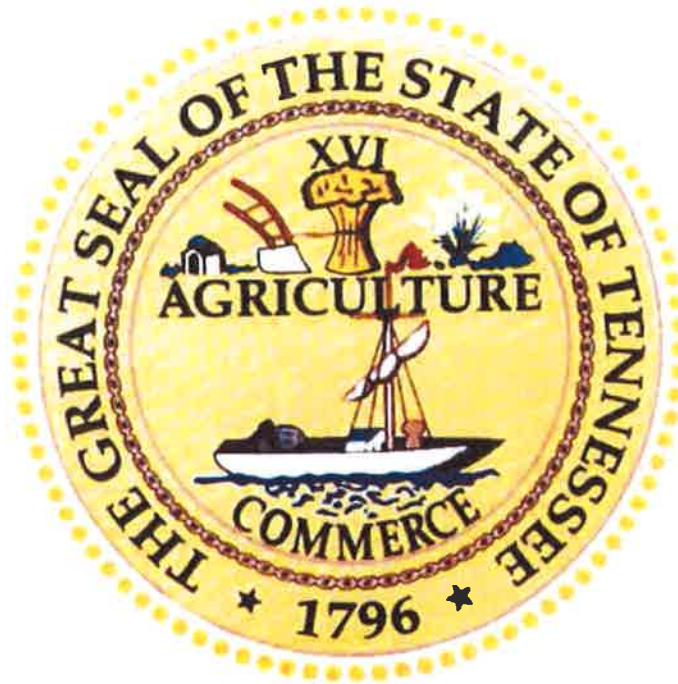


**TENNESSEE**  
**DEPARTMENT OF TRANSPORTATION**



**TRANSPORTATION INVESTMENT REPORT**

**IMPROVE Act**

**State Route 223**

**Bridge over Branch,**

**Log Mile 2.28 Madison County**

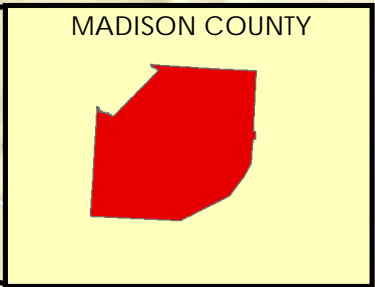
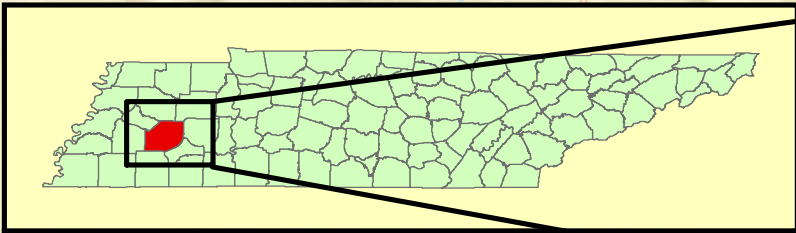
**PIN 124712.00**

PREPARED BY KCI TECHNOLOGIES INC. FOR THE  
TENNESSEE DEPARTMENT OF TRANSPORTATION

Approved by Toks Oritokun Date 03-28-18 Approved by Paul Deegan Date 4/2/18  
Chief of Environment and Planning Deputy Commissioner and Chief Engineer

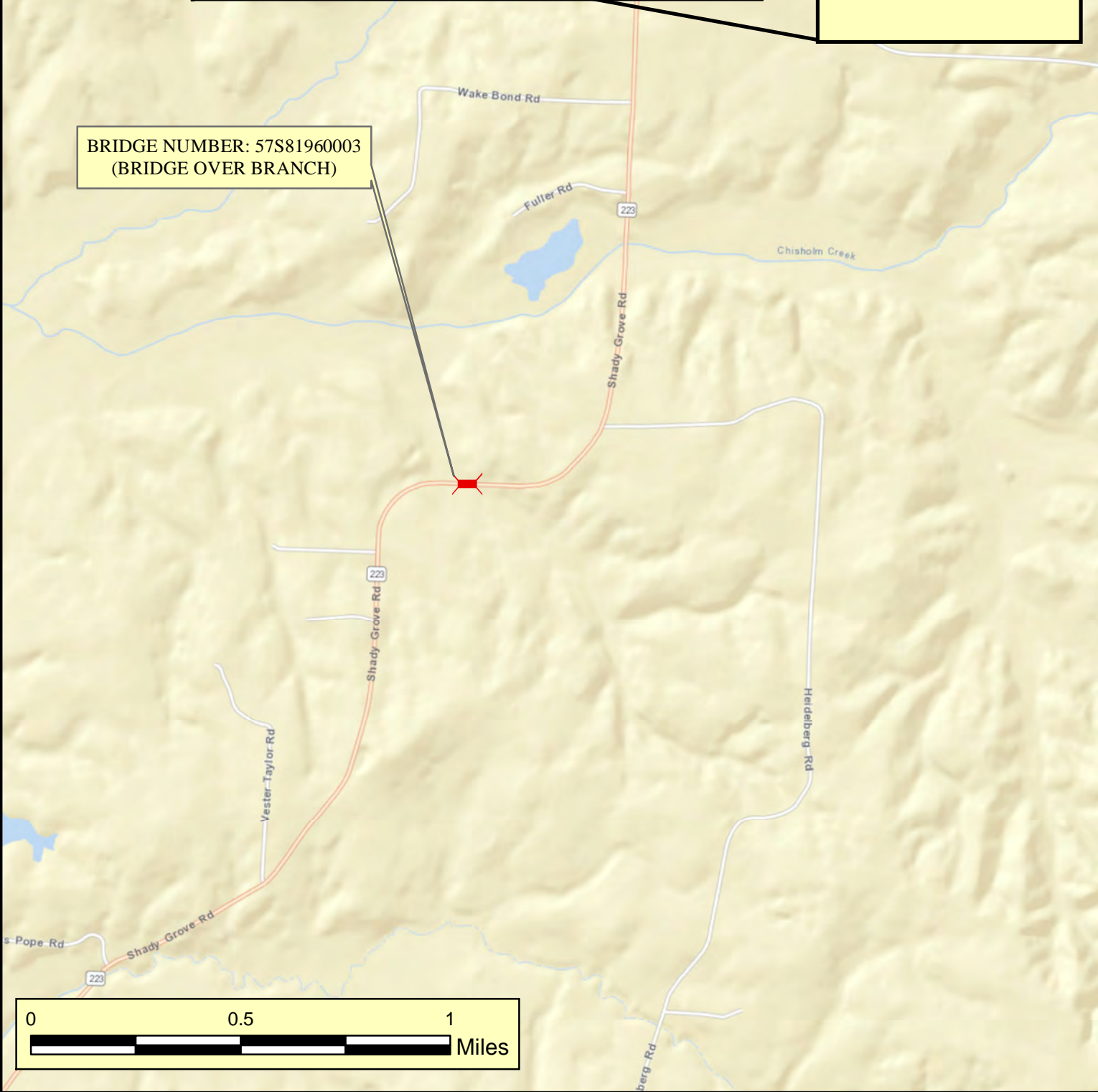
Approved by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION		3-26-18
ENGINEERING DIRECTOR DESIGN DIVISION		03/27/18
ENGINEERING DIRECTOR STRUCTURES DIVISION		3/27/18

