,
STA. 40+50 - 48+50 COAL HILL RD

APR AREAS		
	APR - Encapsulation Required	152,800
	APR - Encapsulation or Partial Blending Required	4,750
	APR - Blending Required	7,200

SEE SHEET 12 FOR ESTIMATED APR MATERIAL QUANTITIES FOR THIS SHEET. STA. 180+00 - 181+00 SR 29

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Roane / Morgan County, TN
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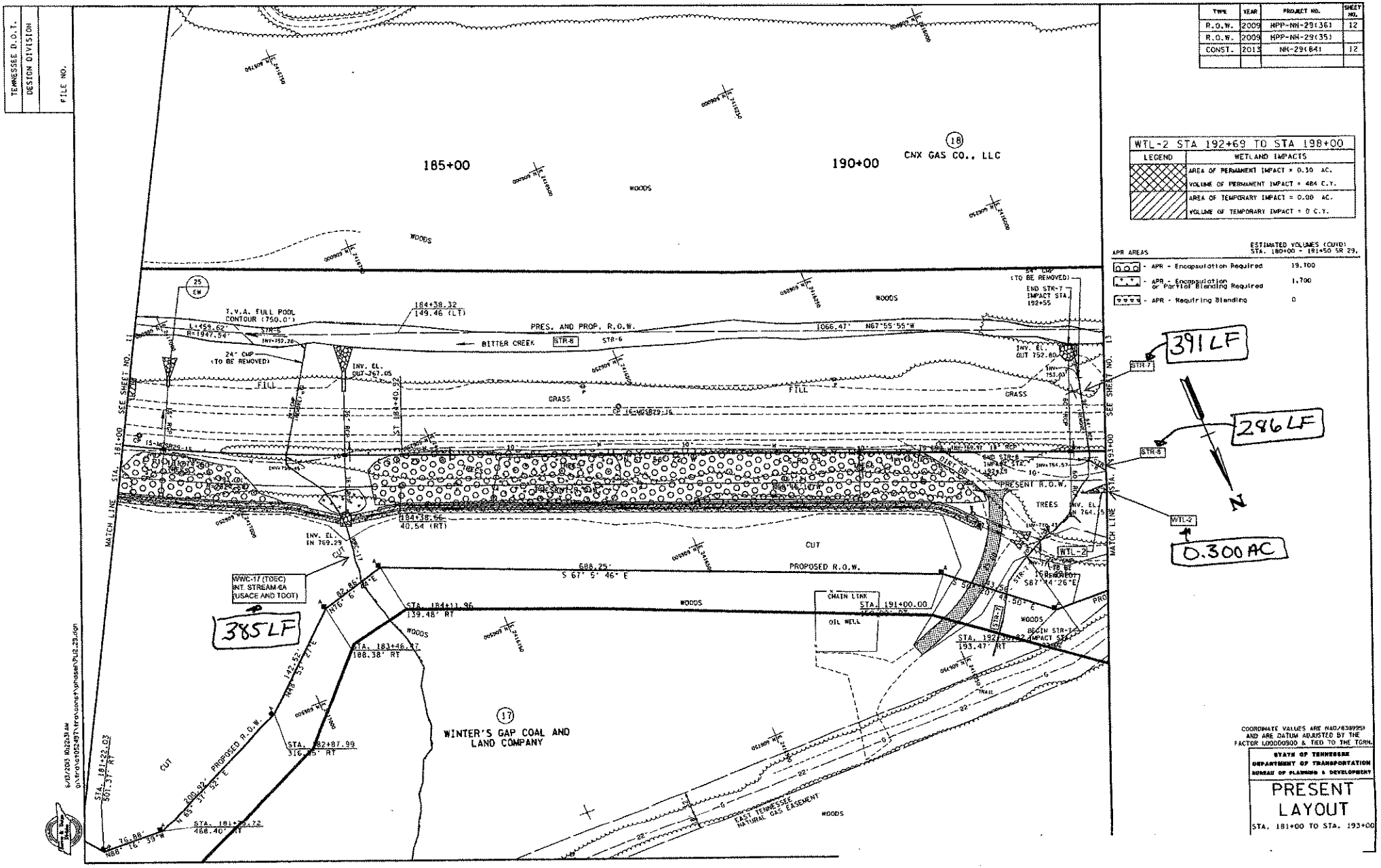

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
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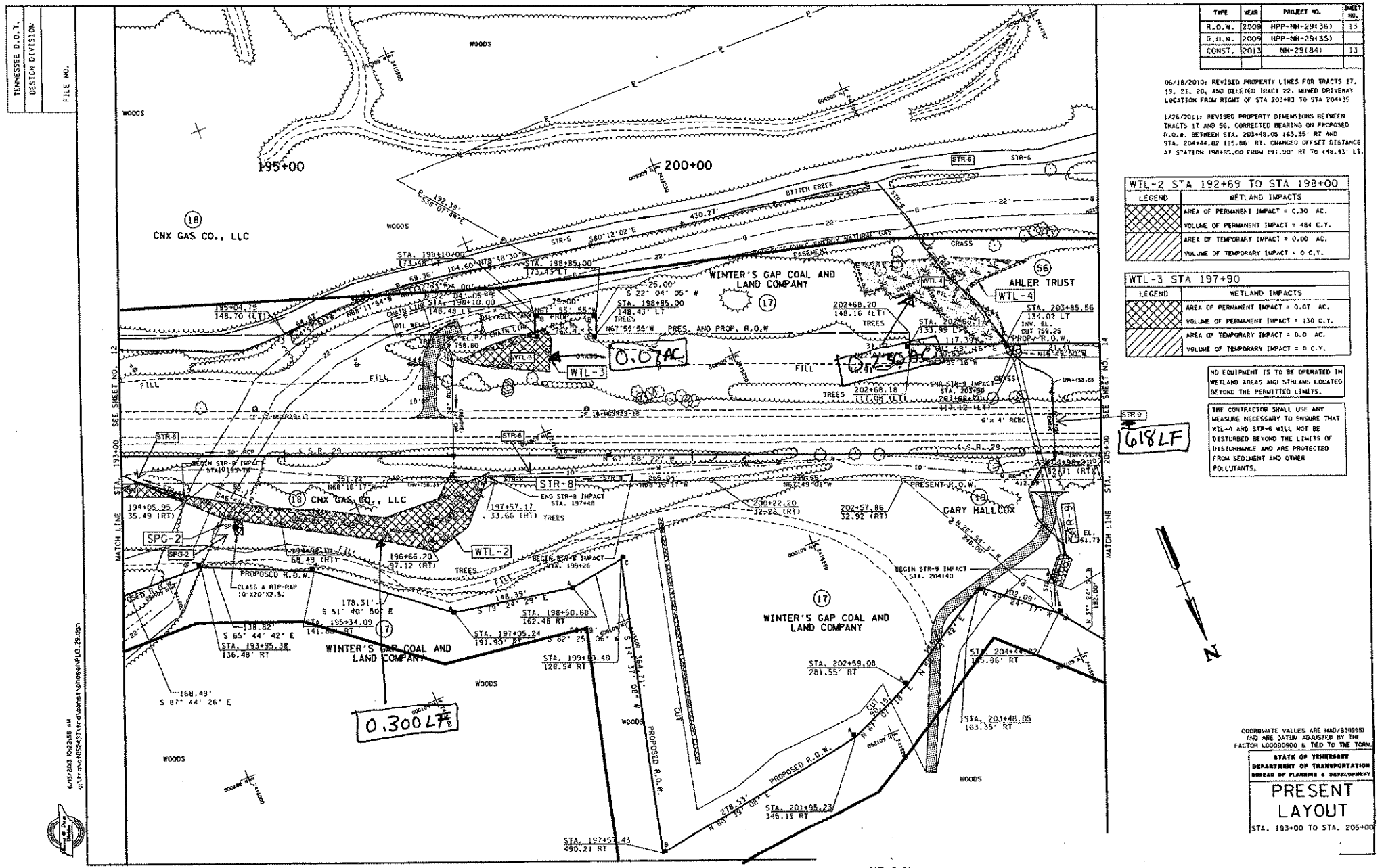

TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	13
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2013	NH-29(84)	13

06/18/2010: REVISED PROPERTY LINES FOR TRACTS 17, 19, 21, 20, AND DELETED TRACT 22. MOVED DRIVEWAY LOCATION FROM RIGHT OF STA 203+83 TO STA 204+35

1/26/2011: REVISED PROPERTY DIMENSIONS BETWEEN TRACTS 17 AND 56. CORRECTED BEARING ON PROPOSED R.O.W. BETWEEN STA. 203+48.05 163.35' RT AND STA. 204+44.62 195.88' RT. CHANGED OFFSET DISTANCE AT STATION 198+85.00 FROM 191.90' RT TO 148.43' LT.

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN
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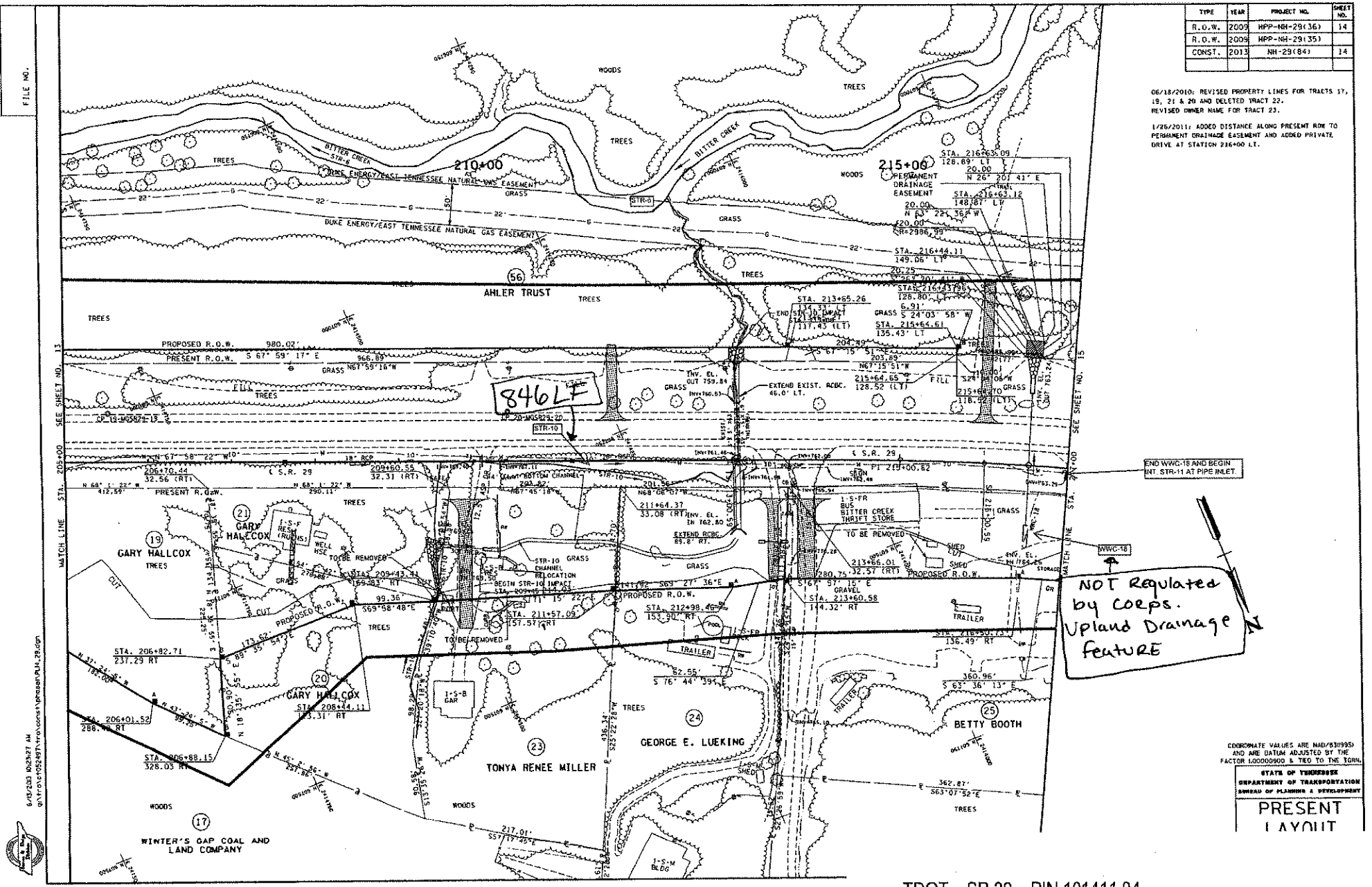

TDOT – SR 29 – PIN 101411.04

D/A Processing No. 2013-00712

Roane / Morgan County, TN

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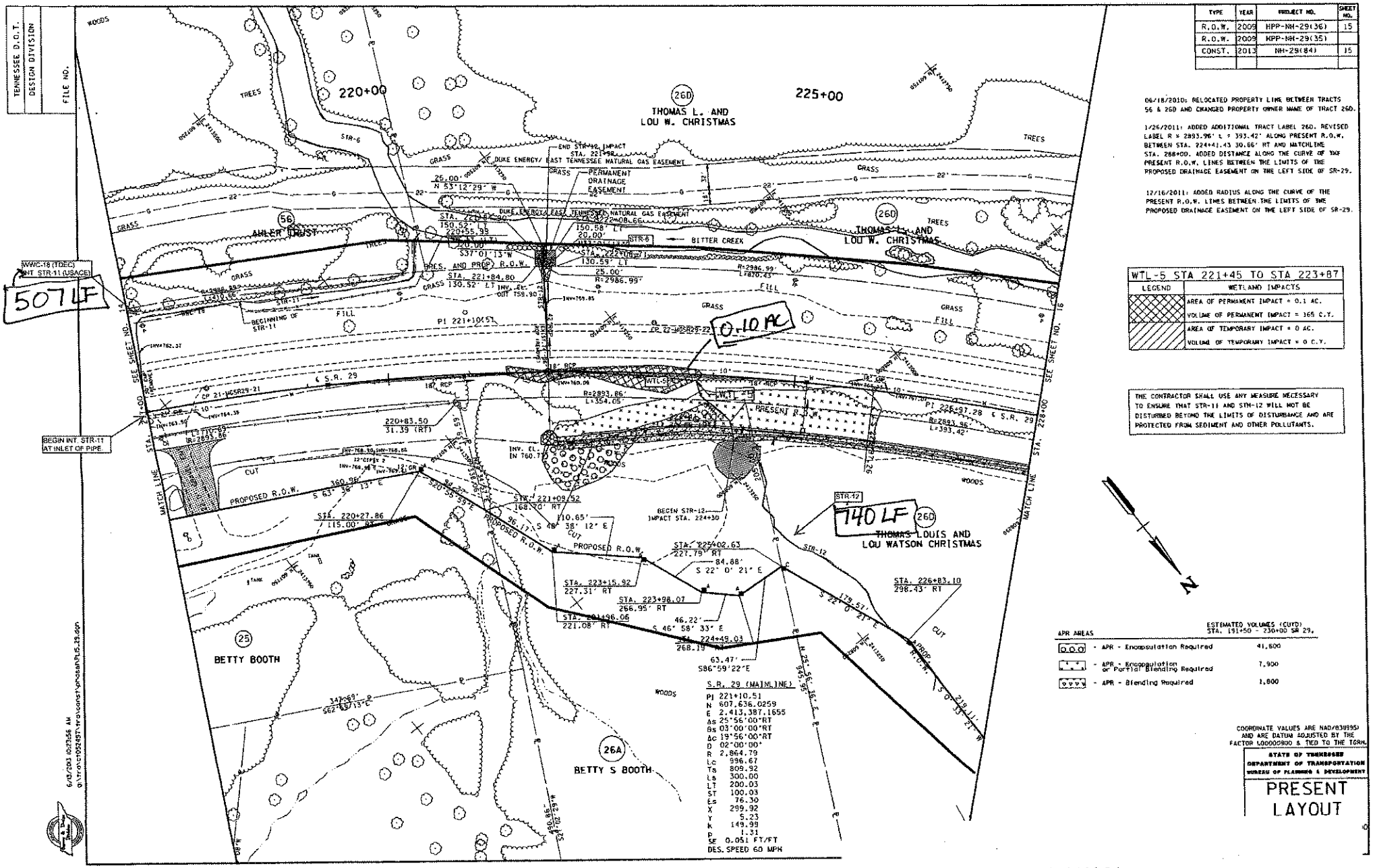


TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	15
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2013	NH-29(84)	15

06/18/2010: RELOCATED PROPERTY LINE BETWEEN TRACTS 56 & 260 AND CHANGED PROPERTY OWNER NAME OF TRACT 260.

1/26/2011: ADDED ADDITIONAL TRACT LABEL 260. REVISED LABEL R = 2893.96' L = 393.42' ALONG PRESENT R.O.W. BETWEEN STA. 224+41.43 30.66' RT AND MATCHLINE STA. 228+00. ADDED DISTANCE ALONG THE CURVE OF THE PRESENT R.O.W. LINES BETWEEN THE LIMITS OF THE PROPOSED DRAINAGE EASEMENT ON THE LEFT SIDE OF SR-29.

12/16/2011: ADDED RADIUS ALONG THE CURVE OF THE PRESENT R.O.W. LINES BETWEEN THE LIMITS OF THE PROPOSED DRAINAGE EASEMENT ON THE LEFT SIDE OF SR-29.

WTL-5 STA 221+45 TO STA 223+87	
LEGEND	WETLAND IMPACTS
	AREA OF PERMANENT IMPACT = 0.1 AC.
	VOLUME OF PERMANENT IMPACT = 165 C.Y.
	AREA OF TEMPORARY IMPACT = 0 AC.
	VOLUME OF TEMPORARY IMPACT = 0 C.Y.

THE CONTRACTOR SHALL USE ANY MEASURE NECESSARY TO ENSURE THAT STR-11 AND STR-12 WILL NOT BE DISTURBED BEYOND THE LIMITS OF DISTURBANCE AND ARE PROTECTED FROM SEDIMENT AND OTHER POLLUTANTS.

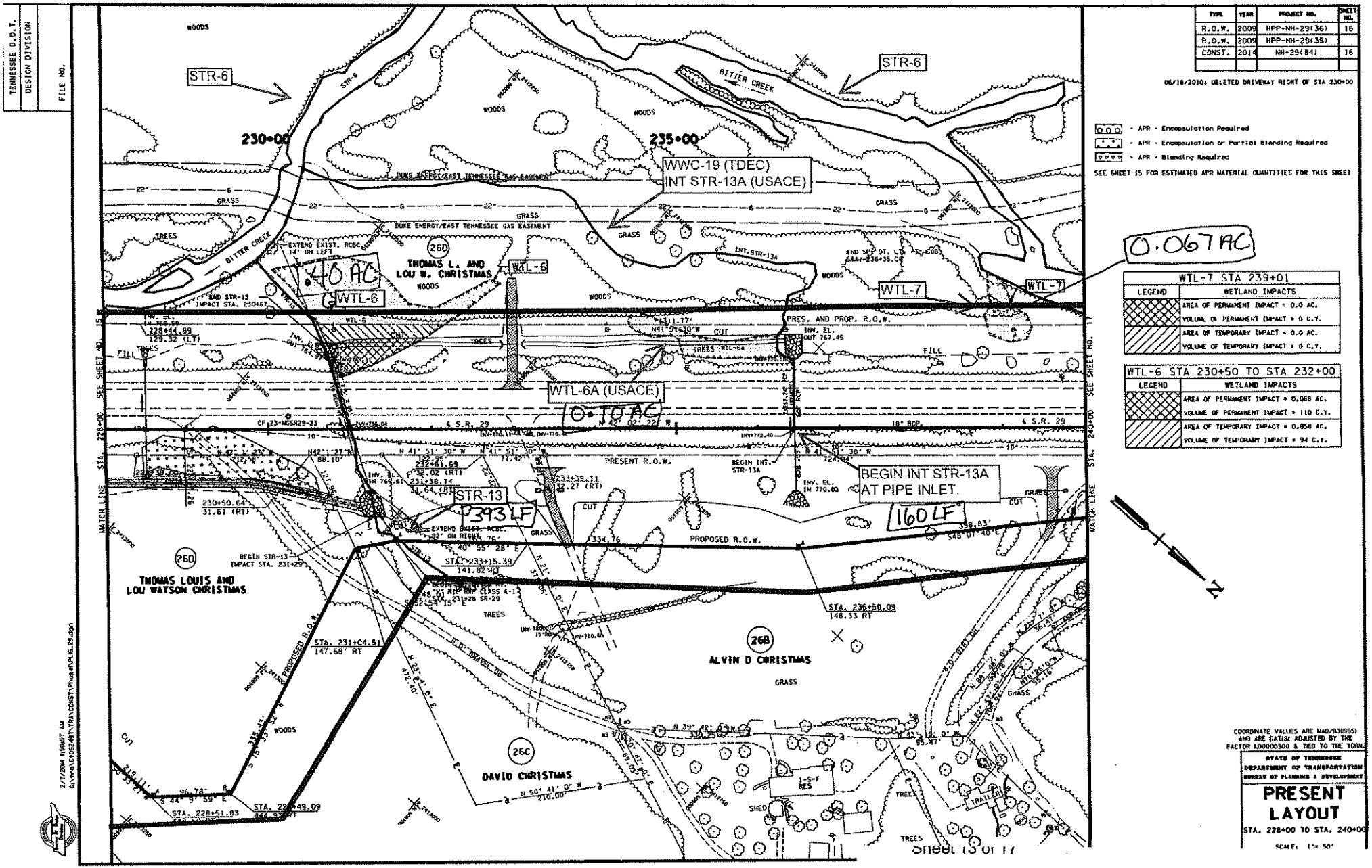
APR AREAS	ESTIMATED VOLUMES (CUYD) STA. 191+50 - 230+00 SR 29.
- APR - Encapsulation Required	41,600
- APR - Encapsulation or Partial Blending Required	7,900
- APR - Blending Required	1,800

COORDINATE VALUES ARE NAD/83(1995) AND ARE DATUM ADJUSTED BY THE FACTOR 1.00000800 & TIED TO THE TCRN.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

PRESENT LAYOUT

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN



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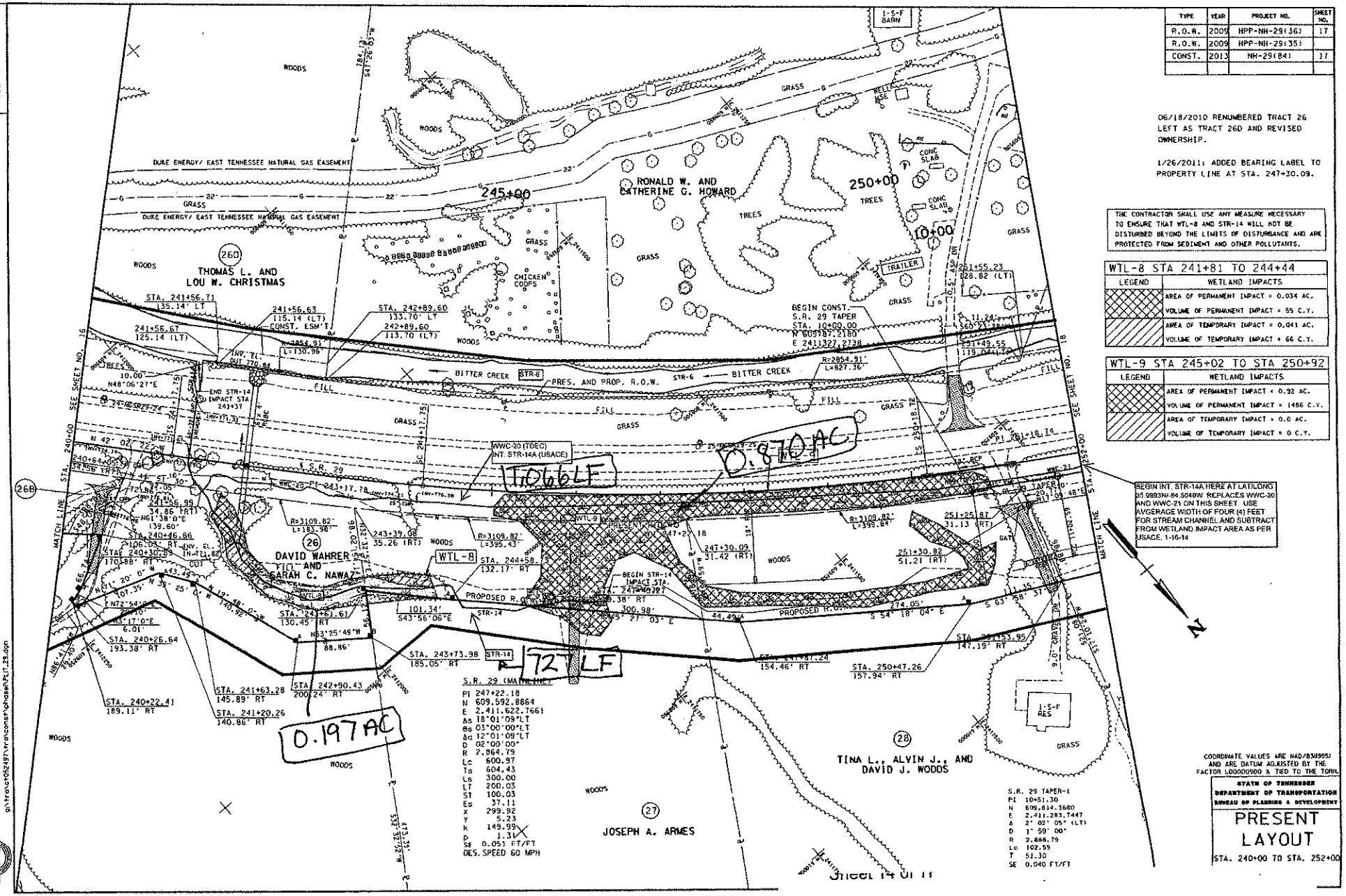
TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN



TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2009	HPP-NH-29(36)	17
R.O.W.	2009	HPP-NH-29(35)	
CONST.	2013	NH-29(84)	37

06/18/2010 RENUMBERED TRACT 26 LEFT AS TRACT 26D AND REVISED OWNERSHIP.

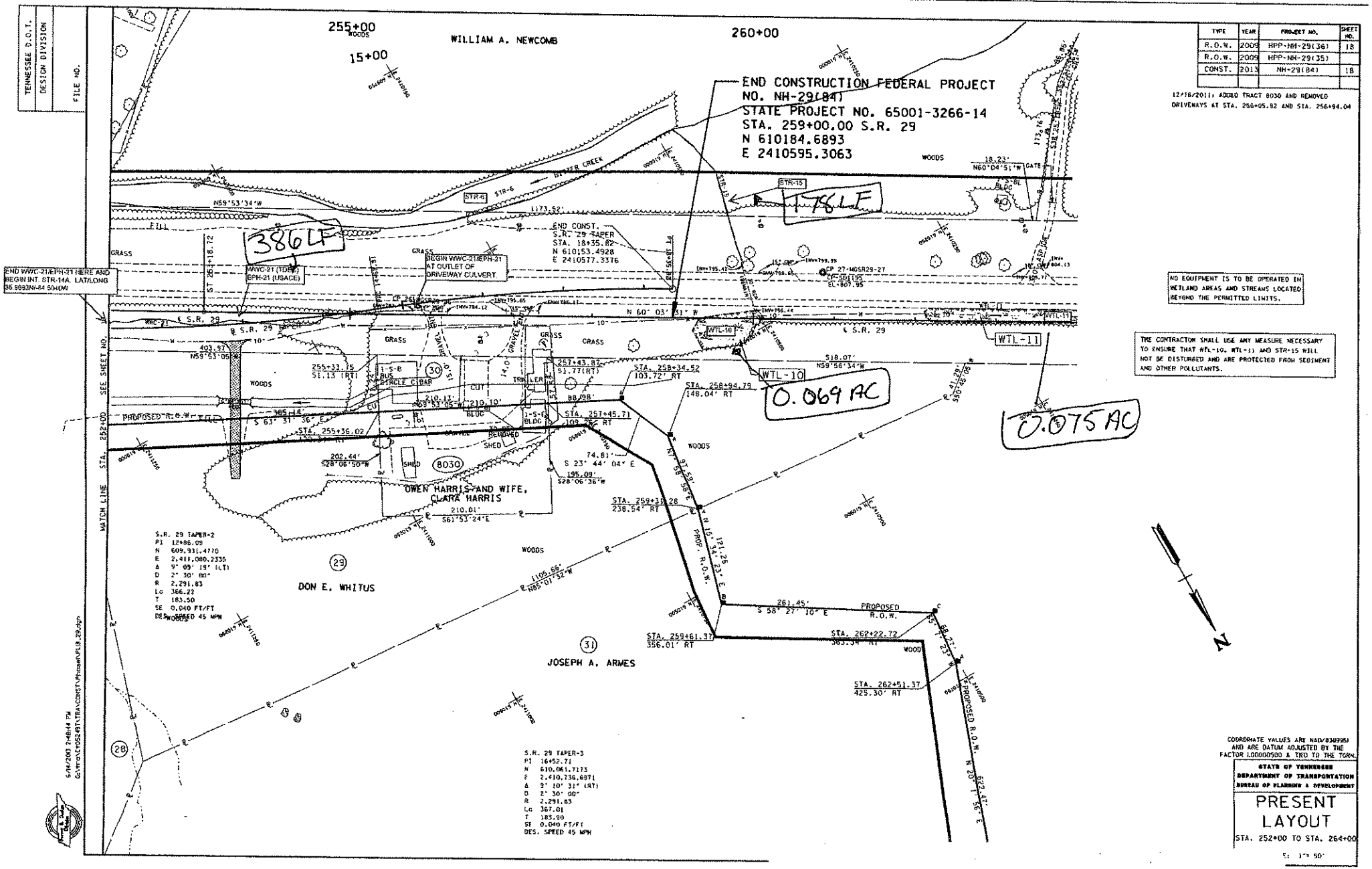
1/26/2011: ADDED BEARING LABEL TO PROPERTY LINE AT STA. 247+30.09.

THE CONTRACTOR SHALL USE ANY MEASURE NECESSARY TO ENSURE THAT WTL-8 AND STR-14 WILL NOT BE DISTURBED BEYOND THE LIMITS OF DISTURBANCE AND ARE PROTECTED FROM SEDIMENT AND OTHER POLLUTANTS.

WTL-8 STA 241+81 TO 244+44	
LEGEND	WETLAND IMPACTS
	AREA OF PERMANENT IMPACT = 0.034 AC.
	VOLUME OF PERMANENT IMPACT = 55 C.Y.
	AREA OF TEMPORARY IMPACT = 0.041 AC.
	VOLUME OF TEMPORARY IMPACT = 66 C.Y.

WTL-9 STA 245+02 TO STA 250+92	
LEGEND	WETLAND IMPACTS
	AREA OF PERMANENT IMPACT = 0.92 AC.
	VOLUME OF PERMANENT IMPACT = 1486 C.Y.
	AREA OF TEMPORARY IMPACT = 0.0 AC.
	VOLUME OF TEMPORARY IMPACT = 0 C.Y.

TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN



TDOT – SR 29 – PIN 101411.04
D/A Processing No. 2013-00712
Roane / Morgan County, TN
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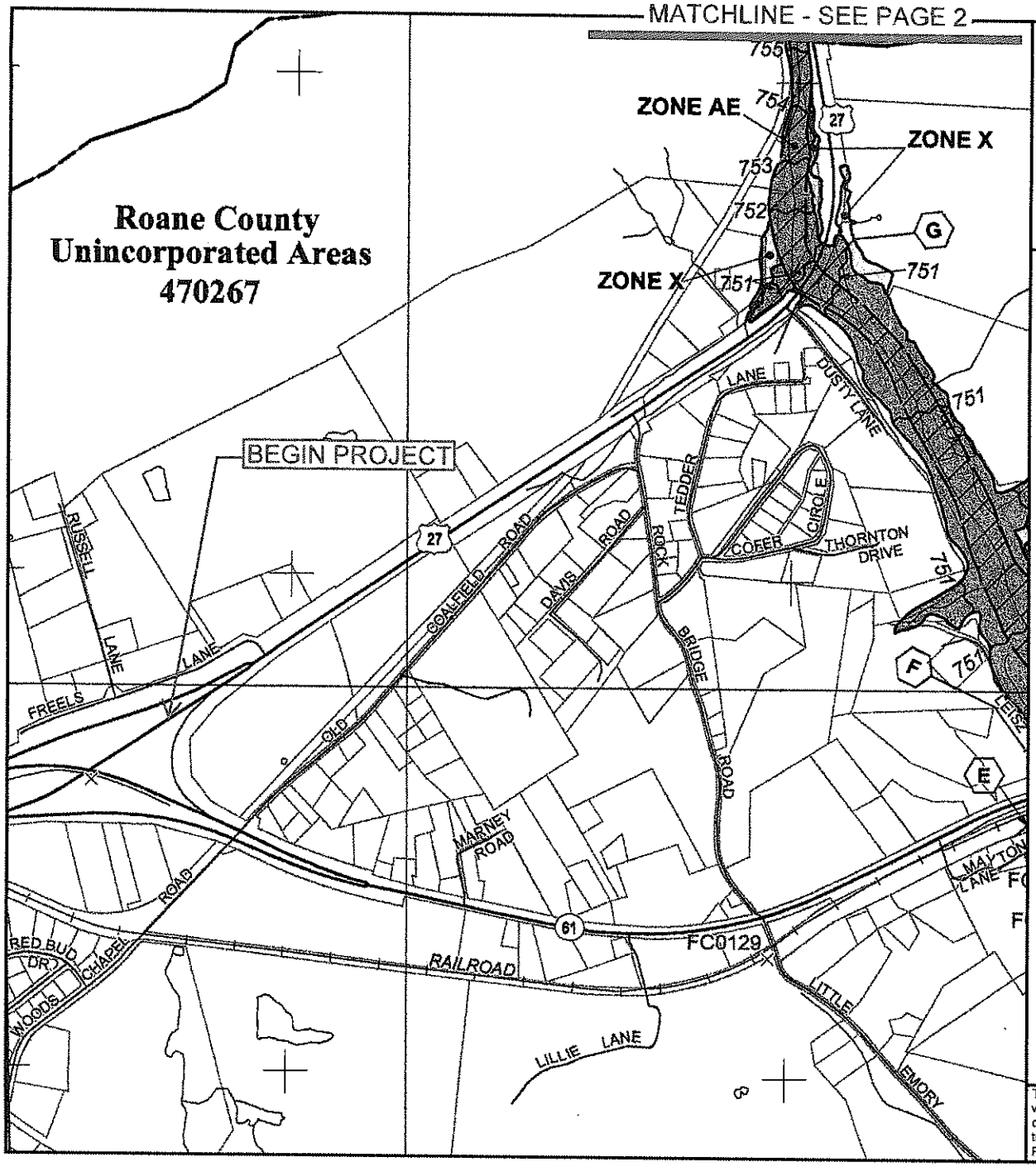
Attachment C. FEMA Floodplain Map



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

FIRM

FLOOD INSURANCE RATE MAP

ROANE COUNTY, TENNESSEE

AND INCORPORATED AREAS

PANEL 105 OF 335

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ROANE COUNTY	470267	0105	F

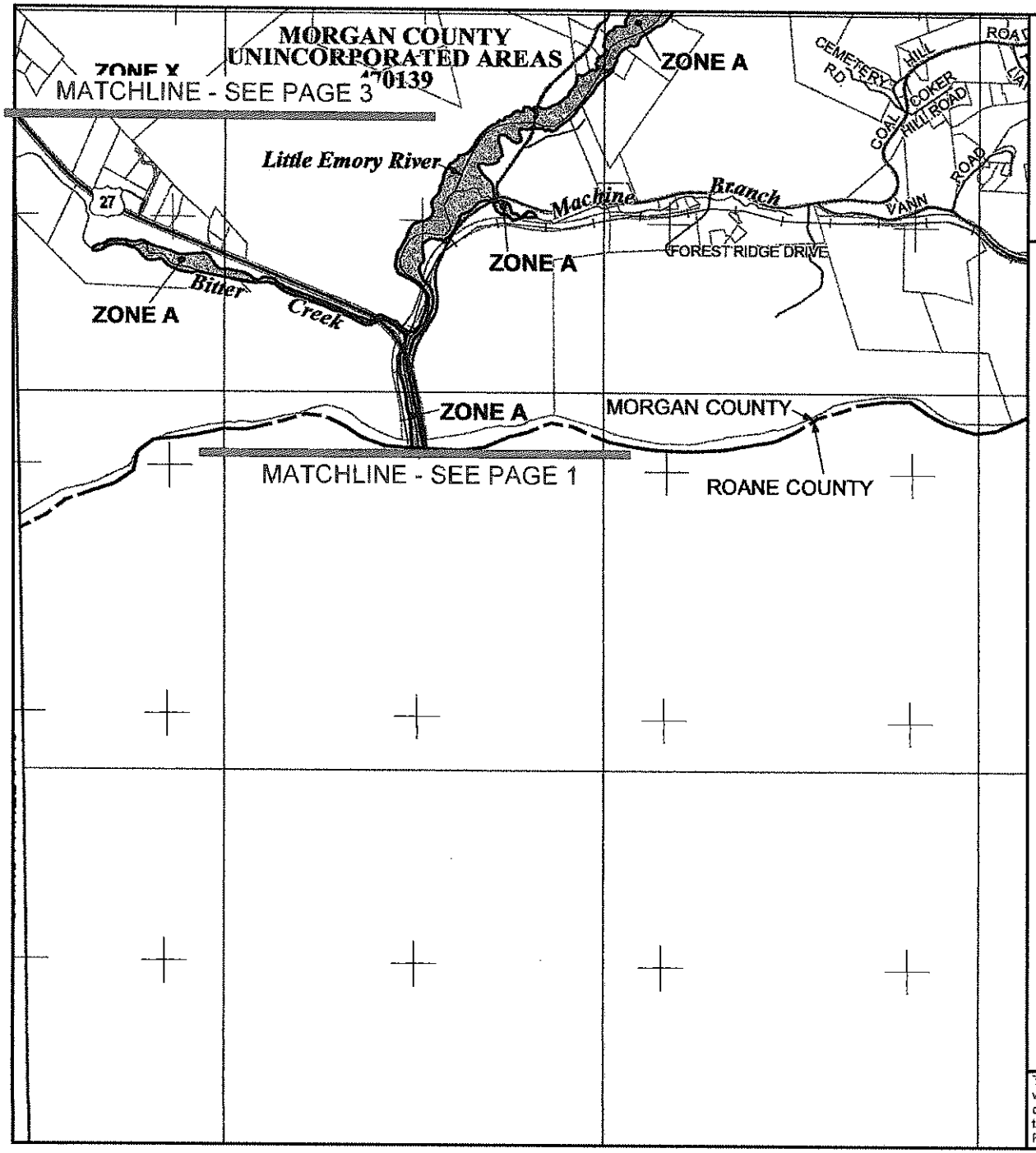
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47145C0105F

EFFECTIVE DATE
SEPTEMBER 28, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

FIRM

FLOOD INSURANCE RATE MAP

MORGAN COUNTY, TENNESSEE

AND INCORPORATED AREAS

PANEL 450 OF 450

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MORGAN COUNTY	470139	0450	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

