TENNESSEE
DEPARTMENT OF TRANSPORTATION

TRANSPORTATION INVESTMENT REPORT

Improve Act
SR-193 (Macon Road)
Bridge over Unknown Branch,
Bridge ID 24015420001
Log Mile 11.48 Fayette County
PIN 124285.00

PREPARED BY PALMER ENGINEERING for
Strategic Transportation Investments Division

Approved by _____ *Date* 3-27-18
Chief of Environment and Planning

Approved by _____ *Date* 3/23/18
Deputy Commissioner and Chief Engineer

Approved by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION		3-22-18
ENGINEERING DIRECTOR DESIGN DIVISION	Tabitha J. Caraness	03/22/18
ENGINEERING DIRECTOR STRUCTURES DIVISION		3/23/18

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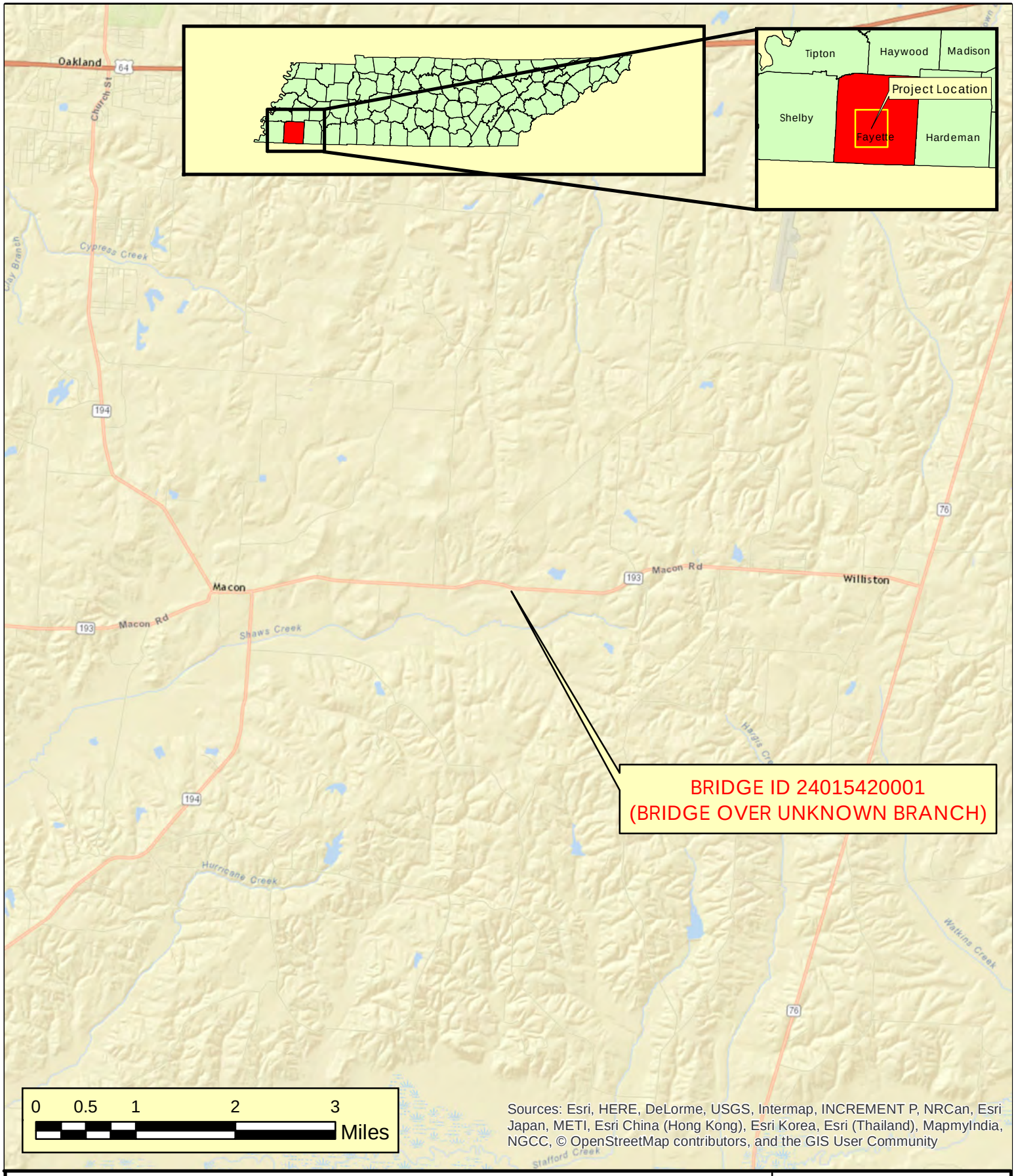

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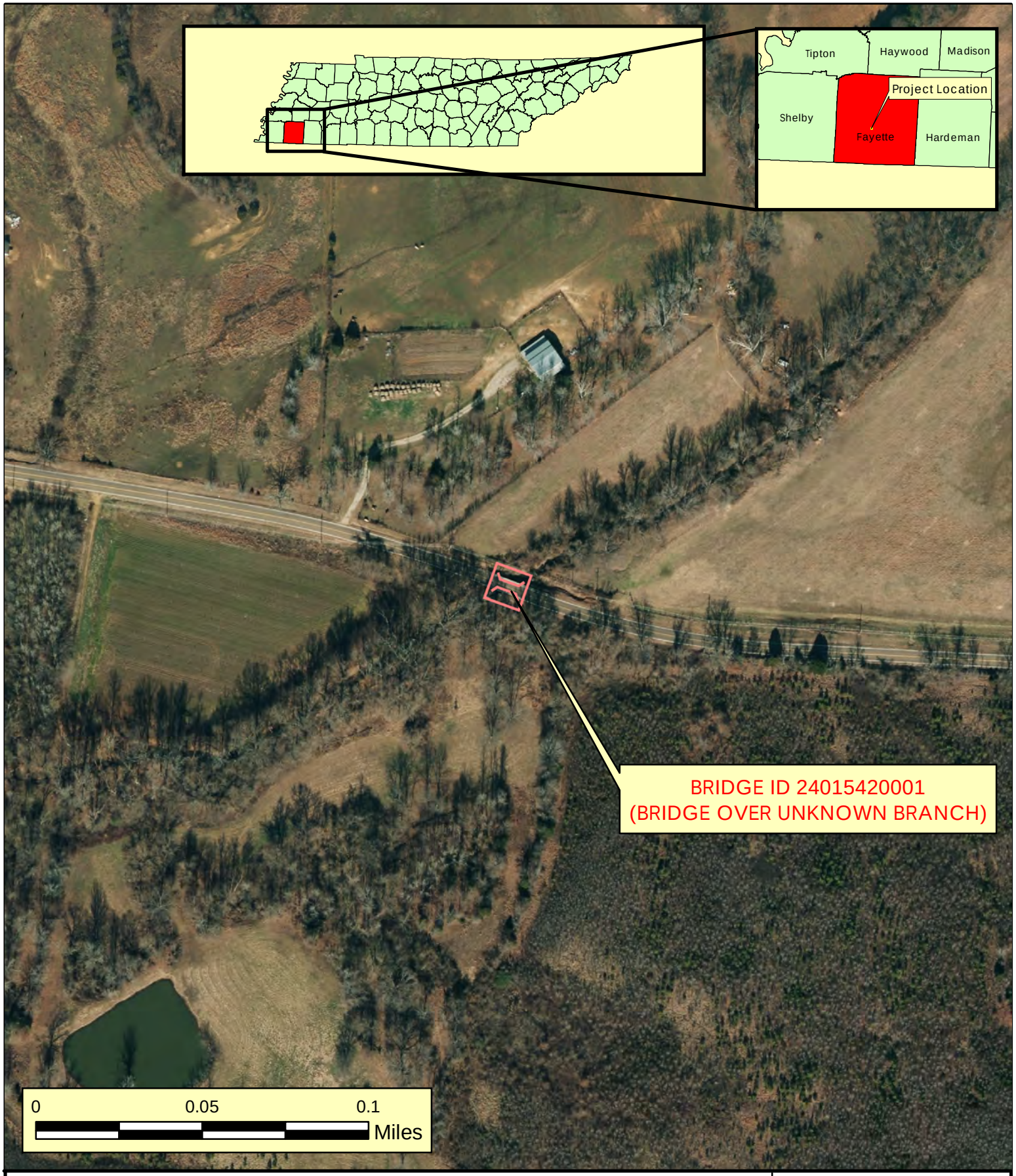
AREA MAP