*This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.*

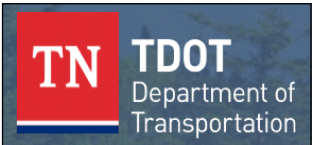


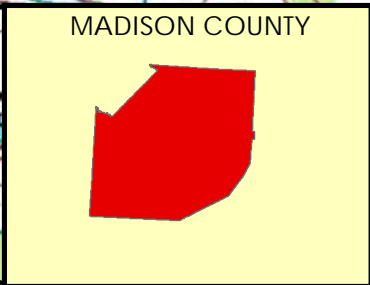
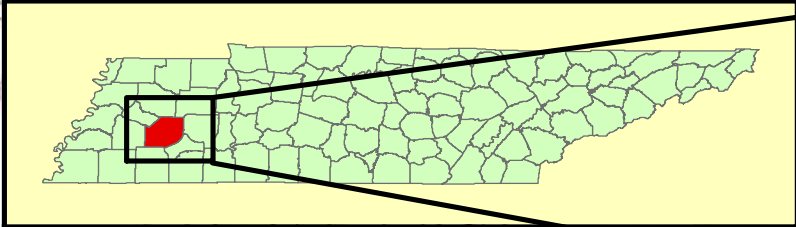
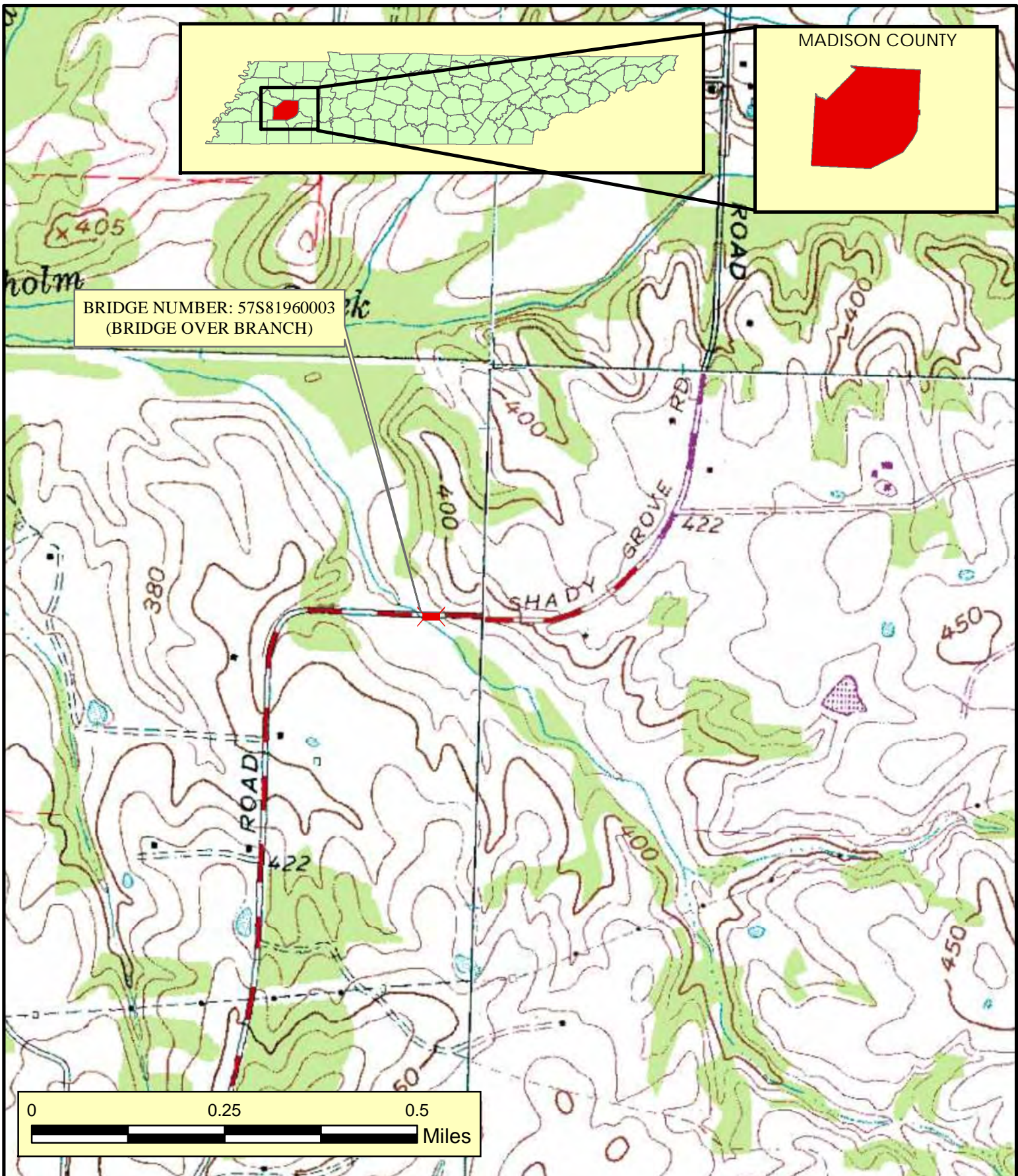
MADISON COUNTY

BRIDGE NUMBER: 57S81960003  
(BRIDGE OVER BRANCH)

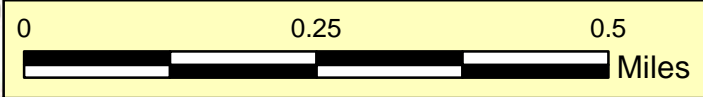


AREA MAP  
BRIDGE TIR  
STATE ROUTE 223 (SHADY GROVE ROAD)  
BRIDGE OVER BRANCH (LM 2.28)  
MADISON COUNTY



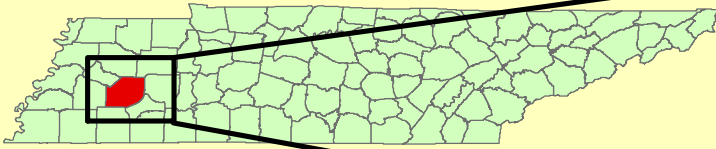


BRIDGE NUMBER: 57S81960003  
(BRIDGE OVER BRANCH)



TOPO MAP  
BRIDGE TIR  
STATE ROUTE 223 (SHADY GROVE ROAD)  
BRIDGE OVER BRANCH (LM 2.28)  
MADISON COUNTY

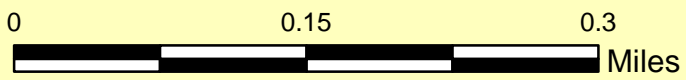




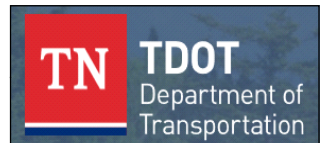
MADISON COUNTY



BRIDGE NUMBER: 57S81960003  
(BRIDGE OVER BRANCH)



PROJECT MAP  
BRIDGE TIR  
STATE ROUTE 223 (SHADY GROVE ROAD)  
BRIDGE OVER BRANCH (LM 2.28)  
MADISON COUNTY





**STATE OF TENNESSEE**  
**DEPARTMENT OF TRANSPORTATION**  
**STRATEGIC TRANSPORTATION INVESTMENTS DIVISION**  
SUITE 1000, JAMES K. POLK BUILDING  
505 DEADERICK STREET  
NASHVILLE, TN 37243  
(615) 741-2208

**JOHN C. SCHROER**  
COMMISSIONER

**BILL HASLAM**  
GOVERNOR

**MEMORANDUM**

**TO:** Steve Allen, Transportation Director  
Strategic Transportation Investments Division

**FROM:** David Duncan P.E., C.E. Manager 1  
Strategic Transportation Investments Division

**DATE:** March 9, 2018

**SUBJECT:** TIR Field Review (IMPROVE Act)  
Shady Grove Road (SR223), Bridge over Branch  
Bridge ID: 57S81960003  
Log Mile 2.28  
Madison County  
PIN: 124712.00

A field review was held for the above-mentioned project on January 11, 2018.

The initial structure, built in 1952, was a single span steel I-beam bridge crossing a branch of Chisholm Creek. The structure had an out-to-out width of 22 feet 3 inches. The overall structure length was 23 feet. The sufficiency rating for this structure is 27.4 based on the Bridge Inspection Report from August 3, 2017. Floating maintenance has removed and replaced the initial bridge with a temporary precast concrete slab bridge. The temporary structure has an out-to-out width of 28 feet 8 inches and overall length of 28 feet. These measurements are taken from a Site Inspection performed by KCI Technologies on January 10, 2018.

The discharges for the drainage basin were determined using StreamStats, which used a drainage area of 0.76 square miles. The 10-year discharge rate (Q10) was 631 cubic feet per second (cfs), Q50 was 839 cfs, and Q100 was 922 cfs.

There is potential for restrictions from TWRA for in stream work due to records of the Pie Bald Mad Tom and the Naked Sand Darter in the vicinity of the project site.

The proposed alignment and grade for the replacement structure will remain the same as the existing structure including the 60-degree skew with the river channel. There is a 45 mph posted speed limit on State Route 223, which will also be the design speed based on the tangent alignment. The TDOT Hydraulics Section has recommended that the proposed structure be a reinforced concrete box bridge with two (2) barrels with a length of 12 feet and a total clearance of 5 feet (2 @ 12' x 5') giving a total structure length of 26 feet per TDOT structures standard STD-17-76. It is estimated that two (2) tracts of land will be affected resulting in approximately 0.06 acres of right-of-way (ROW) acquisition. Detour routes are provided in report. The official detour will be the only detour route that is signed.

The route has a base year 2022 AADT of 610 and a design year 2042 AADT of 1,120. The existing structure and roadway approaches consist of two (2) nine (9) foot travel lanes. The route is classified as a Rural Collector Road and Standard Drawing RD01-TS-2 was used for design considerations. Based on Tables I and IV from the standard drawing, it is recommended that the proposed curb-to-curb width over the structure will be 28 feet based on a design year AADT between 400-1,500 and a design speed of 45 MPH. Therefore, the typical section on the proposed structure will consist of two (2) 11-foot travel lanes with three (3) foot shoulders and guardrail per TDOT structures standard STD-17-7 giving an out-to-out structure width of 33 feet 6 inches. The project will extend 120 feet from the structure to the east and to the west in order to install guardrail and to taper the paved shoulders back into the existing roadway.