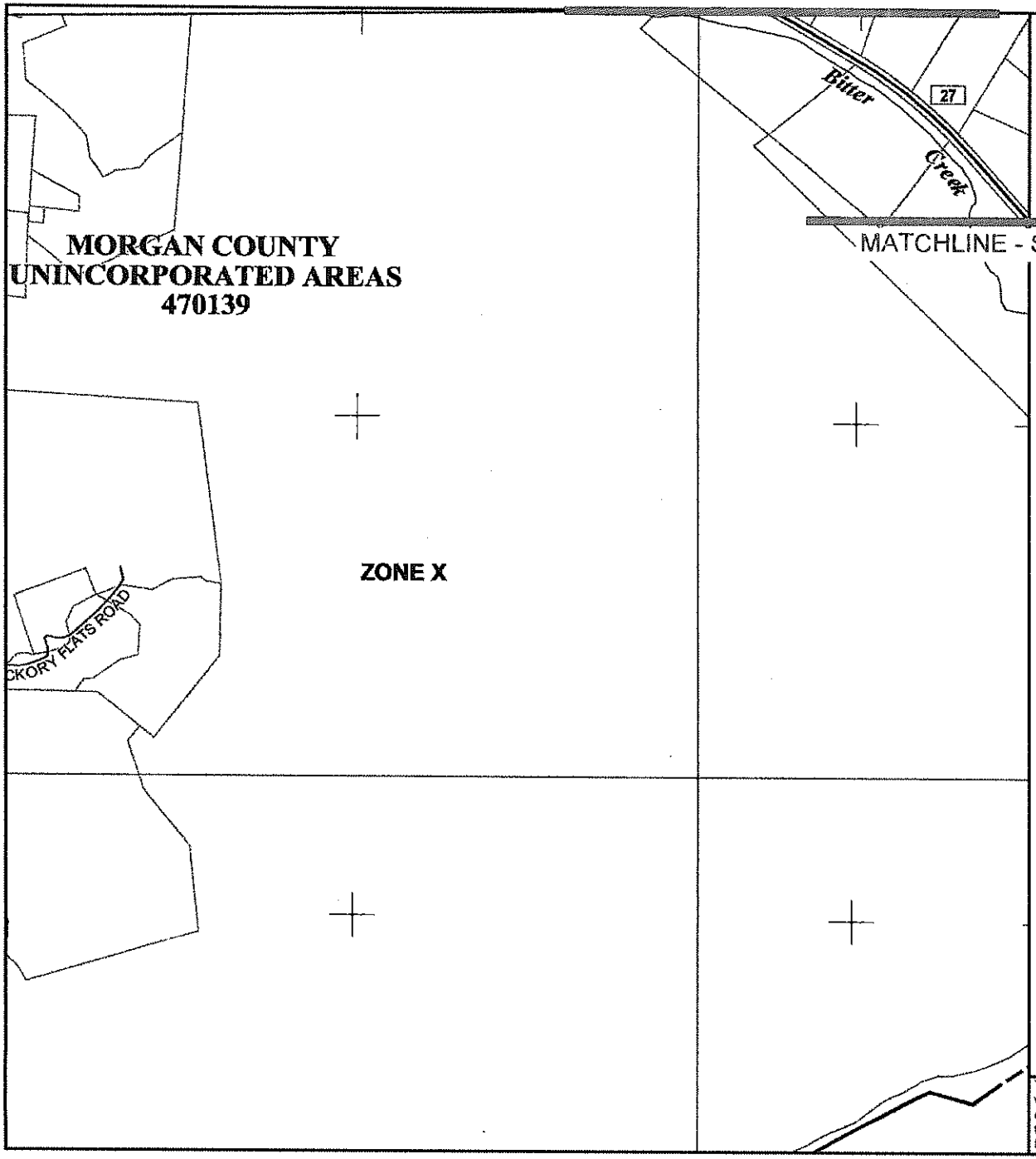
MAP NUMBER
47129C0450C

EFFECTIVE DATE
JUNE 18, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

MATCHLINE - SEE PAGE 4



MATCHLINE - SEE PAGE 2

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

FIRM

FLOOD INSURANCE RATE MAP

MORGAN COUNTY, TENNESSEE

AND INCORPORATED AREAS

PANEL 410 OF 450

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

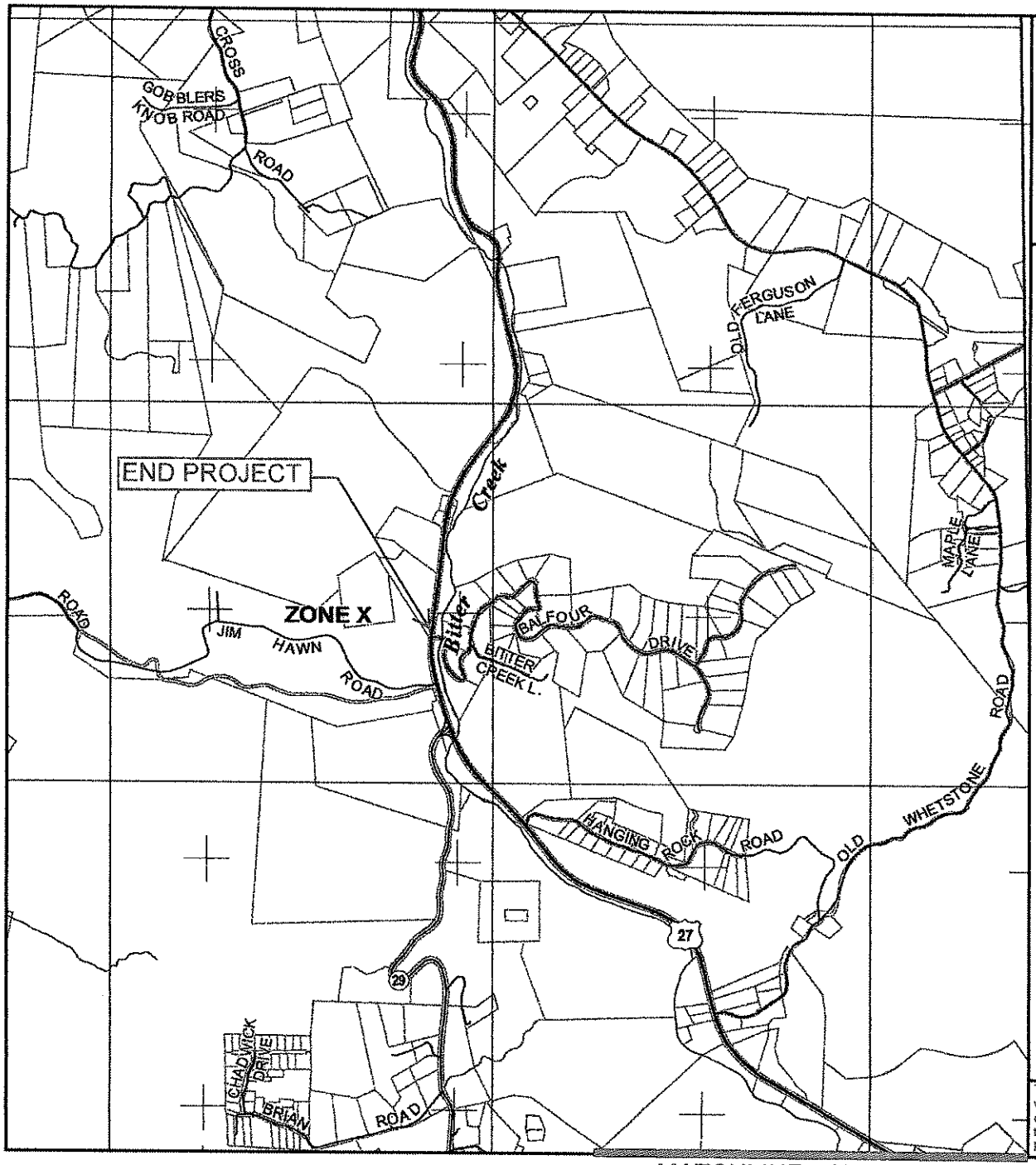
COMMUNITY	NUMBER	PANEL	SUFFIX
MORGAN COUNTY	470139	0410	C
OAKDALE, CITY OF	470140	0410	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47129C0410C

EFFECTIVE DATE
JUNE 18, 2007

Federal Emergency Management Agency



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

FIRM

FLOOD INSURANCE RATE MAP

MORGAN COUNTY, TENNESSEE

AND INCORPORATED AREAS

PANEL 325 OF 450

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MORGAN COUNTY	470139	0325	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47129C0325C

EFFECTIVE DATE
JUNE 18, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

MATCHLINE - SEE PAGE 3

Attachment D. USFWS Correspondence

Frost, Joshua W LRN

From: DJ Wiseman [DJ.Wiseman@tn.gov]
Sent: Monday, September 29, 2014 10:53 AM
To: Frost, Joshua W LRN
Subject: [EXTERNAL] RE: ESA permit condition for SR-29 (UNCLASSIFIED)

No, we can't adhere to it because there are lots of variables such as the letting schedule, project sequence, etc. We can put it as a special note and give it as much consideration as possible but we can't commit to it. USFWS fully understands this and simply wants us to try cutting at a certain time but they understand if it's not possible.

I emailed the credit acceptance letter for the wetland mitigation for the second part of the project this morning. Is there anything else that is needed for permit issuance?

Thanks,
D.J. Wiseman, PE, CPESC
Senior Transportation Project Specialist
Environmental Division
Natural Resources Office, Permits Section
Tennessee Department of Transportation
Work (615) 532-4554
Fax (615) 741-1098
DJ.Wiseman@tn.gov

-----Original Message-----
From: Frost, Joshua W LRN [mailto:Joshua.W.Frost@usace.army.mil]
Sent: Thursday, September 25, 2014 9:23 AM
To: DJ Wiseman
Subject: ESA permit condition for SR-29 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

D.J.,

In USFWS' recent letter they state "Although there is no requirement to implement a winter tree cutting timeframe restriction on this project, we would appreciate consideration given to the removal of trees with a DBH of three inches or greater from October 15 through March 31 to further minimize potential for harm". Can and would TDOT be willing to adhere to this cutting restriction?

Joshua Frost, PWS, Certified Ecologist
Project Manager, Regulatory Branch
U.S. Army Corps of Engineers
3701 Bell Road
Nashville, Tennessee 37214
615-369-7512 / 615-369-7501 (Fax)

Classification: UNCLASSIFIED
Caveats: NONE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

September 16, 2014

Mr. Keven Brown
Tennessee Department of Transportation
Environmental Planning and Permits
James K. Polk Building, Suite 900
505 Deaderick Street
Nashville, Tennessee 37243-0349

Subject: FWS# 14-1-0519. Proposed construction of State Route 29 from State Route 61 in Harriman to north of State Route 328; PIN#s 101411.04 and 101411.05, P.E. 73008-1237-14 and 65001-1256-14, Morgan and Roane counties, Tennessee.

Dear Mr. Brown:

Thank you for your correspondence dated September 3, 2014, transmitting mist netting survey results for construction of approximately five miles of State Route (SR) 29 under two separate projects from SR 61 in Harriman to north of SR 328 in Morgan and Roane counties, Tennessee. The Tennessee Department of Transportation (TDOT) has determined that the project is "not likely to adversely affect" the federally endangered Indiana bat (*Myotis sodalis*) and "not likely to jeopardize" the proposed northern long-eared bat (*Myotis septentrionalis*). Personnel of the U.S. Fish and Wildlife Service have reviewed the subject proposal and offer the following comments.

A mist netting survey was performed during the period of August 2 through August 13, 2014, at nine sites determined to be suitable netting locations. Efforts resulted in the capture of 118 non-listed bats, including two female northern long-eared bats. The northern long-eared bats were captured outside of the project corridor and tracked to three roost sites over two miles from the nearest portion of the proposed SR 29 project, indicating that clearing of trees for construction would likely not have an effect on this colony. Based on this and other information provided, we concur with TDOT's finding of "not likely to jeopardize" for the northern long-eared bat. Although there is no requirement to implement a winter tree cutting timeframe restriction on this project, we would appreciate consideration given to the removal of trees with a DBH (diameter at breast height) of three inches or greater from October 15 through March 31 to further minimize potential for harm.

No Indiana bats were captured during mist net efforts. Therefore, we concur with TDOT's determination of "not likely to adversely affect" for this species. Unless new information otherwise indicates Indiana bat use of the area, this survey will be valid until April 1, 2017. We are unaware of

any federally listed or proposed species that would be impacted by this project. Therefore, based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act (Act) of 1973, as amended, are fulfilled for all species that currently receive protection under the Act. Obligations under the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/525-4995 or by email at *john_griffith@fws.gov*.

Sincerely,

Peggy W. Shute

for Mary E. Jennings
Field Supervisor

From:	John Griffith
To:	Frost, Joshua W LRN
Subject:	[EXTERNAL] **correction** FW: FWS# 14-CPA-0548 BA assessment for the proposed construction of State Route 29 (UNCLASSIFIED)
Date:	Monday, June 30, 2014 7:59:01 AM

Joshua,

On read through, I realized that I missed something when replying below. You asked whether the project would receive our NLAA concurrence. The answer is no. TDOT is contributing into Tennessee's IBCF to address a "likely to adversely affect" finding. We will be providing our section 7 clearance but will not be arriving at a NLAA finding. Sorry for the confusion.

John Griffith
Transportation Biologist
U.S. Fish and Wildlife Service
Tennessee Field Office
931-525-4995 (office)
931-528-7075 (fax)

-----Original Message-----
From: John Griffith [mailto:john_griffith@fws.gov]
Sent: Thursday, June 26, 2014 8:29 AM
To: 'Frost, Joshua W LRN'
Subject: RE: FWS# 14-CPA-0548 BA assessment for the proposed construction of State Route 29 (UNCLASSIFIED)

Joshua,

Thanks for the questions. Technically, when a species is proposed to be listed and an action(s) "may effect" the species, the project proponent must make a jeopardy determination and confer with the Service. For this project, TDOT made the case for "no jeopardy" due to a variety of factors including a cutting timeframe restriction in August-September that would ensure the bats would be absent from the project area or juveniles would be volant (flying). So, in answer to your question, the commitment of a cutting restriction should be included in the permit. TDOT additionally (voluntarily) proposed to enter into an MOA with our office and contribute to Tennessee's Indiana Bat Conservation Fund as a means to mitigate possible impacts from removal of 53 acres of potentially suitable roosting habitat. They had other options, but chose this to expedite the project. We are currently working through the MOA process with their legal counsel. We will grant TDOT our NLAA concurrence and section 7 language once they provide us with the receipt of payment into the fund. So, you might also condition the permit to require payment into the Indiana bat fund since TDOT has agreed to this. Please let me know if you need anything else.

John Griffith
Transportation Biologist
U.S. Fish and Wildlife Service
Tennessee Field Office
931-525-4995 (office)
931-528-7075 (fax)

-----Original Message-----
From: Frost, Joshua W LRN [mailto:Joshua.W.Frost@usace.army.mil]

Sent: Thursday, June 19, 2014 9:54 AM
To: John_Griffith@fws.gov
Subject: FWS# 14-CPA-0548 BA assessment for the proposed construction of State Route 29 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

John,

I read the letter dated June 9, 2014 from USFWS that provided a "No jeopardy" for the NLEB and required TDOT to contribute $201,400 towards the species recovery for impacts to Indiana Bat. Can you clarify the following:

1. Are there cutting restrictions, or other management practices that were required in order for USFWS to make the "no jeopardy" determination? If so, what are they?

2. Also, when TDOT pays the $201,400 towards the species recovery for impacts to Indiana Bat, will USFWS consider the project to "not likely adversely affect" the Indiana Bat?

I am working on drafting special conditions for the permit and in order to ensure that Section 7 requirements are met, can you provide specific permit conditions USFWS would need the Corps to add to the permit to ensure the project will have "no jeopardy" to the NLEB and "not likely adversely affect" the Indiana Bat?

Best Regards,

Joshua Frost, PWS, Certified Ecologist
Project Manager, Regulatory Branch
U.S. Army Corps of Engineers
3701 Bell Road
Nashville, Tennessee 37214
615-369-7512 / 615-369-7501 (Fax)

Classification: UNCLASSIFIED
Caveats: NONE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

June 9, 2014

Ms. Leigh Ann Tribble
Federal Highway Administration
Tennessee Division Office
404 BNA Drive, Suite 508
Nashville, TN 37217

Subject: FWS# 14-CPA-0548. Biological Assessment for the proposed construction of State Route 29 from State Route 61 in Harriman to north of State Route 328; PIN#s 101411.04 and 101411.05, P.E. 65001-3266-14, 73008-3243-14, and 650011-3268-14, Morgan and Roane counties, Tennessee.

Dear Ms. Tribble:

Thank you for the Biological Assessment and letter dated May 15, 2014, regarding the proposal to construct approximately five miles of State Route (SR) 29 under two separate projects from SR 61 in Harriman to north of SR 328 in Morgan and Roane counties, Tennessee. The Tennessee Department of Transportation (TDOT) proposes to widen the first section of roadway from two traffic lanes to a cross-section consisting of four twelve-foot traffic lanes with ten-foot stabilized shoulders and a forty-eight foot wide depressed median. The second segment of SR-29 would be widened to a four lane divided cross-section to tie into the preceding section and then narrow down to a five-lane cross-section consisting of four twelve-foot traffic lanes with twelve-foot shoulders and a twelve-foot center turn lane for most of the remainder. Retaining walls would be constructed along this section at various locations to minimize the extent of cut slopes that would be required in the steeper areas and reduce the exposure of pyritic material present in some of these areas. Personnel of the U.S. Fish and Wildlife Service have reviewed the subject proposal and offer the following comments.

Joint mist netting and acoustical studies were performed between the period of July 8 and July 24, 2011, at 12 sites along both sections of the project where suitable roosting habitat for the Indiana bat was present. The acoustical studies resulted in the recording of a combined 3,775 bat calls, of which one was identified as an Indiana bat. The mist netting efforts resulted in the capture of a total of 85 bats, representing six non-listed species. However, 18 of these individuals were northern long-eared bats (NLEB) (*Myotis septentrionalis*), officially proposed for listing on October 2, 2013. TDOT found that the project is "not likely to adversely affect" the Indiana bat because two or more isolated calls must pass through the MoreNet filter to be considered a positive species indicator and no Indiana bats were captured during mist netting efforts. Also, a cave feature was evaluated within the

project right-of-way and determined not to be suitable for use as a bat hibernaculum. In a letter to Federal Highway Administration dated February 22, 2012, we concurred with TDOT's determination of "not likely to adversely affect" for the Indiana bat.

TDOT requests our concurrence of "no jeopardy" for the proposed NLEB based on an overall minimal removal of habitat and a proposed cutting timeframe that ensures young would be volant and/or bats would be absent from the area. Upon review of the project proposal, we concur with TDOT's determination of "no jeopardy" for the NLEB. Because the 2011 Indiana bat survey results are no longer valid, TDOT has made a "likely to adversely affect" finding and requests to enter into a Memorandum of Agreement with our office and mitigate potential impacts to this species through contribution into the Indiana Bat Conservation Fund. The current forested land average value in Tennessee is $3,800/acre. TDOT has agreed to contribute $201,400 towards species recovery efforts for removal of 53 acres of potential habitat. Upon receipt of payment, TDOT will have met section 7 obligations for this project. We will provide our section 7 clearance at such time.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/525-4995 or by email at *john_griffith@fws.gov*.

Sincerely,

Mary E. Jennings
Field Supervisor

xc: Keven Brown, TDOT, Knoxville, TN

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

August 7, 2013

Lt. Colonel John L. Hudson
District Engineer
U.S. Army Corps of Engineers
3701 Bell Road
Nashville, Tennessee 37214

Attention: Ms. Deborah Tuck, Regulatory Branch

Subject: FWS #13-CPA-0612. Public Notice No. 13-31. Proposed construction of State Route 29 from State Route 61 to State Route 328; PIN #101411.04, P.E. 65001-1256-14, Roane and Morgan counties, Tennessee.

Dear Lt. Colonel Hudson:

Fish and Wildlife Service (Service) personnel have reviewed the subject public notice dated July 8, 2013, regarding the proposal to widen 3.1 miles of State Route (SR) 29 in Roane and Morgan counties, Tennessee. The Tennessee Department of Transportation (TDOT) proposes to widen this portion of roadway to a 4-lane divided highway or 5-lane section, impacting 12 streams and seven wetlands. Compensation for the loss of 1,976 linear feet of stream would be mitigated by purchase of 1,976 credits from the Tennessee Stream Mitigation Program. The applicant proposes 1,378 linear feet of onsite in-kind replacement to three streams. Permanent impacts to 1.52 acres of filled wetlands would be mitigated by purchasing, at a 2:1 ratio, 3.04 acres of available credits from an approved wetland mitigation site. Temporary wetland impacts would be mitigated by restoring pre-construction contours and planting appropriate tree species. The following constitute the comments of the U.S. Department of Interior, provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.)

In a letter dated March 31, 2003, we concurred that the proposed project would not adversely affect the federally endangered purple bean (*Villosa perpurpurea*) and Cumberland elktoe (*Alasmidonta atropurpurea*) or the threatened spotfin chub (*Erimonax monachus*), Virginia spiraea (*Spiraea virginiana*), or Cumberland rosemary (*Conradina verticillata*) due to a lack of suitable habitat in the project area. On July 25, 2008, the Tennessee Wildlife Resources Agency further requested that TDOT consider potential impacts to the State and federally endangered Alabama lampmussel (*Lampsilis virescens*). Civil and Environmental Consultants, Inc., biologists and personnel from

TDOT's Environmental Division conducted 15 person-hours of surveys in the Little Emory River on September 10, 2009. The substrate was heavily silted due to the fluctuating water levels at Watts Bar Lake and no live mussels or relic shells were recovered during the survey effort. Based on these findings, no new information in the area, and the evident barrier to migration by Watts Bar Dam; our concurrences provided on March 31, 2003, are still in effect. Furthermore, we would not anticipate any adverse effects to the Alabama lampmussel or finerayed pigtoe (*Fusconaia cuneolus*), provided in a species list by the Tennessee Department of Environment and Conservation in a July 30, 2013, letter to the Nashville District Corps of Engineers.

Joint mist netting and acoustical studies were performed between July 8 and July 14, 2011, at eight sites determined to contain suitable habitat for the Indiana bat (*Myotis sodalis*). The acoustical study resulted in the recording of 2,611 bat calls, of which none were identified as Indiana bats. The mist netting efforts resulted in the capture of 77 bats, representing six non-listed species. Evaluation of a cave feature within the project right-of-way determined that it is not suitable for use as a bat hibernaculum. Due to negative survey results for the Indiana bat, we concurred with a "not likely to adversely affect" finding for this species in a letter to TDOT dated February 22, 2012.

We are not aware of any federally listed or proposed species that would be adversely affected by this project. Therefore, based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled for all species that currently receive protection under the Act. Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/525-4995 or by email at *john_griffith@fws.gov*.

Sincerely,

Peggy W. Shute

for Mary E. Jennings
Field Supervisor

xc: Chuck Howard, TVA, Knoxville, TN
Robert Todd, TWRA, Nashville, TN
Keven Brown, TDOT, Nashville, TN

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

February 22, 2012

Ms. Leigh Ann Tribble
Federal Highway Administration
Tennessee Division Office
404 BNA Drive, Suite 508
Nashville, Tennessee 37217

Subject: FWS #12-CPA-0283. Biological Assessment for the construction of State Route 29 from State Route 61 to State Route 328; PIN #101411.01, P.E. 73008-1237-14 and 65001-1256-14, Roane and Morgan counties, Tennessee.

Dear Ms. Tribble:

Thank you for your letter dated February 3, 2012, transmitting acoustic and mist netting survey results for the proposed construction to State Route 29 from State Route 61 to State Route 328 in Roane and Morgan counties, Tennessee. At the request of our office, surveys were conducted along the proposed corridor to determine if the area is being utilized as summer roosting habitat by the federally endangered Indiana bat (*Myotis sodalis*). Personnel of the U.S. Fish and Wildlife Service have reviewed the information provided and offer the following comments.

Joint mist netting and acoustical studies were performed between July 8 and July 14, 2011, at eight sites determined to contain suitable habitat for the Indiana bat. The acoustical study resulted in the recording of 2,611 bat calls, of which none were identified as Indiana bats. The mist netting efforts resulted in the capture of 77 bats, representing six non-listed species. Evaluation of a cave feature within the project right-of-way determined that it is not suitable for use as a bat hibernaculum. The Tennessee Department of Transportation (TDOT) has concluded that the project is "not likely to adversely affect" the Indiana bat because none were recorded during the surveys.

Due to negative survey results for the Indiana bat, we concur with TDOT's finding of "not likely to adversely affect" for this species. Although it is likely that this project would have an insignificant effect on the Indiana bat, we would appreciate consideration given to the removal of trees with a DBH (diameter at breast height) of five inches or greater from October 15 through March 31 to further minimize potential for harm to the Indiana bat. Based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner

not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/525-4995 or by email at john_griffith@fws.gov.

Sincerely,

Mary E. Jennings
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

July 23, 2007

Mr. Mark Doty
Tennessee Department of Transportation
7345 Region Lane
Knoxville, Tennessee 37914

Re: FWS #07-FA-0862

Dear Mr. Doty:

Thank you for your email of July 18, 2007, requesting updated information concerning federally listed and proposed endangered and threatened species that might occur in the impact area of the reconstruction of State Route 29 from east of Harriman to State Route 62 in Roane and Morgan counties, Tennessee. Fish and Wildlife Service biologists have reviewed the information submitted and we offer the following comments.

In a response dated March 31, 2003, we concurred that the proposed project is not likely to adversely affect the federally endangered purple bean (*Villosa perpurpurea*) and Cumberland elktoe (*Alasmidonta atropurpurea*) or the threatened spotfin chub (*Erimonax monachus*), Virginia spiraea (*Spiraea virginiana*), or Cumberland rosemary (*Conradina verticillata*). We further stated in that letter that the requirements of section 7 of the Endangered Species Act were fulfilled.

Since that time, we have received no new records of federally listed species nor have we listed new species that might occur in the project impact area. Our March 31, 2003, letter therefore remains in effect. Obligations under section 7 of the Endangered Species Act must be reconsidered, however, if: (1) new information reveals that the proposed project may affect listed species in a manner or to an extent not previously considered, (2) the proposed project is subsequently modified to include activities which were not considered during this review, or (3) new species are listed or critical habitat designated that might be affected by the proposed project.

Thank you for the opportunity to comment. If you have any questions, please contact Jim Widlak of my staff at 931/528-6481, ext. 202.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

March 31, 2003

Ms. Leigh Ann Tribble
Area Engineer
Federal Highway Administration
640 Grassmere Park, Suite 112
Nashville, Tennessee 37211

Re: FWS #03-0309

Dear Ms. Tribble:

On March 28, 2003, Lilah Miller from the Tennessee Department of Transportation (TDOT) called Jim Widlak of my staff concerning the proposed widening of State Route 29 from State Route 61 in Roane County to State Route 62 in Morgan County, Tennessee. On December 11, 2002, we received a letter from you transmitting an evaluation, prepared by TDOT personnel, of potential effects of that project to five federally listed endangered and threatened species. The project evaluation included a determination that the proposed highway widening would not affect any of the five listed species. Our response, dated January 23, 2003, indicated that no listed species occur in the project impact area. This was an erroneous response in light of the fact, as stated in TDOT's evaluation, that we had previously provided the list of species that were included in the project evaluation. Fish and Wildlife Service biologists have reviewed the project evaluation again and we offer the following comments.

Because no suitable habitat for the purple bean (*Villosa perpurpurea*), Cumberland elktoe (*Alasmidonta atropurpurea*), spotfin chub (*Cyprinella monacha*), Cumberland rosemary (*Conradina verticillata*), or Virginia spiraea (*Spiraea virginiana*) exists in the project area, we concur that the proposed widening of State Route 29 from State Route 61 to State Route 62 is not likely to adversely affect those listed species. In view of this, we believe that the requirements of section 7 of the Endangered Species Act have been fulfilled. Obligations under section 7 must be reconsidered, however, if: (1) new information reveals that the proposed project may affect listed species in a manner or to an extent not previously considered, (2) the proposed project is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed project.

Thank you for bringing this matter to our attention. We apologize for our error and hope that it has not caused undue delays in the project. If you have any questions or if we can be of further assistance, please contact Jim Widlak of my staff at 931/528-6481, ext. 202.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

January 23, 2002

Ms. Leigh Ann Tribble
Area Engineer
Federal Highway Administration
640 Grassmere Park, Suite 112
Nashville, Tennessee 37211

Re: FWS #03-0309

Dear Ms. Tribble:

Thank you for your letter and enclosures of December 11, 2002, concerning the bridge widening of State Route 29 from State Route 61 in Roane County to State Route 62 in Morgan County, Tennessee. Fish and Wildlife Service (Service) personnel have reviewed the information submitted and the following comments are provided in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

The Service is concerned that highway projects frequently accelerate erosion and sedimentation in streams, resulting in adverse effects to the aquatic environment. The use of heavy equipment to move earth and existing vegetation disrupts natural drainage patterns and exposes large areas of disturbed soil to erosion. Excessive sedimentation can clog stream channels and contribute to increased flooding. It can also increase water temperatures and cause oxygen demands which can damage or destroy fish and invertebrate populations. Deposition of sediment on the channel bottom also degrades aquatic habitat by filling in substrate cavities, burying demersal eggs, and smothering bottom organisms. In addition, turbidity, as induced by accelerated erosion and sedimentation, results in further damage to aquatic systems. Increased particulate matter suspended in the water column may drive fish from the polluted area by irritating the gills, concealing forage, and/or destroying vegetation that may be essential for spawning and cover habitat for particular species. Turbidity also degrades water quality by reducing light penetration, pH and oxygen levels, and the buffering capacity of the water. Degraded water quality may continue far downstream from the point where the erosion occurs.

Prevention of excessive sedimentation can occur only through application of Best Management Practices during daily construction activities. Rigid application of your agency's construction erosion control standards can preclude most sedimentation problems; however, in some cases additional measures will need to be taken by on-site inspectors and construction representatives.

Upon review of the proposed projects, we find that the information provided is insufficient to determine if the proposed actions will require U.S. Army Corps of Engineers' permits. Since permit applications could more thoroughly reveal the extent of construction activities affecting aquatic resources, we will provide additional comments during the 404 review process should the project necessitate Corps' permits. However, we would likely have no objection to the issuance of permits if any necessary stream channel work is held to a minimum and Best Management Practices are utilized and enforced, effectively controlling erosion, sedimentation, and other potential hazards. The following conditions are specifically recommended:

1. Erosion and sediment control measures, including but not limited to the following, should be implemented on all vegetatively denuded areas:

    a. Preventive planning: A well-developed erosion control plan which entails a preliminary investigation, detailed contract plans and specifications, and final erosion and sediment control contingency measures should be formulated and made a part of the contract.

    b. Diversion channels: Channels should be constructed around the construction site to keep the work site free of flow-through water.

    c. Silt barriers: Appropriate use should be made of silt fences, hay bale and brush barriers, and silt basins in areas susceptible to erosion.

    d. Temporary seeding and mulching: All cuts and fill slopes, including those in waste sites and borrow pits, should be seeded as soon as possible.

    e. Limitation of instream activities: Instream activities, including temporary fills and equipment crossings, should be limited to those absolutely necessary.

2. Concrete box culverts should be placed in a manner that prevents any impediment to low flows or to movement of indigenous aquatic species.

3. Channel excavations required for pier placement should be restricted to the minimum necessary for that purpose. Overflow channel excavations should be confined to one side of the channel, leaving the opposite bank and its riparian vegetation intact.

4. All fill should be stabilized immediately upon placement.

5. Streambanks should be stabilized with riprap or other accepted bioengineering technique(s).

6. Existing transportation corridors should be used in lieu of temporary crossings where possible.

7. Good water quality should be maintained during construction.

Efficient management practices can minimize adverse impacts associated with construction. It is important that these and other measures be monitored and stringently enforced. This will aid in preserving the quality of the natural environment.

Endangered species collection records available to the Service do not indicate that federally listed or proposed endangered or threatened species occur within the impact area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality. However, based on the best information available at this time, we believe that the requirements of Section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under Section 7 of the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

Thank you for giving us the opportunity to comment on these actions. If you have any questions, please contact Jim Widlak of my staff at 931/528-6481, ext. 202.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

Attachment E. SHPO Correspondence

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

April 9, 2002

Mr. Gerald Kline
Tennessee Department of Transportation
Environmental Planning Office
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

RE: FHWA, ARCHAEOLOGICAL ASSESSMENT, SR-29/NORTH OF HARRIMAN TO SR-62, UNINCORPORATED, ROANE COUNTY, TN

Dear Mr. Kline:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, and the revised design, we concur that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

Therefore, this office has no objection to the implementation of this project. If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jmb

July 25, 2013

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON ROAD
NASHVILLE, TENNESSEE 37214
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

Ms. Deborah T. Tuck
COE-Nashville District
3701 Bell Road
Nashville, Tennessee, 37214

RE: COE-N, PN# 13-31/SR-29 WIDENING, MORGAN, ROANE COUNTY

Dear Ms. Tuck:

In response to your request, received on Thursday, July 11, 2013, we have reviewed the documents you 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 applicant 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. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process.

After considering the documents you submitted, we determine that THERE ARE NO NATIONAL REGISTER OF HISTORIC PLACES LISTED OR ELIGIBLE PROPERTIES AFFECTED BY THIS UNDERTAKING. We have made this determination either because: the undertaking will not alter any characteristics of an identified eligible or listed Historic Property that qualify the property for listing in the National Register, the undertaking will not alter an eligible Historic Property's location, setting or use, the specific location, scope and/or nature of the undertaking precluded affect to Historic Properties, the size and nature of the undertaking's area of potential effects precluded affect to Historic Properties, or, no National Register listed or eligible Historic Properties exist within the undertaking's area of potential effects. Therefore, we have no objections to your proceeding with your undertaking.

If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, 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. If you are applying for federal funds, license or permit, you should submit this letter as evidence of consultation under Section 106 to the appropriate federal agency, which, in turn, should contact us as required by 36 CFR 800. If you represent a federal agency, you should submit a formal determination of eligibility and effect to us for comment. You may find additional information concerning the Section 106 process and the Tennessee SHPO's documentation requirements at http://www.tennessee.gov/environment/hist/federal/sect106.shtm. You may direct questions or comments to Joe Garrison (615) 532-1550-103. This office appreciates your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jyg

Attachment F. State Water Quality Certification

STATE OF TENNESSEE
TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11TH Floor
Nashville, Tennessee 37243-1102

September 10, 2014

Ms. Melanie Bumpus
Tennessee Department of Transportation
Environmental Division
Suite 900, James K. Polk Bldg.
505 Deaderick St.
Nashville, TN 37243

Subject: Aquatic Resource Alteration Permit **NRS 14.086.**
TDOT 65001-1256-14, PIN101411.04 File# NRS 14.086, Roane County

Dear Ms. Bumpus:

We have reviewed your application for the proposed 3,053 ft. of stream encapsulation and 44 ft. of riprap in unnamed tributaries of Bitter Creek required to widen and improve State Route 29 in Harriman to South of Whetstone Road.. Pursuant to the *Tennessee Water Quality Control Act of 1977* (T. C. A. § 69-3-101 et seq.) and supporting regulations, the Division of Water Resources is required to determine whether the activity proposed will violate applicable water quality standards.

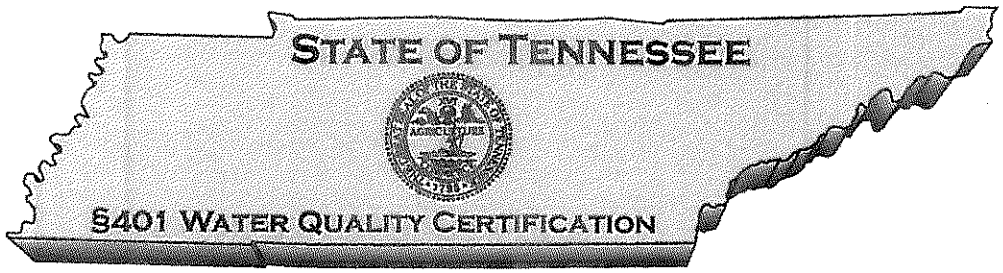
Subject to conformance with accepted plans, specifications and other information submitted in support of application NRS 13.054, the state of Tennessee hereby issues an aquatic resources alteration permit (enclosed). Failure to comply with the terms of this permit or other violations of the *Tennessee Water Control Act of 1977* is subject to penalty in accordance with T.C.A. § 69-3-115.

It is the responsibility of the permittee to ensure that all contractors involved with this project have read and understood the permit conditions before the project begins. If you need additional information or clarification, please contact Brian Canada at 615-532-0660 or by e-mail brian.canada@tn.gov.

Sincerely,

Brian Canada, M.S., Q.H.P.
Natural Resources Unit

Cc: Knoxville Environmental Field Office
U.S. Army Corps of Engineers, Nashville District
file copy



NRS14.086

Pursuant to §401 of *The Federal Clean Water Act* (33 U.S.C. 1341), the State of Tennessee is required to certify whether the activity described below will violate applicable water quality standards. Accordingly, the Division of Water Resources requires reasonable assurance that the activity will not violate provisions of *The Tennessee Water Quality Control Act of 1977* (T.C.A. §69-3-101 et seq.) or provisions of §§301, 302, 303, 306 or 307 of *The Clean Water Act*.

Subject to conformance with accepted plans, specifications and other information submitted in support of the application, pursuant to 33 U.S.C. 1341 the State of Tennessee hereby certifies the activity described below. This shall serve as authorization under T.C.A. §69-3-101 et seq.

PERMITTEE Tennessee Department of Transportation

AUTHORIZED WORK: 3,053 ft. of stream encapsulation and 44 ft. of riprap in unnamed tributaries of Bitter Creek required to widen and improve State Route 29 in Harriman to South of Whetstone Road.

LOCATION: State Route 29 in Harriman to South of Whetstone Road, TDOT 65001-1256-14, PIN101411.04 File# NRS 14.086, Roane County (Lat: 35.9725/ Lon: -84.4946).

EFFECTIVE DATE: September 10, 2015

EXPIRATION DATE: September 9, 2019

Tisha Calabrese Benton
Director, Division of Water Resources

Table of Contents

PART I

Specific Impacts:

Impact 1: Latitude: 35.9750 Longitude: -84.4901

Unnamed tributary to Little Emory River (STR-1) Station 115+38 to Sta. 140+09

Existing structures include 81 ft. of 5X6 RCBC (to remain) 38 ft. of 48" CMP, 67 ft. of 8X6 RCBC and 100 ft. of 10X6 RCBC (to remain) and 1,469 ft. of open stream channel. The applicant shall install 1,309 ft. of relocated channel (includes 58' of riprap), 193' of 5X6 ft. RCBC, 110' of 8X6 ft. RCBC, 202' of 10X6 ft. RCBC. Associated with this impact are storm water outfalls and water line relocations at Sta. 115+83 (Lt.) and Sta. 128+45 (Rt.).

Impact 2: Latitude: 35.9774 Longitude: -84.4851

Unnamed tributary to Little Emory River (SPR-1) Station 131+15+/-

Install a spring box with 105 ft. of 18" RCP.

Impact 3: Latitude: 35.9774 Longitude: -84.4851

Wetland (WTL-1) Station 130+50 to Sta. 131+52

Permanent impact (filling) to 0.03 acre of wetlands.