SR-193 BRIDGE OVER
UNKNOWN BRANCH (LM 11.48)
FAYETTE COUNTY

TN TDOT Department of Transportation



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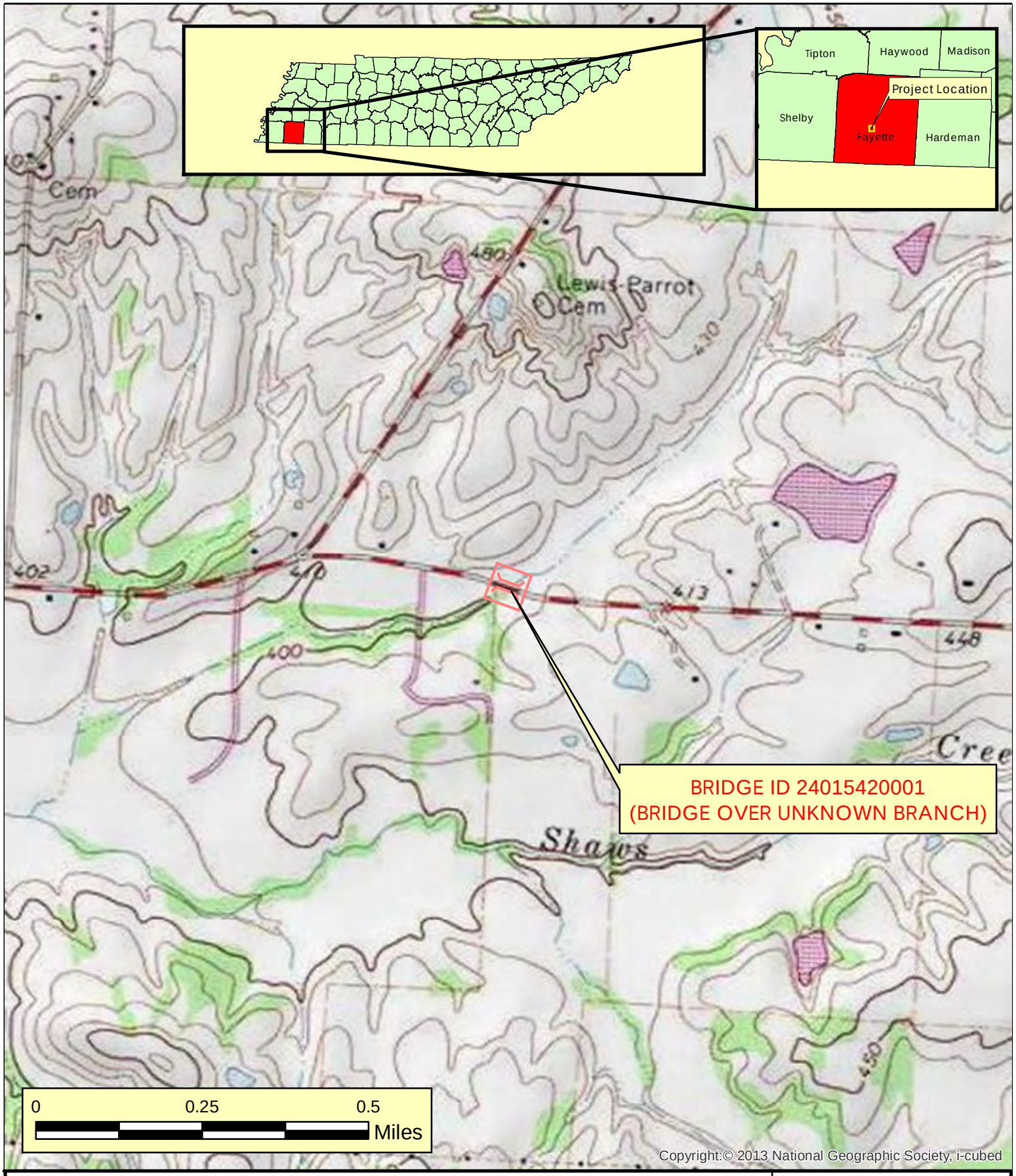
LOCATION MAP
SR-193 BRIDGE OVER
UNKNOWN BRANCH (LM 11.48)
FAYETTE COUNTY

TN TDOT Department of Transportation



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TOPOGRAPHIC MAP
SR-193 BRIDGE OVER
UNKNOWN BRANCH (LM 11.48)
FAYETTE COUNTY

TN TDOT Department of Transportation

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: Mike Gilbert, CE Manager 2
Strategic Transportation Investments Division

DATE: March 9, 2018

SUBJECT: TIR Field Review (Improve Act)
SR-193 (Macon Road), Bridge over Branch
Bridge ID: 24015420001
Log Mile 11.48
Fayette County
PIN: 124285.00

A field review was held for the above-mentioned project on December 12, 2017.

The existing structure, built in 1965, is a two (2) span concrete channel beam bridge with timber substructure crossing an unnamed branch. The structure has an out-to-out width of 21.67 feet. The overall structure length is 37 feet with approximately 7.5 feet of vertical clearance at the lowest flow in the stream bed. The sufficiency rating for this structure is 44.6 based on the Bridge Inspection Report from September 29, 2016.

The discharges for the drainage basin were determined using StreamStats Version 4.1.8. which used a drainage area of 1.15 square miles. The 10-year discharge rate (Q10) was 794 cubic feet per second (cfs), Q50 was 1,060 cfs, and Q100 was 1,170 cfs.

The proposed alignment and grade for the replacement structure will remain the same as the existing structure including the 45° skew with the branch. There is a 45 mph posted speed limit on SR-193 and the proposed design speed will be 50 mph. TDOT hydraulics section has recommended that the proposed structure be a reinforced concrete box bridge with two (2) barrels with a width of 18 feet each and a clearance of six (6) feet on 45° skew (2 @ 18'x6'

RCBB). It is estimated that two tracts of land will be affected resulting in 0.16 acres of estimated right-of-way acquisition and that underground and overhead utilities will need to be relocated.

Closing the road and utilizing a detour route was briefly discussed at the field review. It was determined that the 16.2 mile detour was too far for emergency responders and school buses. It was decided that the better option was to use traffic signals to stage construct the new box bridge while maintaining one lane open during construction. It should be noted that the signals will have to be moved back approximately 400 feet on either end of the existing structure due to horizontal and vertical curve sight distance issues. Additional signage and message boards will be necessary due to this additional distance.

The route has a base year 2022 AADT of 1,540 and a design year 2042 AADT of 1,730. The two (2) lane existing structure and roadway approaches have nine (9) foot travel lanes. The route is classified as a Rural Major Collector and Standard Drawing RD01-TS-2 was used for design considerations. Table IV shows a minimum roadway width of 22 feet and minimum shoulder width of six (6) feet for AADT's between 1500 and 2000. Table I, on the same standard drawing allows a minimum of four (4) foot shoulders; however, due to the need to maintain one lane of traffic during construction the six (6) foot shoulders will be required. Therefore, the typical section on the proposed structure will be eleven (11) foot travel lanes with six (6) foot shoulders. The top of the proposed box bridge will be the new riding surface; so an additional 2.75 feet will be required on either side to allow for guardrail attachment to the top of the box for a total out-to-out width of 39.5 feet on the structure. The project will extend 170 feet from either end of the new proposed structure in order to install guardrail and to taper the lanes and shoulders back to the existing roadway. One (1) lane will remain open during the construction phasing while using temporary signals, signage and message boards to maintain traffic.

