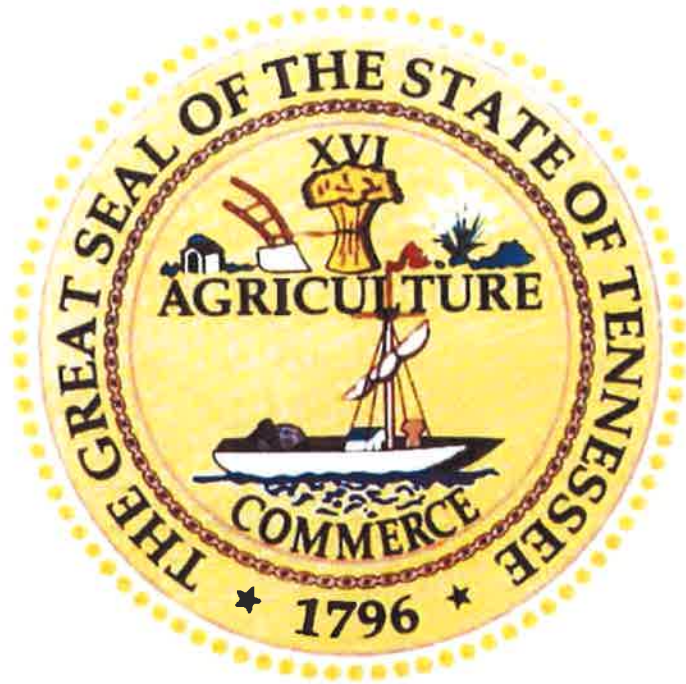


**TENNESSEE**  
**DEPARTMENT OF TRANSPORTATION**



**TRANSPORTATION INVESTMENT REPORT**  
**IMPROVE Act**

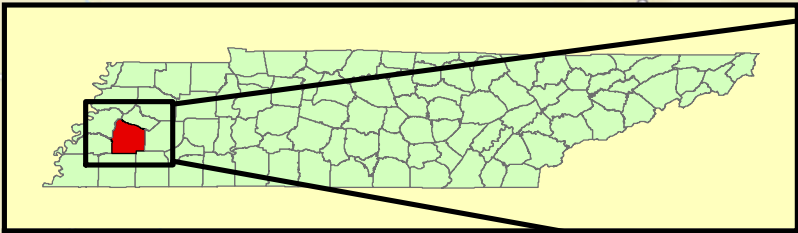
**State Route 1**  
**Bridge over Muddy Creek,**  
**Log Mile 2.13 Haywood County**  
**PIN 124505.00**

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

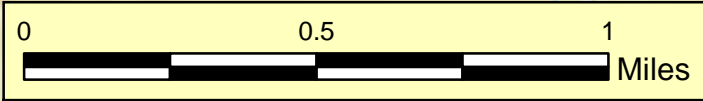
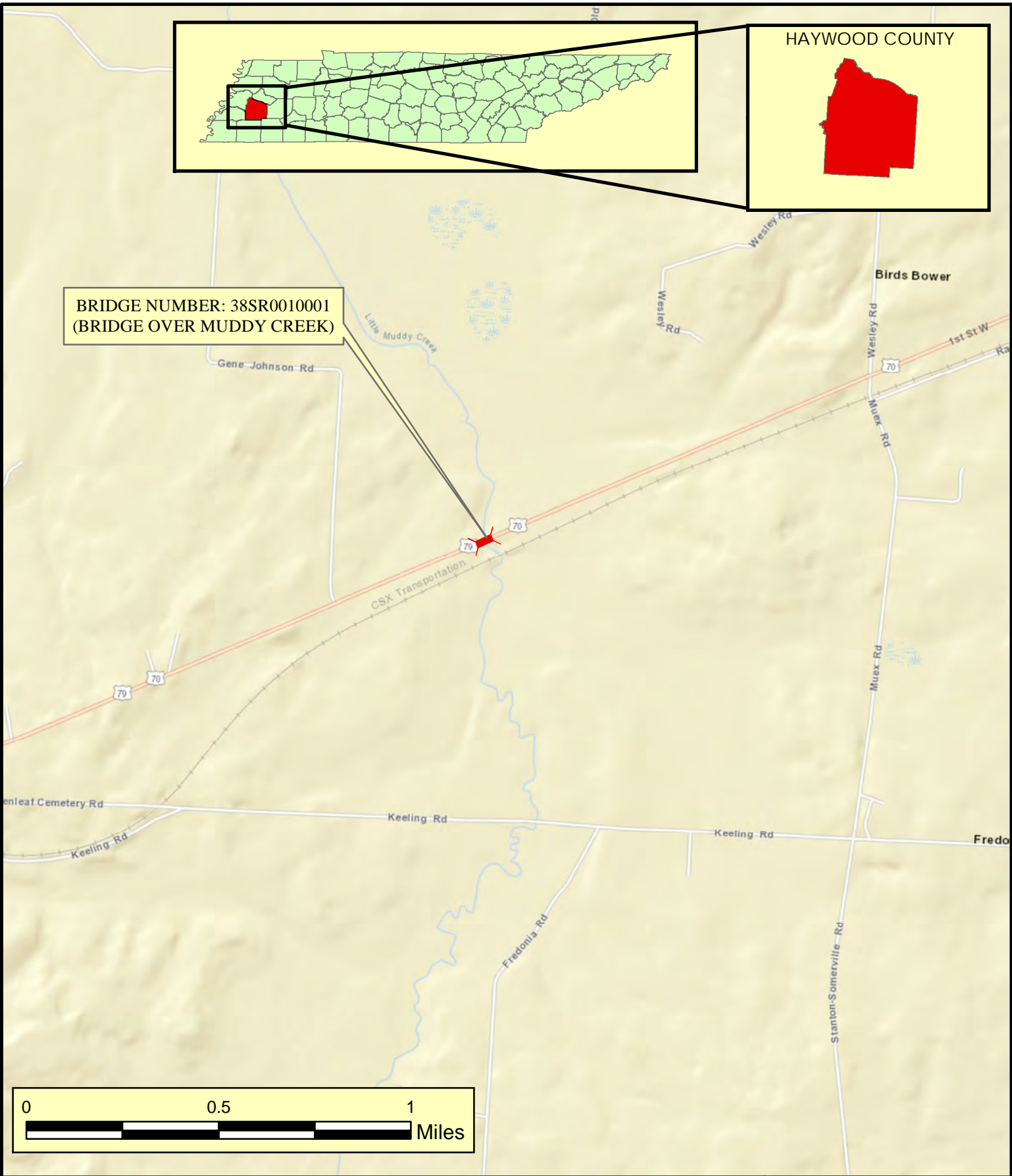
Approved by Tetsu A. Smith Date 04-02-18 Approved by Paul Dwyer Date 4/2/18  
Chief of Environment and Planning Deputy Commissioner and Chief Engineer

Approved by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION		3-26-18
ENGINEERING DIRECTOR DESIGN DIVISION		03/22/18
ENGINEERING DIRECTOR STRUCTURES DIVISION		3/27/18

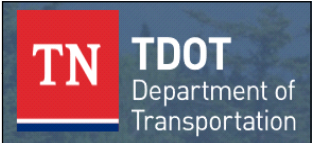
*This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.*