Impact 4: Latitude: 35.9793 Longitude: -84.4821

Little Emory River (STR-3) Station 142+32 to Sta. 168+32

Existing 157 ft. of 5-span concrete deck bridge shall be replaced with 195 ft. of 3-span girder bridge with riprap at the abutments. Also, at Station 172+82.50 replace existing 167 ft. of 5-span concrete deck girder bridge with 195' of 2 @ 3-span bridge with riprap at the abutments.

Impact 5: Latitude: 35.9874 Longitude: -84.4827

Little Emory River (STR-3) Station 171+75 to Sta. 173+90(Lt)

Install a 12" water line.

Impact 6: Latitude: 35.9836 Longitude: -84.4819

Unnamed tributary to Little Emory River (STR-4) Station 159+92 to Sta. 162+33

Existing 287 ft. of open stream and 72 ft. of 24" RCP shall be filled for a total loss of 359 ft. Associated with this impact is relocation of a 12" water line at Sta. 159+92(Lt) and remove of the existing 10" water line.

Impact 7: Latitude: 35.9878 Longitude: -84.4815

Unnamed tributary to Little Emory River (STR-5) Station 48+60 (Coal Hill Road)

Existing 30 ft. of 60" CMP and 85 ft. of open stream shall be replaced with 46 ft. of 60" RCP with 21 ft. of riprap at the outlet and 12 ft. of Class C riprap at the inlet and 43 ft. of open stream. Associated with this impact is removal of an existing 8" water line.

Impact 8: Latitude: 35.9886 Longitude: -84.4841

Bitter Creek (STR-6) Station 177+04 to Sta. 183+71

Existing 142 ft. of 5-span concrete deck bridge shall be replaced with 220 ft. of 3-span bridge (south bound) and 331 ft. of 4-span bridge (north bound). Associated with this impact are storm water outfalls and riprap at the bridge abutments and a 12" water line installation.

Impact 9: Latitude: 35.9889 Longitude: -84.4847

Unnamed tributary to Bitter Creek (STR-6A) Station 350+55 to 357+00

Existing 130 ft. of open stream and 135 ft. of 24" RCP shall be replaced with 148 ft. of 36" RCP with 24 ft. U-shaped end walls and 62 ft. open stream. Associated with this impact is an electrical line and a 12" water line installation.

Impact 10: Latitude: 35.9900 Longitude: -84.4877

Unnamed tributary to Bitter Creek (STR-7) Station 192+02 to Sta. 197+48

Existing 20 ft. of 24" CMP and 98 ft. of 54" RCP and 173 ft. of open stream shall be replaced with 78 ft. of 60" RCP, 7 ft. of catch basin, 107 ft. of 60" RCP plus 18 ft. of riprap and 60 ft. of open stream. Associated with this impact is replacement of a 10" water line with a 12" water line.

Impact 11: Latitude: 35.9906 Longitude: -84.4883

Wetland (WTL-2) Station 192+69 to Sta. 198+00

Permanent impact (fill) to 0.30 acre wetlands and replace an existing 10" water line with a 12" water line.

Impact 12: Latitude: 35.9904 Longitude: -84.4881

Unnamed tributary to Bitter Creek (STR-8) Station 192+55 to Sta. 199+50 (Rt)

Existing 285 ft. of open stream channel shall be filled. Associated with this impact is replacement of a 10" water line with a 12" water line.

Impact 13: Latitude: 35.9905 Longitude: -84.4892

Wetland (WTL-3) Station 192+69 to Sta. 198+00

Permanent impact (fill) to 0.07 acre of wetlands.

Impact 14: Latitude: 35.9914 Longitude: -84.4916

Unnamed tributary to Bitter Creek (STR-9) Station 204+43+/-

Existing 73 ft. of 60" RCP and 282 ft. of open stream shall be replaced with 248 ft. of 6X4 ft. RCBC with 15 ft. riprap at the oulet and 40 ft. of riprap at the inlet and 55 ft. of open stream. Associated with this impact is replacement of a 10" water line with a 12" water line.

Impact 15: Latitude: 35.9922 Longitude: -84.4933

Unnamed tributary to Bitter Creek (STR-10) Station 209+50+/- to Sta. 213+06

Existing 63 ft. of 5' RCBC (to remain) and 31 ft. of 30" CMP and 581 ft. of open stream shall be replaced with 63 ft. of 5' RCBC with 2-10 ft. of U-shaped end walls plus 52 ft. of riprap at the inlet, 90 ft. of 6X5 ft. RCBC extension at inlet and 46 ft. of 6X5 ft. RCBC extension at the outlet. And 390 ft. of open channel (including 79 ft. of riprap). Associated with this impact is ¾" with 2" casing water line and removal of a 10" water line.

Impact 16: Latitude: 35.9926 Longitude: -84.4954

Unnamed tributary to Bitter Creek (STR-11) Station 216+98 to Sta. 218+15

Existing 80 ft. of 30" CMP and 148 ft. of open stream shall be replaced with 107 ft. of open stream relocation for a loss of 121 ft.

Impact 17: Latitude: 35.9937 Longitude: -84.4973

Wetland (WTL-5) Station 221+45 to Sta. 223+87

Permanent impact (fill) to 0.10 acre of wetlands. Associated with this impact is removal of a 10" water line.

Impact 18: Latitude: 35.9933 Longitude: -84.4972

Unnamed tributary to Bitter Creek (STR-12) Station 221+99 to Sta. 224+30

Existing 74 ft. of 36" RCp and 178 ft. of open stream shall be replaced with 177 ft. of 42" RCP with 20 ft. riprap at the inlet and 30 ft. of riprap at the outlet and 278 ft. of open channel (228 ft. concrete lined channel and 50 ft. of riprap). Associated with this impact is a 12" water line.

Impact 19: Latitude: 35.9949 Longitude: -84.4994

Wetland (WTL-6) Station 230+50 to Sta. 223+20

Permanent impact (fill) to 0.07 and temporary impact to 0.06 acre of wetlands. Associated with this impact is a 12" water line.

Impact 20: Latitude: 35.9951 Longitude: -84.4991

Unnamed tributary to Bitter Creek (STR-13) Station 230+89

Existing 65 ft. of 6X5 ft. RCBC (to remain) and 174 ft. of open stream shall be replaced with 92 ft. of 6X5 ft. RCBC extension at the inlet and14 ft. of 6X5 RCBC extension at the outlet with 30 ft. riprap at the inlet and 20 ft. riprap at the outlet and 50 ft. of riprap lined open stream. Associated with this impact is removal of a 10" water line.

Impact 21: Latitude: 35.9962 Longitude: -84.5004

Wetland (WTL-6a) Station 234+42 to Sta. 236+30

Permanent impact (fill) to 0.1 acre of wetlands. Associated with this impact is a 12" water line.

Impact 22: Latitude: 35.9962 Longitude: -84.5004

Unnamed tributary to Bitter Creek (STR-13) Station 230+89

Existing 79 ft. of 24" CMP and 50 ft. of open stream shall be replaced with 140 ft. of 76"X48" RCP and 78 ft. of open stream (riprap). Associated with this impact is a 12" water line.

Impact 23: Latitude: 35.9979 Longitude: -84.5019

Wetland (WTL-8) Station 241+81 to Sta. 244+44

Permanent impact (fill) to 0.03 and temporary impact to 0.04 acre of wetlands.

Impact 24: Latitude: 35.9974 Longitude: -84.5018

Unnamed tributary to Bitter Creek (STR-14) Station 241+38

Existing 69 ft. of 72" CMP and 661 ft. of open stream shall be replaced with 188 ft. of 6X4 ft. RCBC with 20 ft. riprap and 45 ft. 6X4 ft. with 15 ft. of riprap inlet and outlet and 469 ft. of open stream. Associated with this impact is a 12" water line and removal of an existing 10" line.

Impact 25: Latitude: 35.9986 Longitude: -84.5025

Wetland (WTL-9) Station 245+02 to Sta. 250+92

Permanent impact (fill) to 0.92 acre of wetlands. Associated with this impact is a ¾" water line and removal of an existing 10" line.

Impact 26: Latitude: 35.9983 Longitude: -84.5026

Unnamed tributary to Bitter Creek (STR-14a) Station 241+59 to Sta. 251+99

Existing 41 ft. of 15" CMP and 39 ft. of 15" CMP and 987 ft. of open stream shall be filled.

Impact 27: Latitude: 36.0002 Longitude: -84.5060

Wetland (WTL-10) Station 259+25 to Sta. 260+12

Permanent impact (fill) to 0.07 acre of wetlands. Associated with this impact is removal of an existing 10" line.

Impact 28: Latitude: 36.0002 Longitude: -84.5060

Unnamed tributary to Bitter Creek (STR-15) Station 259+66+/-

Existing 58 ft. of 30" RCP and 56 ft. open stream shall be replaced with 27 ft. of 18" perforated pipe and 69 ft. of 36" RCP and 18 ft. of riprap lined open stream.

Impact 29: Latitude: 36.0008 Longitude: -84.5070

Wetland (WTL-11) Station 262+11 to Sta. 266+57

Permanent impact (fill) to 0.17 acre of wetlands. Associated with this impact is removal of an existing 10" line.

Impact 30: Latitude: 36.0017 Longitude: -84.5092

Unnamed tributary to Bitter Creek (STR-16) Station 269+60 to Sta. 271+42

Existing 118 ft. of open stream shall be relocated into a channel 118 ft. in length.

Impact 31: Latitude: 36.0015 Longitude: -84.5088

Unnamed tributary to Bitter Creek (STR-16a) Station 270+29 to Sta. 270+31 (Lt.)

Existing 31 ft. of open stream shall be filled.

Impact 32: Latitude: 36.0032 Longitude: -84.5121

Forked Creek (STR-17) Station 280+51

Existing 67 ft. of 3@12X5 RCBC (to remain) and 109 ft. open stream. Applicant shall extend the 3@12X5 ft. RCBC by 54 ft. at the inlet (with 8 ft. of riprap) and 25 ft. at the outlet (with 22 ft. riprap). Associated with this impact is a 12" water line and removal of an existing 10" line.

General Conditions:

a. It is the responsibility of the applicant to convey all terms and conditions of this permit to all contractors. A copy of this permit, approved plans and any other documentation pertinent to the activities authorized by this permit shall be maintained on site at all times during periods of construction activity.

b. Work shall not commence until the applicant has received the federal §404 permit from the U. S. Army Corps of Engineers, a §26a permit from the Tennessee Valley Authority or authorization under a Tennessee NPDES Storm Water Construction Permit where necessary. The applicant is responsible for obtaining these permits.

c. The work shall be accomplished in conformance with the accepted plans, specifications, data and other information submitted in support of application NRS14.086 and the limitations, requirements and conditions set forth herein.

d. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in Rule 0400-40-03-.03 of the Rules of the Tennessee Department of Environment and Conservation. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of waters of the state for any of the uses designated by Rule 0400-40-04. These uses include fish and aquatic life (including trout streams and naturally reproducing trout streams), livestock watering and wildlife, recreation, irrigation, industrial water supply, domestic water supply, and navigation.

e. Impacts to waters of the state other than those specifically addressed in the plans and this permit are prohibited. All streams, springs and wetlands shall be fully protected prior, during and after construction until the area is stabilized. Any questions, problems or concerns that arise regarding any stream, spring or wetland either before or during construction, shall be addressed to the Division of Water Resource's Knoxville Environmental Field Office (865-594-6035), or the permit coordinator in the division's Natural Resources Section (615-532-0660).

f. Adverse impact to formally listed state or federal threatened or endangered species or their critical habitat is prohibited.

g. This permit does not authorize adverse impacts to cultural, historical or archeological features or sites.

PART II

Mitigation Requirements and Monitoring Procedures

Required Mitigation Activities

The 3,097ft. of stream encapsulation shall be mitigated by purchasing 3,097 ft. of available credits from the Tennessee Stream Mitigation Program Upper Tennessee Service Area. Payment shall be made to TSMP with proof of purchase submitted to the Division within 90 days of the effective date of this permit. Relocated channels shall be replaced in kind with natural bottoms unless specifically noted in this permit. Streams shall be diverted into the new channel and the original channel allowed to remain open for 48 hours to allow aquatic organisms time to migrate out prior to filling. Relocated channels greater than 200 feet shall be constructed to mimic the morphological, habitat and in-stream flow characteristics of the regional reference conditions to the maximum extent practicable. Vegetated buffer strips should be maintained along the relocated channels with mowing exclusion signage placed at 75 feet intervals along relocated streams.

The applicant shall mitigate for the permanent impact to 1.77 acres of wetlands by debiting, at a 2:1 ratio, 3.54 acre of available credit from the Walls Wetland Mitigation Site.

Monitoring Requirements and Procedures

a. The permittee shall submit the following monitoring information on an annual basis, for a term of five years (5 years).

b. Monitoring shall be required for all relocations and restored temporary wetland impacts.

c. Qualitative Habitat Assessment - The RBP (Rapid Bioassessment Protocols) Habitat Assessment score for the mitigation project on year 5 of monitoring must be greater than 75% of the regional habitat assessment guideline score as found in the 2011 TDEC standard operating procedure for macroinvertebrate stream surveys.

d. Vegetation - Vegetative species must be on approved native species planting list. Buffer has been maintained and mowing exclusion signage still present.

e. Morphology - The monitored morphology success criteria values for the restored reach shall not deviate from the actual as-built values by more than 20% in any monitoring year.

f. Stability - A Channel Stability Rating (CSR) of at least "Good" must be achieved during every monitoring year.

g. Hydrology – On the 1st, 3rd and final year of monitoring the applicant shall perform a Hydrologic Determination (HD) using the Division of Water Resources HD methodology (between February and April) to ensure that under normal weather conditions the relocated channels score as streams and are maintaining base flow.

Recording of Results

a. For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

    1. The exact place, date and time of sampling;
    2. The exact person(s) collecting samples;
    3. The dates and times the analyses were performed;
    4. The person(s) or laboratory who performed the analyses;
    5. The analytical techniques or methods used;
    6. The results of all required analyses;
    7. Narrative descriptions, photo-documentation, riparian vegetation surveys, channel morphology surveys, stability assessments, and hydrology surveys/documentation, and;

b. In the event any portion or aspect of the mitigation project does not meet the specified success criteria based on reporting and/or additional visual observations in a monitoring year, the nature and cause(s) of the resulting condition shall be investigated and documented. If it is determined that corrective actions are not warranted at the time, the rationale for the decision shall be stated. Continued monitoring of the condition or area using more detailed methodology may be appropriate and must be documented. In instances where corrective actions are necessary, a plan shall be prepared that includes proposed actions, a time schedule for activities, and revised monitoring plan.

Submission of Monitoring Results

a. All monitoring reports and information shall be submitted in report-form to the division's Natural Resources Unit, located in the William R. Snodgrass – Tennessee Tower, 11th Floor, 312 Rosa L. Parks, Nashville, Tennessee 37243-1102. Copies shall also be provided to the appropriate Water Resources Environmental Field Office, and the U.S. Army Corps of Engineers District Office.

b. The monitoring reports shall be due by October 31st of each monitoring year.

Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation shall be retained for a minimum of five (5) years, or longer, if requested by the Division of Water Resources.

Falsifying Results and/or Reports

Knowingly making any false statement on any report required by this permit or falsifying any result may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

Monitoring Closeout

The applicant shall notify the agencies in writing when the monitoring period is complete. Following receipt of the final report, the agencies will contact the applicant (or agent) as soon as possible to schedule a site visit to confirm the completion of the compensatory mitigation site. The compensatory mitigation shall not be considered complete without an on-site inspection by regulatory staff and written confirmation that the site is functioning as proposed.

PART III

Duty to Reapply

Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of Water Resources. Such applications must be properly signed and certified.

Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

Other Information

If the permittee becomes aware that he/she failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, then he/she shall promptly submit such facts or information.

Changes Affecting the Permit

Transfer/Change of Ownership

a. This permit may be transferred to another party, provided there are no activity or project modifications, no pending enforcement actions, or any other changes which might affect the permit conditions contained in the permit, by the permittee if:

b. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;

c. The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and contractual liability between them; and

d. The Director does not notify the current permittee and the new permittee, within 30 days, of his intent to modify, revoke, reissue, or terminate the permit, or require that a new application be filed rather than agreeing to the transfer of the permit.

e. The permittee must provide the following information to the division in their formal notice of intent to transfer ownership:

1. the permit number of the subject permit;
2. the effective date of the proposed transfer;
3. the name and address of the transferor;
4. the name and address of the transferee;
5. the names of the responsible parties for both the transferor and transferee;
6. a statement that the transferee assumes responsibility for the subject permit;
7. a statement that the transferor relinquishes responsibility for the subject permit;
8. the signatures of the responsible parties for both the transferor and transferee, and;
9. a statement regarding any proposed modifications to the permitted activities or project, its operations, or any other changes which might affect the permit conditions contained in the permit.

Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

Noncompliance

Effect of Noncompliance

All discharges shall be consistent with the terms and conditions of this permit. Any permit noncompliance constitutes a violation of applicable State and Federal laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

Reporting of Noncompliance

24-Hour Reporting

a. In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources in the appropriate Environmental Field Office within 24-hours from the time the permittee becomes aware of the circumstances. (The Environmental Field Office should be contacted for names and phone numbers of environmental response personnel).

b. A written submission must be provided within five (5) days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

    1. A description of the discharge and cause of noncompliance;
    2. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
    3. The steps being taken to reduce, eliminate, and prevent recurrence of the non-complying discharge.

Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph a. above, the permittee shall report the noncompliance by contacting the permit coordinator, and provide all information concerning the steps taken or planned to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including but not limited to, accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

Liabilities

Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of pollutants to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its discharge activities in a manner such that public or private nuisances or health hazards will not be created.

Liability under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or the Federal Water Pollution Control Act, as amended.

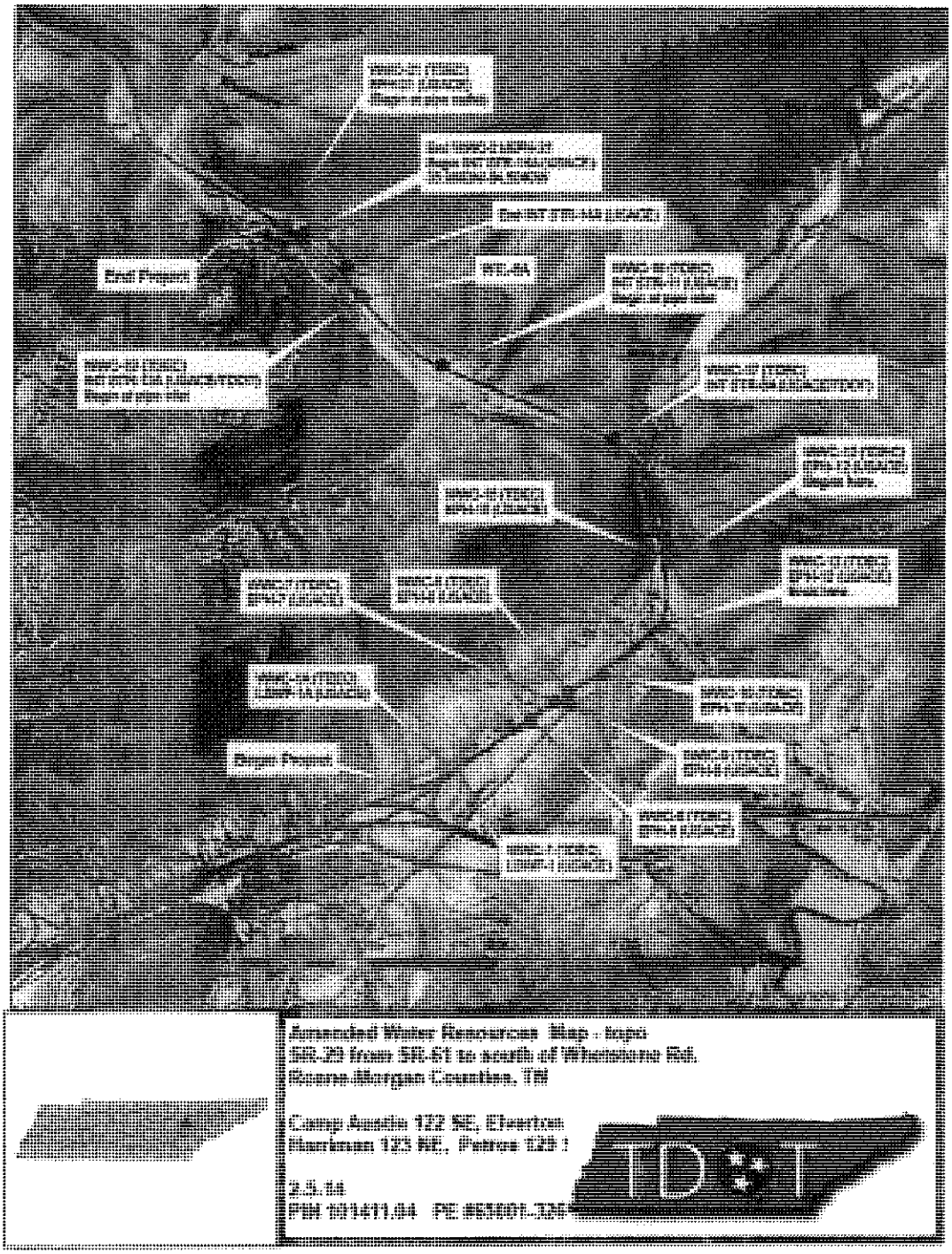
This permit does not preclude requirements of other federal, state or local laws. This permit also serves as a State of Tennessee Aquatic Resource Alteration Permit (ARAP) pursuant to the Tennessee Water Quality Control Act of 1977 (T.C.A. §69-3-101 et seq.).

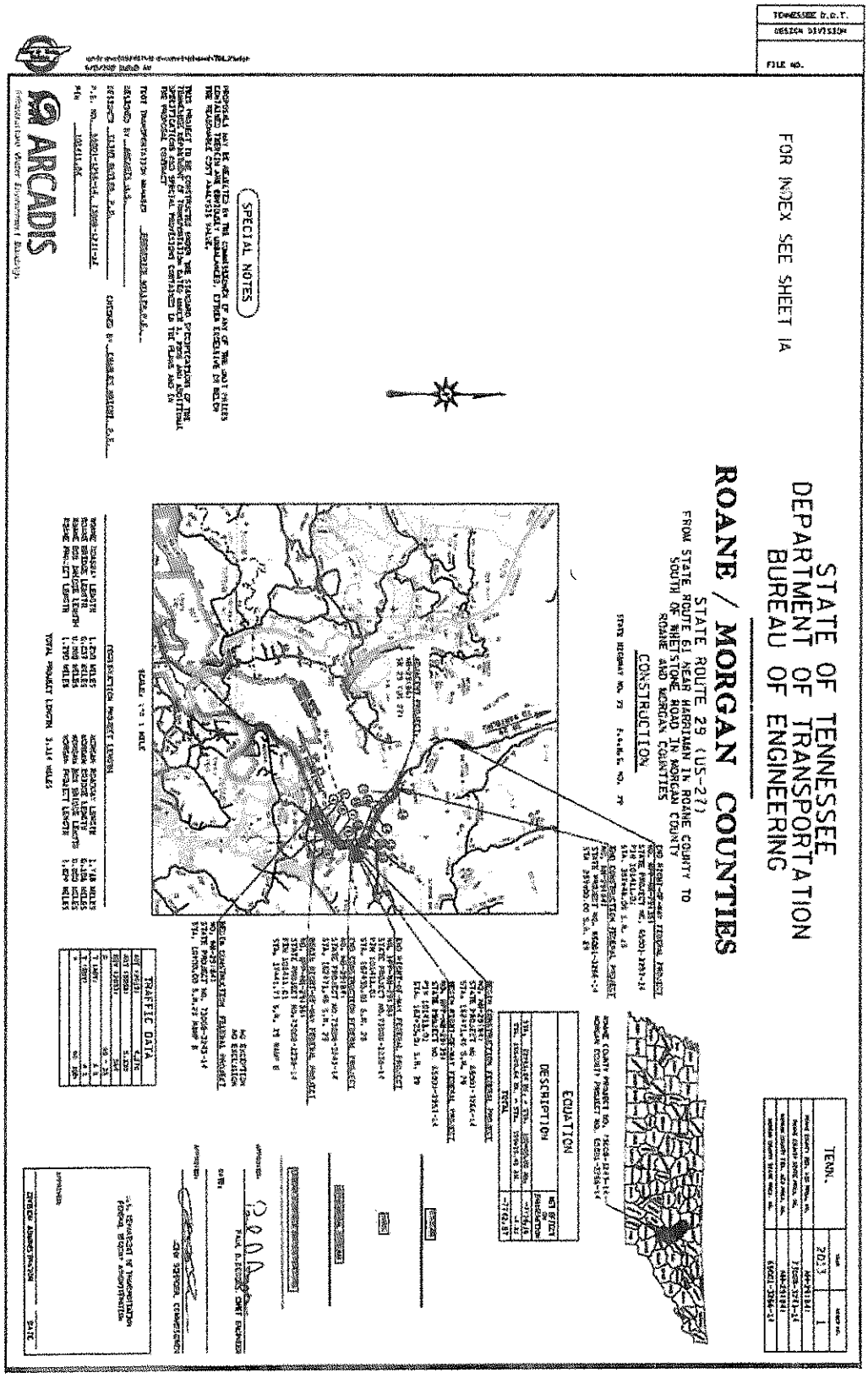
The State of Tennessee may modify, suspend or revoke this permit or seek modification or revocation should the state determine that the activity results in more than an insignificant violation of applicable water quality standards or violation of the act. Failure to comply with permit terms may result in penalty in accordance with T.C.A. §69-3-115.

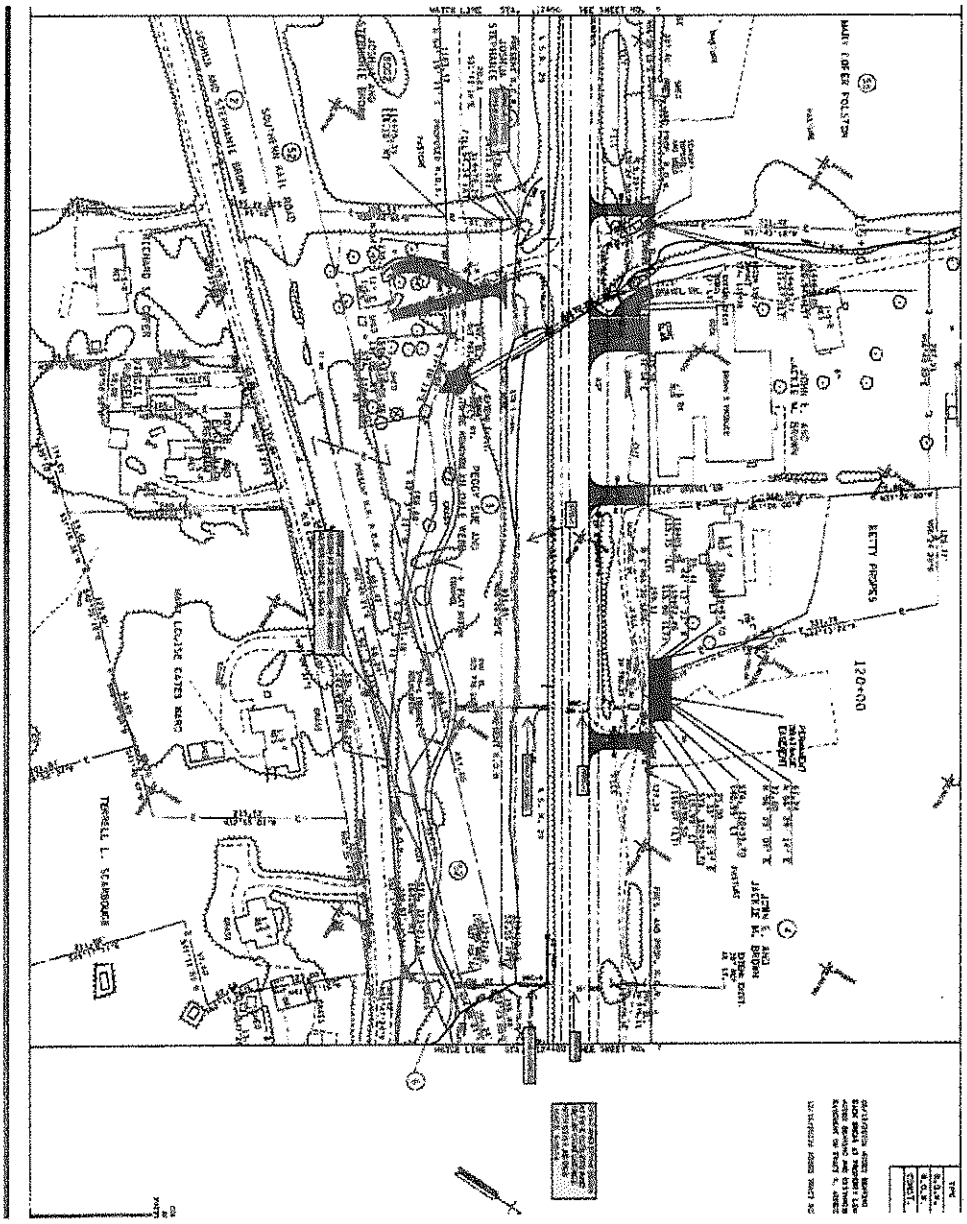
An appeal of this action may be made as provided in T.C.A. §69-3-105(i) and Rule 0400-40-03-.12 by submitting a petition for appeal. This petition must be filed within THIRTY (30) DAYS after public notice of the issuance of the permit. The petition must specify what provisions are being appealed and the basis for the appeal. It should be addressed to the technical secretary of the Tennessee Board of Water Quality, Oil and Gas at the following address: Tisha Calabrese-Benton, Director, Division of Water Resources, 11th Floor William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Ave., Nashville, Tennessee 37243. Any hearing would be in accordance with T.C.A. §§69-3-110 and 4-5-301 et seq.

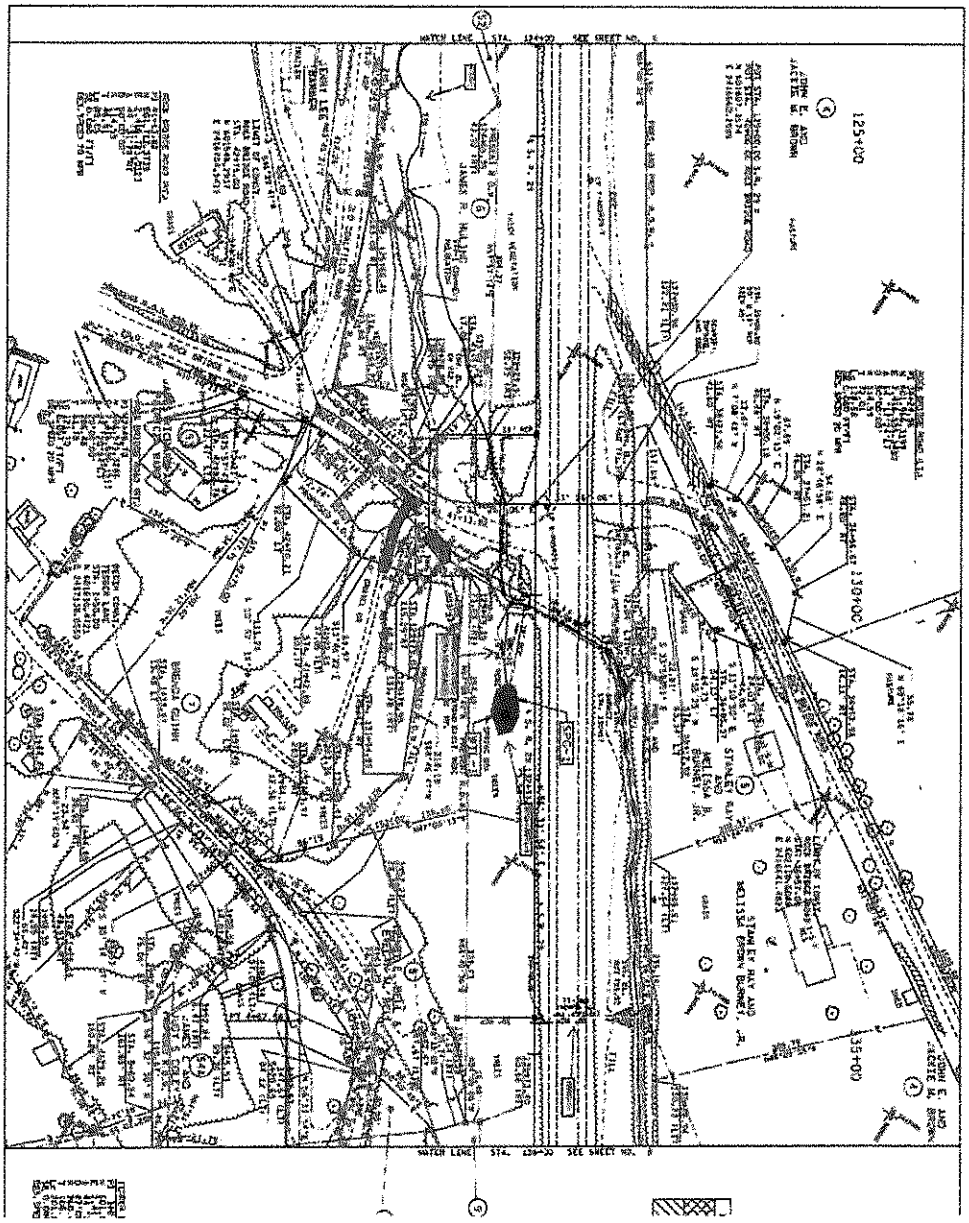
APPENDIX I

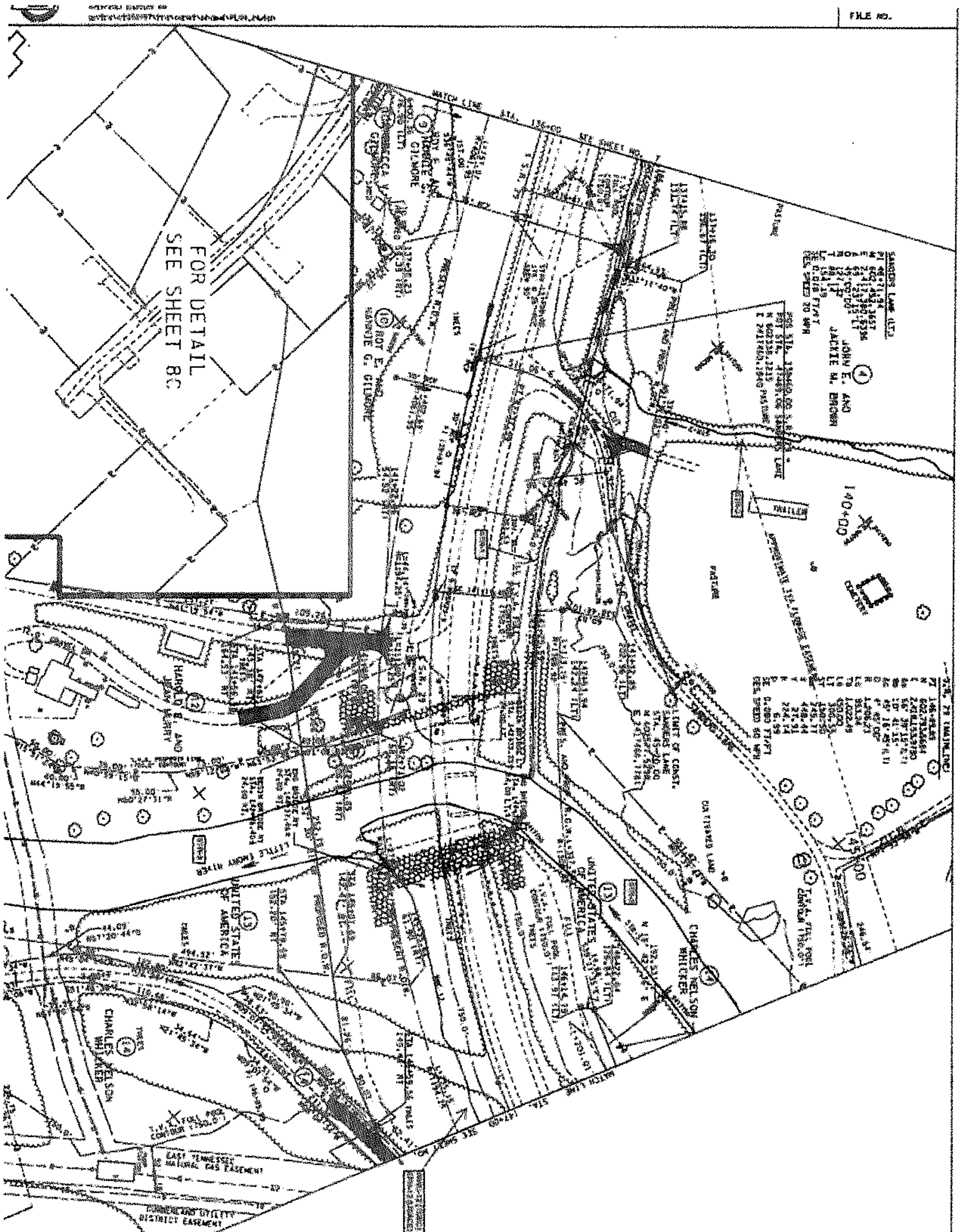
Topographic Maps




STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING
ROANE / MORGAN COUNTIES
STATE ROUTE 29 (US-27)
FROM STATE ROUTE 61 NEAR HARRIMAN IN ROANE COUNTY TO
SOUTH OF WHEELSTONE ROAD IN MORGAN COUNTY
ROANE AND MORGAN COUNTIES
CONSTRUCTION
FOR INDEX SEE SHEET 1A
SPECIAL NOTES
ARCADIS
EQUATION
DESCRIPTION
TRAFFIC DATA