The total cost for the estimated required approach work, estimated replacement and estimated preliminary engineering for this bridge replacement is approximately \$425,000.

cc: File

TYPE	YEAR	COUNTY	FIGURE NO.
BRIDGE	2018	MADISON	

TENNESSEE D.O.T.  
S.T.I.D.  
FILE NO. \_\_\_\_\_

3/23/2018 3:55:44 PM M:\2018\1604080.05 (TDOT TIR - SR-223 Bridge over Branch, Madison County)\Design\Sheets\Proposed Alignment Madison Co.Bridge Over Branch.dgn



## BRIDGE TIR

STATE ROUTE 223 (SHADY GROVE ROAD)  
BRIDGE OVER BRANCH @ L.M. 2.28  
MADISON COUNTY

45 MPH DESIGN SPEED

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

BRIDGE REPLACEMENT  
SR223  
L.M. 2.28

TYPE	YEAR	COUNTY	FIGURE NO.
BRIDGE	2018	MADISON	1

TENNESSEE D.O.T.  
S.T.I.D.  
FILE NO. \_\_\_\_\_

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## ENVIRONMENTAL TECHNICAL STUDY AREA

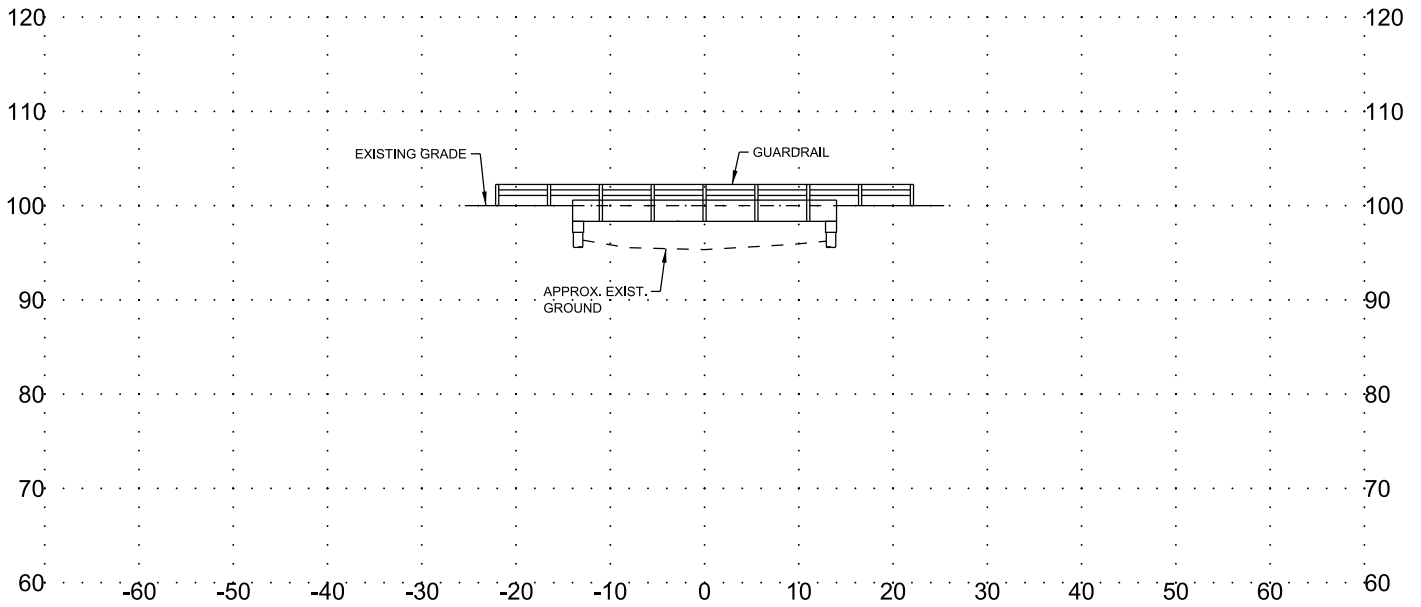
STATE ROUTE 223 (SHADY GROVE ROAD)  
BRIDGE OVER BRANCH @ L.M. 2.28  
MADISON COUNTY

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

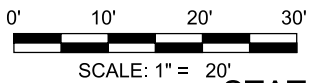
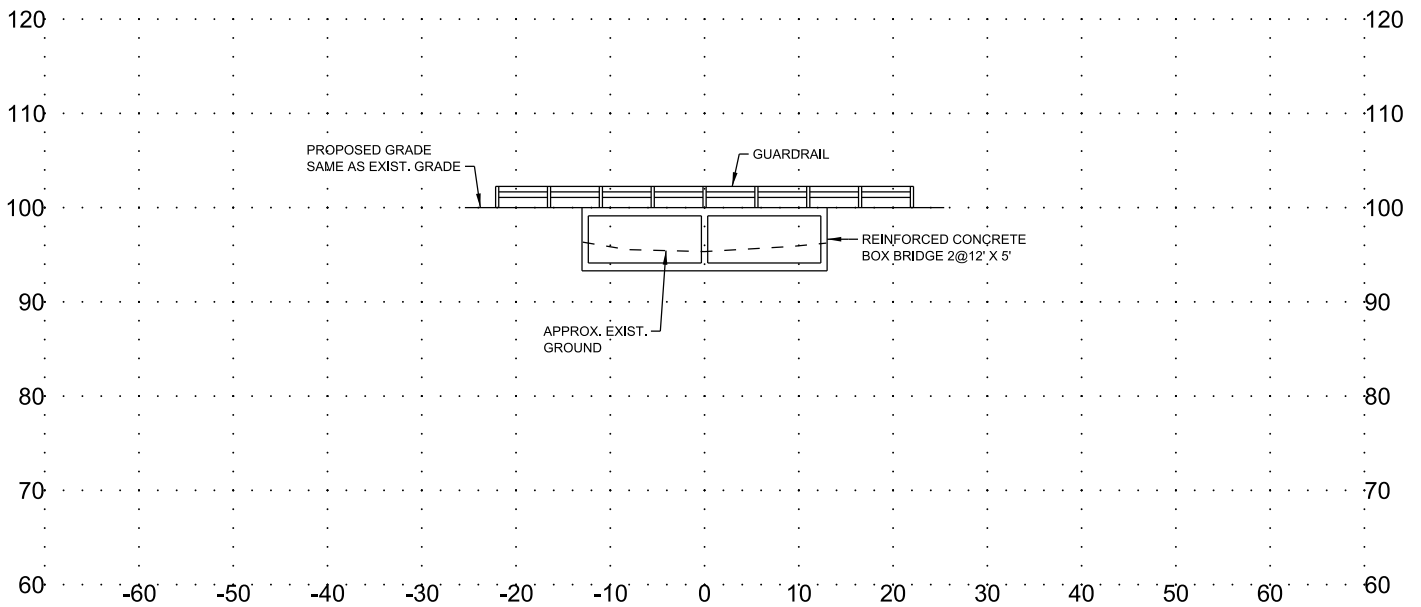
FIGURE 1  
BRIDGE REPLACEMENT  
SR223  
L.M. 2.28



# EXISTING STRUCTURE (INLET)

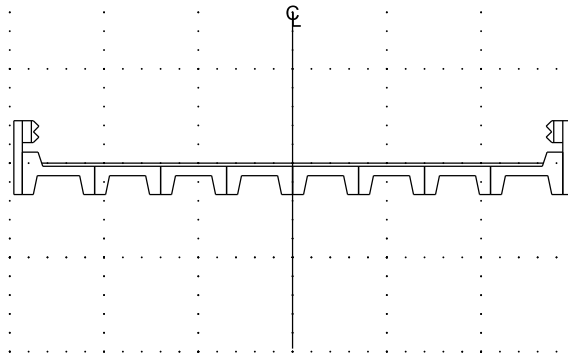


# PROPOSED STRUCTURE (INLET)



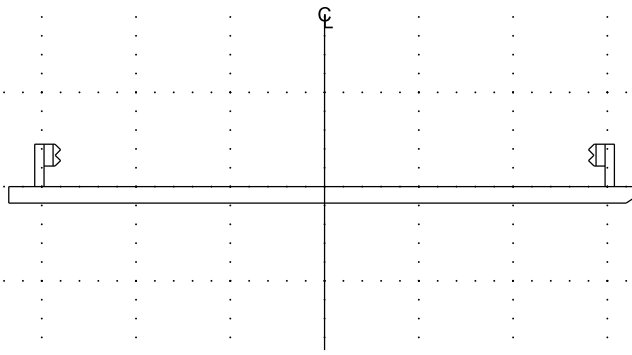
**PROPOSED PROFILE**  
**STATE ROUTE 223 (SHADY GROVE ROAD) MADISON COUNTY**  
**BRIDGE OVER BRANCH L.M. 2.28**  
**BRIDGE ID: 57S81960003**

EXISTING STRUCTURE

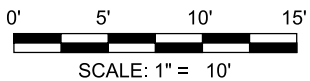


TOTAL WIDTH: 28'-8"