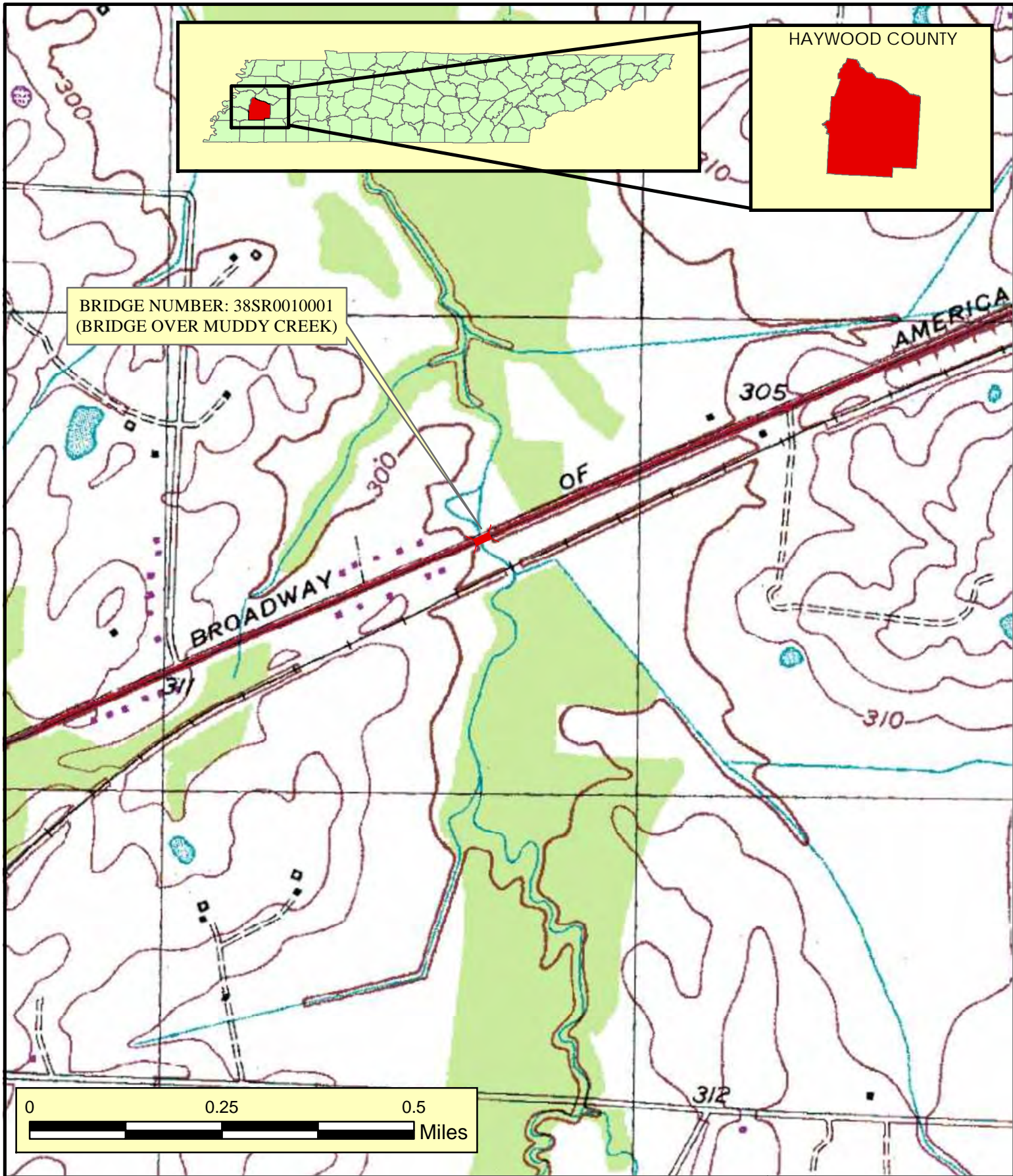
BRIDGE NUMBER: 38SR0010001  
(BRIDGE OVER MUDDY CREEK)



AREA MAP  
BRIDGE TIR  
STATE ROUTE 1 (US HWY 70)  
BRIDGE OVER MUDDY CREEK (LM 2.13)  
HAYWOOD COUNTY



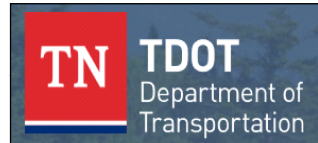




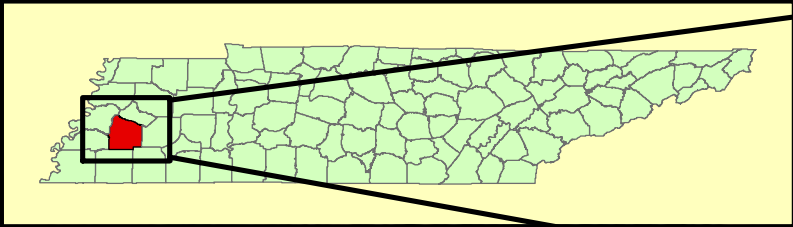
HAYWOOD COUNTY

TOPO MAP  
BRIDGE TIR

STATE ROUTE 1 (US HWY 70)  
BRIDGE OVER MUDDY CREEK (LM 2.13)  
HAYWOOD COUNTY

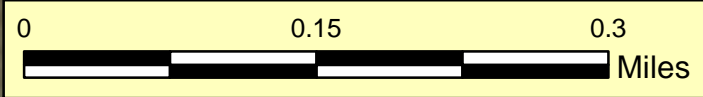
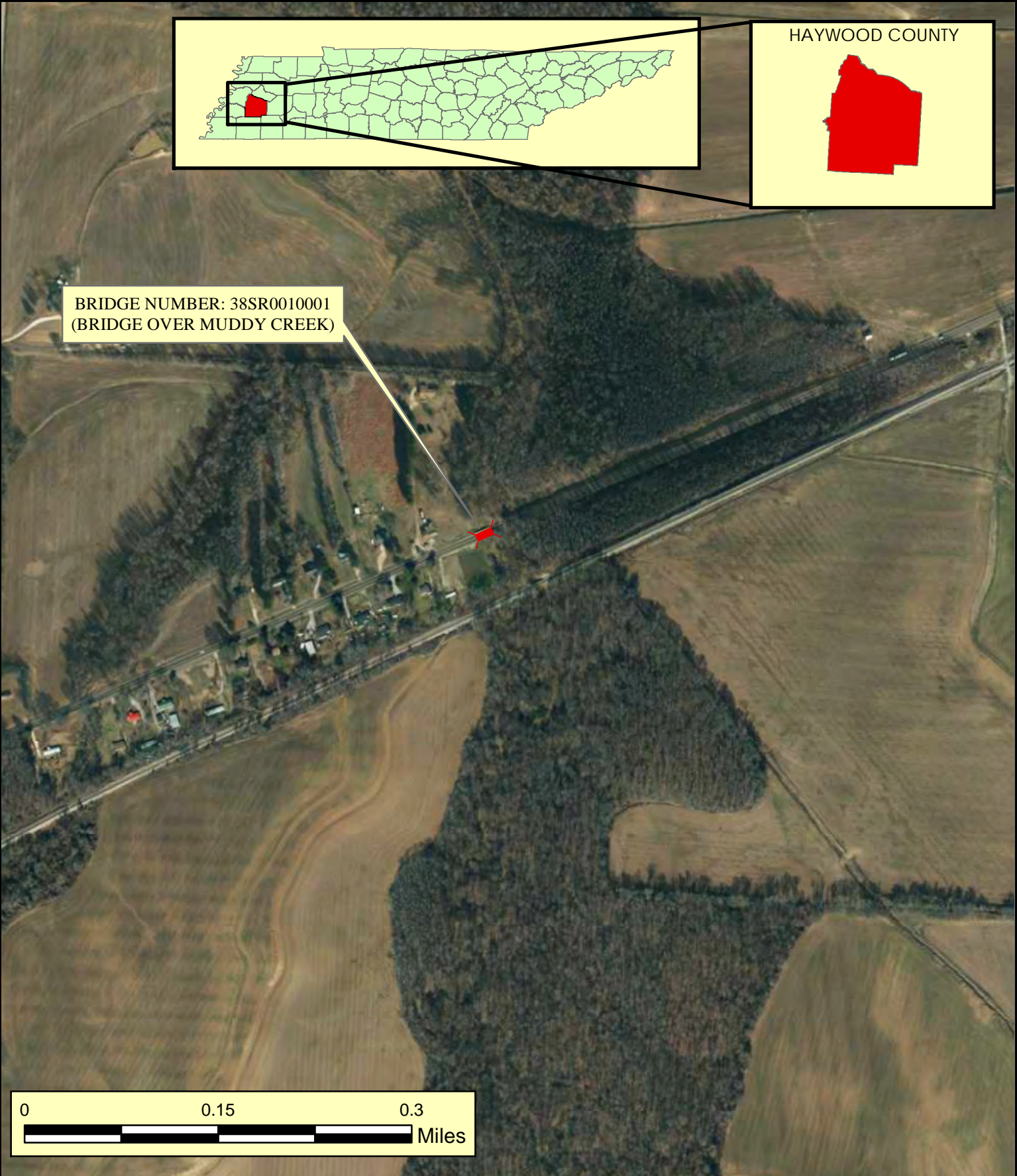






HAYWOOD COUNTY

BRIDGE NUMBER: 38SR0010001  
(BRIDGE OVER MUDDY CREEK)



PROJECT MAP  
BRIDGE TIR  
STATE ROUTE 1 (US HWY 70)  
BRIDGE OVER MUDDY CREEK (LM 2.13)  
HAYWOOD 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)  
State Route 1/US-70 (SR001), Bridge over Muddy Creek  
Bridge ID: 38SR0010001  
Log Mile 2.13  
Haywood County  
PIN: 124505.00

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

The existing structure, built in 1926, is a two (2) span steel beam and concrete deck girder bridge crossing Muddy Creek. The structure has an out-to-out width of 34 feet 5 inches. The overall structure length is 65 feet, and the sufficiency rating for this structure is 48.6 based on the Bridge Inspection Report from December 17, 2015.