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FOR DETAIL
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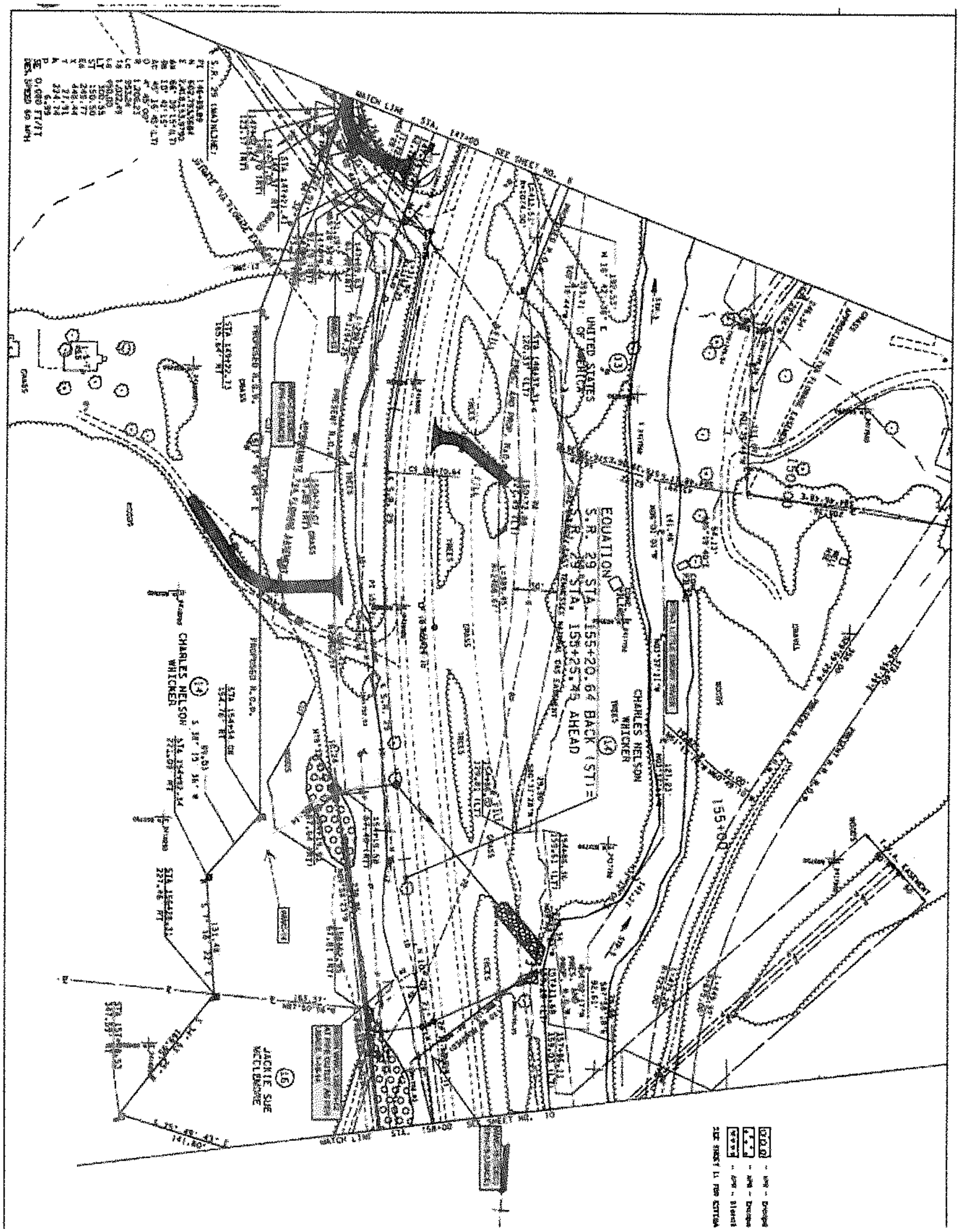
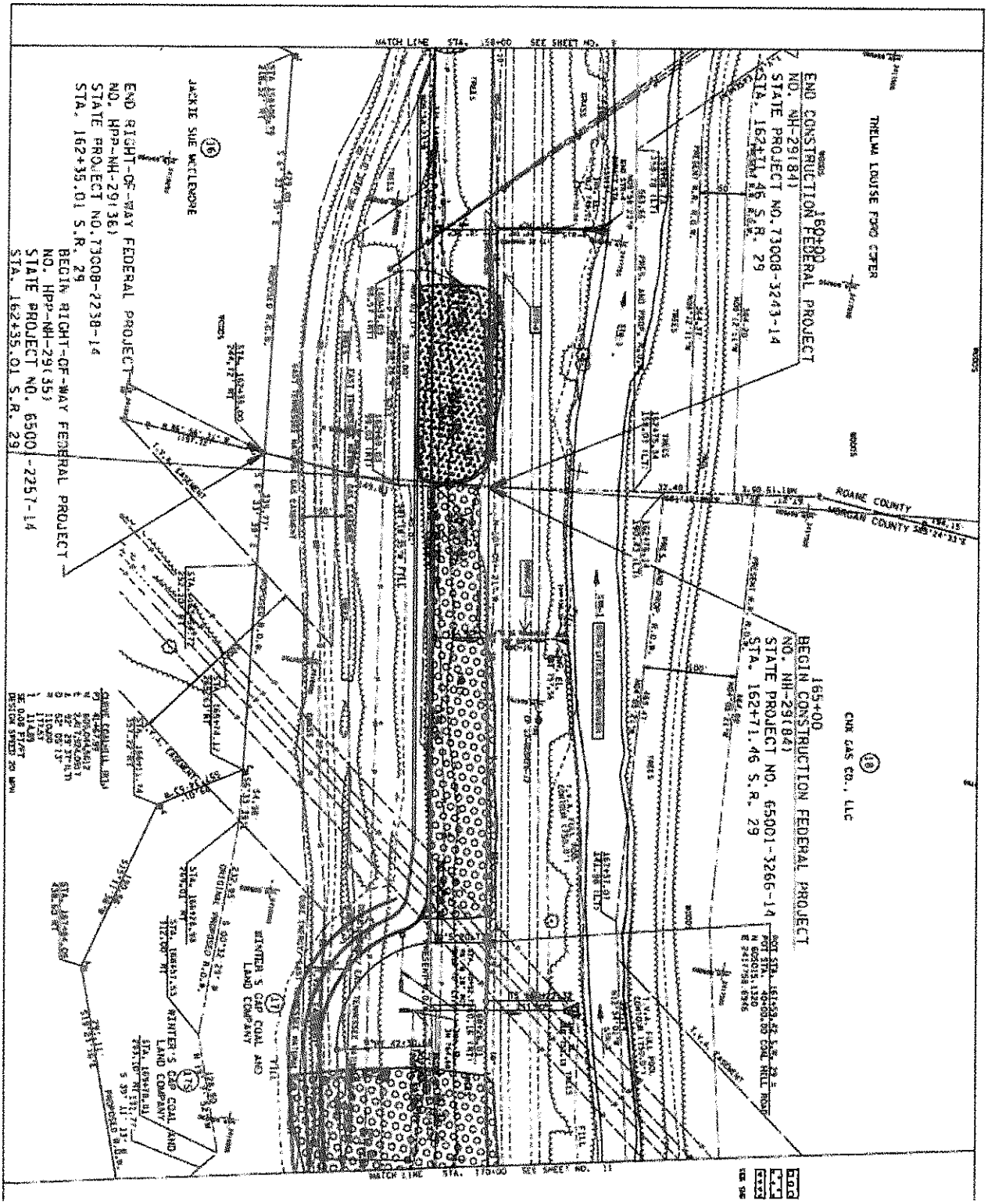
UNITED STATES OF AMERICA
CHARLES NELSON WHITAKER
JOHN E. AND JACKIE M. BROWN


CHARLES NELSON WHICKER
UNITED STATES OF AMERICA
155+00


END CONSTRUCTION
NO. NH-29(84)
STATE PROJECT NO. 73008-3243-14
STA. 162+71.46 S.R. 29
160+00
THELMA LOUISE FORD ESTATE
ROANE COUNTY
ANDERSON COUNTY
165+00
BEGIN CONSTRUCTION FEDERAL PROJECT
NO. NH-29(84)
STATE PROJECT NO. 65001-3266-14
STA. 162+71.46 S.R. 29
CNX GAS CO., LLC
END RIGHT-OF-WAY FEDERAL PROJECT
NO. HPP-NH-29(36)
STATE PROJECT NO. 73008-2238-14
STA. 162+35.01 S.R. 29
JACKIE SUE MCCLENDON
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NO. HPP-NH-29(35)
STATE PROJECT NO. 65001-2257-14
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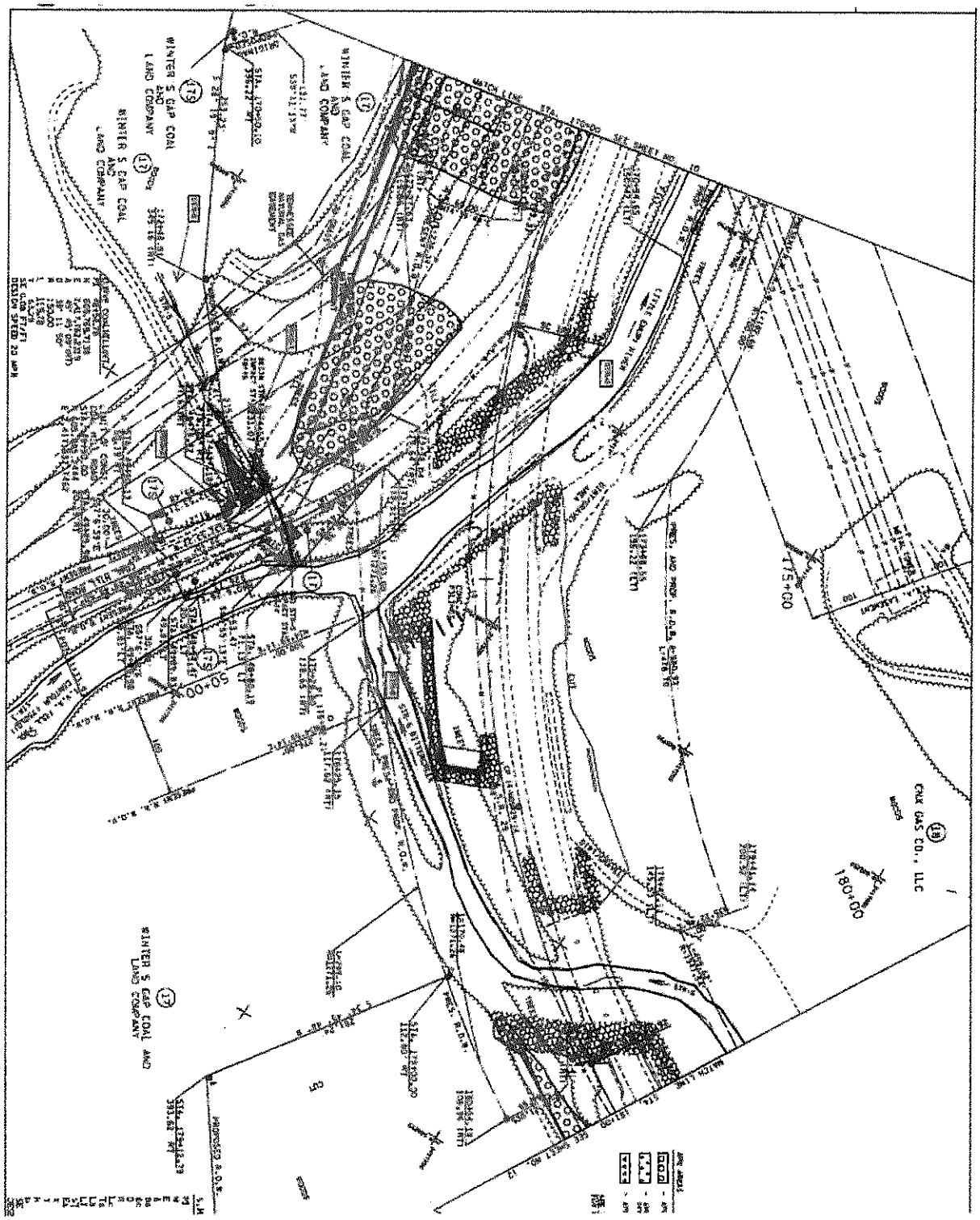
MATCH LINE STA. 158+00 SEE SHEET NO.
MATCH LINE STA. 170+00 SEE SHEET NO. 11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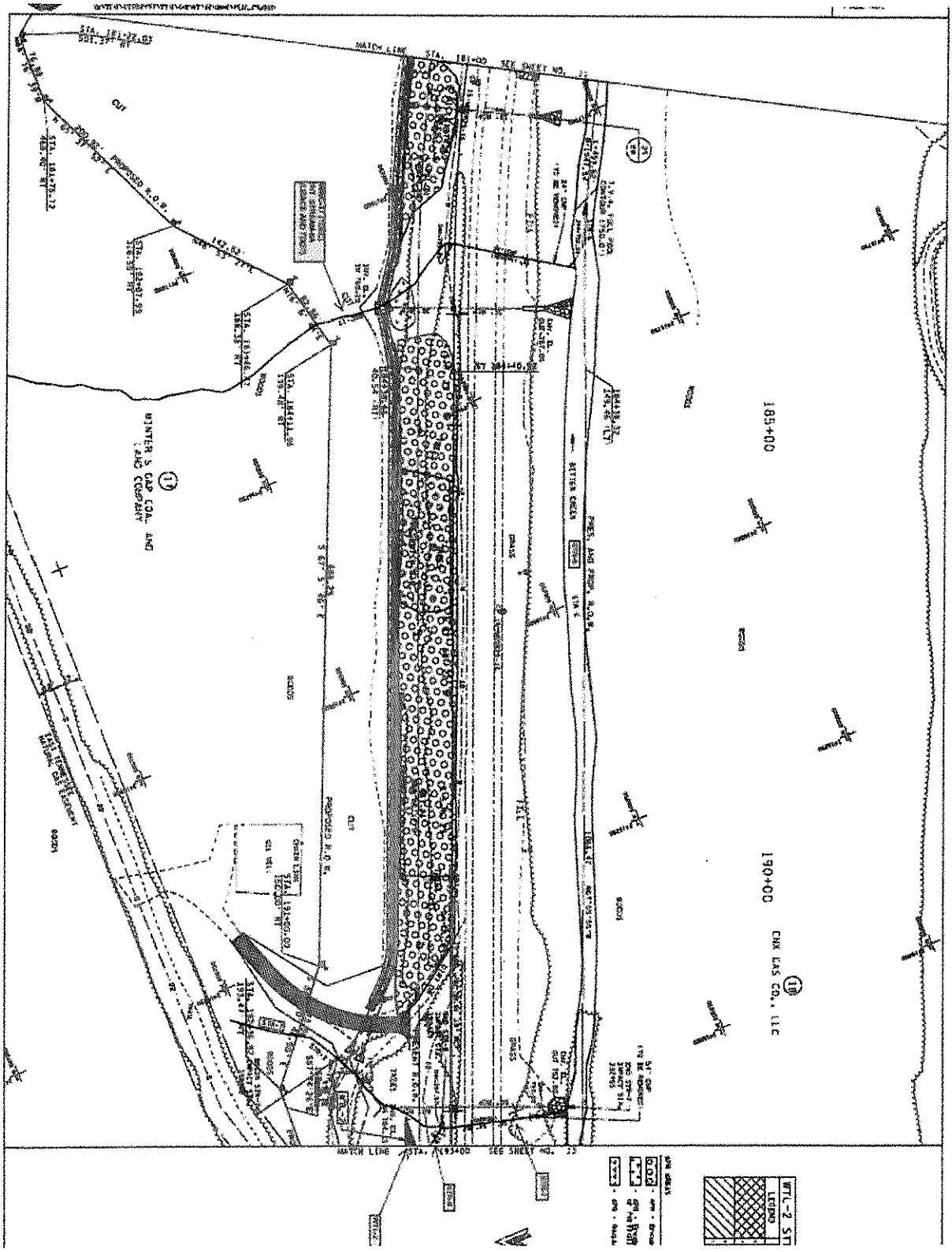
175+00
180+00
CNX GAS CO., LLC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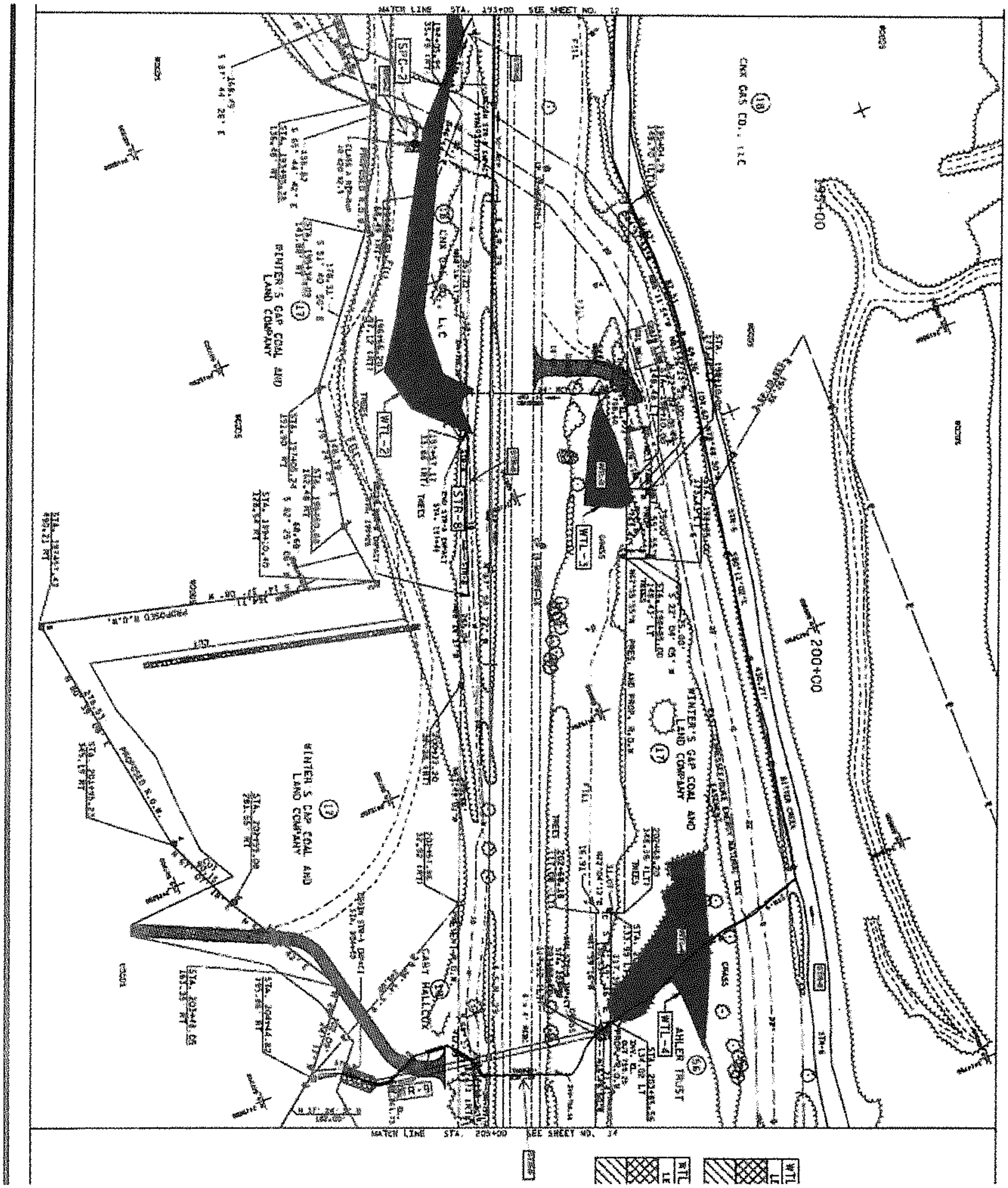
CNX LAS CO., LLC
BUTLER'S GAP COAL CO., INC
LEGEND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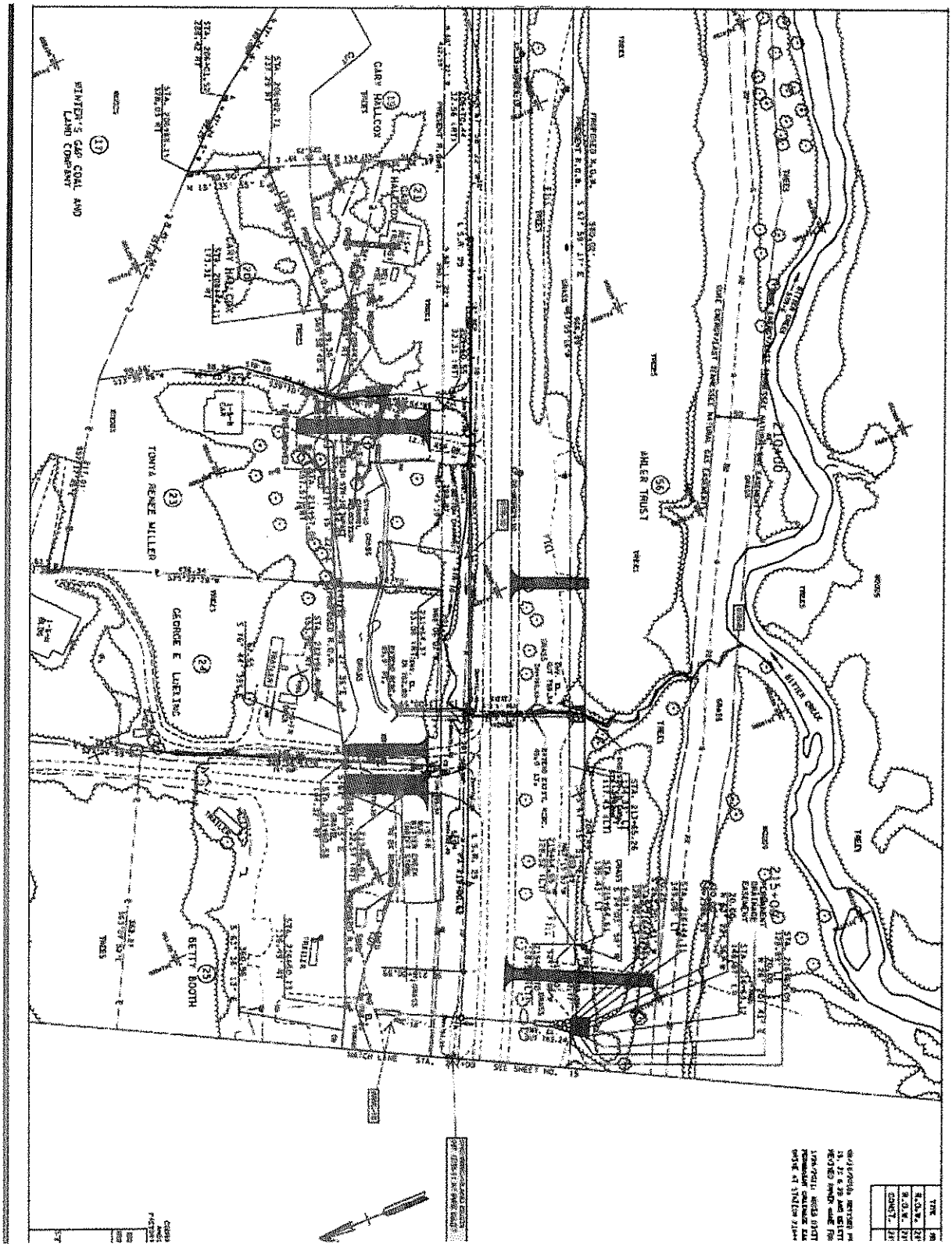
SPC-2
WTL-2
STR-8
WTL-3
WTL-4
AHLER TRUST
MATCH LINE STA. 205+00 SEE SHEET NO. 14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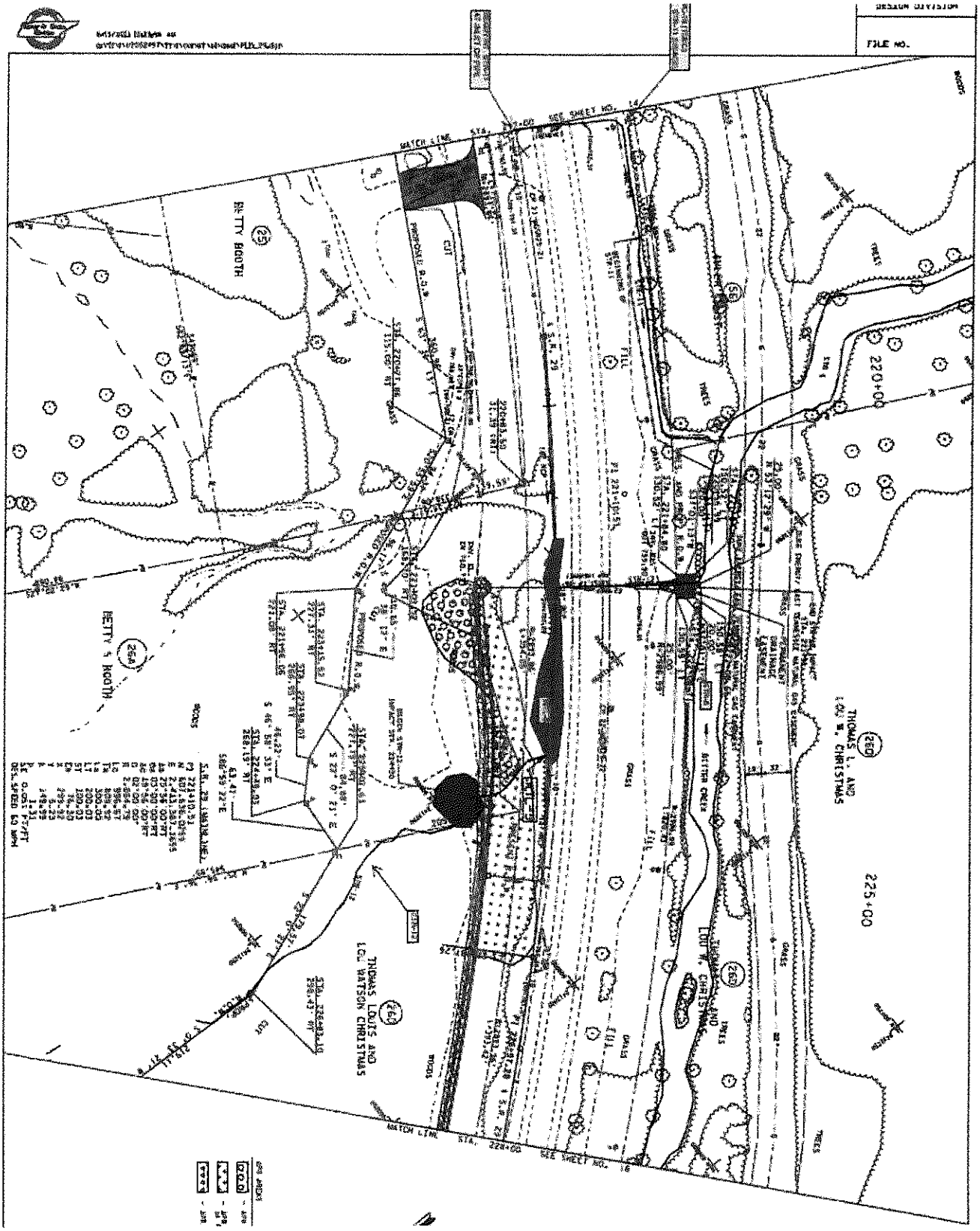
GARY HALLCOM
TONYA RENEE MILLER
GEORGE E LAETING
BETTY BOOTH
HALER TRUST
BITTER CREEK
210+00
215+00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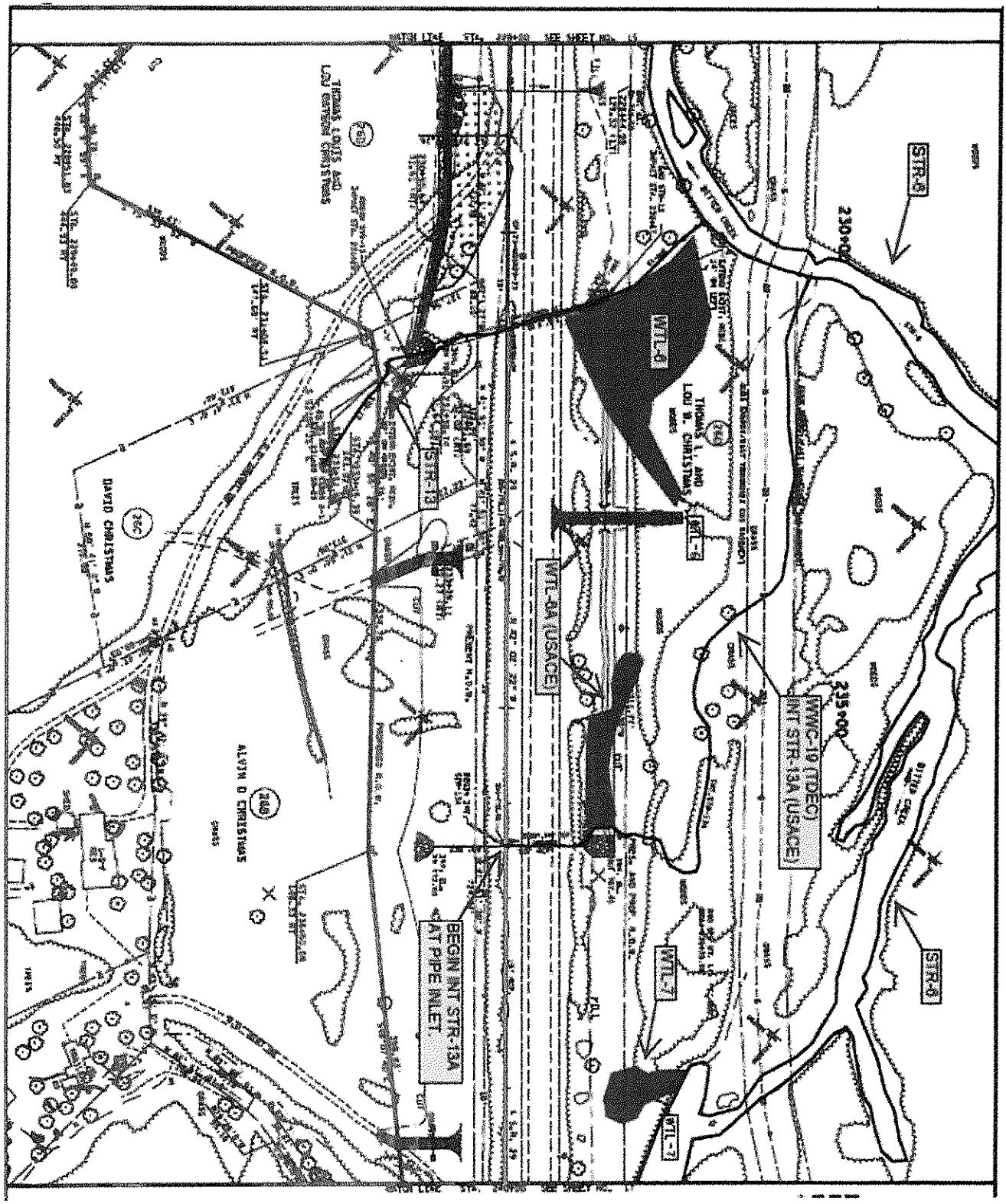
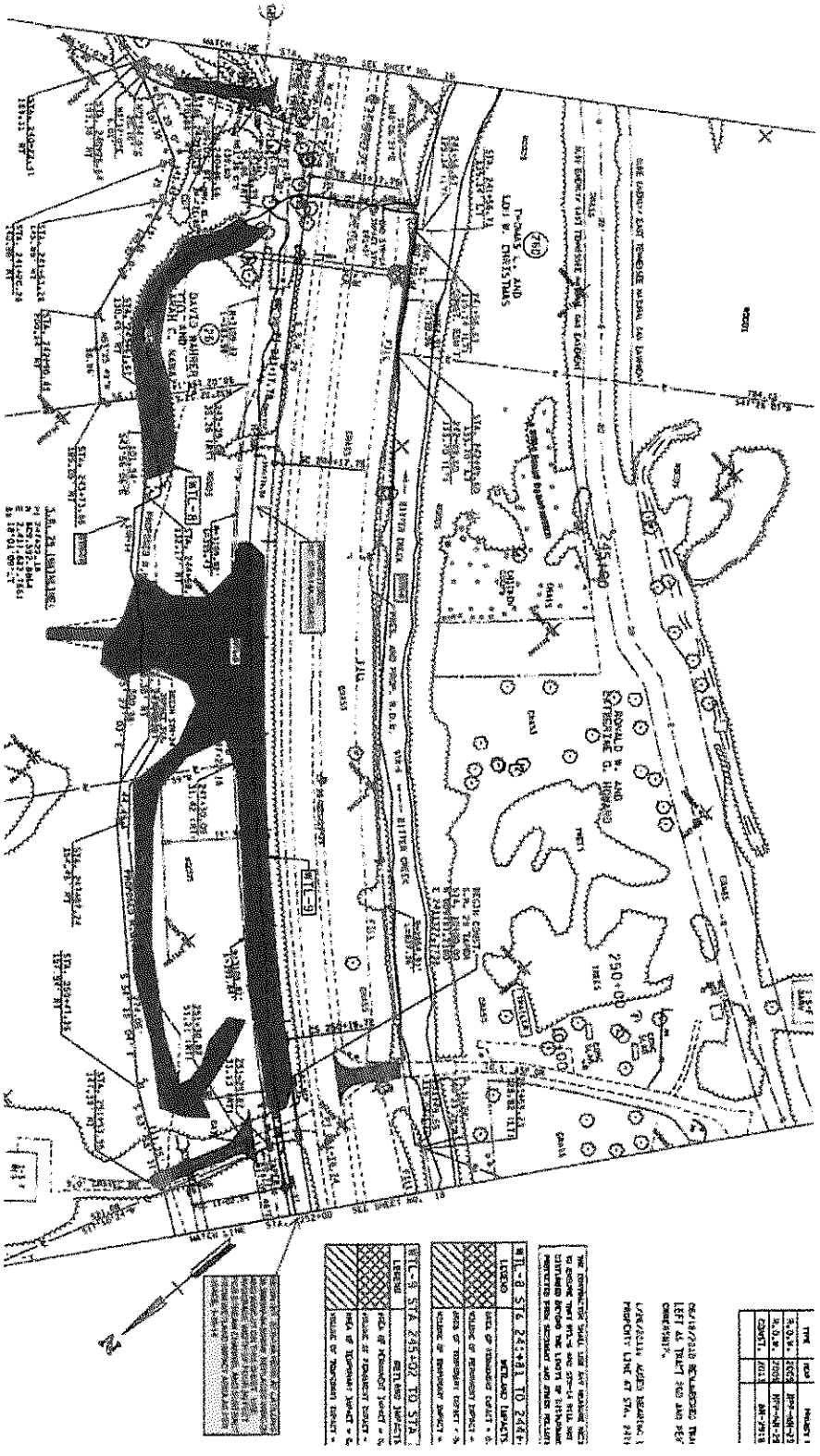
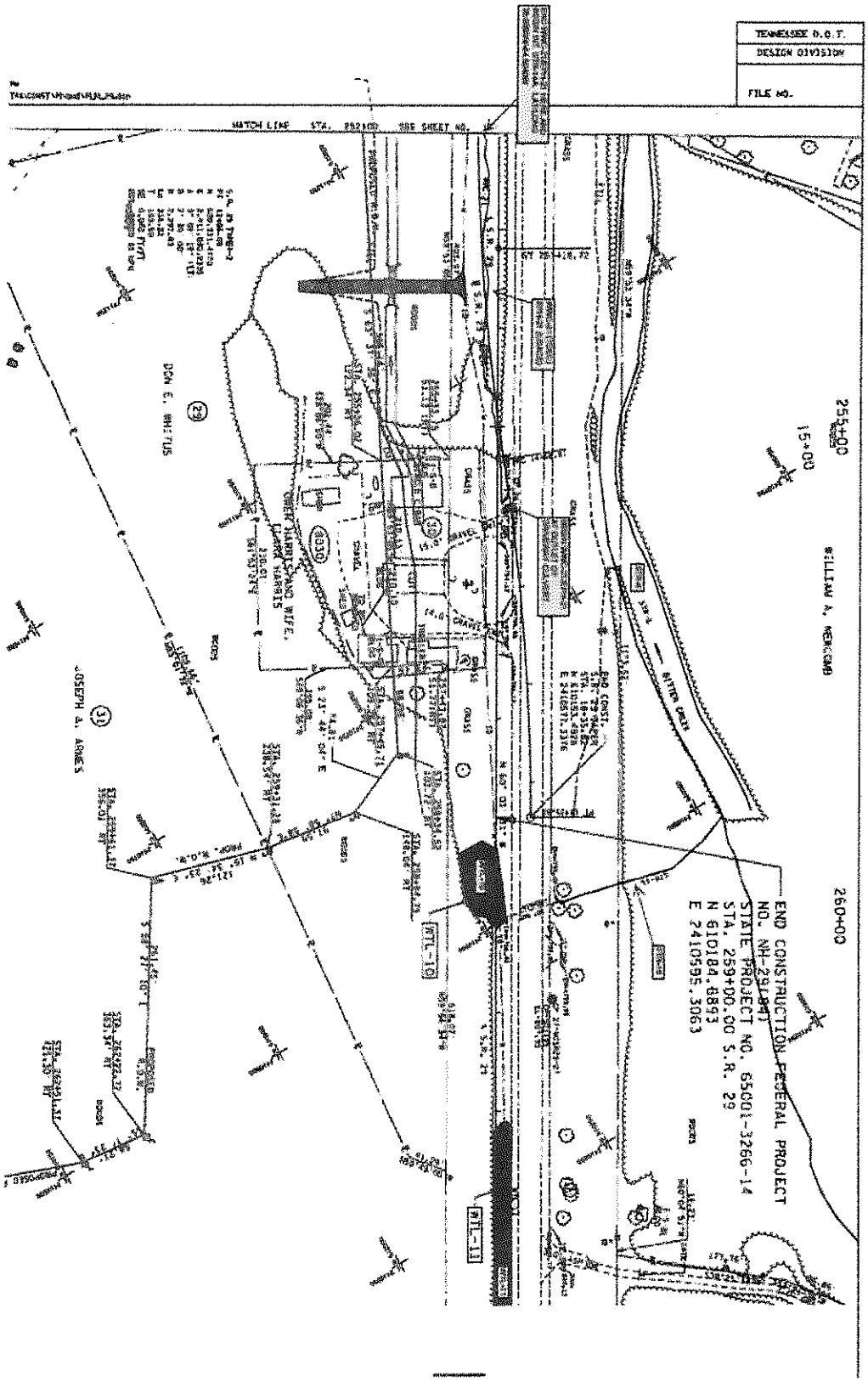
BETTY BOOTH
BETTY L BOOTH
THOMAS L. AND LOU W. CHRISTMAS
THOMAS LOUIS AND LOU WATSON CHRISTMAS
LOU W. CHRISTMAS
220+00
225+00
MATCH LINE
SEE SHEET NO.
PROPOSED R.O.W.
CUT
FILL
TREES
WOODS
CREEK


STR-8
WTL-8
STR-13
WTL-9
WTL-8A (USACE)
WWC-10 (TDEC)
INT STR-13A (USACE)
BEGIN INT STR-13A
AT PIPE INLET
WTL-7
STR-6
WTL-7
DAVID CHRISTMAS
ALVIN D CHRISTMAS
THOMAS L. AND LOU W. CHRISTMAS

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DESIGN DIVISION
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260+00
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STATE PROJECT NO. 65001-3266-14
STA. 259+00.00 S.R. 29
N 610184.6893
E 2410595.3063

STATE OF TENNESSEE
TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11TH Floor
Nashville, Tennessee 37243-1102

July 2, 2014

Ms. Melanie Bumpus
Tennessee Department of Transportation
Environmental Division
Suite 900, James K. Polk Bldg.
505 Deaderick St.
Nashville, TN 37243

Subject: Aquatic Resource Alteration Permit **NRS 14.049.**
TDOT 65001-1256-14 PIN101411.05 SR29, Harriman, Morgan County (Lat: 36.0002/ Lon: -84.5060)

Dear Ms. Bumpus:

We have reviewed your application for the proposed stream alterations in support of the widening of SR-29 from south of Whetstone Road to North of SR-328 near Harriman in Morgan County. Pursuant to the *Tennessee Water Quality Control Act of 1977* (T. C. A. § 69-3-101 et seq.) and supporting regulations, the Division of Water Resources is required to determine whether the activity proposed will violate applicable water quality standards.