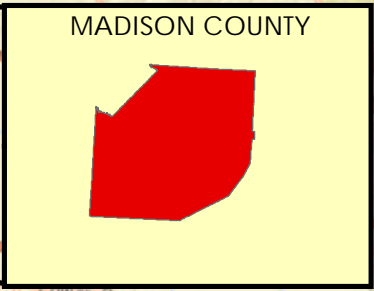
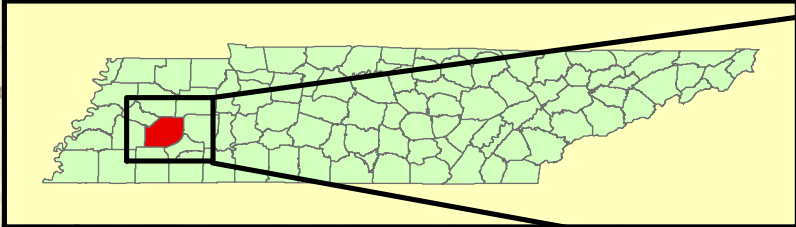
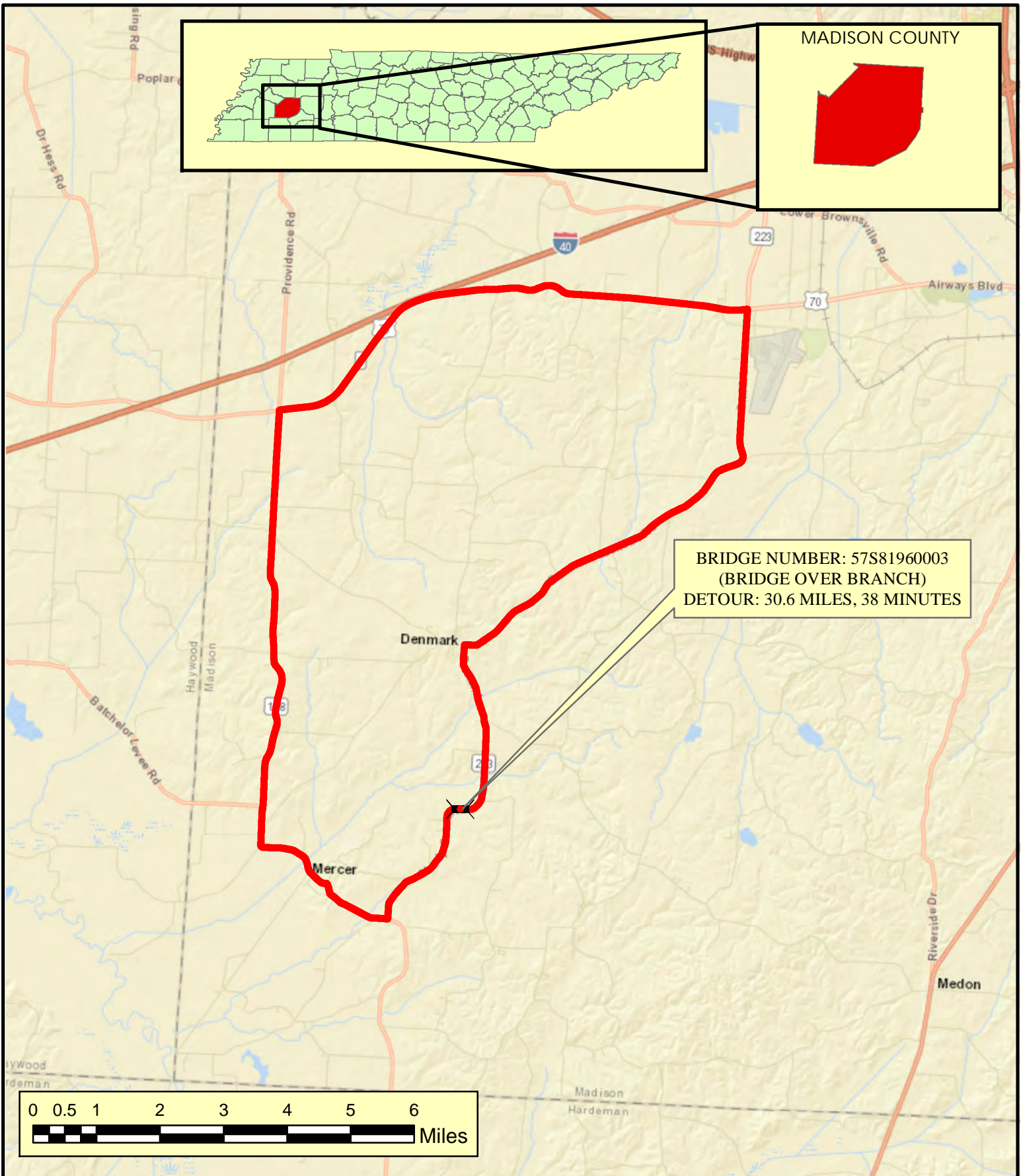
PROPOSED STRUCTURE



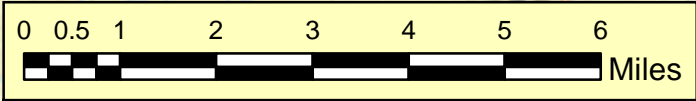
TOTAL WIDTH: 33'-6"



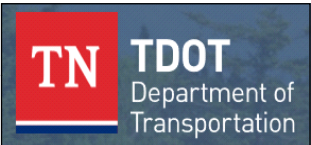
**PROPOSED TYPICAL SECTION**  
**STATE ROUTE 223 (SHADY GROVE ROAD) MADISON COUNTY**  
**BRIDGE OVER BRANCH L.M. 2.28**  
**BRIDGE ID: 57S81960003**

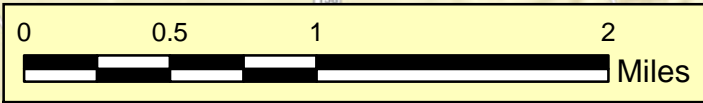
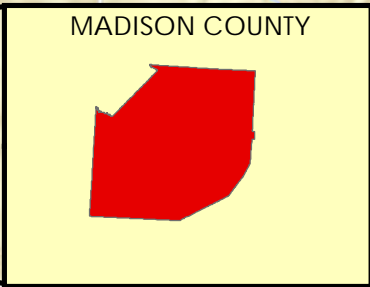
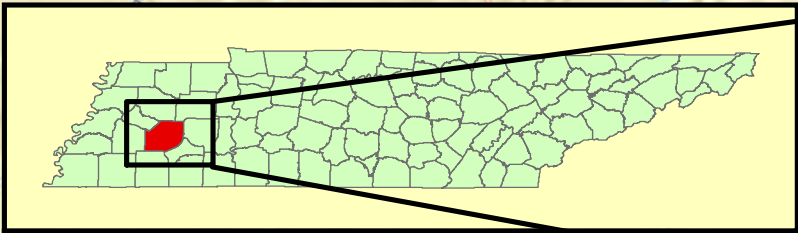
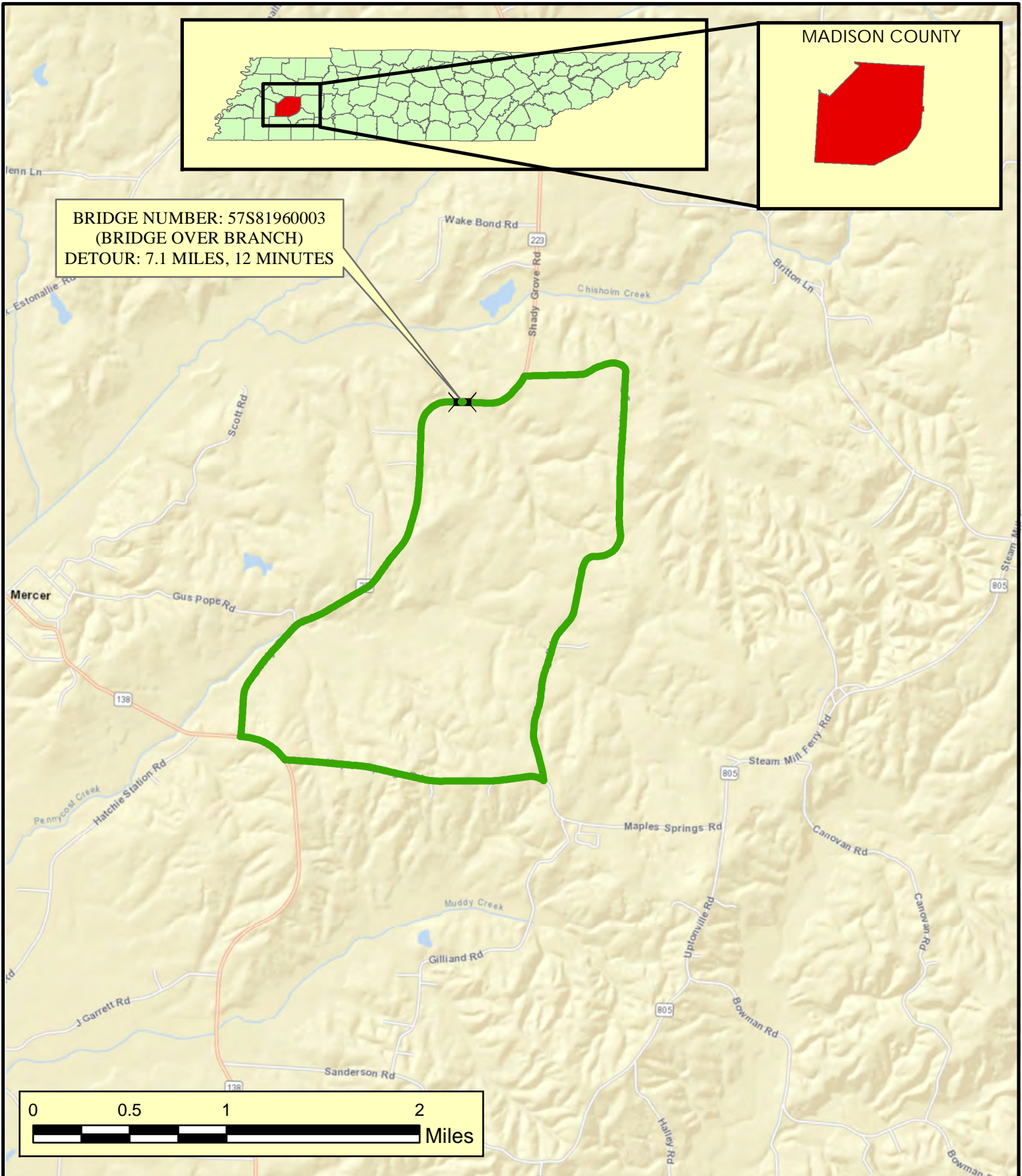