The discharges for the drainage basin were determined using StreamStats, which used a drainage area of 5.81 square miles. The 10-year discharge rate (Q10) was 1,950 cubic feet per second (cfs), Q50 was 2,670 cfs, and Q100 was 2,970 cfs.

The bridge project will potentially need a bat survey to be performed and an endangered plant study since these studies may be required by TWRA as part of the project. Additionally the environmental field review team mentioned Swallows nests under the bridge that need to be removed before April.

The proposed alignment and grade for the replacement structure will remain the same as the existing structure including the 90-degree skew with the river channel. There is a 55 mph posted speed limit on State Route 1, which will also be the design speed based on the tangent alignment. Per TDOT Hydraulic recommendations, the proposed structure will be a two (2) span pre-stressed box beam structure with a total length of 70 feet. Two unequal spans of 30 feet and 40 feet will make up the length of the bridge and allow the pier to be moved out of the creek. It is estimated that two (2) tracts of land will be affected resulting in approximately 0.34 acres of right-of-way (ROW) acquisition. It is also estimated that underground and overhead utilities will need to be relocated. Construction phasing for both bridges on State Route 1 (Bridge over Muddy Creek at LM 2.13 and Bridge over Branch at LM 2.89) need to accommodate access to the property located in between the two (2) bridges in Haywood County. 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 1,650 and a design year 2042 AADT of 1,980. The existing structure and roadway approaches consist of two (2) 12-foot travel lanes. The route is classified as a Rural Arterial Road and Standard Drawing RD01-TS-3 was used for design considerations. Based on Table II from the standard drawing, it is recommended that the proposed curb-to-curb width over the structure will be 40 feet based on a design year AADT between 1,500-2,000 and a design speed of 55 MPH. Therefore, the typical section on the proposed structure will consist of two (2) 12-foot travel lanes with eight (8) foot shoulders and single slope concrete parapets for a total structure out-to-out width of 41 feet 3 inches. The project will extend 150 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.

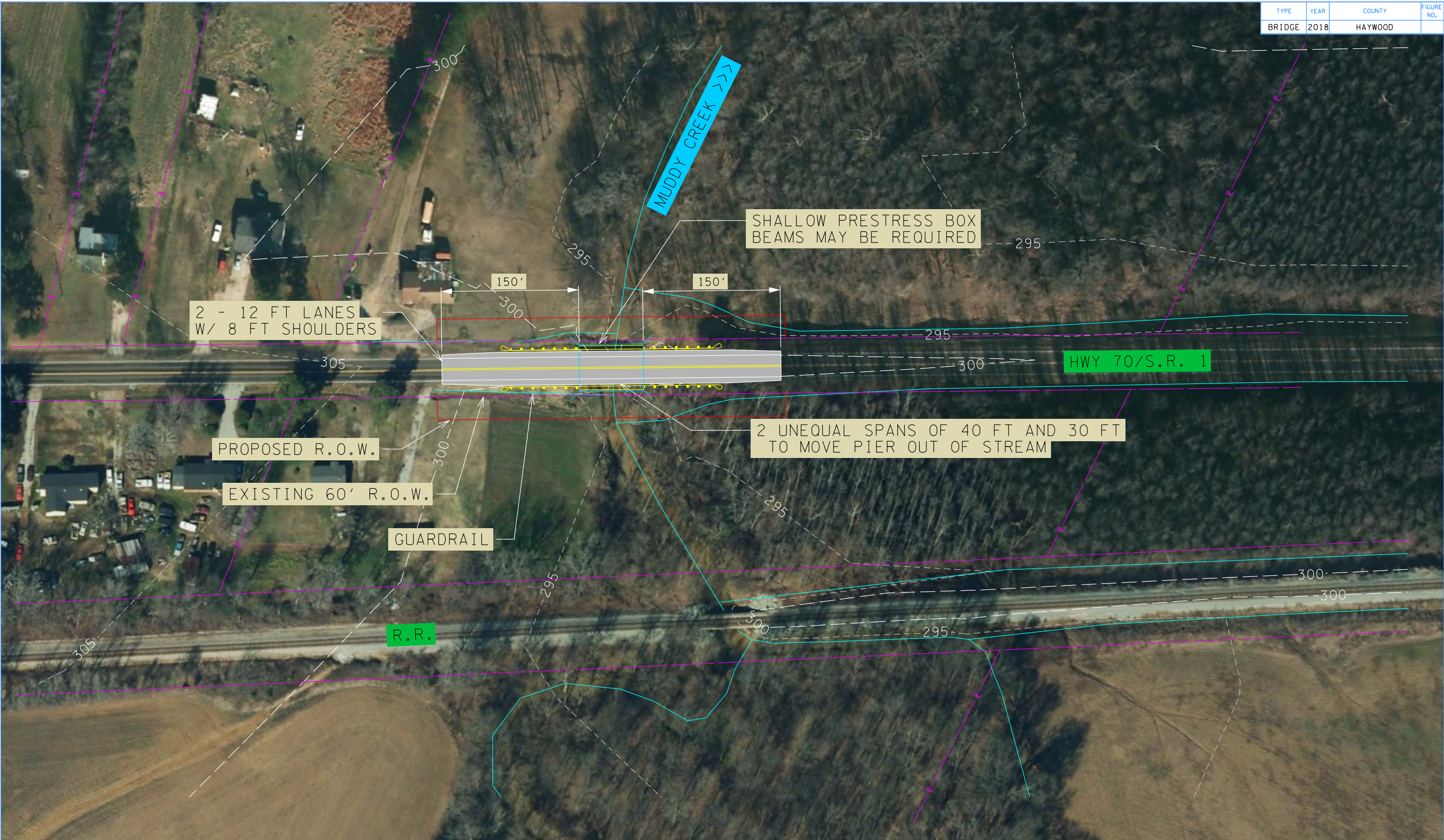
The total cost for the estimated required approach work, estimated replacement and estimated preliminary engineering for this bridge replacement is approximately \$1,055,000.

cc: File



TYPE	YEAR	COUNTY	FIGURE NO.
BRIDGE	2018	HAYWOOD	

3/23/2018 3:44:47 PM M:\2018\1604080.02 (TDOT TIR - Bridge over Muddy Creek, Haywood Cty.)\Design\Sheets\Proposed Alignment Haywood Co.Bridge Over Muddy Creek.dgn



### BRIDGE TIR

STATE ROUTE 1 (US HWY 70)  
BRIDGE OVER MUDDY CREEK @ L.M. 2.13  
HAYWOOD COUNTY

55 MPH DESIGN SPEED

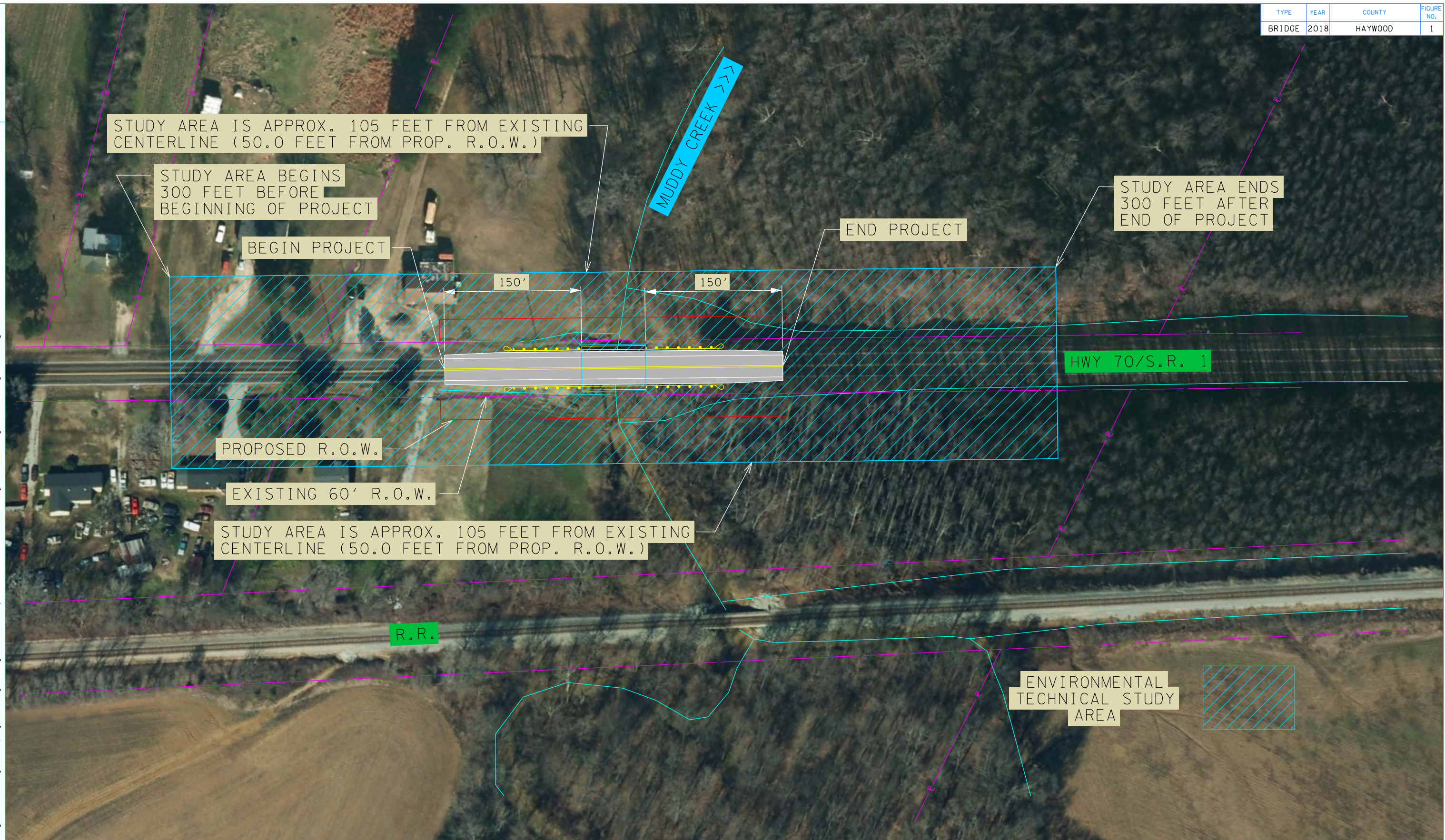
STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION  
S.T.I.D.