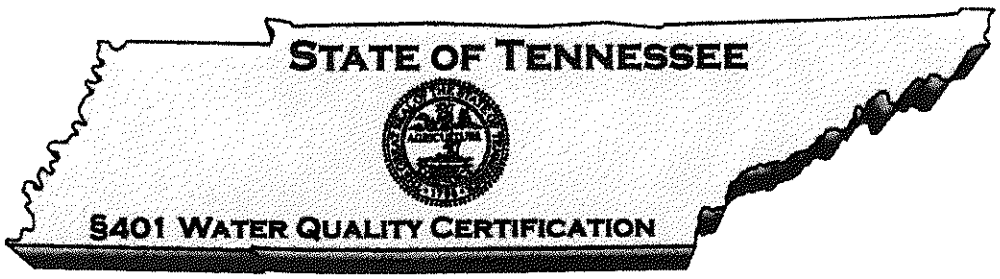
Subject to conformance with accepted plans, specifications and other information submitted in support of application NRS 14.049, the state of Tennessee hereby issues an aquatic resources alteration permit (enclosed). Failure to comply with the terms of this permit or other violations of the *Tennessee Water Control Act of 1977* is subject to penalty in accordance with T.C.A. § 69-3-115.

It is the responsibility of the permittee to ensure that all contractors involved with this project have read and understood the permit conditions before the project begins. If you need additional information or clarification, please contact Brian Canada at 615-532-0660 or by e-mail brian.canada@tn.gov.

Sincerely,

Brian Canada, M.S., Q.H.P.
Natural Resources Unit

Cc: Knoxville Environmental Field Office
U.S. Army Corps of Engineers, Nashville District
file copy



NRS14.049

Pursuant to §401 of *The Federal Clean Water Act* (33 U.S.C. 1341), the State of Tennessee is required to certify whether the activity described below will violate applicable water quality standards. Accordingly, the Division of Water Reources requires reasonable assurance that the activity will not violate provisions of *The Tennessee Water Quality Control Act of 1977* (T.C.A. §69-3-101 et seq.) or provisions of §§301, 302, 303, 306 or 307 of *The Clean Water Act.*

Subject to conformance with accepted plans, specifications and other information submitted in support of the application, pursuant to 33 U.S.C. 1341 the State of Tennessee hereby certifies the activity described below. This shall serve as authorization under T.C.A. §69-3-101 et seq.

PERMITTEE Tennessee Department of Transportation

AUTHORIZED WORK: 563 ft. of stream encapsulation and permanent impact to 0.53 acre of wetlands required to construct 2.023 miles of State Route 29 from South of Whetstone Road to North of SR-328.

LOCATION: Bitter Creek and unnamed tributaries, State Route 29 in Morgan County County (Lat: 36.0002/ Lon: -84.5060)

EFFECTIVE DATE: July 2, 2014

EXPIRATION DATE: July 1, 2019

Sandra Dudley, Ph.D., P.E.
Director

Table of Contents

PART I

Specific Impacts:

Impact 1: Latitude: 36.0156 Longitude: -84.5255
Bitter Creek (STR-6) Station 342+85
Existing 176 ft. of 3@ 12X9 ft. slab bridge and 99 ft. of open stream. The slab bridge shall be extended by 38 ft. at the inlet and 42 ft. at the outlet plus 19 ft. of class C riprap. Associated with this impact are storm water outfalls and overhead telephone pole installations.

Impact 2: Latitude: 36.0120 Longitude: 36.0120
Unnamed tributary to Bitter Creek (STR-18) Station 324+59+/-
Install a 12" water line.

Impact 3: Latitude: 36.0127 Longitude: -84.5225
Unnamed tributary to Bitter Creek (STR-19) Station 328+39 to 328+79
Existing open stream 161 ft. and 117 ft. of 8X6 RCBC. Twenty feet of existing culvert shall be removed and the remaining 97 ft. shall be extended by 126 ft. at the inlet and 17 ft. at the outlet and 15 ft. of riprap lined channel. Associated with this impact are storm water outfalls at Hanging Rock Road and replacement of an existing 10" water line with a 12" water line.

Impact 4: Latitude: 36.0125 Longitude: -84.5225
Wetland (WTL-12) Station 328+62 to 330+33
Permanent impact (fill) to 0.18 acre wetlands. Remove existing 10" water line.

Impact 5: Latitude: 36.0135 Longitude: -84.5233
Wetland (WTL-13) Station 333+00 to 335+14
Permanent impact to 0.02 and temporary impact to 0.18 acre wetlands.

Impact 6: Latitude: 36.0156 Longitude: -84.5255
Bitter Creek (STR-6) Station 342+85 to 354+79
Replace an existing 10" water line with a 12" water line and a ¾" service line and water meter assembly.

Impact 7: Latitude: 36.0135 Longitude: -84.5233
Muddy Branch (STR-20) Station 349+20
Existing open stream 25 ft. and 102 ft. of 2@15X8 ft. slab bridge. Existing bridge shall be extended 20 ft. at the inlet and 5 ft. at the outlet plus 10 ft. of Class B riprap.

Impact 8: Latitude: 36.0171 Longitude: -84.5263
Muddy Branch (STR-20) Station 349+20
Replace an existing 10" water line with a 12" water line.

Impact 9: Latitude: 36.0178 Longitude: -84.5268
Unnamed tributary to Muddy Branch (STR-21) Station 350+55 to 357+00
Existing open stream 275 ft., 33 ft. of 10X4 RCBC (to be removed) and 20 ft. of 30" CMP (to be removed). Relocate 275 ft. of open stream in kind and install 33 ft. of 10X4 ft. RCBC.

Impact 10: Latitude: 36.0188 Longitude: -84.5270
Unnamed tributary to Muddy Branch (STR-22) Station 349+25 to 356+94
Existing 571ft. of open stream shall be relocated into 504 ft. of open stream and 100 ft. 30" RCP with 11 ft. u-shaped end wall at inlet and 5 ft. u-shaped end wall at the outlet. Associated with this impact is an overhead telephone pole relocation and replace an existing 10" water line with a 12" water line.

Impact 11: Latitude: 36.0183 Longitude: -84.5271
Wetland (WTL-14) Station 350+76 to 357+16
Permanent impact (fill) to 0.33 acre wetlands and replace an existing 10" water line with a 12" water line.

General Conditions:

a. It is the responsibility of the applicant to convey all terms and conditions of this permit to all contractors. A copy of this permit, approved plans and any other documentation pertinent to the activities authorized by this permit shall be maintained on site at all times during periods of construction activity.

b. Work shall not commence until the applicant has received the federal §404 permit from the U. S. Army Corps of Engineers, a §26a permit from the Tennessee Valley Authority or authorization under a Tennessee NPDES Storm Water Construction Permit where necessary. The applicant is responsible for obtaining these permits.

c. The work shall be accomplished in conformance with the accepted plans, specifications, data and other information submitted in support of application NRS14.049 and the limitations, requirements and conditions set forth herein.

d. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in Rule 0400-40-03-.03 of the Rules of the Tennessee Department of Environment and Conservation. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of waters of the state for any of the uses designated by Rule 0400-40-04. These uses include fish and aquatic life (including trout streams and naturally reproducing trout streams), livestock watering and wildlife, recreation, irrigation, industrial water supply, domestic water supply, and navigation.

e. Impacts to waters of the state other than those specifically addressed in the plans and this permit are prohibited. All streams, springs and wetlands shall be fully protected prior, during and after construction until the area is stabilized. Any questions, problems or concerns that arise regarding any stream, spring or wetland either before or during construction, shall be addressed to the Division of Water Resource's Knoxville Environmental Field Office (865-594-6035), or the permit coordinator in the division's Natural Resources Section (615-532-0660).

f. Adverse impact to formally listed state or federal threatened or endangered species or their critical habitat is prohibited.

g. This permit does not authorize adverse impacts to cultural, historical or archeological features or sites.

PART II

Mitigation Requirements and Monitoring Procedures

Required Mitigation Activities

The permittee shall provide mitigation for the permanent impact to 0.53 acre of wetlands by debiting, at a 2:1 ratio, 1.06 acre of available credit from the Wall Wetland Mitigation Site. Temproary impacts to wetlands shall be mitigated by removal and stockpiling of the existing topsoil. Upon completion of construction activities, all temporary wetland impact areas shall be restored to pre-construction contours and the stockpiled wetland topsoil spread to restore these areas to preconstruction elevation.

The 563 ft. of stream encapsulation shall be mitigated by purchasing 563 ft.of available credits from the Tennessee Stream Mitigation Program Upper Tennessee Service Area. Payment shall be made to TSMP with proof of purchase submitted to the Division within 90 days of the effective date of this permit. Relocated channels shall be replaced in kind with natural bottoms unless specifically noted in this permit. Streams shall be diverted into the new channel and the original channel allowed to remain open for 48 hours to allow aquatic organisms time to migrate out prior to filling. Relocated channels greater than 200 feet shall be constructed to mimic the morphological, habitat and in-stream flow characteristics of the regional reference conditions to the maximum extent practicable. Vegetated buffer strips should be maintained along the relocated channels with mowing exclusion signage placed at beginning and end of relocated streams.

Monitoring Requirements and Procedures

a. Monitoring shall be required for all relocations and restored temporary wetland impacts.

b. Qualitative Habitat Assessment - The RBP (Rapid Bioassessment Protocols) Habitat Assessment score for the mitigation project must be greater than 75% of the regional habitat assessment guideline score as found in the 2011 TDEC standard operating procedure for macroinvertebrate stream surveys.

c. Vegetation - Vegetative species must be on approved native species planting list.

d. Morphology - The monitored morphology success criteria values for the restored reach shall not deviate from the actual as-built values by more than 20% in any monitoring year.

e. Stability - A Channel Stability Rating (CSR) of at least "Good" must be achieved during every monitoring year.

f. Hydrology – Each year of monitoring the applicant shall perform a Hydrologic Determination (HD) using the Division of Water Resources HD methodology (between February and April) to ensure that the relocated channels score as streams.

Recording of Results

a. For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

    1. The exact place, date and time of sampling;

2. The exact person(s) collecting samples;
3. The dates and times the analyses were performed;
4. The person(s) or laboratory who performed the analyses;
5. The analytical techniques or methods used;
6. The results of all required analyses;
7. Narrative descriptions, photo-documentation, riparian vegetation surveys, channel morphology surveys, stability assessments, and hydrology surveys/documentation, and;
8. A habitat assessment using EPA Rapid Bioassessment Protocol will be conducted and submitted in Year 5.

b. In the event any portion or aspect of the mitigation project does not meet the specified success criteria based on reporting and/or additional visual observations in a monitoring year, the nature and cause(s) of the resulting condition shall be investigated and documented. If it is determined that corrective actions are not warranted at the time, the rationale for the decision shall be stated. Continued monitoring of the condition or area using more detailed methodology may be appropriate and must be documented. In instances where corrective actions are necessary, a plan shall be prepared that includes proposed actions, a time schedule for activities, and revised monitoring plan.

Submission of Monitoring Results

a. The permittee shall submit the following monitoring information on an annual basis, for a term of five years (5 years).

b. All monitoring reports and information shall be submitted in report-form to the division's Natural Resources Unit, located in the Willaim R. Snodgrass – Tennessee Tower, 11th Floor, 312 Rosa L. Parks, Nashville, Tennessee 37243-1102. Copies shall also be provided to the appropriate Water Resources Environmental Field Office, and the U.S. Army Corps of Engineers District Office.

c. The monitoring reports shall be due by October 31st of each monitoring year.

Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation shall be retained for a minimum of five (5) years, or longer, if requested by the Division of Water Resources.

Falsifying Results and/or Reports

Knowingly making any false statement on any report required by this permit or falsifying any result may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

Monitoring Closeout

The applicant shall notify the agencies in writing when the monitoring period is complete. Following receipt of the final report, the agencies will contact the applicant (or agent) as soon

as possible to schedule a site visit to confirm the completion of the compensatory mitigation site. The compensatory mitigation shall not be considered complete without an on-site inspection by regulatory staff and written confirmation that the site is functioning as proposed.

PART III

Duty to Reapply

Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of Water Resources. Such applications must be properly signed and certified.

Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

Other Information

If the permittee becomes aware that he/she failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, then he/she shall promptly submit such facts or information.

Changes Affecting the Permit

Transfer/Change of Ownership

a. This permit may be transferred to another party, provided there are no activity or project modifications, no pending enforcement actions, or any other changes which might affect the permit conditions contained in the permit, by the permittee if:

b. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;

c. The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and contractual liability between them; and

d. The Director does not notify the current permittee and the new permittee, within 30 days, of his intent to modify, revoke, reissue, or terminate the permit, or require that a new application be filed rather than agreeing to the transfer of the permit.

e. The permittee must provide the following information to the division in their formal notice of intent to transfer ownership:

1. the permit number of the subject permit;
2. the effective date of the proposed transfer;
3. the name and address of the transferor;
4. the name and address of the transferee;

5. the names of the responsible parties for both the transferor and transferee;
6. a statement that the transferee assumes responsibility for the subject permit;
7. a statement that the transferor relinquishes responsibility for the subject permit;
8. the signatures of the responsible parties for both the transferor and transferee, and;
9. a statement regarding any proposed modifications to the permitted activities or project, its operations, or any other changes which might affect the permit conditions contained in the permit.

Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

Noncompliance

Effect of Noncompliance

All discharges shall be consistent with the terms and conditions of this permit. Any permit noncompliance constitutes a violation of applicable State and Federal laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

Reporting of Noncompliance

24-Hour Reporting

a. In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources in the appropriate Environmental Field Office within 24-hours from the time the permittee becomes aware of the circumstances. (The Environmental Field Office should be contacted for names and phone numbers of environmental response personnel).

b. A written submission must be provided within five (5) days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

    1. A description of the discharge and cause of noncompliance;
    2. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
    3. The steps being taken to reduce, eliminate, and prevent recurrence of the non-complying discharge.

Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph a. above, the permittee shall report the noncompliance by contacting the permit coordinator,

and provide all information concerning the steps taken or planned to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including but not limited to, accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

Liabilities

Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of pollutants to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its discharge activities in a manner such that public or private nuisances or health hazards will not be created.

Liability under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or the Federal Water Pollution Control Act, as amended.

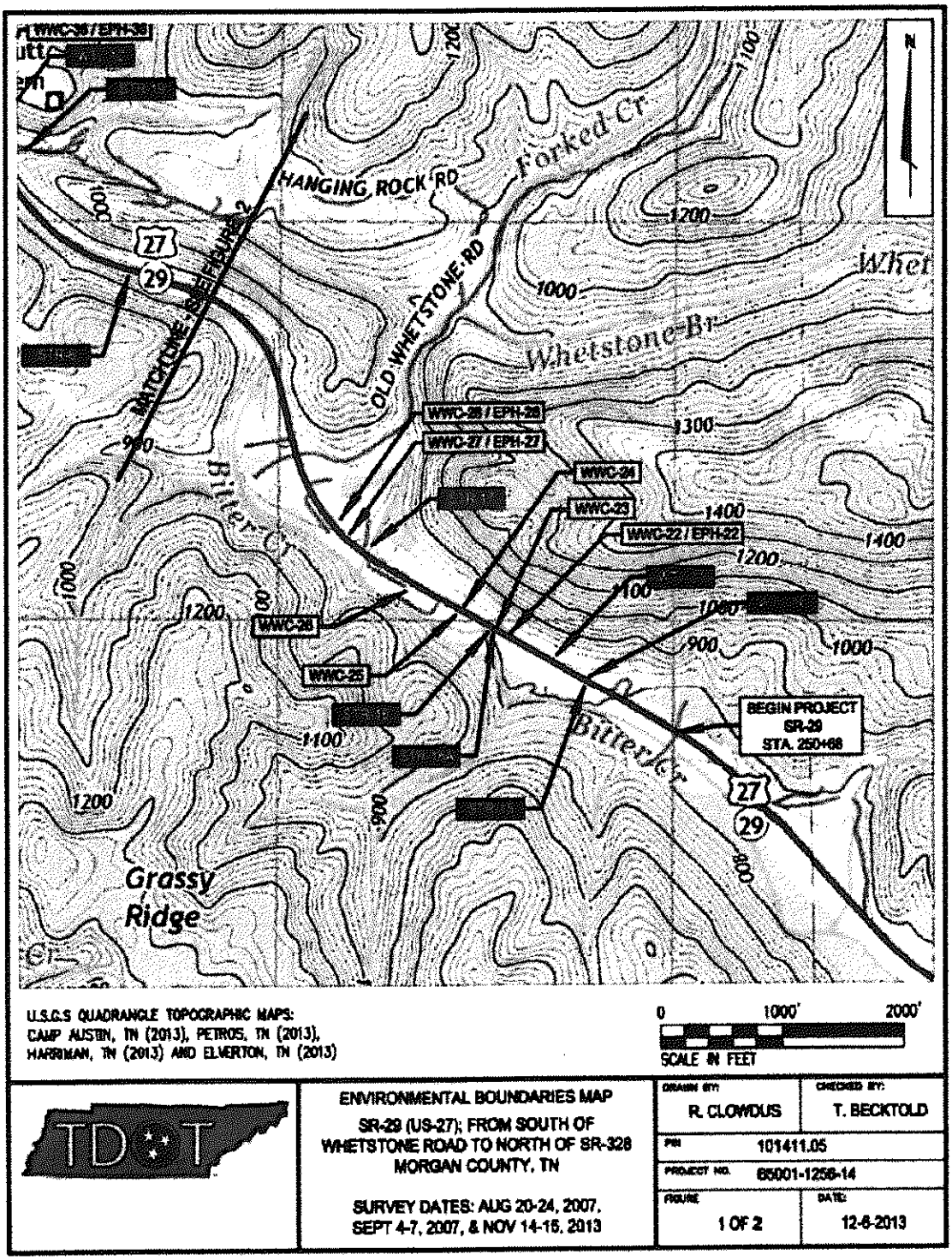
This permit does not preclude requirements of other federal, state or local laws. This permit also serves as a State of Tennessee Aquatic Resource Alteration Permit (ARAP) pursuant to the Tennessee Water Quality Control Act of 1977 (T.C.A. §69-3-101 et seq.).

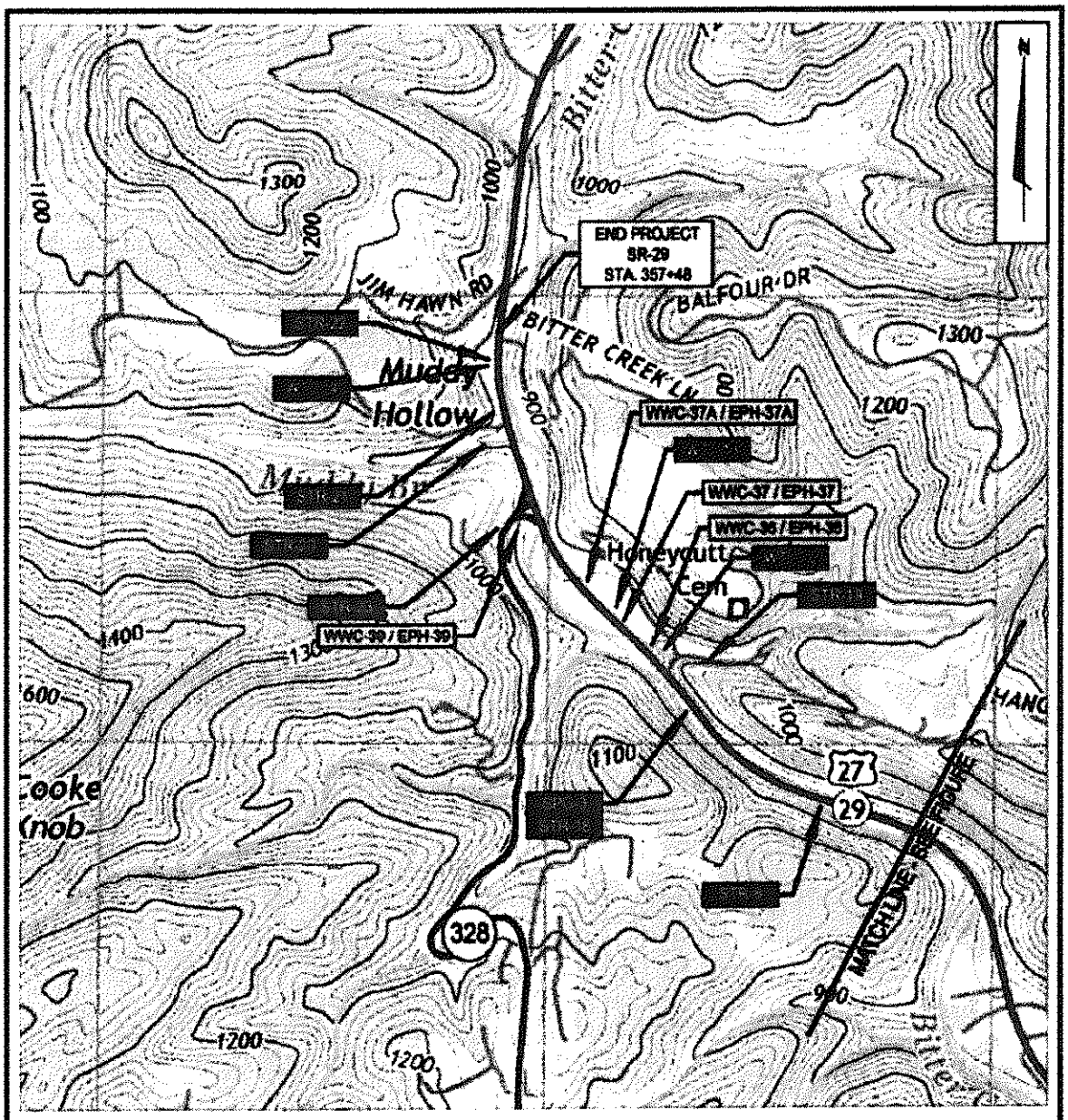
The State of Tennessee may modify, suspend or revoke this permit or seek modification or revocation should the state determine that the activity results in more than an insignificant violation of applicable water quality standards or violation of the act. Failure to comply with permit terms may result in penalty in accordance with T.C.A. §69-3-115.

An appeal of this action may be made as provided in T.C.A. §69-3-105(i) and Rule 0400-40-03-.12 by submitting a petition for appeal. This petition must be filed within THIRTY (30) DAYS after public notice of the issuance of the permit. The petition must specify what provisions are being appealed and the basis for the appeal. It should be addressed to the technical secretary of the Tennessee Board of Water Quality, Oil and Gas at the following address: Dr. Sandra Dudley, Director, Division of Water Resources, 11th Floor William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Ave., Nashville, Tennessee 37243. Any hearing would be in accordance with T.C.A. §§69-3-110 and 4-5-301 et seq.

APPENDIX I

Topographic Maps





U.S.G.S QUADRANGLE TOPOGRAPHIC MAPS:
CAMP AUSTIN, TN (2013), PETROS, TN (2013),
HARRIMAN, TN (2013) AND ELVERTON, TN (2013)

0 1000' 2000'
SCALE IN FEET

TDOT	ENVIRONMENTAL BOUNDARIES MAP SR-29 (US-27); FROM SOUTH OF WHETSTONE ROAD TO NORTH OF SR-328 MORGAN COUNTY, TN SURVEY DATES: AUG 20-24, 2007, SEPT 4-7, 2007, & NOV 14-15, 2013	DRAWN BY: R. CLOWDUS CHECKED BY: T. BECKTOLD PIN: 101411.05 PROJECT NO.: 65001-1256-14 FIGURE: 2 OF 2 DATE: 12-6-2013

5000 Linbar Drive, Suite 275
Nashville, TN 37211

February 13, 2014

Ms. D.J. Wiseman
Transportation Project Specialist
TDOT Environmental Permits Office Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

RE: Preliminary Authorization and Credit Availability Request – TSMP PI 14-009; TDOT PIN 101411.05

Dear Ms. Wiseman:

Thank you for your recent submittal of a Preliminary Authorization and Credit Availability Request to the TSMP. This request is used to determine if the TSMP has credits available and is able to accept the legal liability for providing mitigation in a specific service area. This request is for approximately **539** credits in the **Upper Tennessee Service Area** for proposed impacts to unnamed tributaries to Bitter Creek.

At this time, the TSMP has credits available to satisfy this request and is providing this letter so that you may include it with your permit applications to the appropriate regulatory agencies.

It is understood that the U. S. Army Corps of Engineers and/or the Tennessee Department of Environment and Conservation will determine actual credit requirements and it may vary from what is currently being requested. Payment for any credits is not required until applicable permits have been issued and the TSMP has provided you with an invoice.

These credits will be reserved for a period of 240 days from the date of this letter. If you have any questions or concerns, please feel free to call or email me at any time.

Sincerely,

Eric Chance

Eric Chance, Operations Manager
Tennessee Stream Mitigation Program

Stream	In Kind Stream Replacement	Total Encapsulation	Encapsulation to be Mitigated	Length Losses	Total @ 1.0 Ratio	In Lieu Fee @ 1.0 Ratio	Credits Generated - used	Rip rap	Total * 0.75 Ratio	In Lieu Fee @ 0.75 Ratio	Total In Lieu Fee
STR-15	**0**	**114**									
STR-16	118	0	0	0	0	$ -					$ -
STR-16A	0	0	0	36	36	$ 8,640.00					$ 8,640.00
STR-17	0	146	0	0	0	$ -					$ -
STR-6	0	256	256	0	256	$ 61,440.00					$ 61,440.00
STR-19	0	240	211	23	234	$ 56,160.00	-29				$ 56,160.00
STR-20	0	127	0	0	0	$ -					$ -
STR-21	275	33	0	20	0	$ -	-20				$ -
STR-22	504	116	0	0	0	$ -	49				$ -
Total	**897**	**918**	**467**	**79**	**526**	**$ 126,240.00**		**0**	**0**	**$ -**	**$ 126,240.00**

Attachment G. Acid Producing Rock Adaptive Management and Monitoring Plan

Adaptive Management and APR Water Quality Monitoring Plan for SR-29 (US-27)
From SR-61 Near Harriman in Roane County to South of Whetstone Road in Morgan County
PIN 101411.04; Project No. 65001-3266-14, 73008-3243-14

I. INTRODUCTION

Background

The State Route (SR) 29 (US-27) proposed roadway widening project from SR 61 near Harriman, TN to north of SR 328 will consist of two separate design and construction projects. The first SR-29 project (PIN 101411.04) begins at the intersection of SR-29 and SR-61 east of Harriman in Roane County and extends to the north 3.25 miles ending just south of Whetstone Road in Morgan County. More specifically the first SR-29 project ends at the beginning of the SR-29 second project (PIN 101411.05).

Following is more detailed information regarding the first SR-29 project (PIN 101411.04). The existing roadway consists of two travel lanes with paved shoulders and contains three bridges one over Bitter Creek and two over Little Emory River. The majority of the existing roadway is bounded to the west by Bitter Creek and to the east by Walden Ridge and Whetstone Mountain.

The Advance Planning Report (APR) and the Project Data Summary sheet prepared in 1998 by TDOT contains additional information regarding the existing roadway conditions. SR-29 is considered an arterial highway and is also listed as part of the National Highway System (US-27) by the Federal Highway Administration (FHWA). As such TDOT has design standards (RD01-TS-3A) for 4-lane arterial highways that contain minimum standards for travel lanes, medians, side slopes, etc. The proposed improvements include four 12-foot traffic lanes, a 48-foot median (minimum allowed) and two 12-foot paved shoulders. Side slopes for the project range from 0.25:1 (H:V) to 6:1 depending on the location, topography and geology. The alignment for the proposed roadway widening predominantly follows the existing route; however, safety improvements to correct horizontal and vertical deficiencies, including intersections with side roads and driveways, were also included.

Southbound Lanes: The existing two lane roadway is bounded predominantly to the west by Bitter Creek north of Little Emory River. Minor modifications will develop the existing two lane roadway into the southbound lanes. This will minimize impacts to Bitter Creek.

Northbound Lanes: The northbound lanes are bounded on the west side by the existing two lane roadway (future southbound lanes) and on the east side as previously stated by Walden's Ridge and Whetstone Mountain. The proposed median, northbound lanes and shoulders will be constructed in this location. Design alternatives considered for the tie slopes adjacent to the northbound lanes included the following:

1.) use of typical cut and fill slopes (2:1);

2.) use of cut slopes with benches (where feasible); and

3.) use of retaining walls in select areas.

In the first alternative, the typical cut and fill slopes caused substantial land disturbance and resulted in significant right-of-way requirements and extreme earthwork volumes. Several cut slopes required ridge/mountain top removal.

The second alternative considered slope benching in select areas as defined by the local geology. This alternative reduced the amount of land disturbance, required right-of-way and earthwork volumes when compared to alternative 1. However subsequent geotechnical investigations concluded that acid producing rock (APR) was located in several of the benched slope areas. Further reduction in APR volume/disturbance resulted in Alternative three.

Alternative three uses retaining walls and slope benching in select locations to reduce land disturbance, earthwork volume, and APR exposure. This alternative results in higher construction costs, but was selected as the preferred design alternative to limit environmental impacts. The preferred design alternative reduced stream impacts, land disturbance, erosion, and the amount of APR exposure/mitigation. All other side slopes and associated ditches were reduced to prevent additional environmental impacts.

Adaptive Management Plan Elements

This document describes the Tennessee Department of Transportation's (TDOT) recommended Adaptive Management Plan (AMP) for the first SR-29 (US-27) project (PIN 101411.04) in Roane and Morgan counties, TN. The AMP is focused on localized water quality impacts from potential APR exposure during and post roadway construction.

Adaptive management is a process of information gathering, review and analysis, and response that promotes flexible agency decision-making. It is particularly appropriate where complex systems are involved, where the effects of an agency's decisions and actions play out over an extended period of time, and where the agency must meet multiple objectives. This AMP is consistent with TDOT's approach to other roadway construction projects that contains APR which incorporates the following:

- On-going evaluations of water quality during and post construction,
- Coordination with the Tennessee Department of Environment & Conservation (TDEC),
- Implementation of best management practices (BMPs) during and post construction, and
- Continuous adjustments to the program to meet regulatory requirements, as necessary.

Figure 1 represents the adaptive management process. It illustrates how new information is used to refine and adjust agency action to continually meet its defined objective.

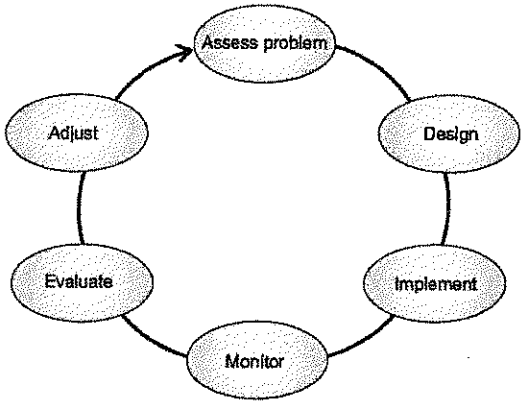


Figure 1: Adaptive Management Process

Construction of SR-29 is expected to begin in the fall/winter of 2014/2015. Using the adaptive management approach, TDOT will assess whether there are unanticipated, adverse localized water quality impacts associated with APR exposure and runoff from the roadway construction and evaluate the data discussed in this plan for indicators of unintended adverse impacts. If adverse impacts in these areas are found and demonstrated to be the result of the roadway construction, TDOT is committed to taking appropriate action and adjusting the operation to minimize the effect or occurrence of the action that caused the impact.

The key elements of this adaptive management plan are:

1. Data and data source identification (information gathering);
2. Analysis to determine whether an adverse impact is caused by the exposure of APR during and post roadway construction; and
3. Identifying potential actions TDOT could take to address these impacts and committing to take appropriate action (response).

In this AMP TDOT is focusing on minimizing APR exposure and maintaining the water quality of the surrounding streams, rivers, etc. The AMP focuses on these two areas because they were identified in the environmental and design analysis previously discussed. Although not anticipated through the use of engineering controls during and post construction, unintended environmental impacts could occur.

Therefore the objectives of TDOT's AMP include:

- Identify potential localized water quality impacts due to APR exposure and runoff caused by the roadway construction.
- Establish a process to address unanticipated adverse local water quality impacts.
- Keep TDOT Construction, the prime contractor, and TDEC informed of impacts attributed to the roadway construction.

The strategies that TDOT will employ to achieve these objectives include:

- Identify data sources (water quality monitoring locations).
- Use water quality data to assess if there has been or is anticipated to be an increase in localized changes to water quality (e.g., increase in pH, conductivity, soluble metals (Al, Fe, Mn, Ni, Zn), hardness, acidity and sulfate).
- Assess if the change is caused directly, or indirectly, by the roadway construction.
- Use data to assess if there has been or is anticipated to be an adverse impact.
- Share data and reports with TDOT Construction, prime contractor and TDEC.
- Take appropriate action to address any adverse impacts related to localized water quality from APR runoff caused by the roadway construction.

The key questions that must be answered on an on-going basis by the AMP are:

- Has an environmental change (e.g., increase in pH and/or conductivity) occurred?
- Is the environmental change caused, directly or indirectly, by the roadway construction?
- Has the environmental change had an adverse localized impact on water quality?
- What action could TDOT and/or the contractor take to address an adverse water quality impact linked to the roadway construction?

It is unlikely that TDOT will be able to rely on any single analysis or data source. The complex interplay of multiple sources, as well as other regulatory drivers, will most likely require TDOT to conduct multiple analyses. It may not be possible to identify a direct relationship between the environmental change and the roadway construction. Therefore, TDOT will evaluate the weight of available evidence to determine the reason for the change.

In conducting the analysis, it will be necessary to consider normal variations, existing conditions, and other factors that may be responsible for changes in the data. For example, water quality data can vary significantly from year-to-year due to meteorology (precipitation), changes in land use conducted by others outside TDOT ROW (land disturbances, silviculture, proposed developments, etc.) upstream/up gradient within the project watershed(s).

The following is an example of the stepwise approach TDOT will take to analyze the water quality data for determining a localized impact:

1) Monitor stream locations subject to receiving APR runoff. For example, increases in pH and conductivity could indicate that storm water runoff from APR-exposed areas has occurred. If an increase is apparent, then

2) Review indicators to assess if the change was caused by the roadway construction, lack of implementation of engineering controls or BMPs to prevent APR exposure and runoff, adjustment of construction techniques or some other factor. If the change is determined to be caused by the roadway construction, then

3) Work with TDOT Construction, Environmental and the contractor to review construction techniques, BMPs, policies, etc. to determine whether the change had or is likely to have adverse impacts on local water quality.

In the event that an unanticipated adverse localized water quality impact is identified and determined to have been caused by the roadway construction, this plan requires TDOT to take action and respond appropriately. Regardless of the potential various water quality impacts, TDOT will be able to address these issues though use of the AMP.

II. APR ENGINEERING CONTROLS DURING CONSTRUCTION

Geotechnical Investigations

TDOT has identified APR locations for potential localized water quality impacts through three (3) separate geotechnical investigations:

1. "Geotechnical Investigation State Route 29 (U.S. 27) sta. 100+00 to sta. 345+00" report prepared by ARCADIS U.S., Inc., February 12, 2002;
2. "Report of Acid Producing Rock Evaluation State Route 29 (U.S. Highway 27) Improvements" prepared by S&ME, Inc., January 4, 2013; and
3. "Retaining Wall and Acid Producing Rock Evaluation Report, State Route 29 Widening from State Route 61 to 0.6 Mile South of Whetstone Road" prepared by S&ME, Inc., April 18, 2013.

The APR classification and locations identified through the geotechnical investigation were then placed within the roadway construction design plans (horizontally) to determine locations and cross sections (horizontally and vertically) to calculate the potential volume of APR excavated during the roadway construction. An estimated volume of 241,000 CY of APR is anticipated to be excavated during the construction of this project. Use of retaining walls substantially decreased this estimate from the original amount.

APR Handling & Disposal

TDOT has existing construction policies in place in regards to handling APR material. As such, TDOT Special Provision 107L, regarding potentially acid producing materials, and supplemental notes included in the construction plans and permits shall be followed for the sampling, testing and disposal of acid producing materials. Additionally, notes have been added to the construction plans to make all site personnel and contractors aware of the potential of APR.

- Project Commitment: Pyrite monitoring plan must be adhered to, starting with pre-construction sampling, 3 months prior to start of construction and continuing during- and post construction.

- This project contains potentially acid producing materials (pyritic materials) consisting of rock, rock-like materials, and soil that contain sufficient amounts of certain minerals that could produce drainage at pH levels sufficiently less than background pH when exposed to atmospheric conditions and weathering processes.

Due to the existing site conditions, lack of ROW and unacceptable areas that could be used to encapsulate APR material on-site, TDOT has adopted the following APR disposal method on this project.

- All acid producing materials that require encapsulation or blending shall be placed in an approved Class I landfill. The following landfill has airspace available to accept acid producing material: Rhea County, TN, landfill. Contact information:

  Santek Waste Services
  Attn: Aaron Elledge
  650 25th Street, N.W., Suite 100
  Cleveland, TN 37311
  Phone: 423-303-7101
  Toll free: 800-467-9160

- The contractor shall coordinate with the landfill regarding the amount of acid producing materials that may be received on a per day basis in order to prevent excess stockpiling of acid producing materials on-site.

APR Exposure During Construction

Construction BMPs, notes, pay items, and estimated quantities have been included in the construction plans to prevent and control APR exposure and runoff during construction. Following is a list of the items included within the construction plans:

1. Special clearing and grubbing notes beyond normal TDOT policy to prevent contact/exposure during clearing operations include the following:

   a. Clearing operations for the entire project shall include the chipping/mulching of trees and vegetation (excluding trees and vegetation used to construct brush barriers) and the spreading/blowing of wood mulch over the cleared area(s) at a depth of 3-inches (min.) for temporary stabilization. The cost for remobilization, chipping/mulching and spreading/blowing of wood mulch is to be included in the cost of pay item 201-01.

   b. In areas of the project site that contain bench cut slopes and associated slopes, the contractor shall not clear the entire bench cut slope area at one time. Clearing will be staged and limited to the construction of access and haul roads and the area required to construct three (3) bench cuts at a time. Once a bench cut and associated slope are stabilized additional area may be cleared for the next bench cut. Brush barriers shall be constructed below each cleared bench construction area and locations depicted on the EPSC plans.

2. In addition to Special Provision 107L, the contractor shall cover all APR slopes and materials that will/may remain exposed for greater than seven (7) calendar days by the use of polyethylene sheeting and sandbags.

3. The contractor shall cover and protect all APR slopes and material by the use of polyethylene sheeting and sandbags at any time the project engineer determines that approaching inclement weather will pose a concern with potential acidic runoff.

4. Offsite storm water runoff will be diverted around APR areas to minimize contact and potential of APR runoff. Diversions will consist of temporary earth berms, sediment tubes, silt fence (with and/or without backing), mulch berms, slope drains, and temporary diversion channels and pipes.

5. TDOT is aware that sediment transported from APR areas may contain contaminants that could result in water quality impacts. As such, several BMPs are included within the erosion prevention and sediment control (EPSC) that will serve a dual purpose: (1) to control erosion of soils in exposed APR areas, and (2) to capture sediment and storm water runoff from exposed APR areas for monitoring and potential treatment.