BRIDGE NUMBER: 57S81960003  
 (BRIDGE OVER BRANCH)  
 DETOUR: 30.6 MILES, 38 MINUTES



OFFICIAL DETOUR MAP  
 BRIDGE TIR  
 STATE ROUTE 223 (SHADY GROVE ROAD)  
 BRIDGE OVER BRANCH (LM 2.28)  
 MADISON COUNTY



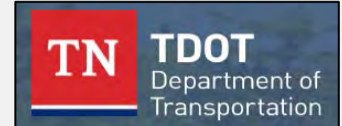


**LOCAL ROUTE DETOUR MAP**  
**BRIDGE TIR**  
**STATE ROUTE 223 (SHADY GROVE ROAD)**  
**BRIDGE OVER BRANCH (LM 2.28)**  
**MADISON COUNTY**



# COST ESTIMATE SUMMARY

**Route:** SR223 STATE ROUTE 223 (SHADY GROVE ROAD)  
**Description:** REPLACEMENT OF BRIDGE OVER BRANCH  
**County:** MADISON  
**Length:** 0.05 MILES  
**Date:** March 9, 2018



DESCRIPTION	LOCAL	STATE	FEDERAL	TOTAL
	0%	100%	0%	
<b>Construction Items</b>				
Pavement Removal	\$0	\$3,800	\$0	\$3,800
Asphalt Paving	\$0	\$29,500	\$0	\$29,500
Concrete Pavement	\$0	\$0	\$0	\$0
Drainage	\$0	\$7,100	\$0	\$7,100
Appurtenances	\$0	\$0	\$0	\$0
Structures	\$0	\$107,600	\$0	\$107,600
Fencing	\$0	\$0	\$0	\$0
Signalization	\$0	\$0	\$0	\$0
Railroad Crossing or Separation	\$0	\$0	\$0	\$0
Earthwork	\$0	\$73,200	\$0	\$73,200
Clearing and Grubbing	\$0	\$10,600	\$0	\$10,600
Seeding & Sodding	\$0	\$2,600	\$0	\$2,600
Rip-Rap or Slope Protection	\$0	\$0	\$0	\$0
Guardrail	\$0	\$24,500	\$0	\$24,500
Signing	\$0	\$300	\$0	\$300
Pavement Markings	\$0	\$1,100	\$0	\$1,100
Maintenance of Traffic	\$0	\$10,900	\$0	\$10,900
Mobilization (5%)	\$0	\$13,600	\$0	\$13,600
Other Items = 10%	\$0	\$28,500	\$0	\$28,500
Const. Contingency = 15%	\$0	\$30,900	\$0	\$30,900
<b>Construction Estimate</b>	<b>\$0</b>	<b>\$344,200</b>	<b>\$0</b>	<b>\$344,200</b>
<b>Interchanges &amp; Unique Intersections</b>				
Roundabouts	\$0	\$0	\$0	\$0
Interchanges	\$0	\$0	\$0	\$0
<b>Right-of-Way &amp; Utilities</b>				
	LOCAL	STATE	FEDERAL	TOTAL
	0%	100%	0%	
Right-of-Way	\$0	\$10,200	\$0	\$10,200
Utilities	\$0	\$0	\$0	\$0
<b>Preliminary &amp; Construction Engineering and Inspection</b>				
Prelim. Eng. 10%	\$0	\$35,400	\$0	\$35,400
Const. Eng. & Inspec. 10%	\$0	\$35,400	\$0	\$35,400
<b>Total Project Cost</b>	<b>\$0</b>	<b>\$425,200</b>	<b>\$0</b>	<b>\$ 425,000</b>

# PAY ITEM SUMMARY

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	TOOL QUANTITIES	ADDITIONAL QUANTITIES	TOOL QUANTITIES + ADDITIONAL QUANTITIES	Statewide UNIT COST	TOTAL COST
<b>Pavement Removal</b>							
415-01.02	Cold Planning Bituminous Pavement	SY	486		486	\$ 7.64	\$ 3,709.56
PAVEMENT REMOVAL TOTAL (ROUNDED)							\$ 3,800
<b>Asphalt Roads</b>							
303-01	Mineral Aggregate, Type A Base, Grading D	TON	571		571	\$ 32.05	\$ 18,291.17
307-02.01	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading A	TON	19		19	\$ 101.33	\$ 1,886.85
307-02.02	Asphalt Cement (PG70-22)(BPMB-HM) Grading A-S	TON	0		0	\$ 727.26	\$ 317.95
307-02.03	Aggregate (BPMB-HM) Grading A-S Mix	TON	14		14	\$ 74.35	\$ 1,051.00
307-02.08	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading B-M2	TON	12		12	\$ 113.84	\$ 1,388.56
402-01	Bituminous Material For Prime Coat (PC)	TON	0		0	\$ 713.72	\$ 266.82
402-02	Aggregate For Cover Material (PC)	TON	1		1	\$ 66.14	\$ 89.25
403-01	Bituminous Material For Tack Coat (TC)	TON	0		0	\$ 781.25	\$ 191.67
411-01.07	ACS (PG64-22) GR "E"	TON	13		13	\$ 112.58	\$ 1,469.71
411-02.10	ACS Mix(PG70-22) Grading D	TON	39		39	\$ 115.32	\$ 4,535.79
PAVING TOTAL (ROUNDED)							\$ 29,500
<b>Concrete Roads</b>							
CONCRETE RAMPS AND ROADWAYS TOTAL (ROUNDED)							\$ -
<b>Drainage</b>							
607-05.02	24" Concrete Pipe Culvert (Class III)	LF	29		29	\$ 85.54	\$ 2,478.94
611-07.01	Class A Concrete (Pipe Endwalls)	CY	1		1	\$ 1,054.82	\$ 1,562.39
611-07.02	Steel Bar Reinforcement (Pipe Endwalls)	LB	141		141	\$ 2.31	\$ 325.19
710.02	Aggregate Underdrains (with pipe)	LF	486		486	\$ 5.46	\$ 2,652.25
DRAINAGE TOTAL (ROUNDED)							\$ 7,100
<b>Appurtenances</b>							
ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)							\$ -
<b>Earthwork &amp; Mineral</b>							
105-01	Construction Stakes, Lines, and Grades	LS	1	-0.8	0.2	\$ 112,407.96	\$ 22,481.59
203-01	Road & Drainage Excavation (Unclassified)	CY	1727		1727	\$ 16.79	\$ 28,994.94
203-03	Borrow Excavation (Unclassified)	CY	1439		1439	\$ 15.04	\$ 21,646.34
EARTHWORK & MINERAL TOTAL (ROUNDED)							\$ 73,200
<b>Structures</b>							
N/A	Removal of Bridge	SF	804		804	\$ 20.00	\$ 16,072.00
N/A	New Bridge (Box)	SF	871		871	\$ 105.00	\$ 91,455.00
STRUCTURES TOTAL (ROUNDED)							\$ 107,600
<b>Interchanges and Unique Intersections</b>							
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUNDED)							\$ -
<b>Lighting &amp; Signalization</b>							
LIGHTING & SIGNALIZATION TOTAL (ROUNDED)							\$ -
<b>Guardrail</b>							
705-01.01	Guardrail at Bridge Ends	LF	100		100	\$ 73.64	\$ 7,364.49
705-02.02	Single Guardrail (Type 2)	LF	134		133.584	\$ 18.82	\$ 2,514.27
705-04.07	Tan Energy Absorb Term (NCHRP, 350, TL3)	EA	5	-1	4	\$ 2,352.59	\$ 9,410.38
705-04.09	Earth Pad for Type 38 GR End Treatment	EA	5	-1	4	\$ 1,294.80	\$ 5,179.21
GUARDRAIL TOTAL (ROUNDED)							\$ 24,500
<b>Seeding and Sodding</b>							
801-01	Seeding (With Mulch)	UNIT	21		21	\$ 78.25	\$ 1,662.90
801-01.07	Temporary Seeding (With Mulch)	UNIT	16		16	\$ 29.94	\$ 477.19
801-02	Seeding (Without Mulch)	UNIT	16		16	\$ 28.52	\$ 454.60
SODDING TOTAL (ROUNDED)							\$ 2,600
<b>Maintenance of Traffic</b>							
N/A	Traffic Control	LS	1		1		\$ 10,412.00
712-02.02	Interconnected Portable Barrier Rail	LF	12		12	\$ 31.96	\$ 388.14
MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)							\$ 10,900
<b>Signs</b>							
Not Listed	Signs (Construction)	LS	1		1	\$ -	\$ 300
SIGNING TOTAL (ROUNDED)							\$ 300
<b>Pavement Markings</b>							
716-13.06	Spray Thermo P.M. (40 mil 4")	LM	0.3		0.3	\$ 2,889.10	\$ 1,010.03
PAVEMENT MARKINGS TOTAL (ROUNDED)							\$ 1,100
<b>Fencing</b>							
FENCE TOTAL (ROUNDED)							\$ -
<b>Rip-Rap</b>							
RIP-RAP & SLOPE PROTECTION TOTAL (ROUNDED)							\$ -
<b>Clearing and Grubbing</b>							
201-01	Clearing and Grubbing	LS		0.04	0.04	\$ 264,380.06	\$ 10,575.20
CLEAR AND GRUBBING TOTAL (ROUNDED)							\$ 10,600.00
<b>Railroad At-Grade Crossing</b>							
RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)							\$ -
<b>Utilities</b>							
UTILITIES TOTAL (ROUNDED)							\$ -
<b>Right-of-Way</b>							
N/A	Right-of-Way	LS	1	27	28	\$ 362.42	\$ 10,147.88
RIGHT-OF-WAY TOTAL (ROUNDED)							\$ 10,200.00