This project has been recommended for design-build by the Construction Division within TDOT. It is also possible that an ABC approach to complete the project with a weekend road closure by utilizing a triple barrel precast box. This would save four (4) feet of box length by reducing the six (6) foot shoulders to four (4) and would also eliminate the need for traffic signals for the lane closure for the maintenance of traffic during construction.

The cost for the estimated required approach work, estimated replacement, and estimated preliminary engineering for this bridge replacement is approximately $833,000. Right-of-way acquisition is anticipated for this project.

DMG

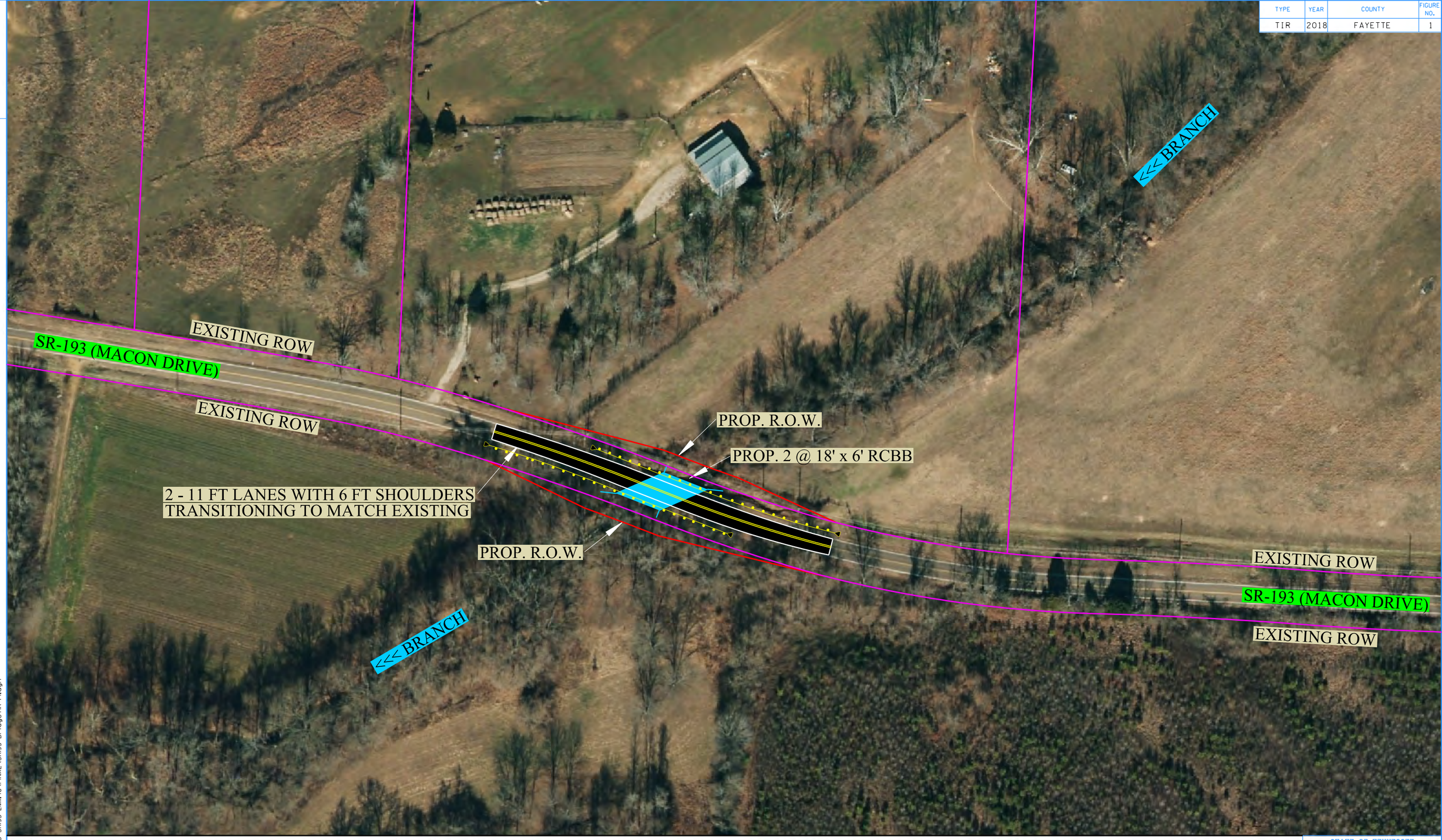
cc: File

TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
TIR	2018	FAYETTE	1



0' 100' 200' 300'

N

BRIDGE TIR

STATE ROUTE 193 (MACON DRIVE)
L.M. 11.48
FAYETTE COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 1
SR-193
L.M. 11.48

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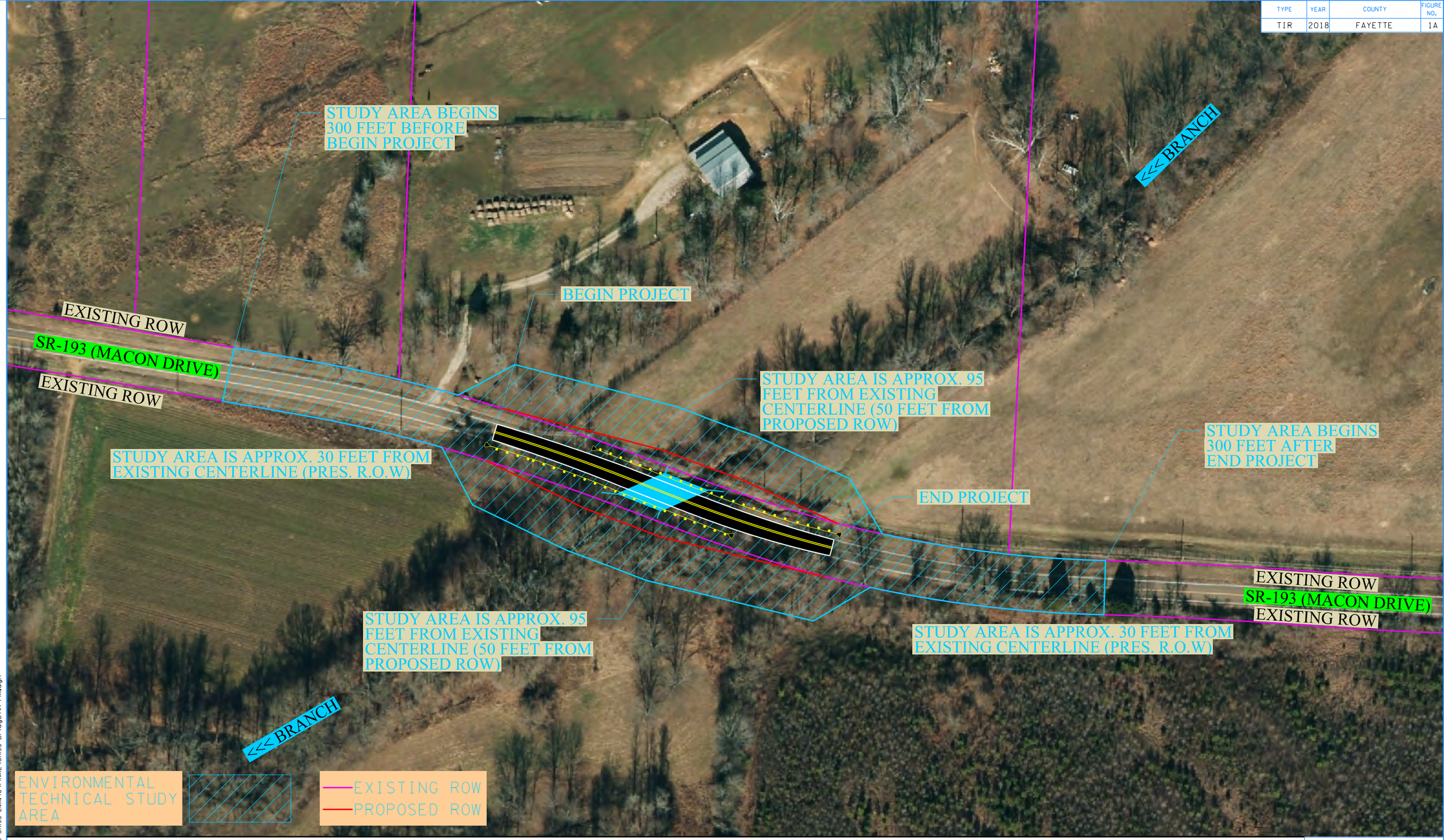
TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
TIR	2018	FAYETTE	1A