6. There are locations that have existing pipe culverts that provide drainage from exposed APR areas and discharge directly into receiving streams. In these locations, notes and BMPs have been added to the plans to plug the pipe culvert as needed to redirect storm water runoff to designated sediment storage areas down gradient.

7. Storm water runoff collected within sediment traps, rock sediment dams, sediment basins, etc. below exposed APR locations will be monitored by TDOT Construction through the EPSC inspector. The EPSC inspector will use a portable pen/pocket type meter and/or pH strips to quickly measure pH and conductivity collected in these areas.

8. Past research and vendor information from the mining industry provided information that the use of anionic polyacrylamides (PAM) may be used as a treatment method to remove soluble metals and sediments from storm water. Pay items and estimated quantities for PAM powder and gel logs have been included in the construction plans. Special notes and PAM specifications have also been included within the construction plans on type and use. PAM should only be used when construction techniques and other BMPs being implemented are not proving effective in preventing water quality impacts associated with APR.

Retaining Walls

As previously mentioned in Section I., TDOT recognized that the use of retaining walls, even though it resulted in higher construction costs, was needed to minimize the amount of APR excavated and exposed to protect water quality. Special techniques have also been incorporated into the retaining walls to minimize APR exposure and runoff. These special techniques include the following detail depicted in Figure 2 and construction notes:

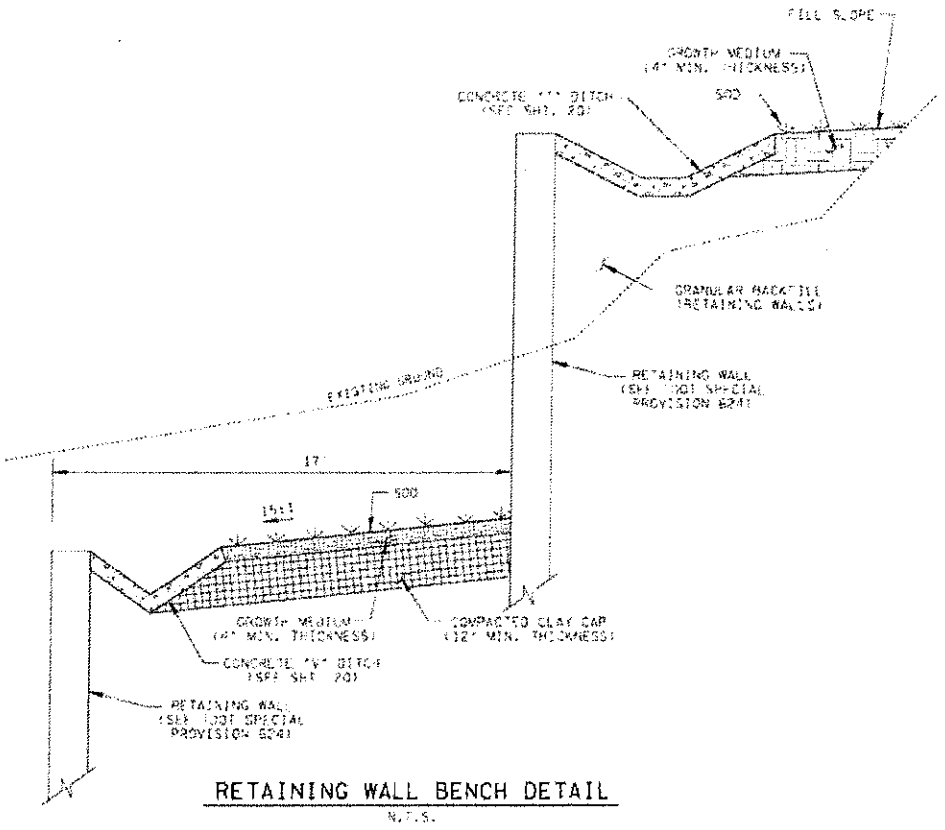


Figure 2

Construction Notes:

1. Bench surfaces located in cuts and retaining wall areas shall be mitigated per the detail depicted on sheet 2R *(Figure 2 above)*.

2. Water infiltrating behind the upper tier retaining walls and discharging through weep holes near the base of the walls shall be mitigated by constructing channels lined with limestone that are routed into the concrete drainage ditch down gradient. The limestone shall meet the gradation of ASTM D448 no. 57 stone and shall be a minimum of one foot thick. *(The limestone channel will serve as a potential passive treatment system for APR runoff.)*

3. The compacted clay cap shall consist of 12 inches of low to moderately plastic clay or silt with a plasticity index of less than thirty five (PI<35) and a standard proctor maximum dry density greater than 90 pounds per cubic foot. The cap shall contain no rock fragments larger than 1 inch in any dimension, and no organic matter. *(The clay cap is to minimize the amount of infiltration of precipitation and runoff from coming in contact with the potential APR located on the bench slope.)*

4. The compacted clay cap shall be placed in thin lifts with a maximum loose thickness of 8 inches, then compacted to 90 percent of the standard proctor maximum dry density, with moisture content within 3 percent of the optimum moisture content, depending on the shape of the Proctor curve. Wetting or drying of these soils may be required, depending on the time of year site grading is performed.

5. The density and moisture content of each lift shall be tested by a soils technician before placing additional lifts to evaluate that the specified degree of compaction is being achieved.

6. The actual testing frequency shall be determined by the geotechnical engineer based on the type of soil being placed, the equipment being used, and the time of year the fill is being placed. Any areas that do not meet the compaction specification shall be re-compacted to achieve compliance.

7. The growth medium shall consist of 4 inches of topsoil placed over the clay cap with sod for permanent stabilization.

8. The back slope of the concrete "T" ditch shall tie into existing ground or be placed in fill. No excavation of the existing slope up gradient of the concrete "T" ditch will be allowed.

9. Densified ASTM D448 No. 57 stone shall be placed beneath the concrete ditch sections located in fill areas.

With no excavation of the existing slope up gradient of the concrete "T" ditch allowed, all surface runoff from up gradient slopes should not come into contact with exposed APR. The storm water runoff will then be collected in the continuous concrete lined ditch placed immediately behind the top of the retaining walls. The concrete ditches will allow water to flow to each end of the retaining walls and discharge into limestone structures that will serve as first velocity energy dissipaters and secondly as passive treatment systems to buffer any potential APR runoff prior to discharge into receiving streams. Additionally, the concrete-lined ditches will also prevent the infiltration of storm water runoff behind the retaining walls. As a secondary preventive measure to treat potential APR runoff and infiltration, the top portion of the retaining wall that is located in fills will be backfilled with No. 57 limestone rock.

Permanent Stabilization

Through TDOT's past experience with projects containing APR, the Department realizes that soils on final graded slopes may be acidic in nature due to APR and limit or prevent the establishment of permanent vegetation. As such the following note has been added to the construction plans:

- Due to the potential of acidic soils throughout the project site, soils on or topsoil placed on cut and fill slopes shall be tested for pH prior to applying permanent stabilization (seed and erosion control blankets, sod, etc.). Agricultural lime (801-09) shall be applied to the slopes to neutralize the soil acidity at the recommended rates to provide a pH range of 6-9.

Pay items and associated quantities for agricultural lime, fertilize, water, seeding, sod and erosion control blankets have been included to obtain permanent vegetation. As a secondary preventive measure to reduce infiltration and establish permanent vegetation quickly in areas that contain retaining walls, all fill slopes placed behind the retaining walls and all benches located between walls will be permanently stabilized with 4-inches of growth media (topsoil) and sod.

III. ACID PRODUCING ROCK MONITORING PLAN

As noted in Section I, Introduction, the construction of the SR-29 roadway widening project will be two separate projects (PIN 101411.04 and 101411.05). For the first SR-29 project (PIN 101411.04), field parameters will be monitored at eight (8) sites on this project pre-, during-, and post-construction to ensure that water quality is not jeopardized from acid runoff behind the retaining walls. The second SR-29 project (PIN 101411.05), will also require water quality monitoring and is addressed in a separate document. Refer to this document for more detailed information regarding the second SR-29 project (PIN 101411.05).

For clarity, water quality monitoring locations have been numbered in sequential order from the beginning of the first SR-29 project through the end of the second SR-29 project. Therefore, Site No. 17 will be used as a reference site for both projects, and is located upstream of all construction activities on the same stream. As such, it will provide a comparison between the characteristics of the seven sites within the construction area and an upstream non-affected site.

Two "trigger" parameters have been chosen to act as indicators of possible acid producing rock (APR) entering waterways during the construction and post-construction phases. If pH is less than 6.0 (based on TDEC Division of Water Resources Division, Chapter 0400-40-03, General Water Quality Criteria, rule 0400-40-03-.03 (3) 4 (b) for Fish and Aquatic Life, and approved by EPA) and/or if specific conductance is greater than 500 µsiemens/cm (unless pre-construction monitoring or the upstream reference site is >500 µsiemens/cm), then samples will be collected at that site for laboratory analysis. Constituents to be analyzed are aluminum, iron, manganese, nickel, zinc, hardness, acidity, and sulfate. Results from each field survey will be submitted to TDEC, Division of Water Resources, Natural Resources Section, within 20 working days of the survey, and within 30 working days of receipt of the laboratory analytical results by TDOT. If the results indicate potential problems, TDEC will be notified immediately. TDOT and TDEC will review the results to determine if corrective action needs to be taken.

Below is a brief description of the site locations, sampling frequencies during various time frames, and parameters analyzed.

Sampling Sites

See Table 1, APR Water Quality Monitoring Locations, for a complete description of the eight site locations. Figure 3, Topographic Map APR Water Quality Monitoring Locations, depicts the locations listed in Table 1.

Frequency and Parameters

The tables below outline the sampling effort for each construction phase of the project. Field measurements will always include pH, dissolved oxygen (DO), specific conductance (conductivity), temperature, and salinity. Laboratory analyses will always include aluminum (Al), iron (Fe), manganese (Mn), nickel (Ni), zinc (Zn), hardness, acidity, and sulfate.

- Pre-Construction

No. Months	No. Surveys/Mo.	Field	Lab	Conditions
3	1	pH DO Cond. Temp. Salinity	Al Fe Mn Ni Zn Hardness Acidity Sulfate	One sample each month will be taken following a period of no rain in the previous 5 days. However, if there is not a five-day period of dry weather by the beginning of the fourth week of a month, the second sample will be taken regardless.
3	3 total over the entire period	as above	as above	Three samples will be taken, regardless of the month, when a rain event of >1.0 inch occurs on the project site.

(Note: The limited sampling timeframe is a result of the constraints of the project letting and initiation.)

- During-Construction

No. Months	No. Surveys/Mo.	Field	Lab	Conditions
Length of project, from beginning to NOT	1*	pH DO Cond. Temp. Salinity	Al Fe Mn Ni Zn Hardness Acidity Sulfate	Sampling will be set at pre-determined dates, and will not be weather dependent. If pH is less than 6.0, and/or conductivity is more than 500 µsiemens/cm (see note on above page) then water for lab analysis will be collected. See Note below.

*There will be one additional survey bi-annually following a >1.0 rain event, and one survey bi-annually for laboratory analysis of the above-listed parameters, regardless of the pH and conductivity values.
Note: Weekly sampling for a minimum of three additional weeks will occur, and will continue until the pH and/or conductivity reaches the numeric criteria.

- Post-Construction

No. Years	No. Surveys	Field	Lab	Conditions
3*	5 total, as follows: 1 mo. post-NOT 6 mos. post-NOT 1 yr. post-NOT 2 yr. post-NOT 3 yr. post-NOT	pH DO Cond. Temp. Salinity	Al Fe Mn Ni Zn Hardness Acidity Sulfate	Sampling will be set at pre-determined dates, and will not be weather dependent. If pH is less than 6.0, and/or conductivity is more than 500 µsiemens/cm above baseline (based on pre-construction data), then water for lab analysis will be collected.

*TDOT Operations conducts routine maintenance on all structures and roadways for the life of the roadway/structure. If a problem occurs which could affect water quality, TDOT's Environmental Division will be contacted to assess the situation, and if necessary, monitor and remedy the problem.

Table 1

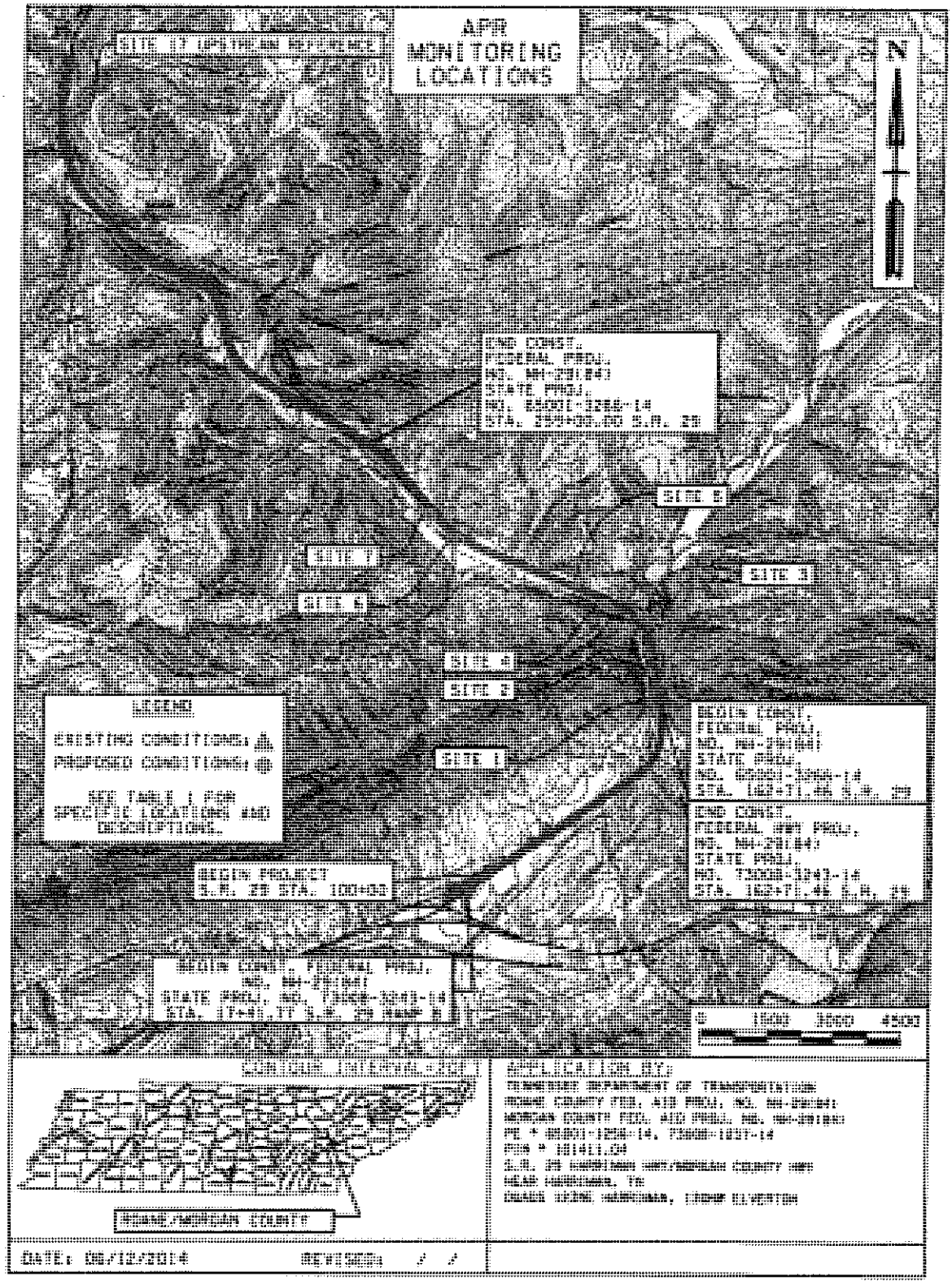
APR Water Quality Monitoring Locations

Site No.	Plans Sheet No.	Plans Station No. (approximate)	Existing Conditions	Proposed Conditions	Descriptions/Notes	Latitude, N	Longitude, W
1	9	156+70 LT	X		At existing 24" RCP outlet (WWC-15) to Little Emory River (STR-3)	35.98286475	-84.48110747
		156+30 LT		X	At proposed 48" RCP outlet (WWC-14) to Little Emory R. (STR-3) Note: While in use (prior to removing), the existing 24" RCP at 156+70L will be monitored. Immediately following installation of the proposed 48" RCP, monitoring will shift to this location.	35.98258707	-84.48109983
2	10	164+35 LT	X		At existing 30" CMP outlet (WWC-16) at Little Emory R. (STR-3)	35.98602021	-84.48173549
		168+32 LT		X	At proposed 24" RCP outlet to Little Emory River (STR-3) Note: While in use (prior to removing), the existing 30" CMP at 164+35L will be monitored. Immediately following installation of the proposed 24" RCP, monitoring will shift to this location.	35.98803309	-84.48146608
3	11	48+77 LT Coal Hill Road	X	X	At STR-5 pipe culvert outlet (existing and proposed), downstream of riprap outlet protection, prior to confluence with Little Emory River (STR-3)	35.98803309	-84.48146608
4	12	183+24 LT	X		At existing 24" CMP outlet (STR-6A), at confluence with Little Emory River (STR-3)	35.98886667	-84.48443198
		183+71 LT		X	At proposed 36" RCP outlet (STR-6A), at confluence with Little Emory River (STR-3) Note: While in use (prior to removing), the existing 24" CMP at 183+24L will be monitored. Immediately following installation of the proposed 36" RCP, monitoring will shift to this location.	35.98890877	-84.48457813
5	12	192+80 RT	X		Within STR-7, at the inlet of the existing 54" RCP	35.99023942	-84.48722482
		192+25 RT		X	Within STR-7, at the proposed 18" and 24" RCP outlets Note: While in use (prior to removing), the existing 54" RCP at 192+80R will be monitored. Immediately following installation of the proposed 36" RCP, monitoring will shift to this location.	35.99042962	-84.48690077
6	15	221+97 LT	X	X	Within STR-12, downstream of pipe culvert (existing & proposed), immediately upstream/prior to confluence with Bitter Ck (STR-6)	35.99325442	-84.49645671
7	16	230+00 LT	X	X	Within STR-13, immediately upstream/prior to confluence with Bitter Creek (STR-6)	35.99478550	-84.49856646
17	14*	Upstream Reference Site 357+00 RT*	X	X	Approximately 2 miles north of the end of construction project limits near the Balfour Drive crossing of Bitter Creek (STR-6), Morgan Co.; within Bitter Creek upstream of road crossing	36.01926290	-84.52548704

*Refer to the construction plans for SR-29 project 2 (PIN 101411.05), "SR-29 (US-27), From South of Whetstone Road to North of SR 328", for more details.

Figure 3

Topographic Map APR Water Quality Monitoring Locations



IV. ADAPTIVE MANAGEMENT PLAN

As noted in Section I, Introduction, TDOT will implement some or all components of the Adaptive Management Plan (AMP) as necessary in response to the following water quality criteria:

- Reduction below or exceedance above threshold values of the two "trigger" parameters
  - ✓ <6.0 for pH or
  - ✓ >500 microsiemens for specific conductance (conductivity), or
- Exceedance of 80 percent of the criterion continuous concentrations for metals, or
- Trending increase in any of the sampled criteria during any of the During- and Post-Construction monitoring events outlined in the APR Monitoring Plan.

During-Construction

Provided below is a systematic approach of steps that will be followed to address water quality monitoring of impacts that may be associated with APR exposure and runoff during construction:

1) *If the pH falls below 6.0 and/or if the conductivity rises above 500 microsiemens/cm, then metal sampling will occur. See Section III, During-Construction sampling schedule.*

2) *If total metal concentrations for a given metal reach levels that exceed 80 percent of the criterion continuous concentrations at a sampling locatian and/or there is an increasing trend of the criterion (20 percent increase from the pre-construction sample levels), then sampling of that metal would continue*

    a. *On a weekly basis until the value dropped below the 80 percent threshold, and/or*

    b. *There was no longer an increasing trend, and metal concentrations were maintained below this level for a minimum of three (3) consecutive samples.*

    This will assist in determining if this was an anomaly and whether conditions will quickly return to background levels.

3) *If there is a continuing trend of exceedance (three samples taken over three weeks), then the following engineering controls will be followed:*

    a. *Visual inspection to observe and document on-site conditions, work being performed and land disturbing activities occurring within the drainage areas immediately adjacent to or up-gradient of the affected water bodies ar conveyances within the project right-af-way. This may include slopes, ditches, natural conveyances or additianal tributories which contribute runoff or surface flaw to the receiving water ar conveyance associated with a particular monitoring location. Documentation should include phatos, locotion of potential contributing site condition or activity (project station number and off-set; lat/long coordinates if necessary), and description af haw conditians, activities, etc. may be affecting receiving waters or conveyances, etc.*

b. *Visual inspection to observe and document off-site conditions up-gradient or outside of the project right-of-way in order to determine if off-site conditions, land disturbance or other activities within the same watershed could be contributing to adverse effects on project receiving woters or conveyances associated with a specific monitoring location. Adequate documentation, including that nated in step 3) a. above, should be provided.*

c. *Interview TDOT, consultant, and/or contractor site personnel regarding knowledge of specific site conditions or construction-related activities which may be resulting in water quality impacts at the designated monitoring location(s).*

d. *Review project-related documentation, including construction diaries, the project Storm Water Pollution Prevention Plan (SWPPP), EPSC inspection reports (including monthly rainfall logs), Quality Assurance (QA) Reports completed by the TDOT Comprehensive Inspections Office (CIO) or any other documents which may provide insight into changing site (or off-site) conditions which may have contributed to adverse effects on water quality.*

e. *Compile and analyze data and site information obtained in steps a through d above.*

f. *Cammunicate findings and potential recommendations to TDOT project personnel, the Region Construction Office, CIO and the contractor for implementation, including the alteratian or addition of APR engineering cantrols and BMPs prescribed far the active phase af canstruction.*

4) *If observation of site conditions or review of water quality manitaring/sompling results indicate an immediate threat to water quality, then recammendatian ta stap on-site work in the affected drainage area should be made to the TDOT Enviranmental Division, Region Construction Office, and CIO until an appropriate level af engineering cantrals and BMPs are installed and site canditions are restored. TDEC will be notified immediately af this action.*

5) *If revisions ta existing BMP measures ar installation of additional measures, such as sediment basins, retention structures, diversion ditches, etc., is required in order to address project water quality, then relocatian and/or establishment of additianal monitoring locations may be made at the discretion of the TDOT Environmental Divisian. Notification af chonges to the APR Monitoring Plan will be made to TDEC within 14 days.*

6) *If an increase in monitaring frequency is mode, then the revised frequency will be maintained until the affected parameters and/ar criterion have returned to within the appropriate threshold value(s) within the affected receiving water ar conveyance for a period of three (3) consecutive monthly monitoring periods. TDEC will be notified and concurrence obtained prior to returning ta the normal monitaring frequency.*

7) *If subsequent review of monitoring and sampling results obtained following changes to existing APR engineering controls and BMPs reveal that measured parameters and criterion continue to follow an unfavorable trend, then further consultation with TDOT Environmental Division, the Region Construction Office, and CIO personnel will be required. Further addition to or revision of existing APR engineering controls and BMPs will be implemented based on the results of this consultation. Subsequent monitoring and changes to site conditions will continue to be followed as outlined in the steps above.*

8) *If at any time throughout the life of project, the measured parameters and criterion have fallen outside of the threshold values for three consecutive monitoring periods, then construction and land-disturbing activities within the affected drainoge area will cease until oppropriate BMPs are prescribed and properly installed. Additionally, any exposed surface areas containing APR, including slopes, ditches, stockpiled soil, etc. will be covered in polyethylene sheeting and anchored with sandbags to prevent further water quality impacts. Offsite water will be diverted around APR exposed areas and storm water basins will be constructed below the exposed APR areas to capture the storm water runoff volume associated with the 2 year-24 hour storm event. The captured storm water runoff will be tested for the same pH, conductivity and metal criteria prior to discharge.*

Post-Construction

Following completion of project construction, a total of five (5) sampling events will be completed over three (3) calendar years. As noted in Section III., sampling will be set at pre-determined dates and will not be weather dependent. Provided below is a systematic approach of steps that will be followed to address water quality monitoring of impacts that may be associated with APR exposure and runoff during construction:

1) *If pH is less than 6.0 and/or conductivity is more than 500 µsiemens/cm (or as otherwise designated), then grab samples for laboratory analysis af metals will be collected.*

2) *If, as noted for the '**During-Construction**' guidance, laboratory analysis reveals that total metal concentrations for a given metal reach levels that exceed 80 percent of the criterion continuous cancentrations at o sampling locotion and/or there is an increasing trend of the criterion (20 percent increase from the pre-construction sample levels) sampling of that metol would continue on a monthly basis until:*

    a. *The volue dropped below the 80 percent threshold and/or*

    b. *There was na longer an increasing trend and was maintained below this level for a minimum of three consecutive samples.*

3) *If the third consecutive monitoring event in which a 20 percent or greater increase from the pre-construction sample levels for a given metal occurs on the final (3rd year) post-construction monitoring event, then site conditions will be assessed by TDOT Environmental Division and TDEC personnel in arder to determine an oppropriate course of action for odditionol monitoring and/or treatment of site conditions.*

4) *In addition to the sampling frequency noted above, should designated thresholds for water quality parameters and criterion be exceeded or their values continue in an unfavorable trend, then APR engineering controls and BMPs shall also be applied during the post-construction period. These will be made an a case-by-case basis due to completian of construction activities, permanent stabilization of the site, and de-mobilization of the contractor.*

Adaptive Management and APR Water Quality Monitoring Plan for SR-29 (US-27)
From South of Whetstone Road to North of SR-328 in Morgan County
PIN 101411.05; Project No. 65001-3268-14

I. INTRODUCTION

Background

The State Route (SR) 29 (US-27) proposed roadway widening project from SR 61 near Harriman, TN to north of SR 328 will consist of two separate design and construction projects. The first SR-29 project (PIN 101411.04) begins at the intersection of SR-29 and SR-61 east of Harriman in Roane County and extends to the north 3.25 miles ending just south of Whetstone Road in Morgan County. The second SR-29 project (PIN 101411.05) begins at the end of the first SR-29 project (PIN 101411.04) just south of Whetstone Road and extends 2.02 miles to just north of the intersection of SR-328 and SR-29 in Morgan County.

Following is more detailed information regarding the second SR-29 project (PIN 101411.05). The existing roadway consists of two travel lanes with paved shoulders and contains four reinforced concrete box culverts (RCBC): one over Bitter Creek and three over tributaries (Forked Creek, Muddy Branch, and unnamed) to Bitter Creek. The majority of the existing roadway is bounded to the south and west by Bitter Creek and to the north and east by Whetstone Mountain.

The Advance Planning Report (APR) and the Project Data Summary sheet prepared in 1998 by TDOT contains additional information regarding the existing roadway conditions. SR-29 is considered an arterial highway and is also listed as part of the National Highway System (US-27) by the Federal Highway Administration (FHWA). As such TDOT has design standards (RD01-TS-3A) for 4-lane arterial highways that contain minimum standards for travel lanes, medians, side slopes, etc. The proposed improvements in the second SR-29 project include two typical sections:

1. Four 12-foot traffic lanes, a 48-foot median (minimum allowed) and two 12-foot paved shoulders, and
2. Four 12-foot traffic lanes, a 12-foot center two-way left turn (TWLT) lane and two 12-foot paved shoulders.

Side slopes for the project range from 2:1 (H:V) to 6:1 depending on the location, topography and geology. The alignment for the proposed roadway widening predominantly follows the existing route; however, safety improvements to correct horizontal and vertical deficiencies, including intersections with side roads and driveways, were also included.

Southbound Lanes: The existing two lane roadway is bounded predominantly to the west/southwest by Bitter Creek. Minor modifications will develop the existing two lane roadway into the southbound lanes. This will minimize impacts to Bitter Creek.

Northbound Lanes: The northbound lanes are bounded on the west/southwest side by the existing two lane roadway (future southbound lanes) and on the east/northeast side as previously stated by Whetstone Mountain. The proposed median, TWLT lanes, northbound lanes and shoulders will be

constructed in this location. Design alternatives considered for the tie slopes adjacent to the northbound lanes included the following:

1.) use of typical cut and fill slopes (2:1);

2.) use of cut slopes with benches (where feasible); and

3.) use of retaining walls in select areas.

In the first alternative, a four lane highway with a divided median using the typical cut and fill slopes caused substantial land disturbance and resulted in significant right-of-way requirements and extreme earthwork volumes. Several cut slopes required ridge/mountain top removal.

The second alternative considered transitioning the typical section with a divided median from the end of SR-29 Project 1 (PIN 101411.04) to a typical section that contained a center TWLT lane with slope benching in select areas as defined by the local geology. This alternative reduced the amount of land disturbance, as well as the required right-of-way and earthwork volumes, when compared to alternative 1. However, subsequent geotechnical investigations concluded that acid producing rock (APR) was located in several of the benched slope areas. Further reduction in APR volume/disturbance resulted in Alternative three.

Alternative three uses the four lanes with a center TWLT lane, retaining walls and slope benching in select locations to reduce land disturbance, earthwork volume, and APR exposure. This alternative results in higher construction costs, but was selected as the preferred design alternative to limit environmental impacts. The preferred design alternative reduced stream impacts, land disturbance, erosion, and the amount of APR exposure/mitigation. All other side slopes and associated ditches were reduced to prevent additional environmental impacts.

Adaptive Management Plan Elements

This document describes the Tennessee Department of Transportation's (TDOT) recommended Adaptive Management Plan (AMP) for the second SR-29 (US-27) project (PIN 101411.05) in Morgan County, TN. The AMP is focused on localized water quality impacts from potential APR exposure during and post roadway construction.

Adaptive management is a process of information gathering, review and analysis, and response that promotes flexible agency decision-making. It is particularly appropriate where complex systems are involved, where the effects of an agency's decisions and actions play out over an extended period of time, and where the agency must meet multiple objectives. This AMP is consistent with TDOT's approach to other roadway construction projects that contains APR which incorporates the following:

- On-going evaluations of water quality during and post construction,
- Coordination with the Tennessee Department of Environment & Conservation (TDEC),
- Implementation of best management practices (BMPs) during and post construction, and

- Continuous adjustments to the program to meet regulatory requirements, as necessary.

Figure 1 represents the adaptive management process. It illustrates how new information is used to refine and adjust agency action to continually meet its defined objective.

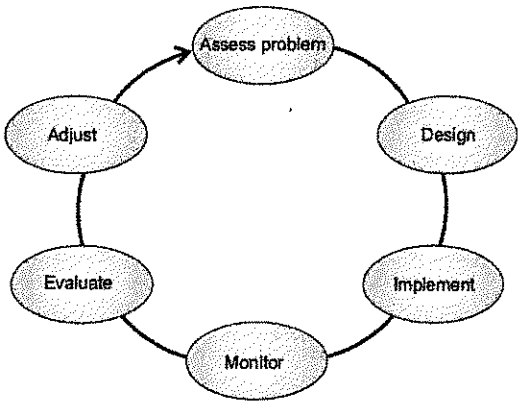


Figure 1: Adaptive Management Process

Construction of SR-29 is expected to begin in the fall/winter of 2014/2015. Using the adaptive management approach, TDOT will assess whether there are unanticipated, adverse localized water quality impacts associated with APR exposure and runoff from the roadway construction and evaluate the data discussed in this plan for indicators of unintended adverse impacts. If adverse impacts in these areas are found and demonstrated to be the result of the roadway construction, TDOT is committed to taking appropriate action and adjusting the operation to minimize the effect or occurrence of the action that caused the impact.

The key elements of this adaptive management plan are:

1. Data and data source identification (information gathering);
2. Analysis to determine whether an adverse impact is caused by the exposure of APR during and post roadway construction; and
3. Identifying potential actions TDOT could take to address these impacts and committing to take appropriate action (response).

In this AMP TDOT is focusing on minimizing APR exposure and maintaining the water quality of the surrounding streams, rivers, etc. The AMP focuses on these two areas because they were identified in the environmental and design analysis previously discussed. Although not anticipated through the use of engineering controls during and post construction, unintended environmental impacts could occur.

Therefore the objectives of TDOT's AMP include:

- Identify potential localized water quality impacts due to APR exposure and runoff caused by the roadway construction.
- Establish a process to address unanticipated adverse local water quality impacts.

- Keep TDOT Construction, the prime contractor, and TDEC informed of impacts attributed to the roadway construction.

The strategies that TDOT will employ to achieve these objectives include:

- Identify data sources (water quality monitoring locations).
- Use water quality data to assess if there has been or is anticipated to be an increase in localized changes to water quality (e.g., increase in pH, conductivity, soluble metals (Al, Fe, Mn, Ni, Zn), hardness, acidity and sulfate).
- Assess if the change is caused directly, or indirectly, by the roadway construction.
- Use data to assess if there has been or is anticipated to be an adverse impact.
- Share data and reports with TDOT Construction, prime contractor and TDEC.
- Take appropriate action to address any adverse impacts related to localized water quality from APR runoff caused by the roadway construction.

The key questions that must be answered on an on-going basis by the AMP are:

- Has an environmental change (e.g., increase in pH and/or conductivity) occurred?
- Is the environmental change caused, directly or indirectly, by the roadway construction?
- Has the environmental change had an adverse localized impact on water quality?
- What action could TDOT and/or the contractor take to address an adverse water quality impact linked to the roadway construction?

It is unlikely that TDOT will be able to rely on any single analysis or data source. The complex interplay of multiple sources, as well as other regulatory drivers, will most likely require TDOT to conduct multiple analyses. It may not be possible to identify a direct relationship between the environmental change and the roadway construction. Therefore, TDOT will evaluate the weight of available evidence to determine the reason for the change.

In conducting the analysis, it will be necessary to consider normal variations, existing conditions, and other factors that may be responsible for changes in the data. For example, water quality data can vary significantly from year-to-year due to meteorology (precipitation) and changes in land use conducted by others outside TDOT ROW (land disturbances, silviculture, proposed developments, etc.) upstream/up gradient within the project watershed(s).

The following is an example of the stepwise approach TDOT will take to analyze the water quality data for determining a localized impact:

1) Monitor stream locations subject to receiving APR runoff. For example, increases in pH and conductivity could indicate that storm water runoff from APR-exposed areas has occurred. If an increase is apparent, then

2) Review indicators to assess if the change was caused by the roadway construction, lack of implementation of engineering controls or BMPs to prevent APR exposure and runoff, adjustment of construction techniques, or some other factor. If the change is determined to be caused by the roadway construction, then

3) Work with TDOT Construction, Environmental and the contractor to review construction techniques, BMPs, policies, etc. to determine whether the change had or is likely to have adverse impacts on local water quality.

In the event that an unanticipated adverse localized water quality impact is identified and determined to have been caused by the roadway construction, this plan requires TDOT to take action and respond appropriately. Regardless of the potential various water quality impacts, TDOT will be able to address these issues though use of the AMP.

II. APR ENGINEERING CONTROLS DURING CONSTRUCTION

Geotechnical Investigations

TDOT has identified APR locations for potential localized water quality impacts through three (3) separate geotechnical investigations:

1. "Geotechnical Investigation State Route 29 (U.S. 27) sta. 100+00 to sta. 345+00" report prepared by ARCADIS U.S., Inc., February 12, 2002;
2. "Report of Acid Producing Rock Evaluation State Route 29 (U.S. Highway 27) Improvements" prepared by S&ME, Inc., January 4, 2013; and
3. "Retaining Wall and Acid Producing Rock Evaluation Report, State Route 29 Widening from South of Whetstone Road to North of State Route 328" prepared by S&ME, Inc., December 11, 2013.

The APR classification and locations identified through the geotechnical investigation were then placed within the roadway construction design plans (horizontally) to determine locations and cross sections (horizontally and vertically) to calculate the potential volume of APR excavated during the roadway construction. An estimated volume of 79,000-84,000 CY of APR is anticipated to be excavated during the construction of this project. Use of retaining walls substantially decreased this estimate from the original amount.

APR Handling & Disposal

TDOT has existing construction policies in place in regards to handling APR material. As such, TDOT Special Provision 107L, regarding potentially acid producing materials, and supplemental notes included in the construction plans and permits shall be followed for the sampling, testing and disposal of acid producing materials. Additionally, notes have been added to the construction plans to make all site personnel and contractors aware of the potential of APR.

- Project Commitment: Pyrite monitoring plan must be adhered to, starting with pre-construction sampling, 3 months prior to start of construction and continuing during- and post-construction.

- This project contains potentially acid producing materials (pyritic materials) consisting of rock, rock-like materials, and soil that contain sufficient amounts of certain minerals that could

produce drainage at pH levels sufficiently less than background pH when exposed to atmospheric conditions and weathering processes.

Due to the existing site conditions, lack of ROW and unacceptable areas that could be used to encapsulate APR material on-site, TDOT has adopted the following APR disposal method on this project.

- All acid producing materials that require encapsulation or blending shall be placed in an approved Class I landfill. The following landfill has airspace available to accept acid producing material: Rhea County, TN, landfill. Contact information:

  Santek Waste Services
  Attn: Aaron Elledge
  650 25th Street, N.W., Suite 100
  Cleveland, TN 37311
  Phone: 423-303-7101
  Toll free: 800-467-9160

- The contractor shall coordinate with the landfill regarding the amount of acid producing materials that may be received on a per day basis in order to prevent excess stockpiling of acid producing materials on-site.

APR Exposure During Construction

Construction BMPs, notes, pay items, and estimated quantities have been included in the construction plans to prevent and control APR exposure and runoff during construction. Following is a list of the items included within the construction plans:

1. Special clearing and grubbing notes beyond normal TDOT policy to prevent contact/exposure during clearing operations include the following:

   Clearing operations for the entire project shall include the chipping/mulching of trees and vegetation (excluding trees and vegetation used to construct brush barriers) and the spreading/blowing of wood mulch over the cleared area(s) at a depth of 3-inches (min.) for temporary stabilization. The cost for remobilization, chipping/mulching and spreading/blowing of wood mulch is to be included in the cost of pay item 201-01.

2. In addition to Special Provision 107L, the contractor shall cover all APR slopes and materials that will/may remain exposed for greater than seven (7) calendar days by the use of polyethylene sheeting and sandbags.

3. The contractor shall cover and protect all APR slopes and material by the use of polyethylene sheeting and sandbags at any time the project engineer determines that approaching inclement weather will pose a concern with potential acidic runoff.

4. Offsite storm water runoff will be diverted around APR areas to minimize contact and potential of APR runoff. Diversions will consist of temporary earth berms, sediment tubes, silt fence (with and/or without backing), mulch berms, slope drains, and temporary diversion channels and pipes.

5. TDOT is aware that sediment transported from APR areas may contain contaminants that could result in water quality impacts. As such, several BMPs are included within the erosion prevention and sediment control (EPSC) that will serve a dual purpose: (1) to control erosion of soils in exposed APR areas, and (2) to capture sediment and storm water runoff from exposed APR areas for monitoring and potential treatment.