# BRIDGE TIR

Madison  
State Route 223/Shady Grove Road

LOCATION			
Bridge #:	57S81960003	Feature Crossed:	Branch
Road Name:	StateRoute223/ShadyGroveRoad	Log mile:	2.28
Route ID:	SR223	System:	5-STP Rural, State
City:	Mercer	Functional Class:	Rural Collector
County:	Madison	State Project Number	57039-0230-04
PIN:	124712.00		

ROADWAY		
	Existing	Proposed (Preliminary Design Estimate)
Design Standard		RD01-TS-2 / 2011 Green Book
<b>Route Characteristics</b>		
AADT:	610	1120
AADT Year:	2022	2042
Terrain:	Rolling	Rolling
No. Lanes:	2	2
Speed(Posted):	45	45
Speed (Design):		45
<b>Approach Character.</b>		
Lane Width (ft):	9	11
Shoulder Width (ft):	2	3
ROW Width (ft):	60	70
ROW Tracts Affected		2
ROW Required (acre)		0.06
Cross Section Width (ft):	18/22/60	22/28/70
Approach Length (ft):		120' (east), 120' (west)
Alignment:	tangent	tangent
Grade:		grade to remain the same as existing
Surface Material:	Pavement	Pavement
Sidewalks (R/L):	No	No
App. Lower Than Structure	No	No
Utilities (list)	N/A	N/A
Utilities to be Relocated	N/A	N/A
Comments		

# BRIDGE TIR

Madison  
State Route 223/Shady Grove Road

STRUCTURE		
	Existing	Proposed (Preliminary Design Estimate)
<b>Bridge Characteristics</b>		
Year Built	2017	
Load Limit	10 tons(inspection report), 40 tons(signed)	
Sufficiency Rating	27.4	
Skew	60	60
Structure Type	Precast Concrete Slab	Reinforced Concrete Box
Structures in Channel	No	No
Length (ft)	28	26
No. Spans (App./Main)	0   1	0   1
Width (curb to curb) (ft)	26.5	28
Width (o to o) (ft)	28.7	33.5
Sidewalks on Structure	No	No
Vert. Clearance (ft)	3	3.8
Superstructure Depth (in)	27	10.5
Girder Depth (in)	18	n/a
Finish Grade-Low Girder (in)	20	10.5
High Water Marks	N/A	
Bridge Rail Type	Guardrail	Guardrail
Bridge Rail Height (ft)	2.7	2.25
Indication Overtopping	No	
Local Scour	No	
Obstructions	No	
Other Structures	N/A	N/A
Comments	Floating maintenance replaced original structure with a temporary structure. Substructure is timber.	



# BRIDGE TIR

Madison  
State Route 223/Shady Grove Road

## FLOW RATES (from USGS StreamStats)

Drainage Area (sq. miles)	0.76
10 Year Discharge Rate (Q10) cfs	631
50 Year Discharge Rate (Q50) cfs	839
100 Year Discharge Rate (Q100) cfs	922

## CHANNEL

Depth (ft)	N/A
Width of Normal Flow (ft)	14
Depth of Normal Flow (ft)	N/A
Skew of Channel with Roadway	60
Type of Material in Stream Bed	silt
Type of Vegetation on Banks	low growth, large timber
Are Channel Banks Stable	No
Signs of Stream Aggradation	No
Signs of Stream Degradation	No
Drift or Drift Potential	Yes
Comments	

## FLOODPLAIN

Skew Same as Channel	Yes
Symmetrical About Channel	Yes
Approx. Floor Elevations	N/A
Type of Vegetation in Floodplain	low growth, large timber, grass
Any Buildings in Floodplain	No
Flood Information From Locals	N/A
Comments	

## MAINTENANCE OF TRAFFIC

Method of Maintaining Traffic	temporary detour
Description	<p><u>Official Detour:</u> Detour thru-traffic north/east of bridge onto Britton Lane/State Route 223 heading north, next onto Denmark Jackson Road/State Route 223 heading east, then onto Smith Lane/State Route 223 heading north, turn onto Airways Boulevard/Brownsville Highway/State Route 1/U.S. Highway 70 heading west, turn onto State Route 138 heading south, lastly back onto Shady Grove Road/State Route 223. Detour thru-traffic south/west of bridge using the same route in reverse order. This is the only detour route that will be signed.</p>
Comments	<p><u>Detour for Local Traffic:</u> Detour thru-traffic north/east of bridge onto Heidelberg Road heading east, next onto Maple Springs Road heading west, then onto State Route 138 heading west, lastly back onto State Route 223 heading north. Detour thru-traffic south/west of bridge using the same route in reverse order.</p>

**TENNESSEE DEPARTMENT OF TRANSPORTATION  
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION**

PROJECT NO.: 57039-0230-04 ROUTE: S.R. 223  
 COUNTY: MADISON CITY: \_\_\_\_\_  
 PROJECT PIN NUMBER: 124712.00  
 PROJECT DESCRIPTION: BRIDGE OVER BRANCH @ L.M. 2.28  
 \_\_\_\_\_  
 \_\_\_\_\_

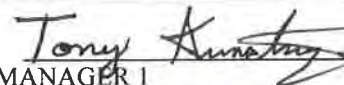
**DIVISION REQUESTING:**

MAINTENANCE  PAVEMENT DESIGN   
 S.T.I.D.  STRUCTURES   
 PROG. DEVELOPMENT & ADM.  SURVEY & ROADWAY DESIGN   
 PUBLIC TRANS. & AERO.  TRAFFIC SIGNAL DESIGN   
 OTHER \_\_\_\_\_   
 YEAR PROJECT PROGRAMMED FOR CONSTRUCTION: \_\_\_\_\_  
 PROJECTED LETTING DATE: \_\_\_\_\_

**TRAFFIC ASSIGNMENT:**

BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
610	2022	1,120	1,460	13	2042	65-35	10	15		