BRIDGE REPLACEMENT  
SRO01  
L.M. 2.13



TYPE	YEAR	COUNTY	FIGURE NO.
BRIDGE	2018	HAYWOOD	1

3/23/2018 3:46:40 PM M:\2018\1604080.02 (TDOT TIR - Bridge over Muddy Creek, Haywood Cty.)\Design\Sheets\Proposed Environmental Plan (Haywood Co. Bridge Over Muddy Creek).dgn

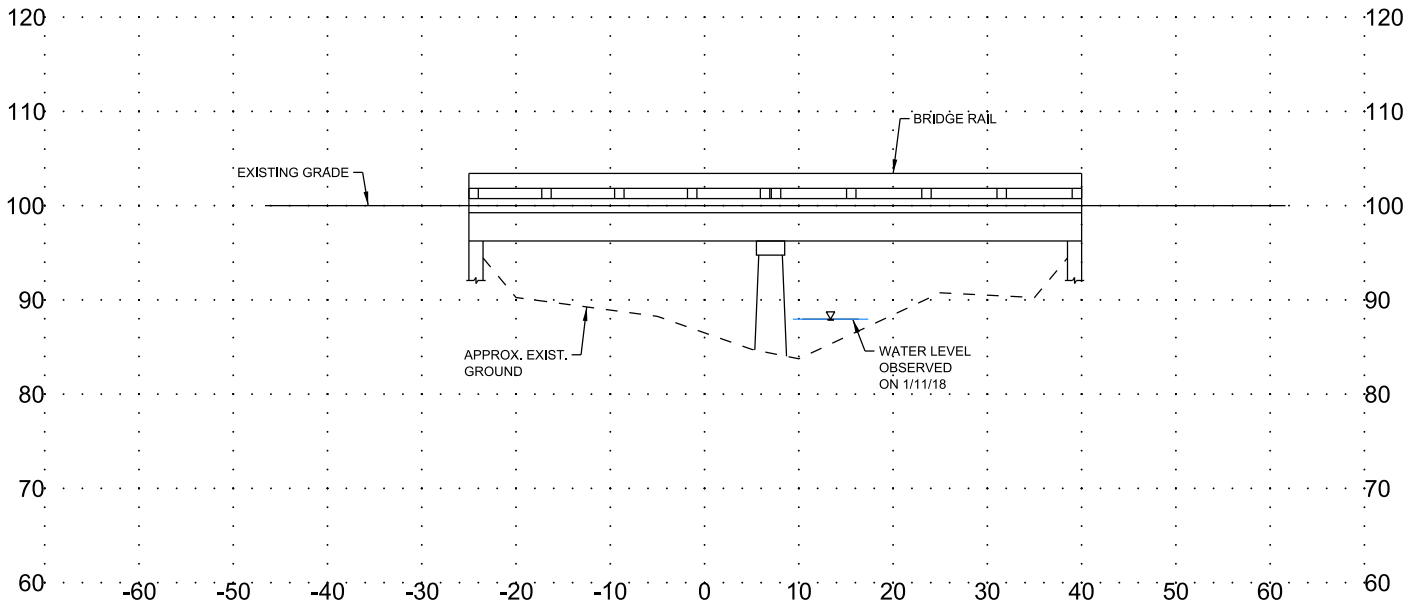


## ENVIRONMENTAL TECHNICAL STUDY AREA

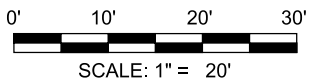
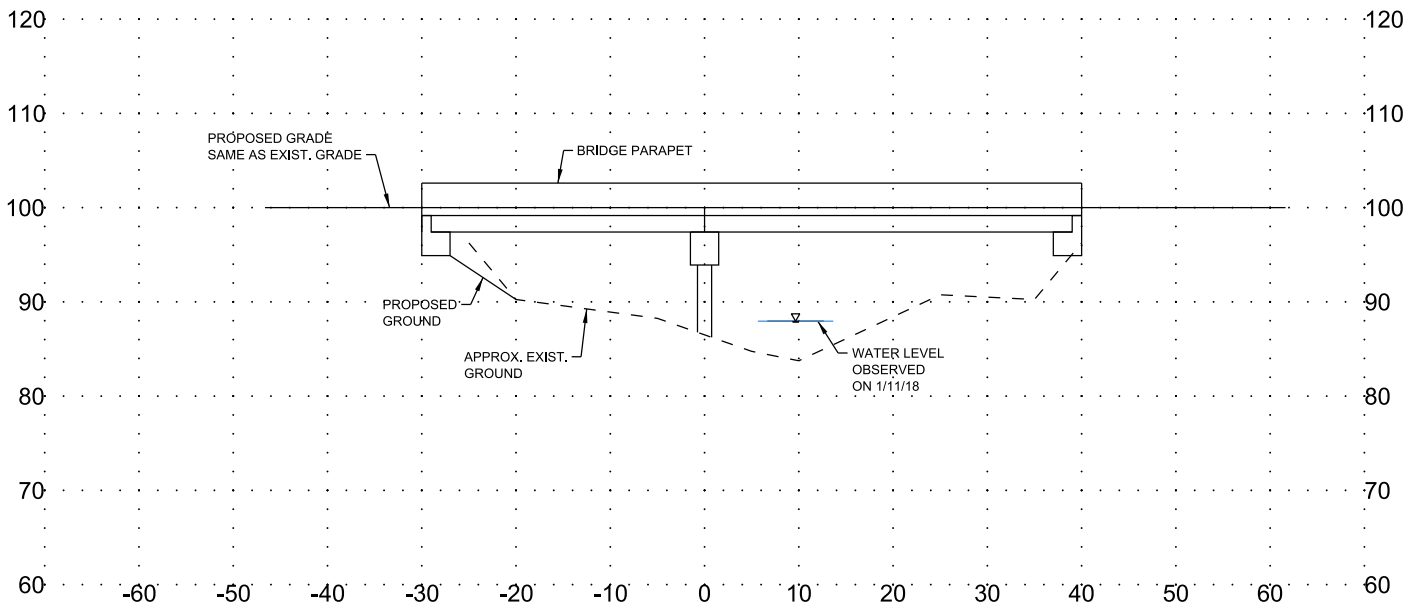
STATE ROUTE 1 (US HWY 70)  
BRIDGE OVER MUDDY CREEK @ L.M. 2.13  
HAYWOOD COUNTY



# EXISTING STRUCTURE (INLET)



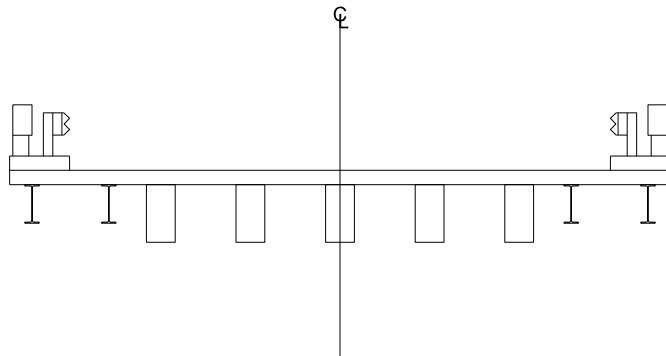
# PROPOSED STRUCTURE (INLET)