0' 100' 200' 300'

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ENVIRONMENTAL TECHNICAL STUDY AREA

STATE ROUTE 193 (MACON DRIVE)
L.M. 11.48
FAYETTE COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 1A
SR-193
L.M. 11.48

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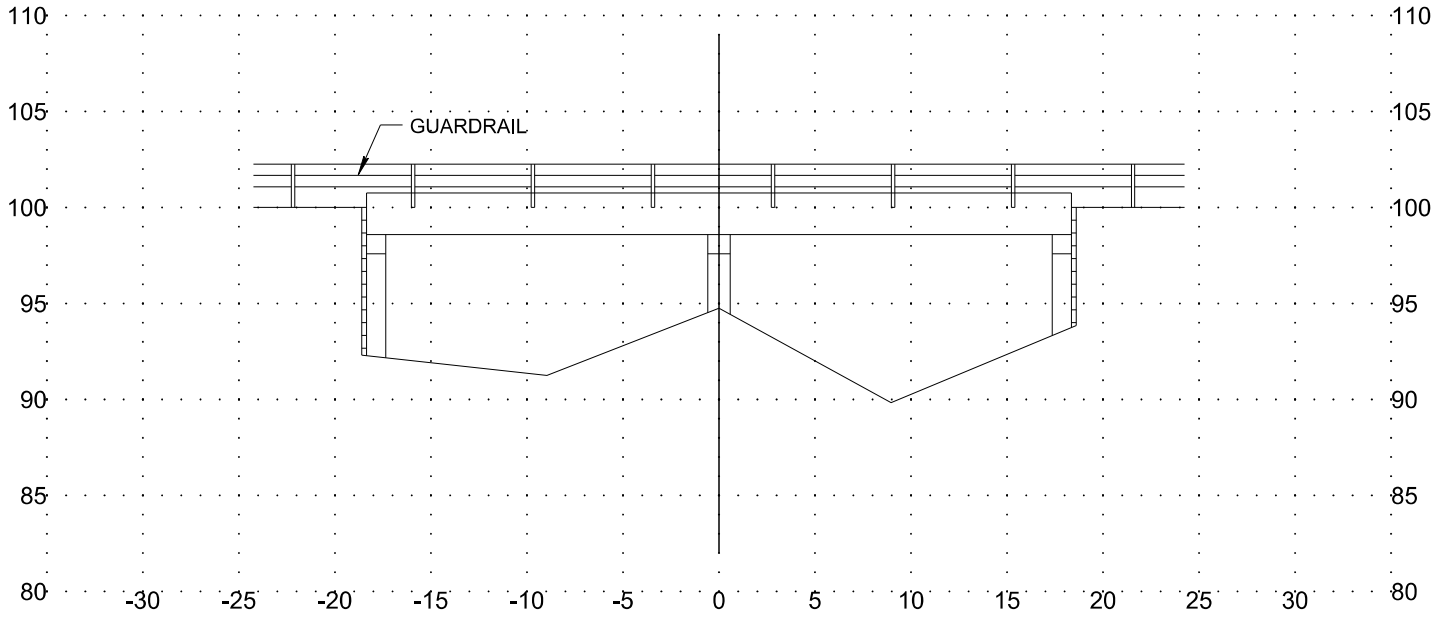
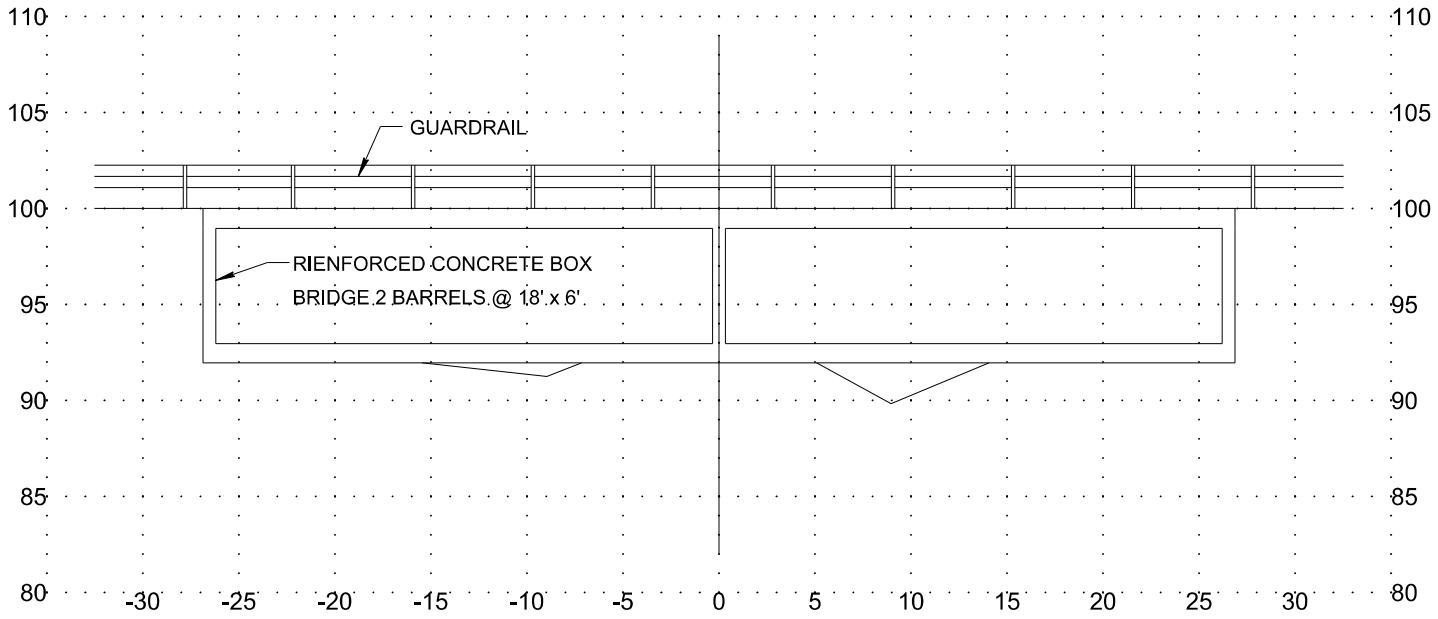
EXISTING STRUCTURE (INLET)



PROPOSED STRUCTURE (INLET)



0' 5' 10' 15'

SCALE: 1" = 10'