REQUESTED BY: NAME CALEB SMITH DATE 11/6/17  
 DIVISION S.T.I.D.  
 ADDRESS 505 DEADERICK STREET  
NASHVILLE, TN. 37243

REVIEWED BY: TONY ARMSTRONG  DATE 11.30.17  
 TRANSPORTATION MANAGER 1  
 SUITE 1000, JAMES K. POLK BUILDING

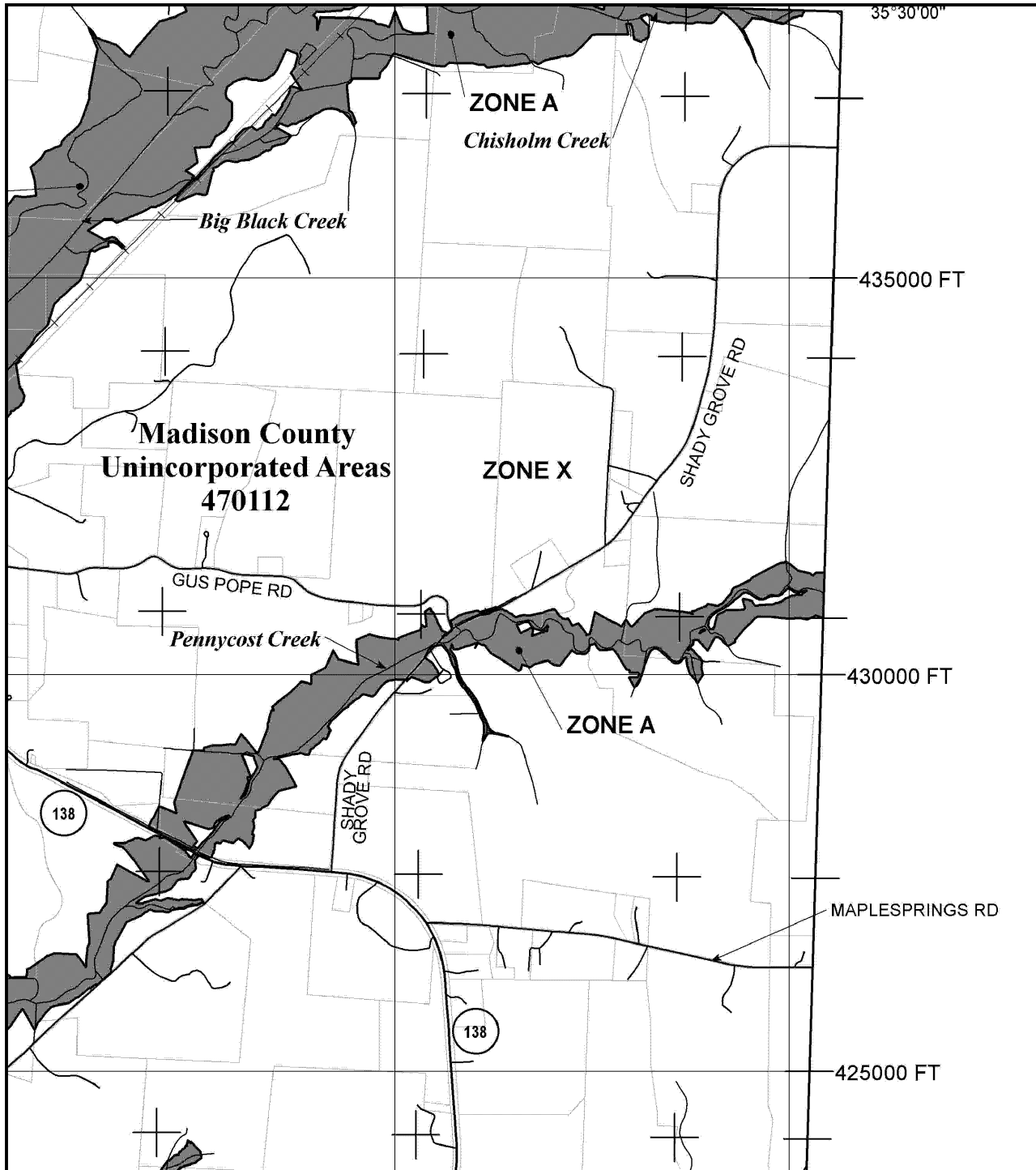
APPROVED BY: JIM WATERS  DATE 12/1/17  
 ASSISTANT DIRECTOR  
 SUITE 1000, JAMES K. POLK BUILDING

**COMMENTS:**

THIS TRAFFIC BASED ON 2017 CYCLE COUNTS. THE DESIGN YEAR TRAFFIC IS BASED ON GROWTH RATE FROM THE JACKSON MPO COMPUTER ASSIGNMENT MODEL.

**DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.**

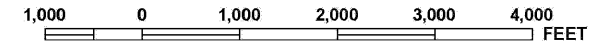
NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR ADTs OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.  
 SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS



and Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 2000'



NFP

PANEL 0375E

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
**MADISON COUNTY,**  
**TENNESSEE**  
**AND INCORPORATED AREAS**

**PANEL 375 OF 435**

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MADISON COUNTY	470112	0375	E

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**  
**47113C0375E**

**MAP REVISED**  
**AUGUST 3, 2009**

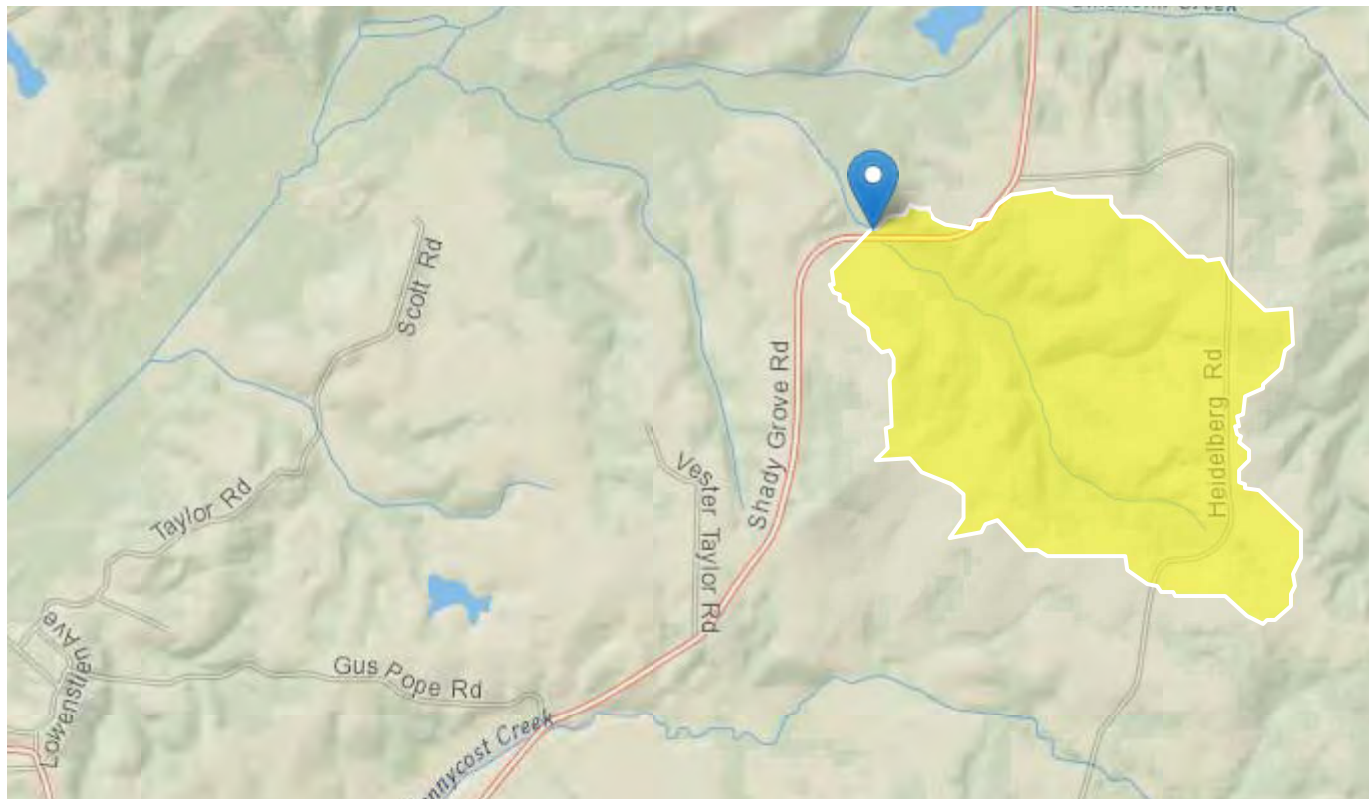


Federal Emergency Management Agency

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](http://www.msc.fema.gov)

# StreamStats Report

Region ID: TN  
 Workspace ID: TN20180105165620999000  
 Clicked Point (Latitude, Longitude): 35.49555, -89.00179  
 Time: 2018-01-05 10:55:51 -0600



## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CONDA	Area that contributes flow to a point on a stream	0.76	square miles
DRNAREA	Area that drains to a point on a stream	0.76	square miles
RECESS	Number of days required for streamflow to recede one order of magnitude when hydrograph is plotted on logarithmic scale	151	days per log cycle
PERMGTE2IN	Percent of area underlain by soils with permeability greater than or equal to 2 inches per hour	99.166	percent
CLIMFAC2YR	Two-year climate factor from Lichy and Karlinger (1990)	2.402	dimensionless
SOILPERM	Average Soil Permeability	2.015	inches per hour

## Peak-Flow Statistics Parameters [DAOnly Area 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONTDA	Contributing Drainage Area	0.76	square miles	0.76	2308

### Peak-Flow Statistics Flow Report [DAOnly Area 4]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	SE	SEp	Equiv. Yrs.
2 Year Peak Flood	377	ft <sup>3</sup> /s	197	722	38.7	38.7	1.8
5 Year Peak Flood	532	ft <sup>3</sup> /s	284	996	37.2	37.2	2.4
10 Year Peak Flood	631	ft <sup>3</sup> /s	333	1200	38	38	3.1
25 Year Peak Flood	752	ft <sup>3</sup> /s	384	1470	40.1	40.1	3.8
50 Year Peak Flood	839	ft <sup>3</sup> /s	414	1700	42.2	42.2	4.2
100 Year Peak Flood	922	ft <sup>3</sup> /s	438	1940	44.7	44.7	4.4
500 Year Peak Flood	1120	ft <sup>3</sup> /s	481	2590	51.1	51.1	4.7

### Peak-Flow Statistics Citations

Law, G.S., and Tasker G.D.,2003, Flood-Frequency Prediction Methods for Unregulated Streams of Tennessee, 2000: U.S. Geological Survey Water-Resources Investigations Report 03-4176, 79p. (<http://pubs.usgs.gov/wri/wri034176/>)

### Low-Flow Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.76	square miles	2	2405
RECESS	Recession Index	151	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	99.166	percent	2	98

### Low-Flow Statistics Disclaimers [Low Flow West Region 2009 5159]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

### Low-Flow Statistics Flow Report [Low Flow West Region 2009 5159]

Statistic	Value	Unit
7 Day 10 Year Low Flow	0.0882	ft <sup>3</sup> /s
30 Day 5 Year Low Flow	0.112	ft <sup>3</sup> /s

### Low-Flow Statistics Citations

Law, G.S., Tasker, G.D., and Ladd, D.E.,2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009-5159, 212 p., 1 pl. (<http://pubs.usgs.gov/sir/2009/5159/>)

Annual Flow Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.76	square miles	2	2405
RECESS	Recession Index	151	days per log cycle	32	350
CLIMFAC2YR	Tennessee Climate Factor 2 Year	2.402	dimensionless	2.307	2.455
PERMGTE2IN	Percent permeability gte 2 in per hr	99.166	percent	2	98

Annual Flow Statistics Disclaimers [Low Flow West Region 2009 5159]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Annual Flow Statistics Flow Report [Low Flow West Region 2009 5159]

Statistic	Value	Unit
Mean Annual Flow	1.14	ft <sup>3</sup> /s

*Annual Flow Statistics Citations*

Law, G.S., Tasker, G.D., and Ladd, D.E., 2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009-5159, 212 p., 1 pl. (<http://pubs.usgs.gov/sir/2009/5159/>)

Seasonal Flow Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.76	square miles	2	2405
RECESS	Recession Index	151	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	99.166	percent	2	98

Seasonal Flow Statistics Disclaimers [Low Flow West Region 2009 5159]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Seasonal Flow Statistics Flow Report [Low Flow West Region 2009 5159]

Statistic	Value	Unit
Summer Mean Flow	0.462	ft <sup>3</sup> /s

*Seasonal Flow Statistics Citations*

Law, G.S., Tasker, G.D., and Ladd, D.E., 2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009-5159, 212 p., 1 pl.

(<http://pubs.usgs.gov/sir/2009/5159/>)

### Flow-Duration Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.76	square miles	2	2405
RECESS	Recession Index	151	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	99.166	percent	2	98
CLIMFAC2YR	Tennessee Climate Factor 2 Year	2.402	dimensionless	2.307	2.455
SOILPERM	Average Soil Permeability	2.015	inches per hour	0.97	2.44

### Flow-Duration Statistics Disclaimers [Low Flow West Region 2009 5159]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

### Flow-Duration Statistics Flow Report [Low Flow West Region 2009 5159]

Statistic	Value	Unit
99.5 Percent Duration	0.0804	ft <sup>3</sup> /s
99 Percent Duration	0.0886	ft <sup>3</sup> /s
98 Percent Duration	0.0967	ft <sup>3</sup> /s
95 Percent Duration	0.116	ft <sup>3</sup> /s
90 Percent Duration	0.132	ft <sup>3</sup> /s
80 Percent Duration	0.166	ft <sup>3</sup> /s
70 Percent Duration	0.199	ft <sup>3</sup> /s
60 Percent Duration	0.196	ft <sup>3</sup> /s
50 Percent Duration	0.263	ft <sup>3</sup> /s
40 Percent Duration	0.374	ft <sup>3</sup> /s
30 Percent Duration	0.648	ft <sup>3</sup> /s
20 Percent Duration	1.12	ft <sup>3</sup> /s
10 Percent Duration	2.07	ft <sup>3</sup> /s

### *Flow-Duration Statistics Citations*

Law, G.S., Tasker, G.D., and Ladd, D.E., 2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009-5159, 212 p., 1 pl. (<http://pubs.usgs.gov/sir/2009/5159/>)

## CHECK LIST OF DETERMINANTS FOR LOCATION STUDY

If any of the following facilities or ESE categories are located within the project area or corridor, place an "x" in the blank opposite the item. Where more than one alternate is to be considered, place its letter designation in the blank.

1. Agricultural land usage	<b>X</b>
2. Airport (existing or proposed)	
3. Commercial area, shopping center	
4. Floodplains	
5. Forested land	<b>X</b>
6. Historical, cultural, or natural landmark	
7. Industrial park, factory	
8. Institutional usages	
a. School or other educational institution	
b. Church or other religious institution (Cemetery)	
c. Hospital or other medical facility	
d. Public building, e.g., fire station	
e. Defense installation	
9. Recreation usages	
a. Park or recreational area	
b. Game preserve or wildlife area	
10. Residential establishment	
11. Urban area, town, city, or community	
12. Waterway, lake, pond, river, stream, spring	<b>X</b>
Permit required:	
Coast Guard	
Section 404	<b>X</b>
TVA Section 26a review	
NPDES	<b>X</b>
Aquatic Resource Alteration	<b>X</b>
13. Other	
14. Location coordinated with local officials	
15. Railroad crossings	
16. Hazardous materials site	
<u>Comments:</u> Additional environmental information includes perform fish study on High Bald Mad Tom and Naked Sand Darter.	



**BRIDGE TIR**Madison  
State Route 223/Shady Grove Road

<b>SITE VISIT ATTENDEES</b>			DATE: 1/11/2018
Name	Organization	Phone	Email
David Duncan	TDOT (STID)	615-532-6131	david.a.duncan@tn.gov
Joseph Clement	TDOT (STID)	615-770-1035	joseph.clement@tn.gov
Willie Coleman	TDOT Utilities	731-935-0160	willie.coleman@tn.gov
Robert Hope	TDOT Survey	731-935-0241	robert.hope@tn.gov
Branden Garcia	TDOT Operations	731-695-5776	branden.garcia@tn.gov
Burt Hutchins	R4 Project Dev.	731-935-0142	burt.hutchins@tn.gov
Nicholas Stephens	R4 Project Dev.	731-935-0133	nicholas.stephens@tn.gov
Evelyn DiOrio	R4 Env. Tech	731-935-0302	evelyn.diorio@tn.gov
Eric Philipps	R4 Env. Tech	731-935-0174	eric.philipps@tn.gov
Derek Ryan	R4 Traffic		derek.ryan@tn.gov
Brandon Taylor	KCI	615-559-0158	brandon.taylor@kci.com
Daniel Keener	KCI	980-288-6763	daniel.keener@kci.com
Drew Randolph	KCI	615-559-0157	drew.randolph@kci.com



Bridge Number



Upstream View from Bridge



Downstream View



Inlet



Outlet



Floodplain Downstream



Flood Plain Downstream looking towards Bridge



Flood Plain Upstream



Looking East from Bridge



Looking West from Bridge



Eastbound from Bridge



Westbound from Bridge



Weight Limit Sign at East Approach of Bridge



Connection to East Abutment on Inlet Side





Connection to West Abutment on Inlet Side



Pavement Cracking at East Abutment Connection



West Abutment



East Abutment

Transportation Investment Report for Bridge ID: 57S81960003  
Madison County  
State Route 223 / Shady Grove Road



Bridge Beams