**PROPOSED PROFILE**  
**STATE ROUTE 1 (US HWY 70) HAYWOOD COUNTY**  
**BRIDGE OVER MUDDY CREEK @ L.M. 2.13**  
**BRIDGE ID: 38SR0010001**

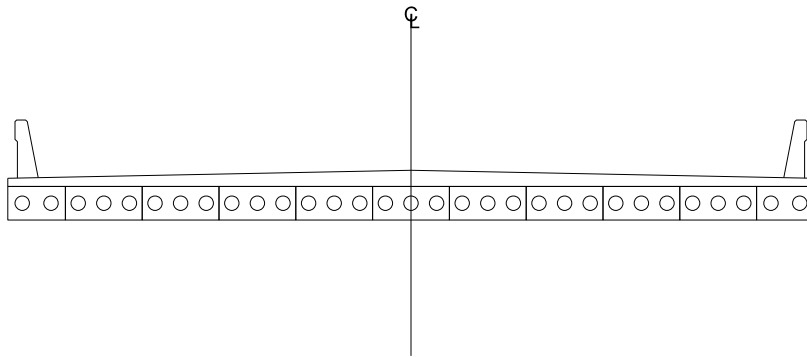


EXISTING STRUCTURE



TOTAL WIDTH: 34'-5"

PROPOSED STRUCTURE



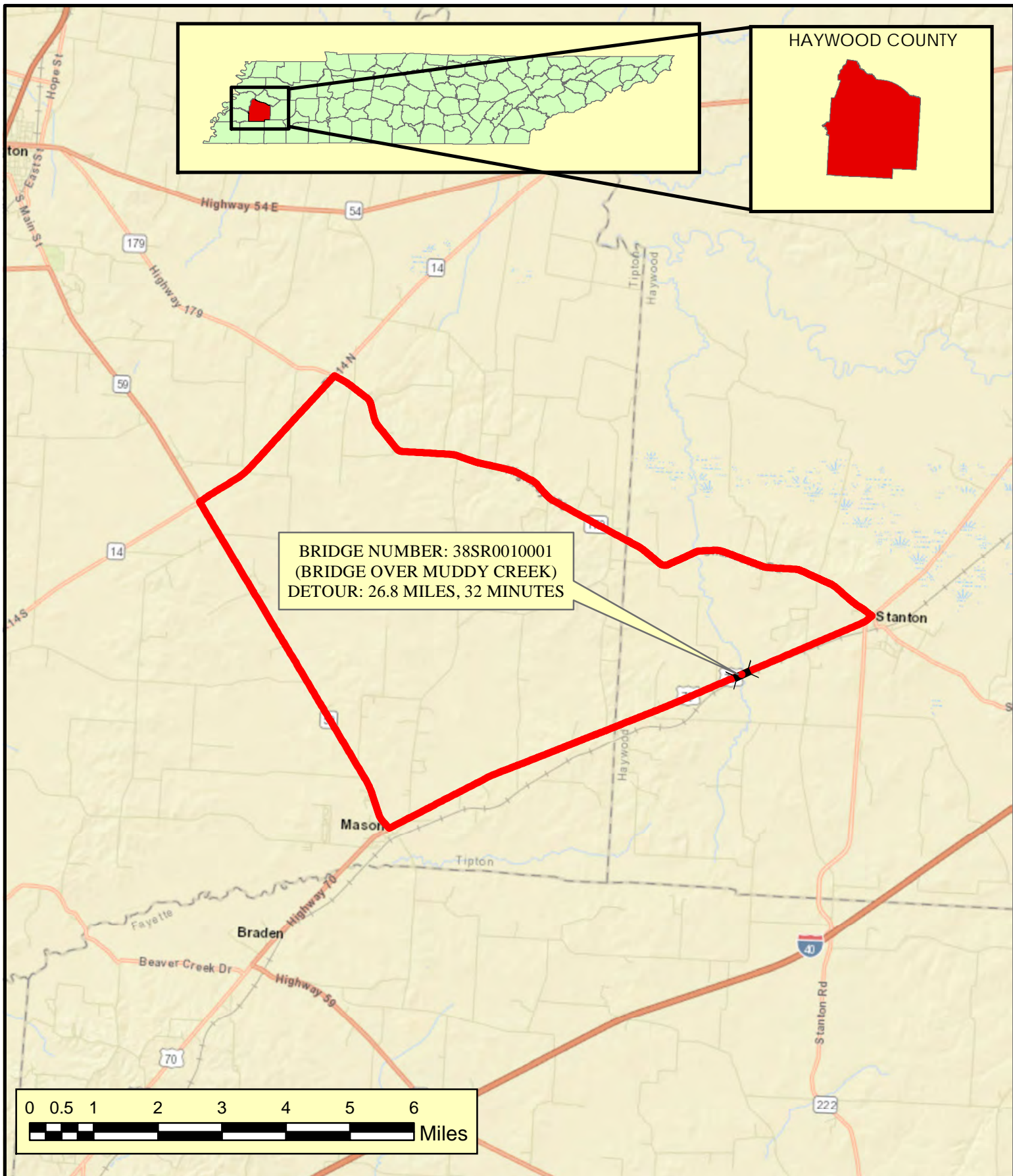
TOTAL WIDTH: 41'-3"



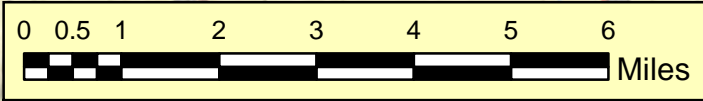
SCALE: 1" = 10'

**PROPOSED TYPICAL SECTION**  
**STATE ROUTE 1 (US HWY 70) HAYWOOD COUNTY**  
**BRIDGE OVER MUDDY CREEK L.M. 2.13**  
**BRIDGE ID: 38SR0010001**





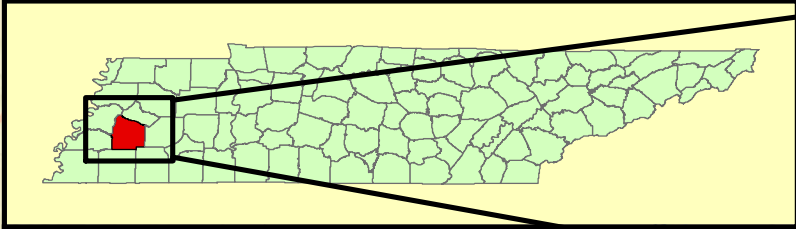
BRIDGE NUMBER: 38SR0010001  
 (BRIDGE OVER MUDDY CREEK)  
 DETOUR: 26.8 MILES, 32 MINUTES



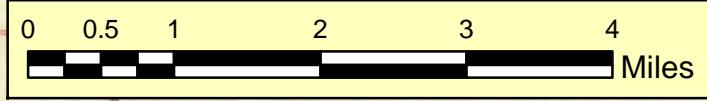
OFFICIAL DETOUR MAP  
 BRIDGE TIR  
 STATE ROUTE 1 (US HWY 70)  
 BRIDGE OVER MUDDY CREEK (LM 2.13)  
 HAYWOOD COUNTY







BRIDGE NUMBER: 38SR0010001  
(BRIDGE OVER MUDDY CREEK)  
DETOUR: 21 MILES, 25 MINUTES



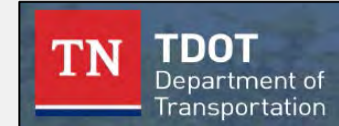
LOCAL ROUTE DETOUR MAP  
BRIDGE TIR  
STATE ROUTE 1 (US HWY 70)  
BRIDGE OVER MUDDY CREEK (LM 2.13)  
HAYWOOD COUNTY





# COST ESTIMATE SUMMARY

**Route:** SR001 STATE ROUTE 1 (U.S. HIGHWAY 70)  
**Description:** REPLACEMENT OF BRIDGE OVER MUDDY CREEK  
**County:** HAYWOOD  
**Length:** 0.07 MILES  
**Date:** March 9, 2018