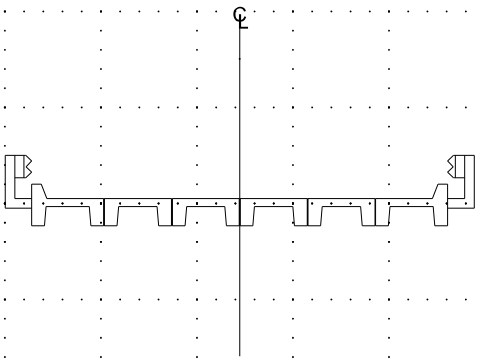
BRIDGE PROFILES

MACON RD (SR193) FAYETTE COUNTY

BRIDGE OVER UNNAMED BRANCH @ L.M. 11.48

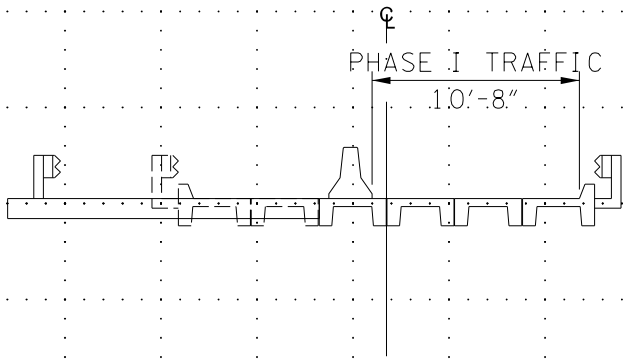
BRIDGE ID: 24015420001

EXISTING STRUCTURE

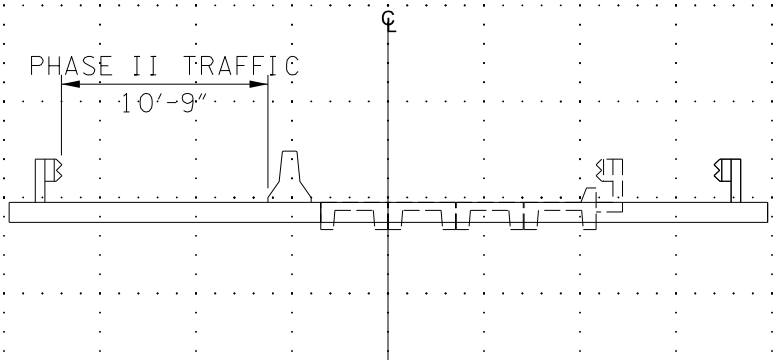


TOTAL WIDTH: 21'-8"

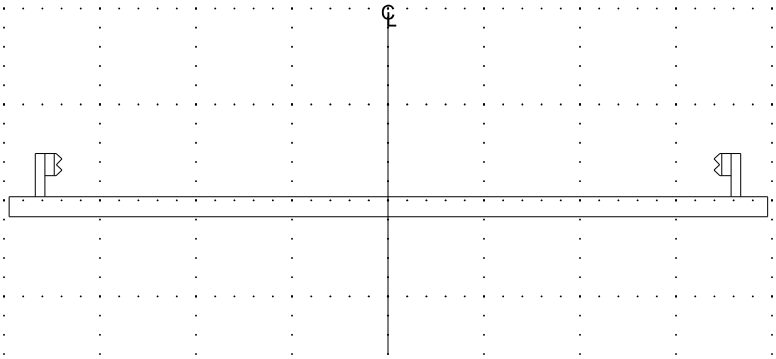
PHASE I



PHASE II



PROPOSED STRUCTURE



TOTAL WIDTH: 39'-6"

0' 5' 10' 15'

SCALE: 1" = 10'

PROPOSED TYPICAL SECTION AND PHASED CONSTRUCTION

MACON RD (SR193) FAYETTE COUNTY

BRIDGE OVER UNNAMED BRANCH @ L.M. 11.48

BRIDGE ID: 24015420001

COST ESTIMATE SUMMARY

Route:	SR -193 (Macon Road)
Description:	Bridge TIR
	RCBB over Branch
County:	Fayette
Length:	0.1 Mile
Date:	March 9, 2018

DESCRIPTION	LOCAL 0%	STATE 0%	FEDERAL 0%	TOTAL	% Contribution
Construction Items					
Pavement Removal	$0	$0	$0	$6,900	1.57%
Asphalt Paving	$0	$0	$0	$60,200	13.73%
Concrete Pavement	$0	$0	$0	$0	0.00%
Drainage	$0	$0	$0	$4,200	0.96%
Appurtenances	$0	$0	$0	$0	0.00%
Structures	$0	$0	$0	$227,500	51.88%
Fencing	$0	$0	$0	$0	0.00%
Signalization	$0	$0	$0	$20,000	4.56%
Railroad Crossing or Separation	$0	$0	$0	$0	0.00%
Earthwork	$0	$0	$0	$69,300	15.80%
Clearing and Grubbing	$0	$0	$0	$0	0.00%
Seeding & Sodding	$0	$0	$0	$4,500	1.03%
Rip-Rap or Slope Protection	$0	$0	$0	$1,400	0.32%
Guardrail	$0	$0	$0	$21,400	4.88%
Signing	$0	$0	$0	$400	0.09%
Pavement Markings	$0	$0	$0	$2,100	0.48%
Maintenance of Traffic	$0	$0	$0	$20,600	4.70%
Mobilization (5%)	$0	$0	$0	$21,900	
Other Items = 10%	$0	$0	$0	$46,000	
Const. Contingency = 15%	$0	$0	$0	$41,800	
Construction Estimate	$0	$0	$0	$548,200	
Interchanges & Unique Intersections					
Roundabouts	$0	$0	$0	$0	
Interchanges	$0	$0	$0	$0	
Right-of-Way & Utilties	**LOCAL 0%**	**STATE 0%**	**FEDERAL 0%**	**TOTAL**	
Right-of-Way	$0	$0	$0	$9,500	
Utilities	$0	$0	$0	$136,300	
Preliminary & Construction Engineering and Inspection					
Prelim. Eng. 10%	$0	$0	$0	$69,400	
Const. Eng. & Inspec. 10%	$0	$0	$0	$69,400	
Total Project Cost	$0	$0	$0	$ 833,000	

