

TRANSPORTATION PLANNING REPORT

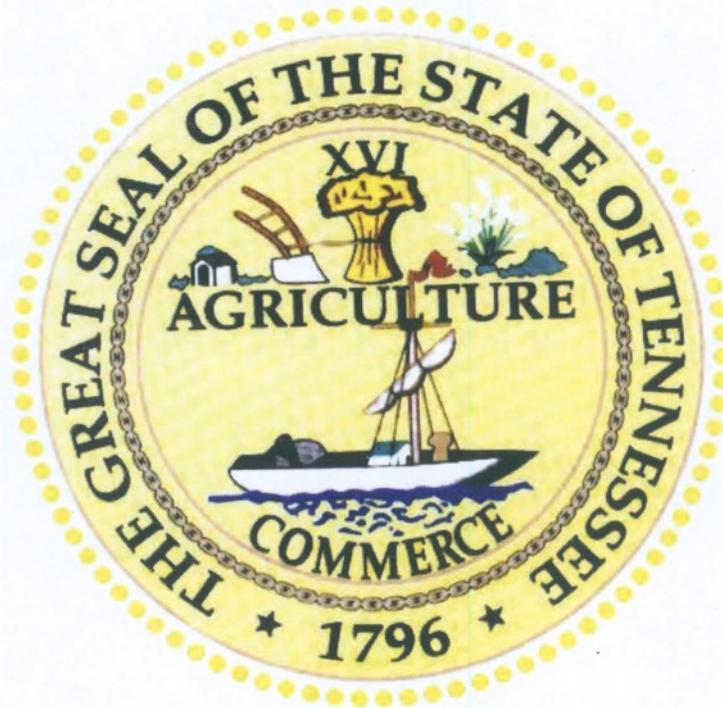
Special Bridge Replacement Program

LOCAL ROUTE 01223 (PATTY ROAD), L.M. 0.12

BRIDGE OVER FOURMILE CREEK

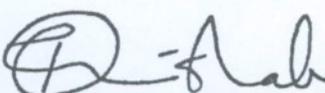
POLK COUNTY

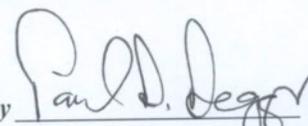
PIN: 117487.00

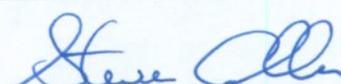
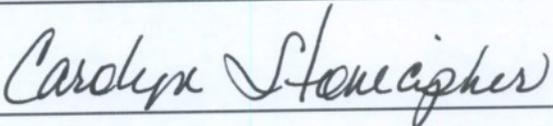
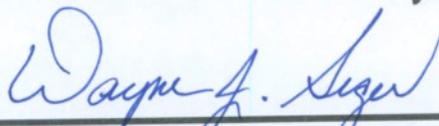