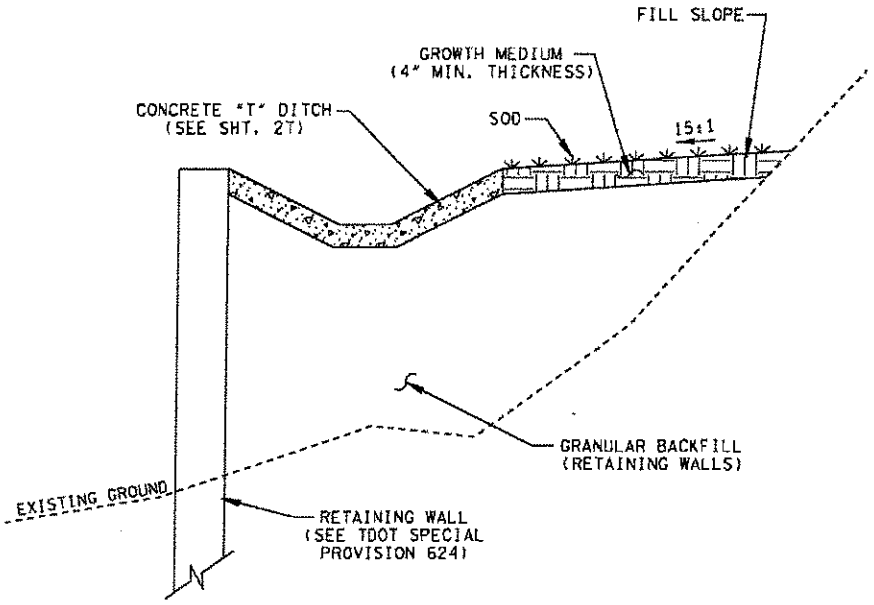
6. There are locations that have existing pipe culverts that provide drainage from exposed APR areas and discharge directly into receiving streams. In these locations, notes and BMPs have been added to the plans to plug the pipe culvert as needed to redirect storm water runoff to designated sediment storage areas down gradient.

7. Storm water runoff collected within sediment traps, rock sediment dams, sediment basins, etc. below exposed APR locations will be monitored by TDOT Construction through the EPSC inspector. The EPSC inspector will use a portable pen/pocket type meter and/or pH strips to quickly measure pH and conductivity collected in these areas.

8. Past research and vendor information from the mining industry provided information that the use of anionic polyacrylamides (PAM) may be used as a treatment method to remove soluble metals and sediments from storm water. Pay items and estimated quantities for PAM powder and gel logs have been included in the construction plans. Special notes and PAM specifications have also been included within the construction plans on type and use. PAM should only be used when construction techniques and other BMPs being implemented are not proving effective in preventing water quality impacts associated with APR.

Retaining Walls

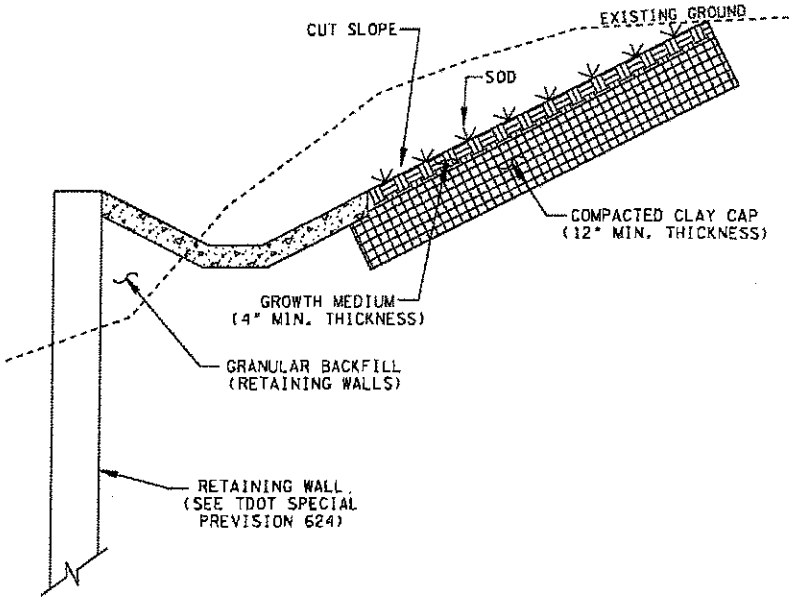
As previously mentioned in Section I, Introduction, TDOT recognized that the use of retaining walls, even though it resulted in higher construction costs, was needed to minimize the amount of APR excavated and exposed to protect water quality. Special techniques have also been incorporated into the retaining walls to minimize APR exposure and runoff. These special techniques include the following details depicted in Figures 2-3 and construction notes:



RETAINING WALL DITCH DETAIL (FILL SECTION)

N.T.S.

Figure 2



RETAINING WALL DITCH DETAIL (CUT SECTION)

N.T.S.

Figure 3

Construction Notes:

1. The back slope of the concrete "T" ditch shall tie into existing ground or be placed in fill. Excavation of the existing slope up gradient of the concrete "T" ditch will be allowed only in the locations listed below:

   STA. 314+00.00 SR 29
   STA. 325+00.00 SR 29
   STA. 60+00.00 Hanging Rock Road

2. The compacted clay cap shall consist of 12 inches of low to moderately plastic clay or silt with a plasticity index of less than thirty five (PI<35) and a standard proctor maximum dry density greater than 90 pounds per cubic foot. The cap shall contain no rock fragments larger than 1 inch in any dimension, and no organic matter. *(The clay cap is to minimize the amount of infiltration of precipitation and runoff from coming in contact with the potential APR located on the cut slope.)*

3. The compacted clay cap shall be placed in thin lifts with a maximum loose thickness of 8 inches, then compacted to 90 percent of the standard proctor maximum dry density, with moisture content within 3 percent of the optimum moisture content, depending on the shape of the Proctor curve. Wetting or drying of these soils may be required, depending on the time of year site grading is performed.

4. The density and moisture content of each lift shall be tested by a soils technician before placing additional lifts to evaluate that the specified degree of compaction is being achieved.

5. The actual testing frequency shall be determined by the geotechnical engineer based on the type of soil being placed, the equipment being used, and the time of year the fill is being placed. Any areas that do not meet the compaction specification shall be re-compacted to achieve compliance.

6. The growth medium shall consist of 4 inches of topsoil placed over the clay cap with sod for permanent stabilization.

7. Densified ASTM D448 No. 57 stone shall be placed beneath the concrete "T" ditch sections located in fill areas.

With the exception of the three areas noted above, no excavation of the existing slope up gradient of the concrete ditch will be allowed as depicted in Figure 2. Therefore all surface runoff from up gradient slopes should not come into contact with exposed APR. The three areas listed requiring small cut areas behind the retaining walls is due to low points within the retaining walls and surrounding topography. As such these low points will require the installation of drainage structures. To mitigate the risk of

potential infiltration and APR runoff, the adjacent up gradient cut slopes will be mitigated per the detail depicted in Figure 3 and the construction notes listed above.

All storm water runoff from up gradient fill and cut slopes will then be collected in the continuous concrete lined "T" ditch placed immediately behind the top of the retaining walls. The concrete ditches will allow water to flow to each end of the retaining walls and discharge into limestone structures that will serve primarily as velocity energy dissipaters and secondly as passive treatment systems to buffer any potential APR runoff prior to discharge into receiving streams. Additionally, the concrete-lined ditches will also prevent the infiltration of storm water runoff behind the retaining walls. As a secondary preventive measure to treat potential APR runoff and infiltration, the top portion of the retaining wall that is located in fills will be backfilled with No. 57 limestone rock.

Permanent Stabilization

Through TDOT's past experience with projects containing APR, the Department realizes that soils on final graded slopes may be acidic in nature due to APR and limit or prevent the establishment of permanent vegetation. As such the following note has been added to the construction plans:

- Due to the potential of acidic soils throughout the project site, soils on or topsoil placed on cut and fill slopes shall be tested for pH prior to applying permanent stabilization (seed and erosion control blankets, sod, etc.). Agricultural lime (801-09) shall be applied to the slopes to neutralize the soil acidity at the recommended rates to provide a pH range of 6-9.

Pay items and associated quantities for agricultural lime, fertilize, water, seeding, sod and erosion control blankets have been included to obtain permanent vegetation. As a secondary preventive measure to reduce infiltration and establish permanent vegetation quickly in areas that contain retaining walls, all slopes placed behind the retaining walls will be permanently stabilized with 4-inches of growth media (topsoil) and sod.

III. ACID PRODUCING ROCK MONITORING PLAN

As noted in Section I, Introduction, the construction of the SR-29 roadway widening project will be two separate projects (PIN 101411.04 and 101411.05). For the second SR-29 project (PIN 101411.05), field parameters will be monitored at nine (9) sites on this project pre-, during-, and post-construction to ensure that water quality is not jeopardized from acid runoff behind the retaining walls. The first SR-29 project (PIN 101411.04), will also require water quality monitoring and is addressed in a separate document. Refer to this document for more detailed information regarding the first SR-29 project (PIN 101411.04).

For clarity, water quality monitoring locations have been numbered in sequential order from the beginning of the first SR-29 project (PIN 101411.04) through the end of the second SR-29 project (PIN 101411.05). Therefore, Site No. 17 will be used as a reference site for both projects, and is located upstream of all construction activities on the same stream. As such, it will provide a comparison between the characteristics of the nine sites within the construction area PIN 101411.05) and an

upstream non-affected site (Site 17). Two "trigger" parameters have been chosen to act as indicators of possible acid producing rock (APR) entering waterways during the construction and post-construction phases. If pH is less than 6.0 (based on TDEC Division of Water Resources Division, Chapter 0400-40-03, General Water Quality Criteria, rule 0400-40-03-.03 (3) 4 (b) for Fish and Aquatic Life, and approved by EPA) and/or if specific conductance is greater than 500 µsiemens/cm (unless pre-construction monitoring or the upstream reference site is >500 µsiemens/cm), then samples will be collected at that site for laboratory analysis. Constituents to be analyzed are aluminum, iron, manganese, nickel, zinc, hardness, acidity, and sulfate. Results from each field survey will be submitted to TDEC, Division of Water Resources, Natural Resources Section, within 20 working days of the survey, and within 30 working days of receipt of the laboratory analytical results by TDOT. If the results indicate potential problems, TDEC will be notified immediately. TDOT and TDEC will review the results to determine if corrective action needs to be taken.

Below is a brief description of the site locations, sampling frequencies during various time frames, and parameters analyzed.

Sampling Sites

See Table 1, APR Water Quality Monitoring Locations, for a complete description of the 10 site locations. Figure 4, Topographic Map APR Water Quality Monitoring Locations, depicts the locations listed in Table 1.

Frequency and Parameters

The tables below outline the sampling effort for each construction phase of the project. Field measurements will always include pH, dissolved oxygen (DO), specific conductance (conductivity), temperature, and salinity. Laboratory analyses will always include aluminum (Al), iron (Fe), manganese (Mn), nickel (Ni), zinc (Zn), hardness, acidity, and sulfate.

- Pre-Construction

No. Months	No. Surveys/Mo.	Field	Lab	Conditions
3	1	pH DO Cond. Temp. Salinity	Al Fe Mn Ni Zn Hardness Acidity Sulfate	One sample each month will be taken following a period of no rain in the previous 5 days. However, if there is not a five-day period of dry weather by the beginning of the fourth week of a month, the second sample will be taken regardless.
3	3 total over the entire period	as above	as above	Three samples will be taken, regardless of the month, when a rain event of >1.0 inch occurs

				on the project site.

(Note: The limited sampling timeframe is a result of the constraints of the project letting and initiation.)

• During-Construction

No. Months	No. Surveys/Mo.	Field	Lab	Conditions
Length of project, from beginning to NOT	1*	pH DO Cond. Temp. Salinity	Al Fe Mn Ni Zn Hardness Acidity Sulfate	Sampling will be set at pre-determined dates, and will not be weather dependent. If pH is less than 6.0, and/or conductivity is more than 500 µsiemens/cm (see note at top of page 11), then water for lab analysis will be collected. See Note below.

*There will be one additional survey bi-annually following a >1.0 rain event, and one survey bi-annually for laboratory analysis of the above-listed parameters, regardless of the pH and conductivity values.

Note: Weekly sampling for a minimum of three additional weeks will occur, and will continue until the pH and/or conductivity reaches the numeric criteria.

• Post-Construction

No. Years	No. Surveys	Field	Lab	Conditions
3*	5 total, as follows: 1 mo. post-NOT 6 mos. post-NOT 1 yr. post-NOT 2 yr. post-NOT 3 yr. post-NOT	pH DO Cond. Temp. Salinity	Al Fe Mn Ni Zn Hardness Acidity Sulfate	Sampling will be set at pre-determined dates, and will not be weather dependent. If pH is less than 6.0, and/or conductivity is more than 500 µsiemens/cm above baseline (based on pre-construction data), then water for lab analysis will be collected.

*TDOT Operations conducts routine maintenance on all structures and roadways for the life of the roadway/structure. If a problem occurs which could affect water quality, TDOT's Environmental Division will be contacted to assess the situation, and if necessary, monitor and remedy the problem.

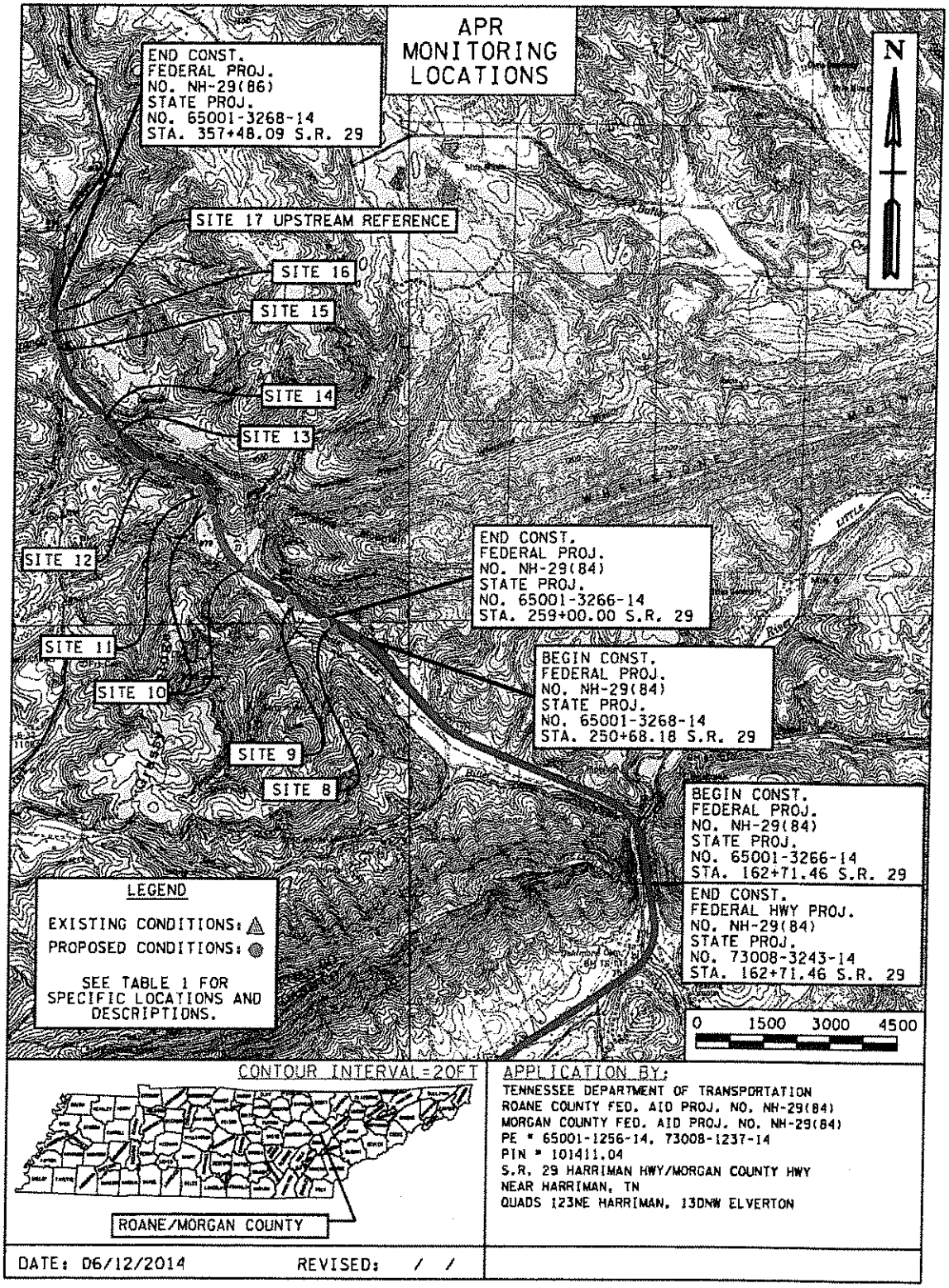
Table 1

APR Water Quality Monitoring Locations

Site No.	Plans Sheet No.	Plans Station No. (approximate)	Existing Conditions	Proposed Conditions	Descriptions/Notes	Latitude, N	Longitude, W
8	5	259+25 LT	X	X	At confluence of STR-15 and Bitter Creek (STR-6)	35.99989799	-84.505791870
9	6	267+07 LT	X	X	At confluence of EPH-22/WWC-22 and Bitter Creek (STR-6)	36.00105250	-84.50801210
10	7	280+73 RT	X		At confluence of existing EPH-27/WWC-27 and Bitter Creek (STR-6)	36.00347356	-84.51160568
		280+98 RT		X	At confluence of proposed 5-ft "T" Rip Rap Class B ditch (relocated EPH-27/WWC-27) and Bitter Creek (STR-6)	36.00361370	-84.51157824
11	9	299+29 LT	X		At existing 30" CMP outlet at confluence with Bitter Creek (STR-6)	36.00785764	-84.51440596
		299+98 LT		X	At proposed 48" RCP outlet at confluence with Bitter Creek (STR-6)	36.00797441	-84.51459983
12	10	314+36 LT	X		At existing 24" RCP outlet at confluence with Bitter Creek (STR-6)	36.00978407	-84.51852761
		314+00		X	At proposed 36" RCP outlet at confluence with Bitter Creek (STR-6)	36.00976161	-84.51841536
13	11	325+16 LT	X	X	At confluence of WWC-35 and Bitter Creek (STR-6)	36.01162199	-84.52159470
14	11	328+25 LT	X	X	Downstream of existing 8' X 6' RCBC at confluence of STR-19 and Bitter Creek (STR-6)	36.01235542	-84.52212861
1S	13	349+19 LT	X		At confluence of existing roadside ditch and Muddy Branch (STR-20)	36.01719724	-84.52584334
		349+18 LT		X	At confluence of proposed 3-ft "T" Rip Rap Class B ditch and Muddy Branch (STR-20)	36.01716348	-84.52596977
16	13	349+34 LT	X		At confluence of STR-21 and Muddy Branch (STR-20)	36.01724040	-84.52584511
		349+31 LT		X	At confluence of relocated channel for STR-21 and Muddy Branch (STR-20)	36.01718838	-84.52602416
17	14	Upstream Reference Site 357+00 RT	X	X	Located at the end of the construction project limits near the Balfour Drive crossing of Bitter Creek (STR-6), Morgan Co.; within Bitter Creek upstream of road crossing.	36.01926290	-84.52548704

Figure 4

Topographic Map APR Water Quality Monitoring Locations



IV. ADAPTIVE MANAGEMENT PLAN

As noted in Section I, Introduction, TDOT will implement some or all components of the Adaptive Management Plan (AMP) as necessary in response to the following water quality criteria:

- Reduction below or exceedance above threshold values of the two "trigger" parameters
  - ✓ <6.0 for pH or
  - ✓ >500 microsiemens for specific conductance (conductivity), or
- Exceedance of 80 percent of the criterion continuous concentrations for metals, or
- Trending increase in any of the sampled criteria during any of the During- and Post-Construction monitoring events outlined in the APR Monitoring Plan.

During-Construction

Provided below is a systematic approach of steps that will be followed to address water quality monitoring of impacts that may be associated with APR exposure and runoff during construction:

1) *If the pH falls below 6.0 and/or if the conductivity rises above 500 microsiemens/cm, then metal sampling will occur. See Section III, During Construction sampling schedule.*

2) *If total metal concentrotions for a given metal reach levels that exceed 80 percent of the criterion continuous concentrations at o sampling location and/or there is an increasing trend of the criterion (20 percent increase from the pre-construction sample levels), then sampling of that metal would continue*

    a. *On a weekly basis until the value drapped below the 80 percent threshold, and/or*

    b. *There was no longer on increasing trend, and metal concentrations were mointoined below this level for a minimum of three (3) consecutive samples.*

    This will assist in determining if this was an anomaly and whether conditions will quickly return to background levels.

3) *If there is a continuing trend of exceedance (three samples taken over three weeks), then the following engineering controls will be followed:*

    a. *Visual inspection to observe ond document on-site conditions, work being performed and land disturbing activities occurring within the drainage areos immediately adjacent to or up-gradient of the affected water bodies or conveyances within the project right-of-way. This may include slopes, ditches, natural conveyonces or additional tributaries which contribute runoff or surface flow to the receiving water or conveyance associoted with a particular monitoring location. Documentation should include photos, locotion of potential contributing site condition or activity (project station number and off-set; lat/long coordinates if necessary), and description of how conditions, activities, etc. may be affecting receiving waters or conveyances, etc.*

b. *Visual inspection to observe and document off-site conditions up-gradient or outside of the project right-of-way in order to determine if off-site conditions, lond disturbance or other activities within the same watershed could be contributing to adverse effects on project receiving waters or conveyances associated with a specific monitoring location. Adequate documentotion, including that noted in step 3) a. above, should be provided.*

c. *Interview TDOT, consultant, and/or contractor site personnel regarding knowledge of specific site conditions or construction-related activities which may be resulting in water quality impacts at the designated monitoring locotion(s).*

d. *Review project-related documentation, including construction diaries, the project Storm Water Pollution Prevention Plan (SWPPP), EPSC inspection reports (including monthly rainfall logs), Quality Assurance (QA) Reports completed by the TDOT Comprehensive Inspections Office (CIO) or any other documents which may provide insight into changing site (or off-site) conditions which moy have contributed to adverse effects on water quality.*

e. *Compile and analyze data and site information obtained in steps a through d above.*

f. *Communicate findings and potential recommendations to TDOT project personnel, the Region Construction Office, CIO and the contractor for implementation, including the alteration or additian af APR engineering controls and BMPs prescribed for the active phase of construction.*

4) *If observation of site conditions or review of woter quality monitoring/sampling results indicate an immediate threat to water quality, then recommendation to stop on-site work in the affected drainage area should be made to the TDOT Environmental Division, Region Construction Office, and CIO until an appropriate level of engineering controls and BMPs are installed and site conditions are restored. TDEC will be notified immediately of this actian.*

5) *If revisions to existing BMP measures ar installation of additianal measures, such as sediment basins, retention structures, diversion ditches, etc., is required in order ta address project water quality, then relocation and/or establishment of additional monitoring locations may be made at the discretion of the TDOT Environmental Divisian. Notification of changes to the APR Manitoring Plan will be made ta TDEC within 14 days.*

6) *If on increase in monitoring frequency is made, then the revised frequency will be maintained until the affected parometers and/ar criterion have returned ta within the appropriate threshold value(s) within the affected receiving water or conveyance for a periad of three (3) cansecutive monthly monitoring periods. TDEC will be notified and concurrence obtained priar to returning to the normal monitoring frequency.*

7) *If subsequent review of monitoring and sampling results obtained following changes to existing APR engineering controls and BMPs reveal that measured parameters and criterion continue to follow an unfavorable trend, then further consultation with TDOT Environmental Division, the Region Construction Office, and CIO personnel will be required. Further addition to or revision of existing APR engineering controls and BMPs will be implemented based on the results of this consultation. Subsequent monitoring and changes to site conditions will continue to be followed as outlined in the steps above.*

8) *If at any time throughout the life of the project, the measured parameters and criterion have fallen outside of the threshold values for three consecutive monitoring periods, then construction and land-disturbing activities within the affected drainage area will cease until appropriate BMPs are prescribed and properly installed. Additionally, any exposed surface areas containing APR, including slopes, ditches, stockpiled soil, etc. will be covered in polyethylene sheeting and anchored with sandbags to prevent further water quality impacts. Offsite water will be diverted around APR exposed areas, and storm water basins will be constructed below the exposed APR areas to capture the storm water runoff volume associated with the 2 year-24 hour storm event. The captured storm water runoff will be tested for the same pH, conductivity and metal criteria prior to discharge.*

Post-Construction

Following completion of project construction, a total of five (5) sampling events will be completed over three (3) calendar years. As noted in Section III, Acid Producing Rock Monitoring Plan, sampling will be set at pre-determined dates and will not be weather dependent. Provided below is a systematic approach of steps that will be followed to address water quality monitoring of impacts that may be associated with APR exposure and runoff during construction:

1) *If pH is less than 6.0 and/or conductivity is more than 500 µsiemens/cm (or as otherwise designated), then grab samples for laboratory analysis of metals will be collected.*

2) *If, as noted for the '**During-Construction**' guidance, laboratory analysis reveals that total metal concentrations for a given metal reach levels that exceed 80 percent of the criterion continuous concentrations at a sampling location and/or there is an increasing trend of the criterion (20 percent increase from the pre-construction sample levels) sampling of that metal would continue on a monthly basis until:*

    a. *The value dropped below the 80 percent threshold and/or*

    b. *There was no longer an increasing trend and the concentration was maintained below this level for a minimum of three consecutive samples.*

3) *If the third consecutive monitoring event in which a 20 percent or greater increase from the pre-construction sample levels for a given metal occurs on the final (3rd year) post-construction monitoring event, then site conditions will be assessed by TDOT Environmental Division and TDEC personnel in order to determine an appropriate course of action for additional monitoring and/or treatment of site conditions.*

4) *In addition to the sampling frequency nated above, should designoted thresholds for water quolity parameters and criterion be exceeded or their values continue in an unfavorable trend, then APR engineering controls and BMPs shall also be applied during the post-construction period. These will be made on a case-by-case basis due to completion of construction activities, permanent stabilization of the site, and de-mobilization of the contractor.*

Attachment H. Compensatory Mitigation Plan

Compensatory Mitigation and Monitoring Plan

County:	Roane/Morgan
Alignment:	State Route 29
Termini:	From State Route 61 near Harriman to South of State Route 328
P. E.:	65001-1256-14 & 73008-1237-14
PIN:	101411.04
Date:	May 15, 2013, Revised March 18, 2014, Revised August 18, 2014, Revised September 10, 2014
Prepared by:	Rhett Baggett CEC/TDOT, Michael Williams TDOT, and Matt Richards TDOT, Ben Brown TDOT

1. Objectives:

STREAMS

Streams impacts associated with this project include encapsulation, rip rap placement, relocation, and loss of stream length. Mitigation for impacts to streams located on site will consist of purchasing 4052 credits from the Tennessee Stream Mitigation Program (TSMP) In-lieu Fee program and on site stream relocations. TSMP will perform compensatory mitigation within the same service area as the impacted streams, resulting in no net loss of stream resource value. The relocation of 1,496 linear feet of stream will be replacement in-kind. In order to maintain or improve existing stream function, stream channel relocations will utilize natural channel design, enhancement of in stream habitat, and riparian vegetation planting.

Please refer to the attached impact table for additional information.

WETLANDS

Mitigation for 1.86 acres of permanent wetland impacts will consist of purchasing wetland restoration acreage from the Walls Mitigation Site at a 2:1 ratio, giving a total of 3.72 acres of restoration. The latitude/longitude coordinates for the corners of the wetland credits at the site are as follows:

La 36.081079 Lo 84.455344
La 36.081011 Lo 84.453889
La 36.080104 Lo 84.453891
La 36.080116 Lo 84.454784
La 36.079934 Lo 84.454788
La 36.079937 Lo 84.455011
La 36.079981 Lo 84.455011
La 36.079988 Lo 84.455184
La 36.080169 Lo 84.455174
La 36.080178 Lo 84.455397

TDOT's contract with Wetland and Environmental Technologies of Tennessee (the developer of the Walls Mitigation site) spells out specific conditions to ensure the credits purchased are

adequate to offset impacts associated with the SR-29 project and comply with regulatory requirements.

Temporary wetland impacts will be restored to pre-construction elevation and re-vegetated.

2. Site Selection:

STREAMS

Currently there are no approved stream mitigation banks that cover the watersheds within the project limits and there are no known existing stream mitigation sites that could be used to offset permanent project related impacts; therefore, we propose to offset permanent stream impacts through the TSMP's In-lieu Fee program.

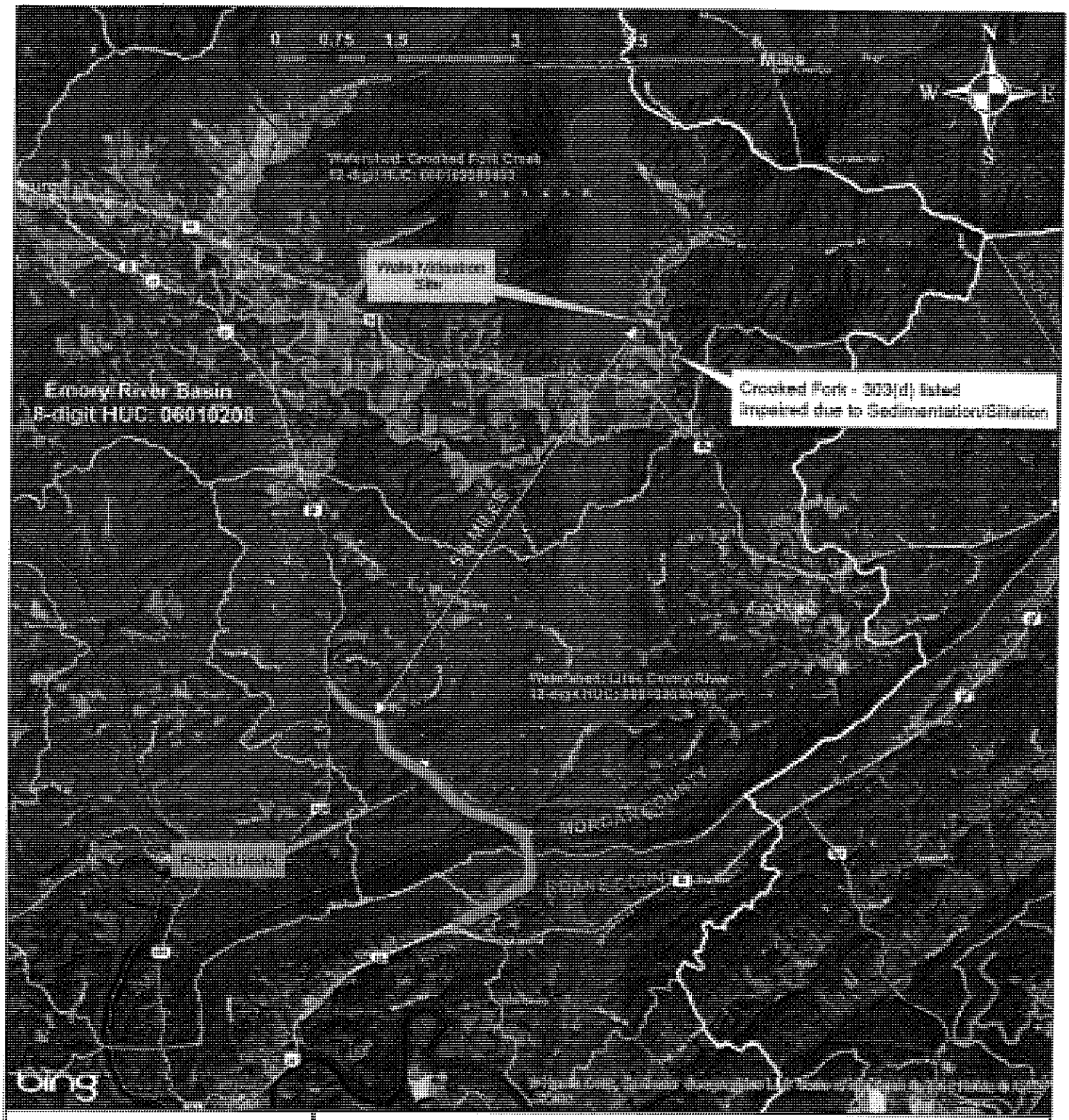
Temporary stream impacts will be mitigated through onsite relocation of the affected streams. Assessing other streams in the watershed was deemed impractical since the impacted streams offered a mitigation opportunity in the form of in-kind replacement. Only one onsite alternative was considered and that was the relocation of the affected streams. The only other viable alternative is to consider the relocated streams a complete loss and pay into an in-lieu fee fund, this is not practical since on-site relocation is a viable alternative.

WETLANDS

Currently there are no approved wetland banks that cover the watersheds within the project limits and in-lieu fee was not pursued due to the fact that the Tennessee Department of Environment and Conservation (TDEC) directed the Tennessee Department of Transportation (TDOT) to mitigate impacts in-system due to unavailable conditions of the wetlands to be impacted - TDEC interprets in-system as within the same 12-digit HUC. A search was conducted within the project limits and Little Emory River watershed for potential in-system (12-digit HUC: 060102080405) wetland mitigation sites, but no suitable sites were located. The mitigation search was then expanded to the adjacent 12-digit HUCs and it was brought to TDOT's attention that there was an existing wetland mitigation site in the adjacent 12-digit HUC (HUC: 060102080403) – this site is known as the Walls Mitigation Site (Walls Site).

The Walls Site is an environmentally preferable mitigation site as it has been established for five years, with hydrology and wetland vegetation being successfully restored to the site. Use of the Walls Mitigation Site to offset project impacts will result in no temporal loss of wetland function as would be associated with use of the in-lieu fee wetland mitigation program because this is an established mitigation site. In addition, the Walls site is only 5.8 miles from the project impact site (Figure 1) and is adjacent to a 303(d) listed stream, Crooked Fork, which is listed as impaired due to sedimentation and siltation; restoration of wetland vegetation and plugging of drainage ditches on the mitigation site should reduce sediment input from this parcel. Restoration of the Walls Mitigation Site began in 2008 with filling of an excavated pond and associated drainage ditches that were designed to dry out the site. In 2008 the site was plowed and a total of 4,600 trees were planted throughout the site (see Appendix B for summary of work and fifth year monitoring report of Walls Mitigation Site). A fifth year

monitoring report (2013 – Appendix B) shows that the Walls Site has wetland hydrology and survival of planted trees exceeds 450 per acre.



Roane/Morgan SR-29 from SR-61 near Harriman to South of SR-328

Proximity of proposed wetland mitigation site to SR-29 project

P.E. 65001-1256-14 & 73008-1237-14; PIN 101411.04

Watershed Boundary for 12-digit HUC =

Subbasin Boundary for 8-digit HUC =

County Boundary =

Major Streams =

TDOT

Figure 1.

TN Comptroller - 0148

3. Site Protection Instrument:

Excluding the Walls Mitigation Site, no land use restrictions (deed restrictions) or conservation easements will be required for this project. The Walls Mitigation site currently has a conservation easement in place over the entire tract. TDOT's contract with Wetland and Environmental Technologies of Tennessee (the developer of the Walls Mitigation site) spells out specific conditions to ensure the credits purchased are adequate to offset impacts associated with the SR-29 project and comply with regulatory requirements.

TDOT will install signs at onsite mitigation locations to prevent mowing or the application of herbicide. TDOT has used these signs in the past and they have been effective. Signs will be monitored annually for 5 years during the standard monitoring period. Maintenance of the signs will fall to TDOT Operations after this period.

4. Baseline Information:

4a - Impact Sites

*Please refer to the environmental boundaries report for additional information existing conditions for impact sites.

- **Impact Site #B; EPH-6**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9749 **Longitude:** -84.4900

  EPH-6 consists of 54 ft of 30 in CMP (to be removed), is ephemeral channel with 90% overhead cover, canopy consists of green ash, tulip poplar, red maple, box elder, Chinese privet, black cherry.

- **Impact Site #1; STR-1** – multiple impact sites - MONITOR
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9750 **Longitude:** -84.4901

  STR-1 is a first-order, intermittent tributary to the Little Emory River. Stream canopy varies along STR-1, from near absent to 90% coverage. Dominate species on forested sections include green ash, tulip poplar, red maple, black willow and Chinese privet. Disturbed sections of the stream are dominated by Kudzu. Habitat scores for portions of the stream that will be impacted were marginal (75 to 81).

- **Impact Site #2; SPG-1**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9774 **Longitude:** -84.4851

  SPG-1 is a perennial spring that feeds WTL-1.

- **Impact Site #3; WTL-1**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9774 **Longitude:** -84.4851

  WTL-1 is a small forested wetland adjacent to the roadway; the site is dominated by black willow, green ash, red maple and rushes. The site will be completely filled. Soils sampled in the wetland area were grayish brown (2.5Y 5/2).

- **Impact Site #C; EPH-7**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9757 **Longitude:** -84.4886

  EPH-7 currently consists of 81 ft of 24 in RCP to remain, is and ephemeral channel that starts at pipe outlet, has no overhead cover above the pipe and 90% overhead cover below the pipe, canopy consists of Chinese privet and green ash.

- **Impact Site #D; EPH-8**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9762 **Longitude:** -84.4876

EPH-8 currently consists of 77 ft of 30 in RCP, is an ephemeral channel which starts at the pipe outlet, has 90% overhead cover below pipe and no overhead cover below the pipe.

- **Impact Site #E; EPH-9**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9756 **Longitude:** -84.4876

  EPH-9 is an ephemeral channel with 80% canopy cover, canopy species include Tulip poplar, black cherry, Chinese privet, and green ash.

- **Impact Site #F; EPH-10**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9771 **Longitude:** -84.4855

  EPH-10 is an ephemeral channel with approximately 85% canopy cover, canopy species include tulip poplar, black cherry, sycamore, persimmon, elm.

- **Impact Site #G; EPH-12**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9810 **Longitude:** -84.4813

  EPH-12 consists of 69 ft of 66 in CMP, 56 ft of 18 in CMP (to be removed), is an ephemeral channel with no canopy cover in upper section, up to 90% canopy cover in the lower section, canopy species include tulip poplar, American beech, red maple, hickory, sycamore.

- **Impact Site #H; EPH-15**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9828 **Longitude:** -84.4815

  EPH-15 currently consists of 110 ft of 24 in RCP (to be removed), is an ephemeral channel with shrub vegetation, approximately 5% canopy cover upstream of S29, 75% downstream of SR29, dominant canopy species include privet and weeds.

- **Impact Site #4; STR-4**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9836 **Longitude:** -84.4819

  STR-4 is a first-order perennial tributary to Little Emory River. Stream habitat was rated at suboptimal (123), with dominant riparian species consisting of jewelweed, hog peanut, cardinal flower, black locust and sycamore. Flow in STR-4 is shallow and substrate is primarily mud/silt. No fish were observed and a limited benthic fauna was noted.

- **Impact Site #5; STR-5**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9878 **Longitude:** -84.4815

  STR-5 is a first-order intermittent tributary to Little Emory River. Stream habitat was rated at suboptimal (142), with dominant riparian species consisting of sweetgum, red maple, poison ivy, sycamore, jewelweed, hog peanut and witch hazel. Flow in STR-5

was non-existent the day of the survey and substrate is primarily cobble and pebble. No fish or benthic fauna were observed.

- **Impact Site #I; STR-6A**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9889 **Longitude:** -84.4847

  STR-6A currently consists of 135 ft 24 in RCP, is an ephemeral channel with 90% canopy cover in the forest portion and no cover outside of the forest, canopy species include tulip poplar, white oak, American beech.