Per Mile Cost
$ 10,412,500.00

PAY ITEM SUMMARY

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	TOOL QUANTITIES	ADDITIONAL QUANTITIES	TOOL QUANTITIES + ADDITIONAL QUANTITIES	Statewide UNIT COST	TOTAL COST
Pavment Removal							
415-01.02	Cold Planning Bituminous Pavement	SY	892		892	$ 7.63	$ 6,800.56
						PAVEMENT REMOVAL TOTAL (ROUNDED)	$ 6,900
Asphalt Roads							
303-01	Mineral Aggregate, Type A Base, Grading D	TON	1248		1248	$ 31.98	$ 39,903.43
307-02.01	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading A	TON	24		24	$ 101.32	$ 2,460.90
307-02.02	Asphalt Cement (PG70-22)(BPMB-HM) Grading A-S	TON	1		1	$ 727.26	$ 414.71
307-02.03	Aggregate (BPMB-HM) Grading A-S Mix	TON	18		18	$ 74.35	$ 1,370.76
307-02.08	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading B-M2	TON	16		16	$ 113.83	$ 1,811.03
402-01	Bituminous Material For Prime Coat (PC)	TON	1		1	$ 713.29	$ 695.62
402-02	Aggregate For Cover Material (PC)	TON	4		4	$ 66.05	$ 232.50
403-01	Bituminous Material For Tack Coat (TC)	TON	0		0	$ 781.16	$ 311.08
411-01.07	ACS (PG64-22) GR "E"	TON	45		45	$ 112.43	$ 5,105.09
411-02.10	ACS Mix(PG70-22) Grading D	TON	68		68	$ 115.27	$ 7,884.87
						PAVING TOTAL (ROUNDED)	$ 60,200
Concrete Roads							
						CONCRETE RAMPS AND ROADWAYS TOTAL (ROUNDED)	$ -
Drainage							
607-05.02	24" Concrete Pipe Culvert (Class III)	LF	55	-55	0	$ 85.64	$ 17.13
710.02	Aggregate Underdrains (with pipe)	LF	845		845	$ 5.46	$ 4,612.61
						DRAINAGE TOTAL (ROUNDED)	$ 4,200
Appurtenances							
						ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)	$ -
Earthwork & Mineral							
105-01	Constrction Stakes, Lines, and Grades	LS	1	-0.8	0.2	$ 112,407.96	$ 22,481.59
203-01	Road & Drainage Excavation (Unclassified)	CY	3191	-1595	1596	$ 16.79	$ 26,802.82
203-03	Borrow Excavation (Unclassified)	CY	2660	-1330	1330	$ 15.04	$ 19,996.92
						EARTHWORK & MINERAL TOTAL (ROUNDED)	$ 69,300
Structures							
N/A	Removal of Bridge	SF	814		814	$ 20.00	$ 16,280.00
N/A	New Bridge (Box):	SF	2011		2011	$ 105.00	$ 211,150.80
						STRUCTURES TOTAL (ROUNDED)	$ 227,500
Interchanges and Unique Intersections							
						INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUNDED)	$ -
Lighting & Signalization							
730-40	Temporary Traffic Signal System	EA		1	1	$ 20,000.00	$ 20,000.00
						LIGHTING & SIGNALIZATION TOTAL (ROUNDED)	$ 20,000
Guardrail							
705-02.02	Single Guardrail (Type 2)	LF	232	130	362.32	$ 18.79	$ 6,809.37
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
						GUARDRAIL TOTAL (ROUNDED)	$ 21,400
Seeding and Sodding							
801-01	Seeding (With Mulch)	UNIT	37		37	$ 77.90	$ 2,879.12
801-01.07	Temporary Seeding (With Mulch)	UNIT	28		28	$ 29.91	$ 829.03
801-02	Seeding (Without Mulch)	UNIT	28		28	$ 28.44	$ 788.41
						SODDING TOTAL (ROUNDED)	$ 4,500
Maintenace of Traffic							
N/A	Traffic Control	LS	1		1		$ 16,716.00
712-02.02	Interconnected Portable Barrier Rail	LF	21	55	76	$ 31.96	$ 2,432.77
712-01.02	Lane Closure	EA		1	1	$ 117.36	$ 117.36
712-04.01	Flexible Drums (Channelizing)	EA		50	50	$ 25.83	$ 1,291.64
						MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)	$ 20,600
Signs							
Not Listed	Signs (Construction)	LS	1		1	$ -	$ 400
						SIGNING TOTAL (ROUNDED)	$ 400
Pavement Markings							
716-13.06	Spray Thermo P.M. (40 mil 4")	LM	0.7		0.7	$ 2,886.74	$ 2,032.26
						PAVEMENT MARKINGS TOTAL (ROUNDED)	$ 2,100
Fencing							
						FENCE TOTAL (ROUNDED)	$ -
Rip-Rap							
709-05.08	Machined Rip-Rap (Class B)	TON		40	40	$ 33.70	$ 1,347.90
						RIP-RAP & SLOPE PROTECTION TOTAL (ROUNDED)	$ 1,400.00
Clearing and Grubing							
						CLEAR AND GRUBBING TOTAL (ROUNDED)	$ -
Railroad At-Grade Crossing							
						RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)	$ -
Utilties							
N/A	Overhead Distribution	LM	0.1		0.1	$ 375,000	$ 37,500
N/A	Underground Communication	LM	0.1		0.1	$ 500,000	$ 50,000
N/A	Underground Gas	LM	0.1		0.1	$ 250,000	$ 25,000
N/A	Underground Water	LM	0.1		0.1	$ 237,600	$ 23,760
						UTILITIES TOTAL (ROUNDED)	$ 136,300.00
Right-of-Way							
N/A	Right-of-Way	LS	1		1	$ 9,454.55	$ 9,454.55
						RIGHT-OF-WAY TOTAL (ROUNDED)	$ 9,500.00

BRIDGE TIR

Fayette
SR-193 (Macon Rd.) at LM 11.48

LOCATION			
Bridge #:	24015420001	Feature Crossed:	Unnamed Branch
Road Name:	SR-193 (Macon Rd.)	Log mile:	11.48
Route ID:	SR193	System:	05-STP Rural State
City:	Macon	Functional Class:	Rural Major Collector
County:	Fayette	State Project Number	24029-0207-94
PIN:	124285.00		

ROADWAY		
	Existing	**Proposed (Preliminary Design Estimate)**
Design Standard		RD01-TS-2 / 2011 Green Book
Route Characteristics		
AADT:	1540	1730
AADT Year:	2022	2042
Terrain:	Rolling	Rolling
No. Lanes:	2	2
Speed(Posted):	45	50
Speed (Design):		50
Approach Character.		
Lane Width (ft):	9	11
Shoulder Width (ft):	4	6
ROW Width (ft):	60	90
ROW Tracts Affected		2
ROW Required (acre)		0.16
Cross Section Width (ft):	18/26/60	22/34/90
Approach Length (ft):		170' (north), 170' (south)
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, OH electric, UG Fiber, UG Gas	N/A
Utilities to be Relocated	N/A	UG water, OH electric, UG Fiber, UG Gas
Comments	Discussions at Field Review on large farming equipment having impacts on existing guardrail.	This project has been recommended for design build by the Construction Division within TDOT.

BRIDGE TIR

Fayette
SR-193 (Macon Rd.) at LM 11.48

STRUCTURE		
	Existing	**Proposed (Preliminary Design Estimate)**
Bridge Characteristics		
Year Built	1965	
Load Limit	15 tons	
Sufficiency Rating	44.6	
Skew	45	45
Structure Type	PCCS with Timber Substructure	2 @ 18'X6" RCBB
Structures in Channel	Yes	Yes
Length (ft)	37	53.74
No. Spans (App./Main)	0 | 2	0 | 2
Width (curb to curb) (ft)	20	34
Width (o to o) (ft)	21.6	39.5
Sidewalks on Structure	No	No
Vert. Clearance (ft)	7.5	6
Superstructure Depth (in)	17	N/A
Girder Depth (in)	17	N/A
Finish Grade-Low Girder (in)	17	N/A
High Water Marks	N/A	
Bridge Rail Type	Metal Gaurdrail	Metal Guardrail attached to Box
Bridge Rail Height (ft)	2.17	2.58
Indication Overtopping	No	
Local Scour	No	
Obstructions	No	
Other Structures	N/A	Another option to consider is an ABC approach to complete the project with a weekend road closure by utilizing a triple barrel precast box. This would save 4 feet of box length by reducing the 6 foot shoulders to 4 and would also eliminate the need for temporary traffic signals.
Comments	Concrete filled retaining walls added to each abutment. Mild timber decay of pier columns.	This project has been recommended for design build by the Construction Division within TDOT.

BRIDGE TIR

Fayette
SR-193 (Macon Rd.) at LM 11.48

FLOW RATES (from USGS StreamStats Program Version 3)	
Drainage Area (sq. miles)	1.15 sq mi
10 Year Discharge Rate (Q10) cfs	794
50 Year Discharge Rate (Q50) cfs	1060
100 Year Discharge Rate (Q100) cfs	1170

CHANNEL	
Depth (ft)	6
Width of Normal Flow (ft)	25
Depth of Normal Flow (ft)	2
Skew of Channel with Roadway	45
Type of Material in Stream Bed	rock, gravel, sand, and silt
Type of Vegetation on Banks	low growth, large timber, dead trees
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	stage construct
Description	Utilizing traffic signals, the new box bridge will be stage constructed while maintaining one lane open during construction. It should be noted that the signals will have to be moved back on either end due to horizontal and vertical curve limitations. Additional signage and message boards will be required.
Comments	Another option to consider is an ABC approach to complete the project with a weekend road closure by utilizing a triple barrel precast box.