DESCRIPTION	LOCAL	STATE	FEDERAL	TOTAL
	0%	100%	0%	
<b>Construction Items</b>				
Pavement Removal	\$0	\$6,600	\$0	\$6,600
Asphalt Paving	\$0	\$31,000	\$0	\$31,000
Concrete Pavement	\$0	\$0	\$0	\$0
Drainage	\$0	\$5,900	\$0	\$5,900
Appurtenances	\$0	\$0	\$0	\$0
Structures	\$0	\$405,700	\$0	\$405,700
Fencing	\$0	\$0	\$0	\$0
Signalization	\$0	\$0	\$0	\$0
Railroad Crossing or Separation	\$0	\$0	\$0	\$0
Earthwork	\$0	\$88,800	\$0	\$88,800
Clearing and Grubbing	\$0	\$10,600	\$0	\$10,600
Seeding & Sodding	\$0	\$3,200	\$0	\$3,200
Rip-Rap or Slope Protection	\$0	\$0	\$0	\$0
Guardrail	\$0	\$25,100	\$0	\$25,100
Signing	\$0	\$600	\$0	\$600
Pavement Markings	\$0	\$1,700	\$0	\$1,700
Maintenance of Traffic	\$0	\$23,700	\$0	\$23,700
Mobilization (5%)	\$0	\$30,100	\$0	\$30,100
Other Items = 10%	\$0	\$63,300	\$0	\$63,300
Const. Contingency = 15%	\$0	\$43,600	\$0	\$43,600
<b>Construction Estimate</b>	<b>\$0</b>	<b>\$739,900</b>	<b>\$0</b>	<b>\$739,900</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	\$61,100	\$0	\$61,100
Utilities	\$0	\$77,900	\$0	\$77,900
<b>Preliminary &amp; Construction Engineering and Inspection</b>				
Prelim. Eng. 10%	\$0	\$87,900	\$0	\$87,900
Const. Eng. & Inspec. 10%	\$0	\$87,900	\$0	\$87,900
<b>Total Project Cost</b>	<b>\$0</b>	<b>\$1,054,700</b>	<b>\$0</b>	<b>\$ 1,055,000</b>

# PAY ITEM SUMMARY

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	TOOL QUANTITIES	ADDITIONAL QUANTITIES	TOOL QUANTITIES + ADDITIONAL QUANTITIES	Statewide UNIT COST	TOTAL COST
<b>Pavment Removal</b>							
202-03.01	Removal of Asphalt Pavement	SY	22		22	\$ 25.98	\$ 577.42
415-01.02	Cold Planning Bituminous Pavement	SY	788		788	\$ 7.63	\$ 6,015.21
<b>PAVEMENT REMOVAL TOTAL (ROUNDED)</b>							<b>\$ 6,600</b>
<b>Asphalt Roads</b>							
303-01	Mineral Aggregate, Type A Base, Grading D	TON	600		600	\$ 32.05	\$ 19,235.58
402-01	Bituminous Material For Prime Coat (PC)	TON	1		1	\$ 713.46	\$ 519.53
402-02	Aggregate For Cover Material (PC)	TON	3		3	\$ 66.09	\$ 173.70
403-01	Bituminous Material For Tack Coat (TC)	TON	0		0	\$ 781.26	\$ 186.67
411-01.07	ACS (PG64-22) GR "E"	TON	42		42	\$ 112.44	\$ 4,765.36
411-02.10	ACS Mix(PG70-22) Grading D	TON	52		52	\$ 115.30	\$ 6,022.65
<b>PAVING TOTAL (ROUNDED)</b>							<b>\$ 31,000</b>
<b>Concrete Roads</b>							
<b>CONCRETE RAMPS AND ROADWAYS TOTAL (ROUNDED)</b>							<b>\$ -</b>
<b>Drainage</b>							
607-05.02	24" Concrete Pipe Culvert (Class III)	LF	42		42	\$ 85.50	\$ 3,590.85
611-07.01	Class A Concrete (Pipe Endwalls)	CY	2		2	\$ 1,054.36	\$ 1,901.22
611-07.02	Steel Bar Reinforcement (Pipe Endwalls)	LB	171		171	\$ 2.31	\$ 395.80
<b>DRAINAGE TOTAL (ROUNDED)</b>							<b>\$ 5,900</b>
<b>Appurtenances</b>							
<b>ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)</b>							<b>\$ -</b>
<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	2260		2260	\$ 16.78	\$ 37,935.73
203-03	Borrow Excavation (Unclassified)	CY	1884		1884	\$ 15.04	\$ 28,323.13
<b>EARTHWORK &amp; MINERAL TOTAL (ROUNDED)</b>							<b>\$ 88,800</b>
<b>Structures</b>							
N/A	Removal of Bridge	SF	2236		2236	\$ 20.00	\$ 44,720.00
N/A	New Bridge (Concrete Girder)	SF	2888		2888	\$ 125.00	\$ 360,937.50
<b>STRUCTURES TOTAL (ROUNDED)</b>							<b>\$ 405,700</b>
<b>Interchanges and Unique Intersections</b>							
<b>INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUNDED)</b>							<b>\$ -</b>
<b>Lighting &amp; Signalization</b>							
<b>LIGHTING &amp; SIGNALIZATION TOTAL (ROUNDED)</b>							<b>\$ -</b>
<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	163		162.624	\$ 18.82	\$ 3,060.28
705-04.07	Tan Energy Absg 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
<b>GUARDRAIL TOTAL (ROUNDED)</b>							<b>\$ 25,100</b>
<b>Seeding and Sodding</b>							
801-01	Seeding (With Mulch)	UNIT	26		26	\$ 78.14	\$ 2,021.75
801-01.07	Temporary Seeding (With Mulch)	UNIT	19		19	\$ 29.93	\$ 580.75
801-02	Seeding (Without Mulch)	UNIT	19		19	\$ 28.50	\$ 552.97
<b>SODDING TOTAL (ROUNDED)</b>							<b>\$ 3,200</b>
<b>Maintenance of Traffic</b>							
N/A	Traffic Control	LS	1		1		\$ 23,168.00
712-02.02	Interconnected Portable Barrier Rail	LF	15		15	\$ 31.96	\$ 472.52
<b>MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)</b>							<b>\$ 23,700</b>
<b>Signs</b>							
Not Listed	Signs (Construction)	LS	1		1	\$ -	\$ 600
<b>SIGNING TOTAL (ROUNDED)</b>							<b>\$ 600</b>
<b>Pavement Markings</b>							
716-13.06	Spray Thermo P.M. (40 mil 4")	LM	0.6		0.6	\$ 2,887.70	\$ 1,617.11
<b>PAVEMENT MARKINGS TOTAL (ROUNDED)</b>							<b>\$ 1,700</b>
<b>Fencing</b>							
<b>FENCE TOTAL (ROUNDED)</b>							<b>\$ -</b>
<b>Rip-Rap</b>							
<b>RIP-RAP &amp; SLOPE PROTECTION TOTAL (ROUNDED)</b>							<b>\$ -</b>
<b>Clearing and Grubbing</b>							
201-01	Clearing and Grubbing	LS		0.04	0.04	\$ 264,380.06	\$ 10,575.20
<b>CLEAR AND GRUBBING TOTAL (ROUNDED)</b>							<b>\$ 10,600.00</b>
<b>Railroad At-Grade Crossing</b>							
<b>RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)</b>							<b>\$ -</b>
<b>Utilities</b>							
N/A	Overhead Distribution	LM	0.07		0.07	\$ 375,000	\$ 26,250
N/A	Underground Communication	LM	0.07		0.07	\$ 500,000	\$ 35,000
N/A	Underground Water	LM	0.07		0.07	\$ 237,600	\$ 16,632
<b>UTILITIES TOTAL (ROUNDED)</b>							<b>\$ 77,900.00</b>
<b>Right-of-Way</b>							
N/A	Right-of-Way	LS	1		1	\$ 61,090.91	\$ 61,090.91
<b>RIGHT-OF-WAY TOTAL (ROUNDED)</b>							<b>\$ 61,100.00</b>



# BRIDGE TIR

Haywood  
State Route 1

LOCATION			
Bridge #:	38SR0010001	Feature Crossed:	Little Muddy Creek
Road Name:	State Route 1	Log mile:	2.13
Route ID:	SR001	System:	5-STP Rural, State
City:	Stanton	Functional Class:	Rural Arterial
County:	Haywood	State Project Number	38002-0216-94
PIN:	124505.00		

ROADWAY		
	Existing	Proposed (Preliminary Design Estimate)
Design Standard		RD01-TS-3 / 2011 Green Book
<b>Route Characteristics</b>		
AADT:	1650	1980
AADT Year:	2022	2042
Terrain:	Rolling	Rolling
No. Lanes:	2	2
Speed(Posted):	55	55
Speed (Design):		55
<b>Approach Character.</b>		
Lane Width (ft):	12	12
Shoulder Width (ft):	4	8
ROW Width (ft):	60	110
ROW Tracts Affected		2
ROW Required (acre)		0.34
Cross Section Width (ft):	24/32/60	24/40/110
Approach Length (ft):		150' (east), 150' (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)	UG: Water, FOC OH: Electric	N/A
Utilities to be Relocated	N/A	UG: Water, FOC OH: Electric
Comments		