- **Impact Site #6; STR-7** - MONITOR
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9900 **Longitude:** -84.4877

  STR-7 is a first-order perennial tributary to Bitter Creek. Stream habitat was rated as marginal (106), with overhead canopy cover ranging from 20% to 80% and dominant riparian species consisting of sycamore, red maple, white oak and Virginia pine. Flow in STR-7 upstream of the gravel drive was minimal and substrate is primarily bedrock, boulders, cobble and pebble. Downstream of the gravel drive substrate consisted primarily of mud/silt and gravel. No fish or benthic fauna were observed.

- **Impact Site #7; WTL-2**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.9906 **Longitude:** -84.4883

  WTL-2 is a small forested/emergent wetland; the site is dominated by sweetgum, sycamore, black willow, eastern cottonwood, jewelweed, broad-leaf arrowhead, water plantain, sedges and rushes. This site will be completely filled. Site hydrology is driven flow from SPG-2 and STR-8. Soils sampled in the wetland area were gray (2.5YR 5/1).

- **Impact Site #8; STR-8**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9904 **Longitude:** -84.4881

  STR-8 is a first-order intermittent tributary to Bitter Creek. Stream habitat was rated as sub-optimal (114), with dominant riparian species consisting of tulip poplar, sycamore, red maple, sweetgum and Virginia pine. There was no flow present the day of the survey and substrate is primarily mud/silt. No fish or benthic fauna were observed.

- **Impact Site #9; WTL-3**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.9905 **Longitude:** -84.4892

  WTL-3 is a small emergent/scrub-shrub wetland; the site is dominated by black willow, hazel alder, silky dogwood, sweetgum and buttonbush. This site will be completely filled. Site hydrology appears to be partially driven by STR-8. Soils sampled in the wetland area were grayish brown (2.5YR 5/2).

- **Impact Site #10; STR-9**

- **Watershed:** Little Emory River (HUC 060102080405)
- **Latitude:** 35.9914 **Longitude:** -84.4916

STR-9 is a first-order intermittent tributary to Bitter Creek. Stream habitat was rated as sub-optimal (121), with dominant riparian species consisting of red maple, sweetgum, hornbeam, black walnut and white oak. There was no flow present the day of the survey and substrate is primarily cobble with mud/silt. No fish or benthic fauna were observed.

- **Impact Site #11; STR-10** - MONITOR
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9922 **Longitude:** -84.4933

  STR-10 is a first-order intermittent tributary to Bitter Creek. Stream habitat ranged from sub-optimal (124) to marginal (75), with dominant riparian species consisting of sycamore, red cedar, loblolly pine, black willow, hazel alder Chinese privet and Japanese honeysuckle. There was no flow present the day of the survey and substrate is primarily mud/silt. No fish or benthic fauna were observed.

- **Impact Site #J; STR-11**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9926 **Longitude:** -84.4954

  STR-11 currently consists of 80 ft of 30 in CMP, is an ephemeral channel with zero canopy cover on right bank and 75% canopy cover on left bank, dominant canopy species include black willow, hornbeam, hazel alder, sycamore, red maple, tulip poplar, Chinese privet.

- **Impact Site #12; WTL-5**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.1312 **Longitude:** -83.9141

  WTL-5 is a small scrub-shrub wetland adjacent to STR-12; the site is dominated by black willow, hazel alder, sycamore, cattail, soft rush and flat sedge. This site will be completely filled. Soils sampled in the wetland area were dark grayish brown (2.5Y 5/2).

- **Impact Site #13; STR-12**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9933 **Longitude:** -84.4972

  STR-12 is a first-order intermittent tributary to Bitter Creek. Stream habitat was rated at poor (59), with a substrate dominated by mud, silt and sand. Dominant riparian species consisted of black willow, sycamore, box elder, blackberry, goldenrod, Japanese honeysuckle and multiflora rose. There was no flow present the day of the survey and substrate is primarily mud/silt. No fish or benthic fauna were observed.

- **Impact Site #14; WTL-6** - MONITOR
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9949 **Longitude:** -84.4994

WTL-6 is a small forested/scrub-shrub wetland adjacent to STR-6 and Bitter Creek; the site is dominated by sweetgum, black willow, hazel alder, tulip poplar, red maple, jewelweed, false nettle, smartweed and tearthumb. This site will be partially filled. Soils sampled in the wetland area were gray (2.5Y 5/1).

- **Impact Site #15; STR-13**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9951 **Longitude:** -84.4991

  STR-13 is a small first-order intermittent tributary to Bitter Creek. Stream habitat was rated at marginal (81), with a substrate made up of gravel, pebbles and sand. Dominant riparian species consisted of sycamore, red maple, sweetgum, jewelweed, false nettle Japanese honeysuckle, blackberry, bamboo, and Chinese privet. There was no flow present the day of the survey and substrate is primarily mud/silt. No fish or benthic fauna were observed.

- **Impact Site #K; WTL-6A**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9962 **Longitude:** -84.5004

  WTL-6A is an herbaceous wetland located in mowed field.

- **Impact Site #L; STR-13A**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9962 **Longitude:** -84.5004

  STR-13A currently consists of 79 ft of 24 in CMP, is an ephemeral channel with zero canopy cover in ROW and 80% canopy cover outside ROW, species in ROW consist of alder, sycamore, privet, green ash outside ROW.

- **Impact Site #16; WTL-8** - MONITOR
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9979 **Longitude:** -84.5019

  WTL-8 is a small forested wetland adjacent to STR-14; the site is dominated by hazel alder, green ash, tulip poplar, red maple, pawpaw, hornbeam, water plantain and false nettle. This site will be partially filled. Soils sampled in the wetland area were grayish brown (2.5Y 5/2).

- **Impact Site #17; STR-14**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9974 **Longitude:** -84.5018

  STR-14 is a first-order intermittent tributary to Bitter Creek. Stream habitat was rated at marginal (86) to sub-optimal (126), with a substrate dominated by mud and silt. Dominant riparian species consisted of hazel alder, sycamore, tulip poplar, green ash, goldenrod and ironweed. There was no flow present the day of the survey and substrate is primarily mud/silt. No fish or benthic fauna were observed.

- **Impact Site #18; WTL-9**
  - **Watershed:** Little Emory River (HUC 060102080405)

- **Latitude:** 35.9986 **Longitude:** -84.5025

WTL-9 is a forested wetland adjacent to STR-14; the site is dominated by hazel alder, sycamore, sweetgum, tulip poplar, hornbeam, jewelweed, rushes, sedges and false nettle. This site will be completely filled. Soils sampled in the wetland area were light gray (2.5Y 7/1).

- **Impact Site #M; STR-14A**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9757 **Longitude:** -84.4886

STR-14A currently consists of 41 ft of 15 in CMP and 38 ft of 15 in CMP, is an ephemeral channel located in the road side ditch line, with 75% canopy cover in the woods, canopy species include sycamore, sweetgum, red maple, tulip poplar, black cherry, hickory.

- **Impact Site #N; EPH-21**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 35.9996 **Longitude:** -84.5047

EPH-21 is an ephemeral channel in road side ditch line with zero canopy cover in the mowed area along the road and 80% canopy cover in woods, canopy species include sycamore, tulip poplar, sweetgum.

- **Impact Site #O; WTL-10**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0002 **Longitude:** -84.5060

WTL-10 is an emergent wetland that is dominated by rushes, sedges, black willow, sweetgum, red maple, hornbeam, Japanese honeysuckle. WTL-10 is hydrologically connected to the headwaters of STR-15.

- **Impact Site #P; STR-15**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0002 **Longitude:** -84.5060

STR-15 currently consists of 58 ft of 30 in RCP (to be removed), is an intermittent stream channel with approximately 10% canopy cover within ROW consisting of Sweetgum, mimosa, loblolly pine, tulip poplar, goldenrod, trumpet weed. Canopy cover outside ROW is 90% with dominant species consisting of Tulip poplar, sweetgum, red maple, dogwood, white pine.

- **Impact Site #Q; WTL-11**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0008 **Longitude:** -84.5070

WTL-11 is an emergent wetland located in the roadside ditch within the existing ROW, approximately 3-5 ft wide and 450 ft in length. This wetland is dominated by rushes, sedges and cattails.

- **Impact Site #R; EPH-22**
  - **Watershed:** Little Emory River (HUC 060102080405)

- **Latitude:** 36.0002 **Longitude:** -84.5060

EPH-22 is an ephemeral channel, approximately 62 ft of the channel is in a 24 in RCP. Up gradient of the pipe is a maintained lawn, down gradient of the pipe is forested with approximately 80% cover consisting of red oak, tulip poplar, red maple, white pine, sweetgum, sycamore.

- **Impact Site #S; STR-16** - MONITOR
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0017 **Longitude:** -84.5092

STR-16 is an intermittent channel located in a maintained lawn, the channel has no vegetative canopy cover, only herbaceous vegetation is present.

- **Impact Site #T; STR-16A**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0015 **Longitude:** -84.5088

STR-16A is an intermittent channel located in a maintained lawn, the channel has no vegetative canopy cover, only herbaceous vegetation is present.

- **Impact Site #T; STR-17**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0032 **Longitude:** -84.5121

STR-17 is a perennial stream with no canopy cover in ROW and approximately 90% canopy cover upstream of ROW, canopy species consist of Rhododendron, hornbeam, black cherry, hemlock. Downstream of ROW the channel has approximately 40% canopy cover, canopy species consist of Sycamore, black locust, tulip poplar, hazel alder.

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- **Impact Site #T; STR-27**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0032 **Longitude:** -84.5121

STR-27 is an ephemeral channel in a maintained lawn with zero overhead canopy cover.

- **Impact Site #T; STR-28**
  - **Watershed:** Little Emory River (HUC 060102080405)
  - **Latitude:** 36.0032 **Longitude:** -84.5121

STR-28 is an ephemeral channel with 80% canopy cover, canopy species consist of tulip poplar, persimmon, sweetgum, sycamore, red maple.

4b - MITIGATION SITES

ON-SITE/IN-KIND

Impact Site #1: STR-1

Refer to Impact Site descriptions (above) for description of STR-1.

Impact Site #6 – STR-7

Refer to Impact Site descriptions (above) for description of STR-7.

Impact Site #11 – STR-10
Refer to Impact Site descriptions (above) for description of STR-10.

Impact Site #14 – WTL-6 - Temporary Wetland Impact
Refer to Impact Site descriptions (above) for description of WTL-6 that will be restored following temporary impacts.

Impact Site #16: WTL-8 - Temporary Wetland Impact
Refer to Impact Site descriptions (above) for description of WTL-8 that will be restored following temporary impacts.

OFF-SITE

Excluding payment to the Tennessee Stream Mitigation Program (TSMP) in-lieu-fee program, no stream impacts will be mitigated off-site.

Permanent wetland impacts will be mitigated at the Walls Mitigation Site.

5. Determination of Credits:

Streams impacts associated with this project include encapsulation, rip rap placement, relocation, and loss of stream length. Mitigation for impacts to streams located on site will consist of purchasing 4052 credits from the Tennessee Stream Mitigation Program (TSMP) In-lieu Fee program and on site stream relocations. TSMP will perform compensatory mitigation within the same service area as the impacted streams, resulting in no net loss of stream resource value. The relocation of 1,496 linear feet of stream will be replacement in-kind. In order to maintain or improve existing stream function, stream channel relocations will utilize natural channel design, enhancement of in stream habitat, and riparian vegetation planting.

Wetland impacts consist of 1.86 acres of permanent fill. TDOT proposes to offset these impacts by providing 3.72 acres of wetland restoration (2:1 ratio) at the Walls Wetland Mitigation Site.

Please refer to the attached impact table for additional information.

6. Mitigation Work Plan:

Impact Site #1 – STR-1
Impact Site #6 – STR-7
Impact Site #11 – STR-10
Impact Site # S - STR 16
The relocation plan provides for mimicking existing channel characteristics (size, shape, slope, etc.) as closely as possible while also constructing in-stream structures including step pools,

Newberry riffles and cross vanes as a means to provide for channel stability until vegetation is established and also to provide in-stream habitat. Stream banks will be planted in native trees in order to restore riparian buffer along the stream, helping to improve bank stability and reduce water temperatures as the canopy matures.

The vegetative component of this relocation will include use of live stakes, seedlings and container grown trees planted along bankfull benches and along both banks of the relocated channel. Invasive, non-native species, found within the project limits will be cut and treated with herbicide should they invade the newly planted riparian zone. Invasive species will be managed with a target of 5% or less canopy cover, which will be assessed visually.

All relocated streams will have an undisturbed riparian vegetative buffer, which will be planted as indicted on the plans. The undisturbed riparian vegetative buffer will have signs indicating the area should not be mowed and should remain undisturbed. We have numerous constraints for additional plantings within the right of way (ROW); such as overhead power lines, underground utilities, cost feasibility of purchasing additional ROW, and safety issues planting near the roadway. The amount woody vegetation we are planting will provide water quality protection, aquatic riparian habitat, stream bank stabilization, and detrital input. Areas not planted with woody vegetation will be planted with herbaceous vegetation. Herbaceous vegetation will still provide substantial water quality benefits, including nutrient and sediment retention.

Refer to permit sketches and project plans for details concerning channel construction sequence and construction of in-stream structures for stream STR-1, STR-7, STR-10.

Impact Sites #14 & #16 (WTL-6 & WTL-8): Temporary Wetland Impacts
For areas where temporary wetland impacts cannot be avoided, the topsoil will be removed from the site and stockpiled. Following construction, the stockpiled wetland topsoil will be returned to the sites and spread to the original elevation of the site and the site seeded with a temporary cover crop and covered with straw. The site will then be allowed to re-vegetate naturally.

7. Maintenance

Impact Site #1 – STR-1; Impact Site #6 – STR-7 & Impact Site #11 – STR-10, Impact Site #S – STR-16,:
Maintenance of riparian buffers, restored stream channels, restored wetlands and the structures associated with these features will be the responsibility of TDOT and/or their agents. Replacement planting will be performed by TDOT and/or their agents if stem counts fall below 300 stems per acre during the monitoring period. Any portion of the project failing to meet specified performance standards will be evaluated and the reason for the failure determined and an adaptive management plan prepared.

Impact Sites #14 & #16: (WTL-6 & WTL-8) - Temporary Wetland Impacts

Maintenance of temporary wetland impact sites will be the responsibility of TDOT and/or their agents. Re-planting of ground cover will be performed by TDOT and/or their agents if final stabilization falls below 70% coverage during the first 3 years of monitoring. No long term maintenance will be required for temporary wetland impact sites once the sites have been determined successful; however, these areas will likely receive periodic mowing as they will be located within utility right-of-way easements.

8. Performance Standards:

Impact Site #1 – STR-1 and Impact Site #11 – STR-10:
Performance of these relocations will be evaluated based on four parameters: 1) channel stability, 2) vegetation, 3) morphological assessment and 4) hydrology. Refer to Appendix A for success criteria for each stream reach.

- **Channel Stability**: The channel stability rating must be classified as "good" each monitoring year.

- **Vegetation:** Survival and growth of 300 stems per acre at the end of the monitoring period. Native volunteer species will also be included in assessment of vegetation success criteria. TDOT has selected a number of trees to be planted but does not intend to list every tree that may be appropriate for each site. No more than 5% cumulative areal cover of the mitigation area shall be vegetated at the end of the 5-year monitoring period with invasive species, species cover will be assessed visually. If this threshold is exceeded during or at the end of the 5-year monitoring period, corrective measures must be implemented to preclude the growth of the above listed species within the mitigation areas.

- **Morphological assessment:** Channel dimensions must fall within target ranges specified in success criteria for each stream. See Appendix A for success criteria for each stream.

- **Hydrology:** Bankfull events will occur in a minimum of 2 of the 5 years monitored.

Impact Site #6 – STR-7 & Impact Site #S - STR16
Performance of these stream relocations will be evaluated based on two parameters: 1) channel stability and 2) vegetation.

- **Channel Stability**: The channel stability rating must be classified as "good" each monitoring year.

- **Vegetation:** Survival and growth of 300 stems per acre at the end of the monitoring period. Native volunteer species will also be included in assessment of vegetation success criteria. TDOT has selected a number of trees to be planted but does not intend to list every tree that may be appropriate for each site. No more than 5% cumulative areal cover, or contiguous areas greater than 200 square feet shall, of the mitigation area shall be vegetated at the end of the 5-year monitoring period with invasive species, species cover will be assessed visually. If this threshold is exceeded during or at the end of the 5-year monitoring

period, corrective measures must be implemented to preclude the growth of the above listed species within the mitigation areas.

Impact Sites #14 & #16: (WTL-6 & WTL-8) Temporary Wetland Impact - At the end of the monitoring period the temporary wetland impact sites will have a predominance of wetland vegetation and shall delineate as a wetland as outlined in the 1987 US Army Corps of Engineers Wetland Delineation Manual and the Eastern Mountains and Piedmont Region supplement (1987 Manual and Regional Supplement).

1) *Vegetation:* At the end of the monitoring period, more than 50% of the dominant species will be obligate wetland (OBL), facultative wetland (FACW), and/or facultative (FAC) species. TDOT has selected a number of trees to be planted but does not intend to list every tree that may be appropriate for each site. No more than 5% cumulative areal cover, or contiguous areas greater than 200 square feet shall, of the mitigation area shall be vegetated at the end of the 5-year monitoring period with invasive species, species cover will be assessed visually. If this threshold is exceeded during or at the end of the 5-year monitoring period, corrective measures must be implemented to preclude the growth of the above listed species within the mitigation areas.
2) *Soils:* At the end of the monitoring period, soils will classify as hydric soils based on field indicators of hydric soils as described in the 1987 Manual and Regional Supplement.
3) *Hydrology:* At the end of the monitoring period the sites will exhibit wetland hydrology based on field indicators as described in the 1987 Manual and Regional Supplement, including, but not be limited to:
    a) visual observation of inundation
    b) visual observation of soil saturation in hole to 12" depth
    c) watermarks on vegetation
    d) sediment deposits on plants and other vertical objects
    e) drainage patterns within site
    f) water stained leaves

9. Monitoring Requirements:

Beginning with the first growing season following construction completion, annual monitoring events will be conducted by TDOT or their agents for a period of 5 years and annual reports submitted to the Corps and TDEC until the project has been deemed successful. Post construction monitoring will include qualitative visual assessments, photo documentation, vegetation surveys, morphological surveys and stability assessments and hydrological evaluations.

The Walls Site has been monitored for five years by the developer already with the latest report submitted to the IRT in October of 2013. TDOT's contract with Wetland and Environmental Technologies of Tennessee (the developer of the Walls Mitigation site) spells out specific conditions to ensure the credits purchased are adequate to offset impacts associated with the SR-29 project and comply with regulatory requirements. This site will be monitored for 2 additional years.

Impact Site #1 – STR-1 & Impact Site #11 – STR-10:
Visual Assessments
Visual assessments will be used to qualitatively evaluate project site conditions. During each monitoring event, an overall qualitative visual inspection of the entire project restored reaches will be conducted to confirm that areas not otherwise measured or documented do not contain conditions that may require further analysis or attention. The conditions observed during the overall qualitative visual inspection will be documented, photographed and described in a narrative section of each annual monitoring report.

Photograph Documentation
Photograph reference points will be established in the field and the location of each reference point will be permanently marked, whereupon the bearing/orientation of the photograph will be documented. The following areas will contain photograph reference

- **Cross-sections:** A photograph reference point will be located at each designated, permanent cross-section of a stream reach. At least one reference point per stream will be selected based on field conditions. The photograph will be taken from a point located upstream or downstream of the cross-section, and will show as much of the channel banks and stream channel as possible within that cross-section.

- **Vegetation Sampling Plots:** Photographs will be taken of each vegetation monitoring plot and these photographs should include the plot center and surrounding vegetation.

- **In-stream Structures:** Additional photographs will be taken to document the condition of specific in-stream structures used in the project, such as cross-vanes, log drops, step pools, boulder sills, Newberry Riffle, and log vane deflectors, etc.

Vegetation
Vegetation monitoring will document species composition, growth and survivorship of planted and volunteer native woody species, as well as conditions related to ground cover and the presence of invasive species. Vegetation will be monitored for a period of five years.

- **Monitoring Data:** All native stems, both planted and volunteer, within the plot will be included in stem counts and tallied by species in the appropriate height class. The data will be analyzed to compare total planted stems per acre to surviving stems per acre. Evaluations will focus on changes in species composition, survivorship, growth and total number of stems from year to year. Invasive species composition will be visually assessed.

Morphology Data
The purpose of morphological monitoring is to evaluate the stability of the restored stream. Procedures established in the USDA Forest Service Manual, Stream Channel Reference Sites and the methodologies utilized in the Rosgen stream assessment and classification system will be followed. Data collected will consist of measurements of the channel dimensions only of the restored/relocated channel, which shall be used in documenting the collected data.

- One permanent pool and one permanent riffle cross section will be established per reach and surveyed each year of the monitoring period.

- Assessments of structures and each channels longitudinal profile will be taken via visual documentation. For example, head-cuts, visual channel incision, and undermining of structures will be noted during each annual monitoring event.

Stability
The Phankuch Channel Stability Evaluation will be used each year of the monitoring period to evaluate the upper and lower banks and streambed for evidence of instability on each reach.

Impact Site #6 – STR-7, Impact Site #S - STR16
Monitoring requirements for Impact Site #6 & #S will be the same as those listed above for Impact Sites #1 and #11, excluding monitoring of Morphological Data (cross-sections, longitudinal profile and in-stream structures), as no in-stream structures will be constructed for this relocation.

Impact Sites #14 & #16: (WTL-6 & WTL-8): Temporary Wetland Impacts
Beginning with the first growing season following construction completion, annual monitoring events will be conducted by TDOT or their agents for a period of 5 years and annual reports submitted to the Corps and TDEC until the project has been deemed successful.

Post-construction monitoring will include collecting data on the vegetation, soils, and indicators of wetland hydrology as well as photographic documentation of the site. Vegetation surveys will follow procedures outlined in the 1987 Manual and Regional Supplement. Hue, value and chroma of soils will be determined using a Munsell Soil Color Chart and hydric soil indicators such as mottling and redoximorphic features will be noted.

Walls Site: Wetland and Environmental Technologies of Tennessee (the developer of the Walls Mitigation site) is going to provide monitoring of the Walls site.

Monitoring reports will be in similar format as years 1 through 5, documenting hydrology and vegetation.

10. Monitoring reports:

The monitoring reports for on-site stream and wetland impacts will follow the guidelines of Regulatory Guidance Letter 08-03. At a minimum, annual monitoring reports will include the following items:

- Permit Number(s)
- Names of party(s) responsible for the monitoring.
- A brief narrative of the key elements of the proposed mitigation work.
- A description of the baseline conditions (e.g., soils, hydrology, vegetation, and wildlife).

- A listing of measurable success factors with quantifiable criteria for determining success.
- Definitions for success factors and other terms used in the plan.
- Descriptions of equipment, materials, and methods to be used.
- Proposed protective measures (e.g., restrictive covenants or conservation easements).
- Vegetation monitoring
- Hydrological monitoring.
- For stream mitigation, pre/post construction habitat assessments, survey of channel pattern, profile, and dimension for all restored stream segments.
- Conclusions
- Recommendations

Walls Site: Wetland and Environmental Technologies of Tennessee (the developer of the Walls Mitigation site) is going to provide monitoring of the Walls site.

11. Long-term Management Plan:

TDOT will be responsible for the long term management of the impact sites below.

Impact Site #1 – STR-1; Impact Site #6 – STR-7; Impact Site #11 – STR-10, Impact Site #S - STR16:
All three sites within TDOT Right-of-Way will be marked with "Do Not Mow" signs to prevent mowing of riparian areas.

Impact Site #14 – WTL-6 and Impact Site #16 – WTL-8:
Temporary wetland impact sites will be located within a relocated utility line right-of-way and as such the sites will be maintained by the utility company in an early successional stage in order to control growth of woody vegetation.

Walls Site: Wetland and Environmental Technologies of Tennessee (the developer of the Walls Mitigation site) is going to provide long term management of the site.

12. Adaptive Management Plan:

TDOT will be responsible for the long term management of the impact sites below.

Impact Sites #1, #6, #11, & #S (STR-1, STR-7, STR-10, STR-16), Sites #14 & #16: (WTL-6 & WTL-8): Temporary Wetland Impacts

The TDOT and/or their agents will implement and coordinate the adaptive management process with the Corps of Engineers and TDEC. For all sites within TDOT Right-of-Way the adaptive management framework will consist of the following steps:

1) Implementation of mitigation plan
2) Monitor mitigation sites
3) Evaluation of monitoring data

4) If applicable, recommend to Corps and TDEC modification of mitigation based on monitoring data
5) Adaptive management decision is made and implemented
6) Original and/or adaptive mitigation is monitored
7) Repeat steps 3 through 6.

In the event that monitoring indicates corrective actions are necessary to ensure successful restoration of temporary wetland impact sites, then notice will be provided to the Corps and TDEC. The TDOT or its agents shall prepare an analysis of the cause of the failure and determine the appropriate corrective action and a time-frame for implementing the corrective actions. If corrective actions are not feasible, the temporary wetland impact acreage will be mitigated at the nearest wetland mitigation bank or in-lieu-fee wetland mitigation program.

Walls Site: Wetland and Environmental Technologies of Tennessee (the developer of the Walls Mitigation site) is going to provide adaptive management of the site.

13. Financial Assurances:

The Tennessee Department of Transportation will provide the funds required to implement all phases of the proposed mitigation plan, including adaptive and long-term management.

APPENDIX A

Success Criteria for Relocated Channels

PROJECT SUCCESS CRITERIA – STR-1

Project Name: Roane County SR-29 **TDOT Project No.:** PE No.: 65001-1256-14, PIN: 101411.01

Stream Name: U.N. Tributary to Little Emory River (STR-1) Sta. 117+00 – 123+44 **Stream Reach:** 1,320 lf Replacement

Habitat Assessment Criteria	**Pre-project Value**	**Median Ecoregion Reference Score 68a**	**Target RBP score at end of monitoring period[1]**
RBP Habitat Assessment Score			
Vegetation Criteria		**Design Value**	**Target value at end of monitoring period**
Min. # Total Stems/Acre		400[3]	300
Max. % Comprised by Any One Species		<25	<25
Max. % Non-native Invasive Species		0	5
Morphology Criteria		**Design Value or Value Range[2]**	**Target value range (min./max.)**
Mean Bankfull Depth @ Bankful (bkf)		0.8 ft	0.75 – 1.5 ft
Bankfull Cross-sectional Area (A_{bkf})		6 - 8 sq ft	5.5 - 10 sq ft
Bankfull Width (W_{bkf})		7 - 10 ft	6 – 11 ft
Width/Depth Ratio		8.75 - 10	7 - 12
Entrenchment Ratio		> 2.2	> 2.2
Bank Height Ratio		1.0	1.0 - 1.2
Max. Depth (D_{max})		1.0 - 1.8 ft	1 – 2 ft
Avg. WS Slope		0.005 - 0.03	0.005 - 0.03
Avg. Channel Slope		0.007 – 0.03	0.006 – 0.05
Stability Criteria	**Stream Type**	**Pre-project Rating/Condition**	**Monitored Condition**
Channel Stability Evaluation Rating	Bc4	Poor/Fair	"Good" during every monitored year
Hydrology Criteria			**Annual Peak Stage Recorded**
Bankfull stage			Bankfull event occurs in minimum of 2 of the 5 years monitored[4]

1. Greater than 75% of mean ecoregion reference score.
2. Approximately 75% of planted stems should be planted overstory trees.
3. To be replaced with actual as-built values or ronge upon completion of baseline monitoring.

PROJECT SUCCESS CRITERIA – STR-1

Project Name: Roane County SR-29 **TDOT Project No.:** PE No.: 65001-1256-14, PIN: 101411.01

Stream Name: U.N. Tributary to Little Emory River (STR-1) Sta. 125+60 -128+10 **Stream Reach:** 1,320 lf Replacement

Habitat Assessment Criteria	**Pre-project Value**	**Median Ecoregion Reference Score 68a**	**Target RBP score at end of monitoring period[1]**
RBP Habitat Assessment Score			
Vegetation Criteria		**Design Value**	**Target value at end of monitoring period**
Min. # Total Stems/Acre		400[2]	300
Max. % Comprised by Any One Species		<25	<25
Max. % Non-native Invasive Species		0	5
Morphology Criteria		**Design Value or Value Range[3]**	**Target value range (min./max.)**
Mean Bankfull Depth @ Bankful (bkf)		0.8 ft	0.75 – 1.5 ft
Bankfull Cross-sectional Area (A_{bkf})		6 - 8 sq ft	5.5 - 10 sq ft
Bankfull Width (W_{bkf})		7 - 10 ft	6 – 11 ft
Width/Depth Ratio		8.75 - 10	7 - 12
Entrenchment Ratio		> 2.2	> 2.2
Bank Height Ratio		1.0	1.0 - 1.2
Max. Depth (D_{max})		1.0 - 1.8 ft	1 – 2 ft
Avg. WS Slope		0.005 - 0.03	0.005 - 0.03
Avg. Channel Slope		0.005 – 0.02	0.004 – 0.04
Stability Criteria	**Stream Type**	**Pre-project Rating/Condition**	**Monitored Condition**
Channel Stability Evaluation Rating	Bc4	Poor/Fair	"Good" during every monitored year
Hydrology Criteria			**Annual Peak Stage Recorded**
Bankfull stage			Bankfull event occurs in minimum of 2 of the 5 years monitored[4]

1. Greater than 75% of mean ecoregion reference score.
2. Approximately 75% of planted stems should be planted overstory trees.
3. To be replaced with actual as-built values or range upon completion of baseline monitoring.

PROJECT SUCCESS CRITERIA – STR-10

Project Name: Roane County 5R-29
Stream Name: U.N. Tributary to Bitter Creek (STR-10)

TDOT Project No.: PE No.: 65001-1256-14, PIN: 101411.01
Stream Reach: 323 lf Replacement

Habitat Assessment Criteria	**Pre-project Value**	**Median Ecoregion Reference Score 68a**	**Target RBP score at end of monitoring period[1]**
RBP Habitat Assessment Score			
Vegetation Criteria		**Design Value**	**Target value at end of monitoring period**
Min. # Total Stems/Acre		400[2]	300
Max. % Comprised by Any One Species		<25	<25
Max. % Non-native Invasive Species		0	5
Morphology Criteria		**Design Value or Value Range[3]**	**Target value range (min./max.)**
Mean Bankfull Depth @ Bankful (bkf)		0.8 ft	0.75 – 1.5 ft
Bankfull Cross-sectional Area (A_{bkf})		6 - 8 sq ft	5.5 - 10 sq ft
Bankfull Width (W_{bkf})		7 - 10 ft	6 – 11 ft
Width/Depth Ratio		8.75 - 10	7 - 12
Entrenchment Ratio		> 2.2	> 2.2
Bank Height Ratio		1.0	1.0 - 1.2
Max. Depth (D_{max})		1.0 - 1.8 ft	1 – 2 ft
Avg. WS Slope		0.005 - 0.03	0.005 - 0.03
Avg. Channel Slope		0.005 – 0.03	0.004 – 0.04
Stability Criteria	**Stream Type**	**Pre-project Rating/Condition**	**Monitored Condition**
Channel Stability Evaluation Rating	Bc4	Poor/Fair	"Good" during every monitored year
Hydrology Criteria			**Annual Peak Stage Recorded**
Bankfull stage			Bankfull event occurs in minimum of 2 of the 5 years monitored[4]

1. Greater than 75% of mean ecoregion reference score.
2. Approximately 75% of planted stems should be planted overstory trees.
3. To be replaced with actual as-built values or range upon completion of baseline monitoring.

Appendix B

Walls Mitigation Site Reports: 2009 & 2013

Mr. Mike Lee
Environmental Specialist
Natural Resources Section
Tennessee Department of Environment Conservation
Division of Water Pollution Control
401 Church Street
7th Floor, L&C Annex
Nashville, TN 37243-7534

May 17, 2009

Dear Mr. Lee,

As per our conversation, following is a brief summary of the Walls wetland site in Morgan County.

In the Fall and Winter of 2008 the restoration of the Walls site began. Task activities consisted of plugging all drainage ditches, filling in the pond and removing the large deposit of Coal wash in the restoration area as TDEC requested. A water control structure was also installed, as well as 4 water monitoring wells. The wells were placed in a evenly spaced distribution through out the property. The wells were monitored through the spring growing season from March 30th through April 10th. The monitoring demonstrated that the water levels were consistently at the ground surface or above.

In the spring of 2009 4,600 trees were planted. The distribution consisted of willow oak, pin oak, and swamp white oak in addition to a few persimmon trees. The site was plowed in preparation to plant the trees. Approximately 479 trees were planted per acre.

In summary, the trees are now in bloom and appear to be healthy. Much to our satisfaction following the filling of the spring fed pond and plugging the drainage ditch a substantial amount of water was present. As of May 17, 2009 water was at or above the surface on wells 1, 2, and 4 and within 3 inches of the surface on well 3. Within just a few weeks of the growing season underway vegetation on the site is demonstrating substantial growth. A variety of wetland vegetation is also beginning to appear as demonstrated in the attached photographs. Restoration is now complete on 9.6 acres of the 12 acre site.

Please find attached pictures taken May 17, 2009 depicting the site. Please don't hesitate to give me a call should you have any questions. Thank you,

Respectfully,

Lynn Bumgardner

Enclosure

Cy: Kathleen Kuna

October 28, 2013

Forrest Mcdaniel
U.S. Army Corps of Engineers
Nashville District
Bell Road
Nashville, Tennessee

Subject: Fifth Monitoring Report for the Walls Wetland Mitigation Site, Morgan County, Tennessee

Dear Mr. Mcdaniel:

This is the fifth monitoring report (report) of the monitoring that has been undertaken in association with the Wetland Mitigation Site (Site). This report is provided to the Tennessee Interagency Review Team (IRT) to provide them with information on the work that was accomplished on the Walls Wetland Mitigation Site (Site) in 2008. The monitoring report was conducted in October 2013.

Construction

The construction of the Walls Mitigation Site at the instruction of TDEC began in the summer of 2008 and was completed in the Fall of 2008. The construction consisted of removing a deposited hump that was believed to have been a man made deposit according to the US Fish and Wild Life Service (USFWS), Tennessee Wildlife Resources Agency (TWRA) and the Tennessee Department of Environment and Conservation (TDEC). Additionally the pond was filled in located on the west side of the property. A plug and a water level control structure was installed at the confluence of the main ditch which allowed the pond overflow to drain, as well as, side drains that drained the property. During the construction process evidence of wetland vegetation was uncovered underneath the spoils from the original pond excavation. According to locals the pond was continuously excavated explaining the unusual shape in an attempt to locate an underground spring and divert the water flow from saturating the field. This is anticipated to be the primary water source in restoring the natural hydrology to the site. The water monitoring section of this report will demonstrate that the natural hydrology has been appropriately restored as WETT anticipated.

In the Winter of 2008 the site was plowed to eliminate non native species and to prepare for the planting of the trees. In the early Spring of 2009 4,600 trees were planted, 479 trees per acre. Species planted were 1,500 Willow Oak trees, 1,500 Pin Oaks, 1,500 Swamp White Oak and 100 Persimmon trees.

A soil test was conducted on July, 11 2006. The testing was conducted with the criteria of restoring a bottom land hardwood forest. Two plots were sampled according to the guidelines of the University of Tennessee. The pH level on plot 1 was 4.8 with no lime recommended. The pH level for plot 2 was 4.6 with no lime recommended. Professor Don Graves from the University of Kentucky had stated that they had successfully restored an old coal wash settling pond that had an initial pH of 1.8 and no soil in the coal fines.

Monitoring

Hydrology Monitoring Summary

Four hydrologic monitoring wells were installed. Monitoring of these wells was conducted using hand measurements of ground and/or surface water levels and ground elevations. This year's monitoring was initiated on March 30, 2013, and ceased on April 10, 2013. All wells demonstrated wetland hydrology (i.e.., saturation within 6 inches of the ground surface) between March 30, 2013, and April 10, 2013. During this period, all 4 wells had shallow inundation for the entire hydrologic monitoring period (see Table 1). Hydrologic monitoring ended on April 10th, since the success criterion had been met for 2013. Table 1 below contains a summary of the recorded observations of hydrology at the site.

The NRCS published a growing season of March 30 to November 1 (217 days) for Morgan County. Using this growing season, wetland hydrology would have to be met for 11 days during the growing season (i.e., 5 percent of 217 days), or until April 9 of each year.

Vegetation Monitoring Summary

Four permanent vegetation monitoring plots were established in the restored wetland areas within the Site. A metal stake was established at each of the plots and the stake was marked with colored flagging and the plot number. Photographs of the center stake of each plot were taken from a point 25 feet west of the center stake to document the condition of each vegetation monitoring plot during 2013. One photo of each plot is enclosed with this report. Planted tree seedlings and stems of other tree species within the vegetation monitoring plot were counted and recorded on datasheets. A summary table of the vegetation monitoring is enclosed with this report. This data shows that, overall, the site contains over 450 planted tree seedlings per acre (Table 2), which exceeds the success criterion for vegetation.

The following observations were made:

1. Wetland sedges and soft rush was observed on over approximately 95% of the site.

2. 15% of the site had standing water.

3. 50% of plot 4 has standing water most or all of the year.

4. During June of 2013 Mike Lee (TDEC), Forest McDaniel (ACOE) and Lynn Bumgardner (WETT) conducted a site visit. Any direct comments can be obtained from

them. I believe the visit went very well.

5. During monitoring we observed many sweet gum trees that had made their way through the vegetation canopy and could be identified. They were not planted but was noted on the tree summery table.

Summary

This site continues to improve. It was observed that many of the trees increased in height enough to start extending through the vegetation canopy. Some trees were noted as high as 8 to 10 feet. Many volunteer sweet gums were noted during this period.

Sincerely,

Lynn Bumgardner

Table 1. Walls Mitigation Site 2013 Summary Table of Hydrologic Monitoring Well Data

DATE	WELL 1	WELL 2	WELL 3	WELL 4
3/30	surface	surface	surface	surface
3/31	surface	surface	surface	surface
4/1	surface	surface	surface	surface
4/2	surface	surface	surface	surface
4/3	surface	surface	surface	surface
4/4	surface	surface	surface	surface
4/5	surface	surface	surface	surface
4/6	surface	surface	surface	surface
4/7	surface	surface	surface	surface
4/8	surface	surface	surface	surface
4/9	surface	surface	surface	surface
4/10	surface	surface	surface	surface

"Surface" means at or above ground level at the referenced monitoring well on the referenced date.

"Dry" means the referenced monitoring well was dry (i.e., no groundwater present within the well) on the referenced date.

Negative measurements are measured in inches below ground level at the referenced monitoring well (i.e., -0.50" is 0.50 inches below ground level) on the referenced date.

Table 2. Walls Mitigation Site 2012 Summary Table of Vegetation Monitoring

Plot	Live Pin Oak	Live Willow Oak	Live Swamp White Oak	Sweet Gum	Total Trees Per plot	Planted Seedlings Per Acre	Unknown species
1	26	5	7	13	51	>450	2
2	12	5	22	5	44	>450	2
3	12	11	10	16	49	>450	
4	9	6	3	13	31	>450	1
Totals					**175**	**>450**	

Vegetation Monitoring Plot 1.

Vegetation Monitoring Plot 2.

Vegetation Monitoring Plot 3.

Vegetation Monitoring Plot 4.