BRIDGE TIR

Fayette
SR-193 (Macon Rd.) at LM 11.48

SITE VISIT ATTENDEES			DATE: 3/17/2016
Name	Organization	Phone	Email
Mike Gilbert	TDOT (STID)	615-741-0772	michael.gilbert@tn.gov
Glen Blankenship	TDOT - Survey	731-935-0137	glen.blankenship@tn.gov
James Boyd	TDOT - Survey	731-935-0138	james.boyd@tn.gov
Derek Ryan	TDOT- Traffic		derek.ryan@tn.gov
Willie Coleman	TDOT - Utilities	731-935-0160	willie.coleman@tn.gov
Marcus Powell	TDOT	901-537-4399	marcus.l.powell@tn.gov
Jason D. Moody	TDOT	731-935-0183	jason.d.moody@tn.gov
Ryan Philpott	TDOT	731-935-0147	ryan.philpott@tn.gov
Dustin Tucker	TDOT	731-935-0101	dustin.tucker@tn.gov
Evelyn DiOrio	TDOT	731-935-0302	evelyn.diorio@tn.gov
Eric Philipps	TDOT	731-935-0174	eric.philipps@tn.gov
Elizabeth Cardwell	TDOT	731-935-0243	elizabeth.cardwell@tn.gov
Peter DeLong	TDOT	731-935-0338	peter.delong@tn.gov
Todd Kemp	Palmer	615-476-0772	tkemp@palmernet.com
Kyle McLemore	Palmer	615-297-8957	kmclemore@palmernet.com

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: 24029-1207-94 ROUTE: S.R. 193
COUNTY: FAYETTE CITY:
PROJECT PIN NUMBER: 124285.00
PROJECT DESCRIPTION: BRIDGE OVER BRANCH (L.M. 11.48)
BRIDGE ID: 24015420001

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
1,540	2022	1,730	190	11	2042	65-35	3	4	42	58

REQUESTED BY: NAME MICHAEL GILBERT DATE 2/28/18
DIVISION S.T.I.D.
ADDRESS J.K. POLK BLDG.
NASHVILLE, TN. 37243

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 2.28.18
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: JIM WATERS DATE 3/1/18
ASSISTANT DIRECTOR
SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

THIS TRAFFIC BASED ON 2017 CYCLE COUNTS. THE DESIGN YEAR TRAFFIC BASED ON GROWTH RATE FROM THE MEMPHIS 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. (REV. 2/22/17)

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: 24029-1207-94 ROUTE NO.: S.R. 193
COUNTY: FAYETTE CITY:
PROJECT DESCRIPTION: BRIDGE OVER BRANCH (L.M. 11.48)
BRIDGE ID: 240154200001

FAP Rural

Pavement Structural Design

Calculation of Equivalent Daily 18 Kip Single Axle Loads

Type Vehicle		ADT (No. Counted)	Flexible 18-kip Factor	Flexible ADL	Rigid 18-kip Factor	Rigid ADL
Pass. cars and motorcycles (1-2)		973	0.001	1	0.001	1
Pick-up, Panel, Van (3)		597	0.005	3	0.004	2
Sing. Unit	Buses (4)	0	0.300	0	0.300	0
	2-axle, 6-tire (5)	13	0.240	3	0.310	4
	3-axle or more (6-7)	26	1.700	44	2.300	60
Comb.	4-axle (8)	11	1.110	12	1.500	17
	5-axle or more (9-13)	15	1.320	20	2.200	33
Totals (2032 AADT)		1,635		83		117

Suggested Percentages of Trucks in Design Lane

5,000 or less ADT	95%
5,000 - 10,000 ADT	90%
10,000 - 15,000 ADT	85%
15,000 - 20,000 ADT	80%
20,000 - 30,000 ADT	75%
30,000 - 40,000 ADT	70%
40,000 Plus	60%

No. of Lanes: 2
% Trucks in Design Lane: 100%
ADL in Design Lane:

FLEX:	0.5	X	1.00	X	83.3	=	42
RIGID:	0.5	X	1.00	X	116.7	=	58

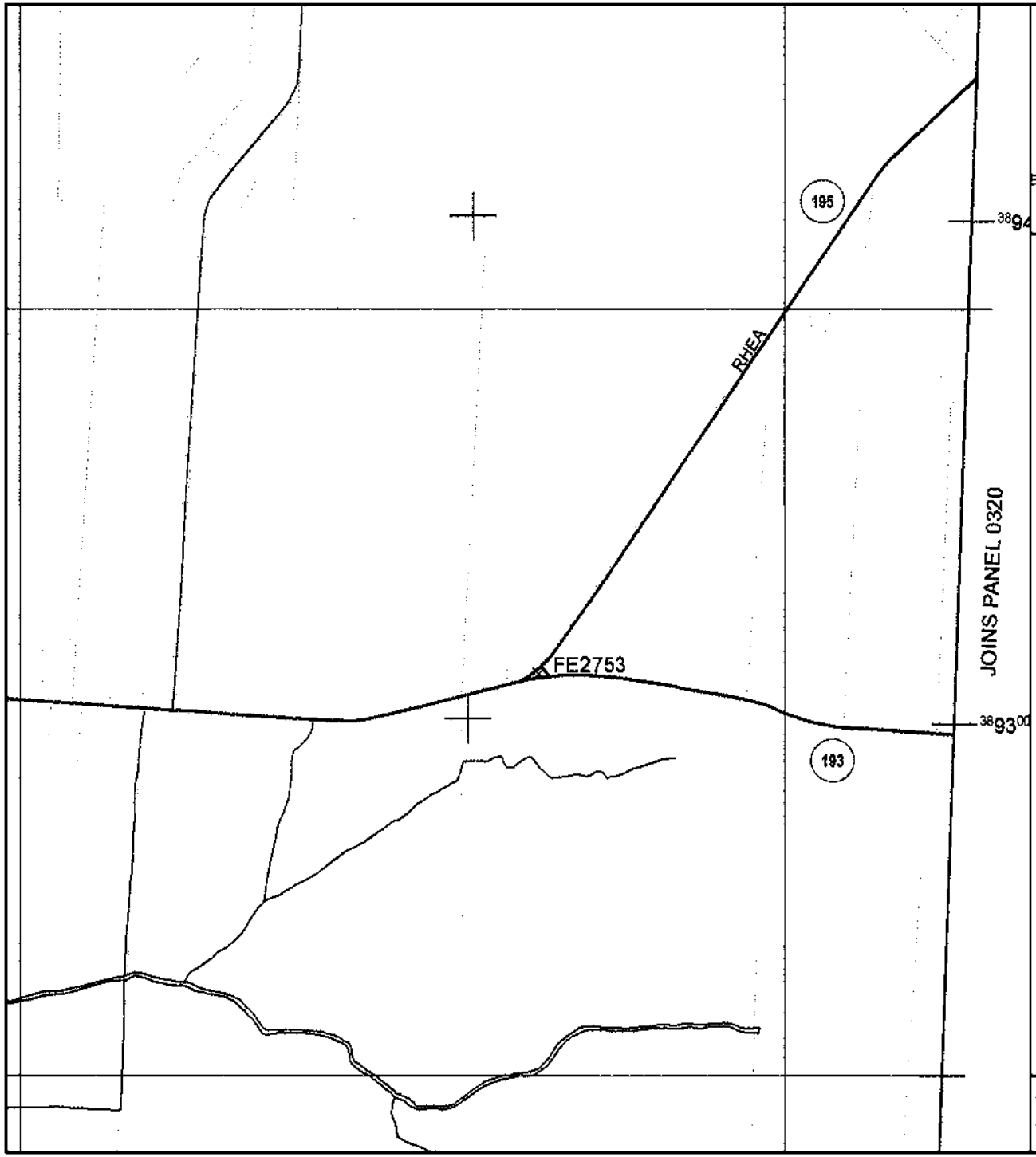
ADL Calculations By: RANDY BOGUSKIE Date: 2/28/2018
Reviewed By: Tony Kuntz Date: 2.28.18
[REV. 7/1/14]

FAYETTE

MSLINK	1
ID_NUMBER	24SR193001
BLM	11.48
NBR_STRCT	240154200011
NBR_TENN_CNTY	FAYETTE
NBR_RTE	SR193

FAYETTE COUNTY

S.R. 193 @ L.M. 11.48



MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET

METE

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0315C

FIRM

FLOOD INSURANCE RATE MAP

FAYETTE COUNTY, TENNESSEE

AND INCORPORATED AREAS

PANEL 315 OF 605

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FAYETTE COUNTY	470352	0315	C
OAKLAND, TOWN OF	470418	0315	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.