# BRIDGE TIR

Haywood  
State Route 1

STRUCTURE		
	Existing	Proposed (Preliminary Design Estimate)
<b>Bridge Characteristics</b>		
Year Built	1926	
Load Limit	20 tons(inspection report), 40 tons(signed)	
Sufficiency Rating	48.6	
Skew	90	90
Structure Type	Concrete Deck Girder/Steel Beam	Prestressed Box Beam
Structures in Channel	Yes	No
Length (ft)	65	70
No. Spans (App./Main)	0   2	0   2
Width (curb to curb) (ft)	28.2	40
Width (o to o) (ft)	34.4	41.3
Sidewalks on Structure	No	No
Vert. Clearance (ft)	8	9.2
Superstructure Depth (in)	86	67
Girder Depth (in)	36 (Conc. Deck Girder) / 24 (Steel Beams)	21
Finish Grade-Low Girder (in)	45	31
High Water Marks	N/A	
Bridge Rail Type	Conc. Rail w/ Guardrail	Single Slope Concrete Parapet
Bridge Rail Height (ft)	2.7	3
Indication Overtopping	No	
Local Scour	No	
Obstructions	No	
Other Structures	N/A	N/A
Comments	Heavy corrosion on I-beams in several spots. Poor pavement condition on bridge deck. Bridge deck, girders and approaches have spalling and cracks. Abutment #1 has cracks.	



# BRIDGE TIR

Haywood  
State Route 1

## FLOW RATES (from USGS StreamStats)

Drainage Area (sq. miles)	5.81
10 Year Discharge Rate (Q10) cfs	1950
50 Year Discharge Rate (Q50) cfs	2670
100 Year Discharge Rate (Q100) cfs	2970

## CHANNEL

Depth (ft)	4.2
Width of Normal Flow (ft)	22
Depth of Normal Flow (ft)	4.2
Skew of Channel with Roadway	90
Type of Material in Stream Bed	sand and silt
Type of Vegetation on Banks	low growth, large timber, dead trees
Are Channel Banks Stable	Yes
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	<u>Offical Detour:</u> Detour thru-traffic east of bridge onto State Route 179 heading west, next onto State Route 14 heading south, then onto State Route 59 heading east, lastly back onto State Route 1 heading west . Detour thru-traffic west of bridge using the same route in reverse order. This is the only detour route that will be signed.
Comments	<u>Detour for Local Traffic:</u> Detour thru-traffic east of bridge onto State Route 179 heading west, next onto Charleston-Mason Rd heading south, then back onto State Route 1 heading west. Detour thru-traffic west of bridge using the same route in reverse order. Construction phasing for both bridges on State Route 1 (Bridge over Muddy Creek at LM 2.13 and Bridge over Branch at LM 2.89) need to accommodate access to the property located in between the two (2) bridges in Haywood County.

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

PROJECT NO.: 38002-1216-94 ROUTE: S.R. 1  
 COUNTY: HAYWOOD CITY: \_\_\_\_\_  
 PROJECT PIN NUMBER: 124505.00  
 PROJECT DESCRIPTION: HWY. 70 E. BRIDGE OVER MUDDY CREEK (L.M. 2.13)  
BRIDGE ID: 38SR0010001

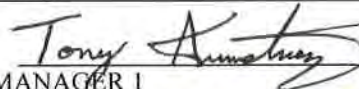
**DIVISION REQUESTING:**


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
1,650	2022	1,980	218	11	2042	65-35	9	13		

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

REVIEWED BY: TONY ARMSTRONG  DATE 11.30.17  
 TRANSPORTATION MANAGER I  
 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 ADAM COMPUTER PROGRAM.

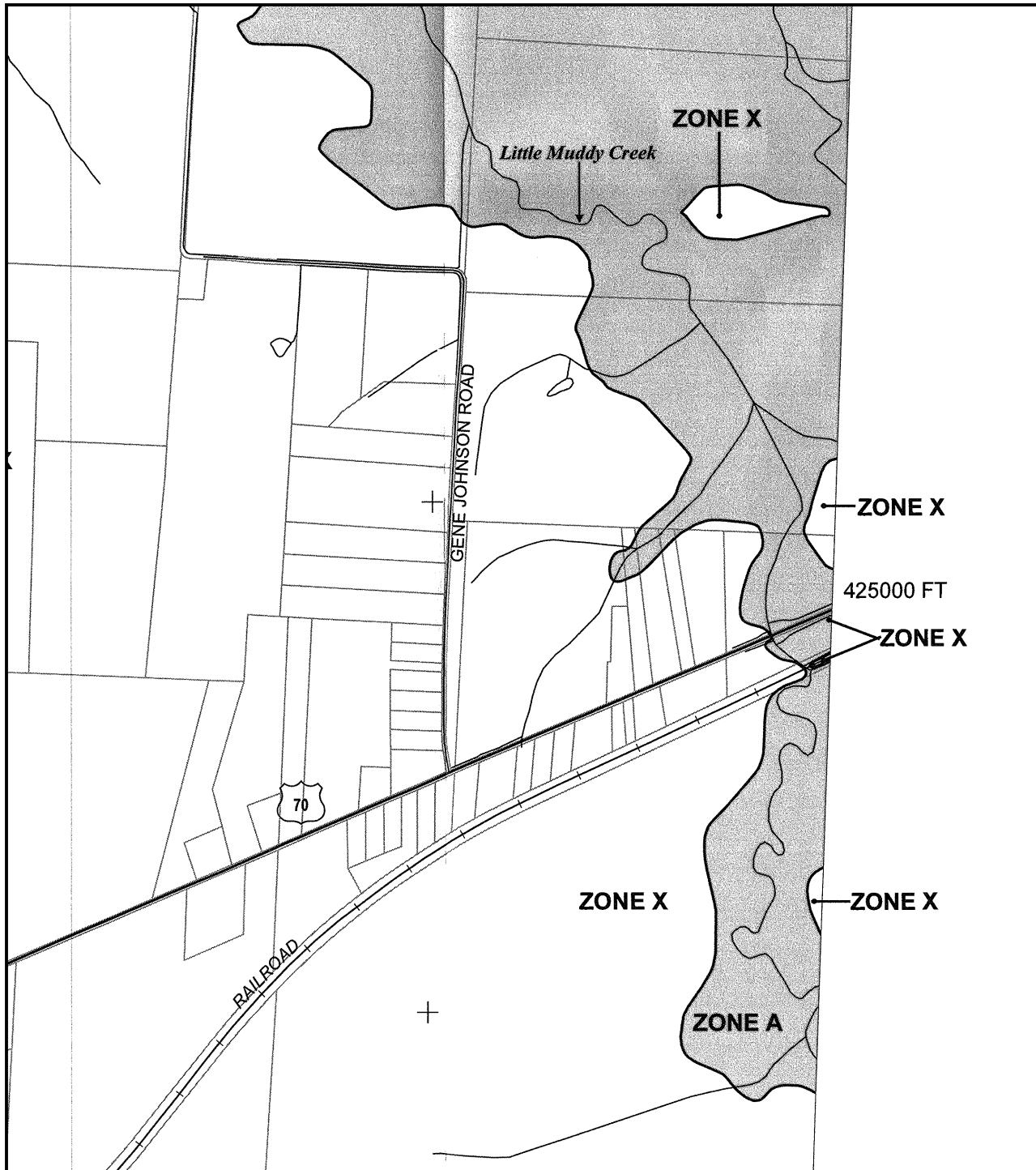
**DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.**

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR ADTs OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.

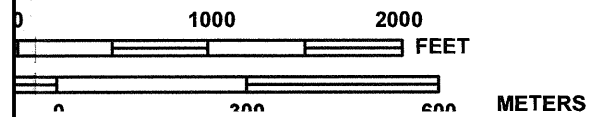
SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS.

(REV. 2/22/17)





MAP SCALE 1" = 1000'



PANEL 0305D

**FIRM**  
FLOOD INSURANCE RATE MAP

**HAYWOOD COUNTY,  
TENNESSEE  
AND INCORPORATED AREAS**

**PANEL 305 OF 400**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HAYWOOD COUNTY	470227	0305	D

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.