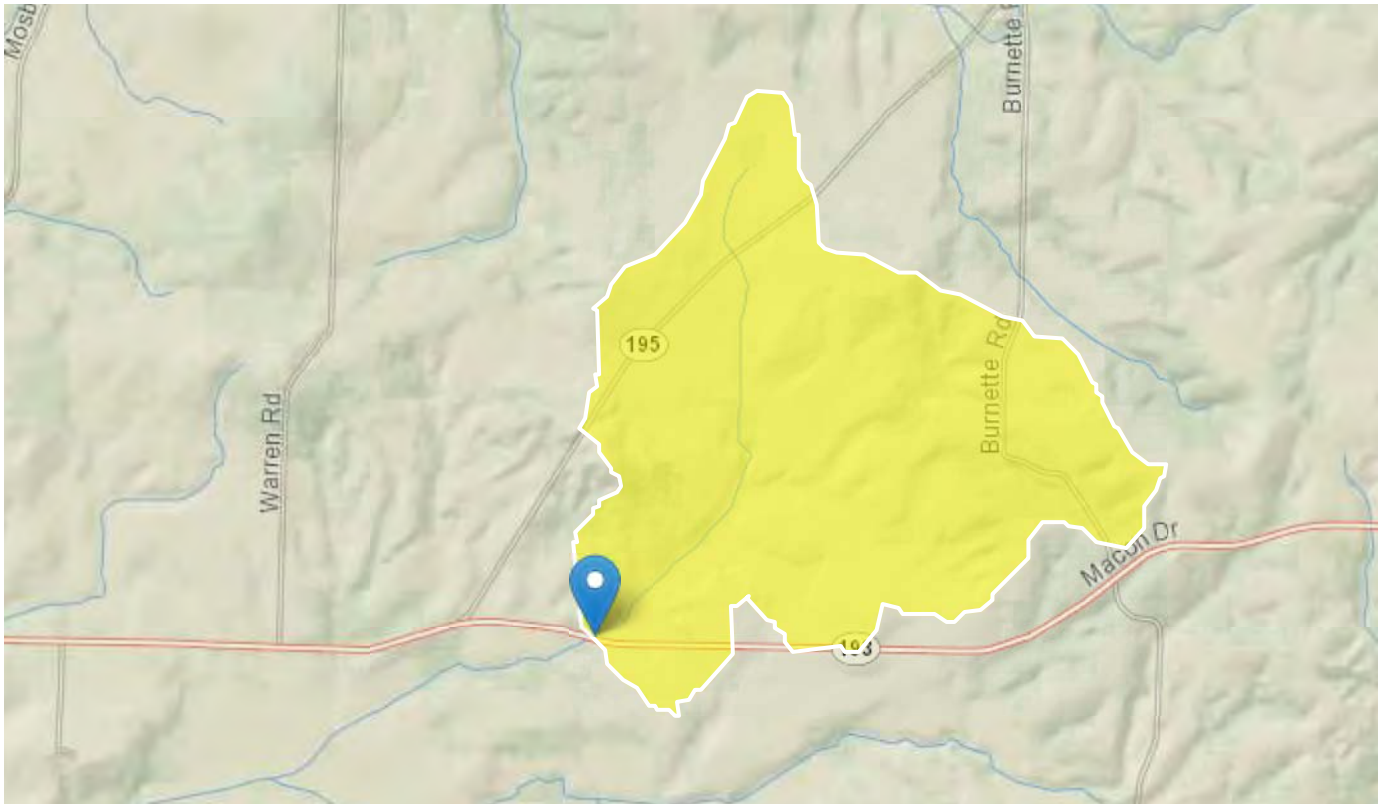
MAP NUMBER
47047C0315C

EFFECTIVE DATE
NOVEMBER 5, 2008

Federal Emergency Management Agency

Fayette SR 193 @ LM 11.48 StreamStats Report

Region ID: TN
Workspace ID: TN20180205214405755000
Clicked Point (Latitude, Longitude): 35.15558, -89.44109
Time: 2018-02-05 15:44:20 -0600



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CONTDA	Area that contributes flow to a point on a stream	1.15	square miles
DRNAREA	Area that drains to a point on a stream	1.15	square miles
RECESS	Number of days required for streamflow to recede one order of magnitude when hydrograph is plotted on logarithmic scale	140	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)	2.424	dimensionless
SOILPERM	Average Soil Permeability	1.07	inches per hour
TNCLFACT2	Tennessee climate factor, 2-year interval	2.424	
TNSOILFAC	Tennessee soil factor, percentage of area underlain by a soil permeability greater than or equal to 2 inches per hour	37	
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	49.48	feet per mi

Peak-Flow Statistics Parameters [DAOnly Area 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONTDA	Contributing Drainage Area	1.15	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	469	ft^3/s	247	893	38.7	38.7	1.8
5 Year Peak Flood	667	ft^3/s	358	1240	37.2	37.2	2.4
10 Year Peak Flood	794	ft^3/s	422	1500	38	38	3.1
25 Year Peak Flood	950	ft^3/s	488	1850	40.1	40.1	3.8
50 Year Peak Flood	1060	ft^3/s	527	2140	42.2	42.2	4.2
100 Year Peak Flood	1170	ft^3/s	560	2450	44.7	44.7	4.4
500 Year Peak Flood	1420	ft^3/s	618	3270	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	1.15	square miles	2	2405
RECESS	Recession Index	140	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	37.002	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	0.0156	ft^3/s
30 Day 5 Year Low Flow	0.0359	ft^3/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	1.15	square miles	2	2405
RECESS	Recession Index	140	days per log cycle	32	350
CLIMFAC2YR	Tennessee Climate Factor 2 Year	2.424	dimensionless	2.307	2.455
PERMGTE2IN	Percent permeability gte 2 in per hr	37.002	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	1.5	ft^3/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	1.15	square miles	2	2405
RECESS	Recession Index	140	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	37.002	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	0.328	ft^3/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	1.15	square miles	2	2405
RECESS	Recession Index	140	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	2.424	dimensionless	2.307	2.455
SOILPERM	Average Soil Permeability	1.07	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	0.0144	ft^3/s
99 Percent Duration	0.0206	ft^3/s
98 Percent Duration	0.0273	ft^3/s
95 Percent Duration	0.0391	ft^3/s
90 Percent Duration	0.0532	ft^3/s
80 Percent Duration	0.0775	ft^3/s
70 Percent Duration	0.119	ft^3/s
60 Percent Duration	0.178	ft^3/s
50 Percent Duration	0.24	ft^3/s
40 Percent Duration	0.406	ft^3/s
30 Percent Duration	1.04	ft^3/s
20 Percent Duration	1.81	ft^3/s
10 Percent Duration	3.16	ft^3/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	**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	
12.	Waterway, lake, pond, river, stream, spring	

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	

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Bridge Number

Looking west across bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking west across bridge standing near east end of bridge

Looking west standing near middle of bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking east across bridge standing near west end of bridge

Looking east standing near middle of bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking east standing off east end of bridge

Pavement failure at west end of bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking at downstream side standing off SW corner of bridge

Looking at upstream side standing off NW corner of bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking at downstream side standing off SE corner of bridge

Looking north at upstream side standing on bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking south at downstream side standing on bridge

Looking south at downstream side standing on bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking at west abutment standing on the south side of bridge

Looking at west abutment standing on the south side of bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking at east abutment standing on the south side of bridge

Looking under bridge deck

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking at west abutment standing under bridge

Looking at center pier and east abutment standing under bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking at west abutment standing under bridge

Looking at center pier and east abutment standing under bridge

Transportation Investment Report
Bridge ID: #24015420001
Fayette County
SR-193 (Macon Rd.) at LM 11.48 over Branch

Looking at center pier and east abutment standing under bridge