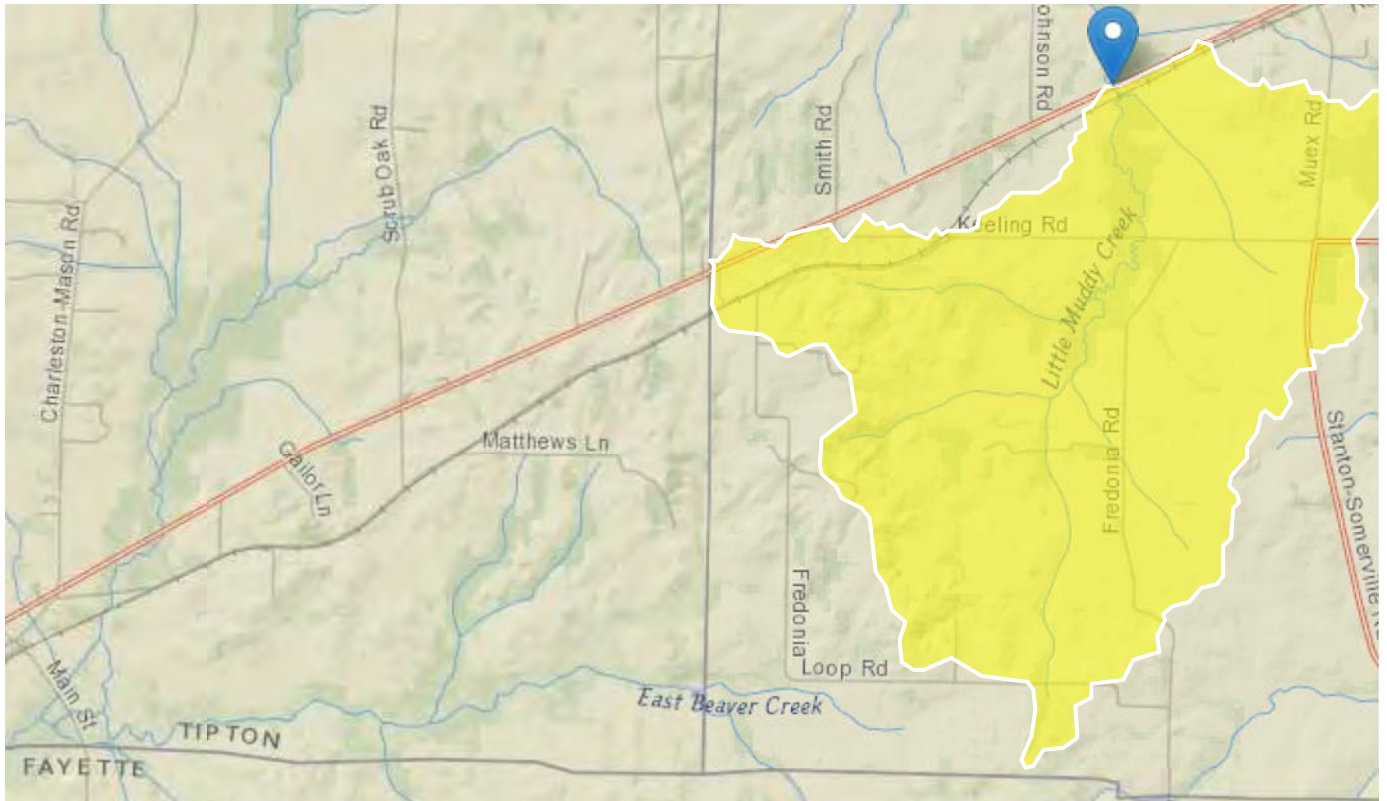
**MAP NUMBER**  
**47075C0305D**  
**EFFECTIVE DATE**  
**APRIL 16, 2008**

**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: TN20180105164809997000  
 Clicked Point (Latitude, Longitude): 35.45055, -89.43871  
 Time: 2018-01-05 10:47:40 -0600



## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CONDA	Area that contributes flow to a point on a stream	5.81	square miles
DRNAREA	Area that drains to a point on a stream	5.81	square miles
RECESS	Number of days required for streamflow to recede one order of magnitude when hydrograph is plotted on logarithmic scale	32	days per log cycle
PERMGTE2IN	Percent of area underlain by soils with permeability greater than or equal to 2 inches per hour	37.002	percent
CLIMFAC2YR	Two-year climate factor from Lichy and Karlinger (1990)	2.403	dimensionless
SOILPERM	Average Soil Permeability	1.07	inches per hour

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



Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONDA	Contributing Drainage Area	5.81	square miles	0.76	2308

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

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

Statistic	Value	Unit	PII	PIu	SE	SEp	Equiv. Yrs.
2 Year Peak Flood	1100	ft <sup>3</sup> /s	588	2070	38.7	38.7	1.8
5 Year Peak Flood	1610	ft <sup>3</sup> /s	879	2960	37.2	37.2	2.4
10 Year Peak Flood	1950	ft <sup>3</sup> /s	1050	3610	38	38	3.1
25 Year Peak Flood	2370	ft <sup>3</sup> /s	1240	4540	40.1	40.1	3.8
50 Year Peak Flood	2670	ft <sup>3</sup> /s	1350	5290	42.2	42.2	4.2
100 Year Peak Flood	2970	ft <sup>3</sup> /s	1450	6090	44.7	44.7	4.4
500 Year Peak Flood	3670	ft <sup>3</sup> /s	1630	8270	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	5.81	square miles	2	2405
RECESS	Recession Index	32	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	37.002	percent	2	98

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

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

Statistic	Value	Unit	SEp
7 Day 10 Year Low Flow	0.00927	ft <sup>3</sup> /s	123
30 Day 5 Year Low Flow	0.0245	ft <sup>3</sup> /s	93.5

### 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	5.81	square miles	2	2405

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
RECESS	Recession Index	32	days per log cycle	32	350
CLIMFAC2YR	Tennessee Climate Factor 2 Year	2.403	dimensionless	2.307	2.455
PERMGTE2IN	Percent permeability gte 2 in per hr	37.002	percent	2	98

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

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

Statistic	Value	Unit	SEp
Mean Annual Flow	6.84	ft <sup>3</sup> /s	13.1

### 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	5.81	square miles	2	2405
RECESS	Recession Index	32	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	37.002	percent	2	98

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

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

Statistic	Value	Unit	SEp
Summer Mean Flow	1.16	ft <sup>3</sup> /s	38.3

### 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	5.81	square miles	2	2405
RECESS	Recession Index	32	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	37.002	percent	2	98
CLIMFAC2YR	Tennessee Climate Factor 2 Year	2.403	dimensionless	2.307	2.455
SOILPERM	Average Soil Permeability	1.07	inches per hour	0.97	2.44



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

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

<b>Statistic</b>	<b>Value</b>	<b>Unit</b>	<b>SEp</b>
99.5 Percent Duration	0.00858	ft <sup>3</sup> /s	122
99 Percent Duration	0.0131	ft <sup>3</sup> /s	105
98 Percent Duration	0.018	ft <sup>3</sup> /s	96.4
95 Percent Duration	0.0261	ft <sup>3</sup> /s	90.5
90 Percent Duration	0.0361	ft <sup>3</sup> /s	85.8
80 Percent Duration	0.0592	ft <sup>3</sup> /s	79.6
70 Percent Duration	0.0964	ft <sup>3</sup> /s	75
60 Percent Duration	0.203	ft <sup>3</sup> /s	69.2
50 Percent Duration	0.338	ft <sup>3</sup> /s	57
40 Percent Duration	0.713	ft <sup>3</sup> /s	46.9
30 Percent Duration	1.92	ft <sup>3</sup> /s	36.6
20 Percent Duration	6.24	ft <sup>3</sup> /s	27.4
10 Percent Duration	13.6	ft <sup>3</sup> /s	17.7

### *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	X
2. Airport (existing or proposed)	
3. Commercial area, shopping center	
4. Floodplains	X
5. Forested land	
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	X
12. Waterway, lake, pond, river, stream, spring	X
Permit required:	
Coast Guard	
Section 404	X
TVA Section 26a review	
NPDES	X
Aquatic Resource Alteration	X
13. Other	
14. Location coordinated with local officials	
15. Railroad crossings	
16. Hazardous materials site	

Comments: Additional environmental information includes a bat survey needs to be performed, Swallows nests under the bridge need to be removed before April and an endangered plant study.

**BRIDGE TIR**Haywood  
State Route 1

<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 From Bridge





Downstream From Bridge



Upstream From West Bank





Downstream From East Bank



Looking Westbound from Bridge





Looking Eastbound from Bridge



Westbound Approach of Bridge





Eastbound Approach of Bridge



Weight Limit Sign at West Approach





Fiber Optic Cable Warning Sign



Existing Utility Pole on North Side of Bridge





Inlet



Outlet





Corrosion on Girder at Outlet



Extensive Decay of Pier near Girder and Foundation at Inlet





Outlet Pier from East Bank



Extensive Pavement Cracking and Rutting on Bridge





Corrosion and Decay at Girder Connection to East Abutment on Inlet Side



Extensive Pavement Cracking and Rutting Leaving Bridge Eastbound





Corrosion of Outlet Girder between West Abutment and Pier



East Abutment





West Abutment



Bridge Beams