PREPARED BY
ARCADIS
FOR THE

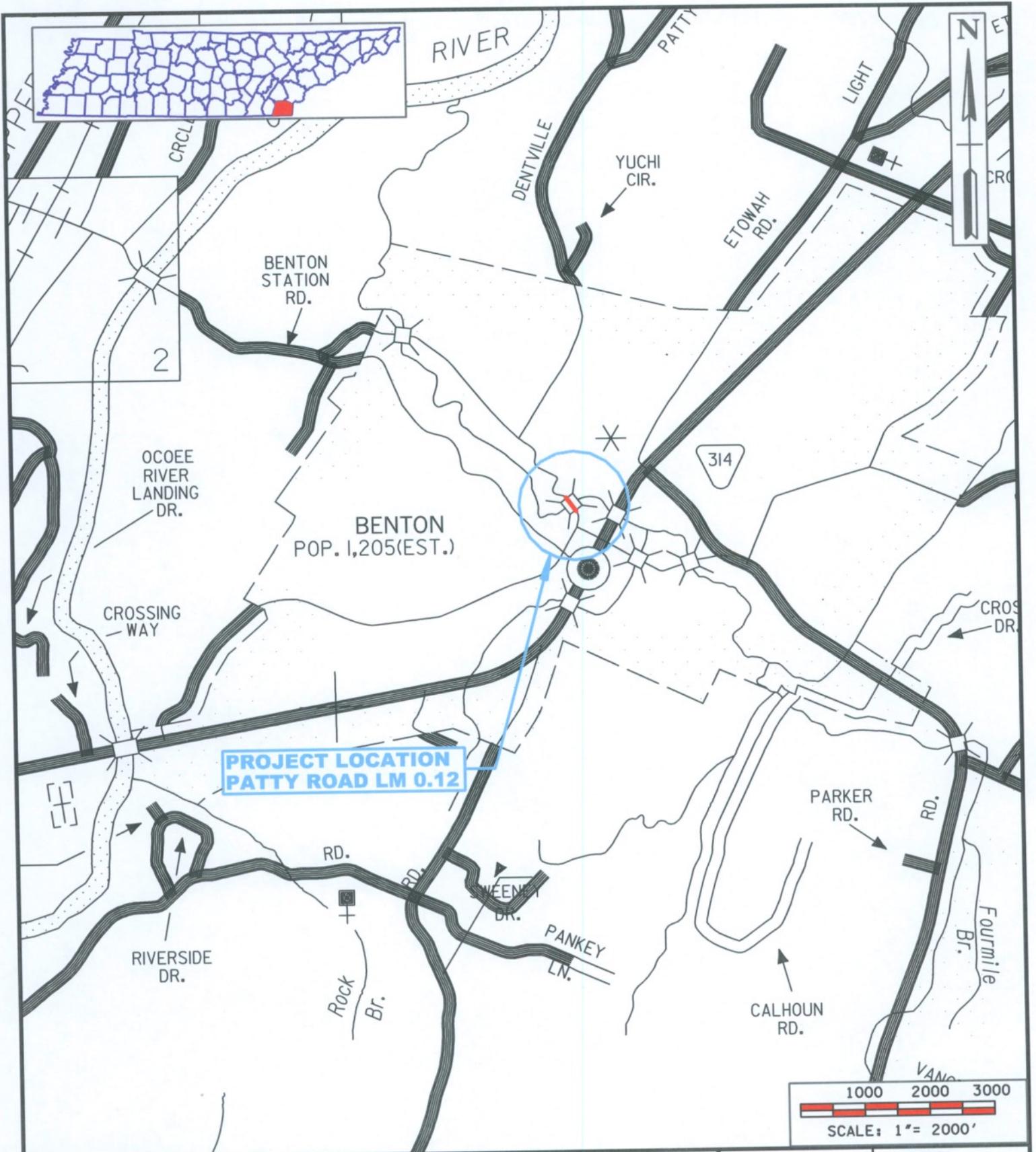
TENNESSEE DEPARTMENT OF TRANSPORTATION

Approved by  Date 7/16/13
Chief of Environment and Planning

Approved by  Date 7/14/13
Deputy Commissioner and Chief Engineer

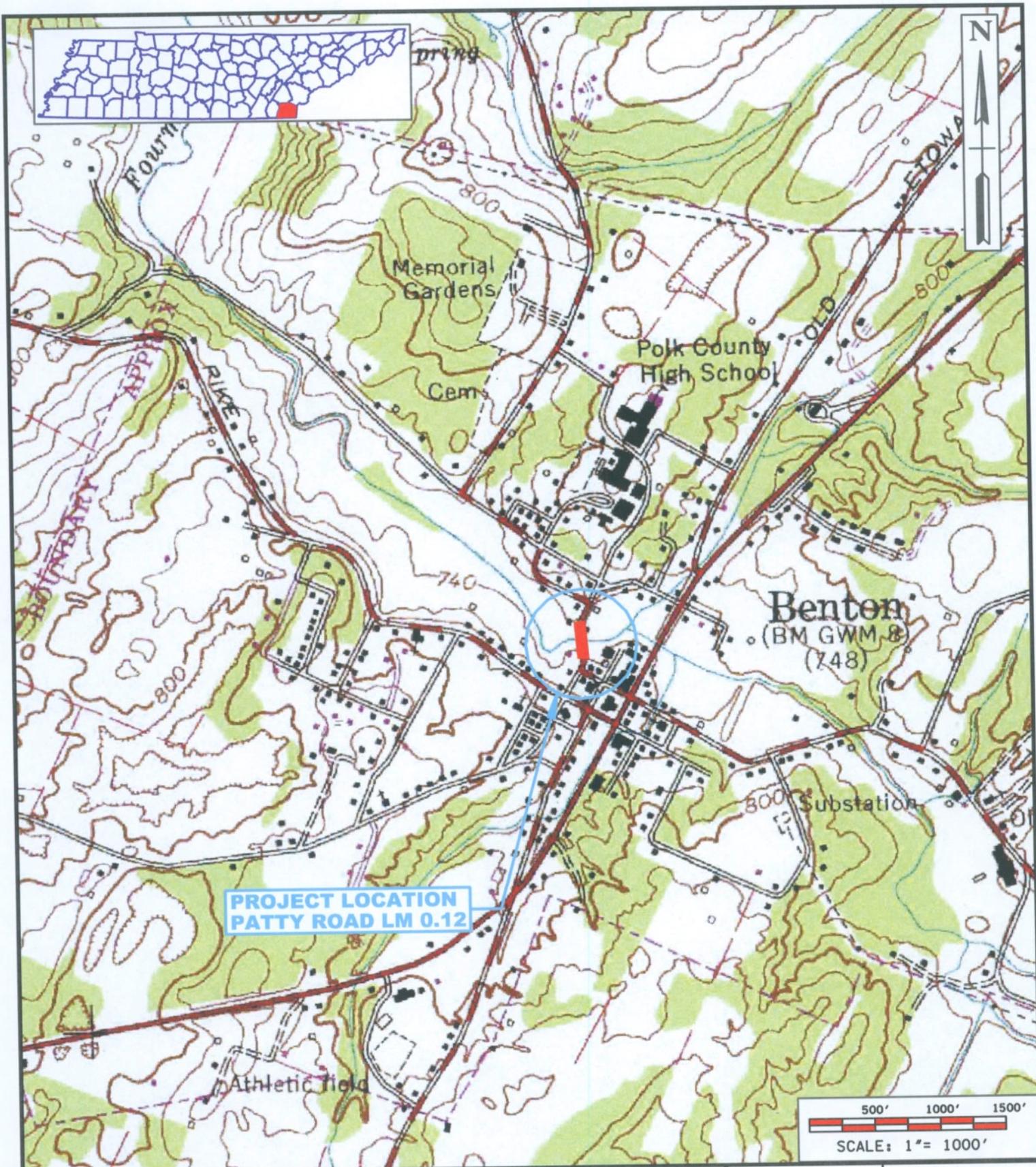
Approved by:	Signature:	Date:
Transportation Director Project Planning Division		6-24-13
Engineering Director Design Division		6-25-13
Engineering Director Structures Division		7-1-13

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



**LOCATION MAP
LOCAL ROUTE 01223 (PATTY ROAD)
BRIDGE OVER FOURMILE CREEK
L.M. 0.12
BRIDGE NUMBER 70S43130007
POLK COUNTY, TN**

DRAWN BY: BJH	CHECKED BY: HAM
L.R. 01223 (PATTY ROAD) L.M. 0.12	
PIN 117487.00	
DATE: 06-18-2013	

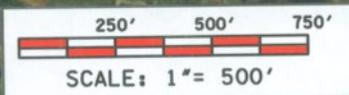
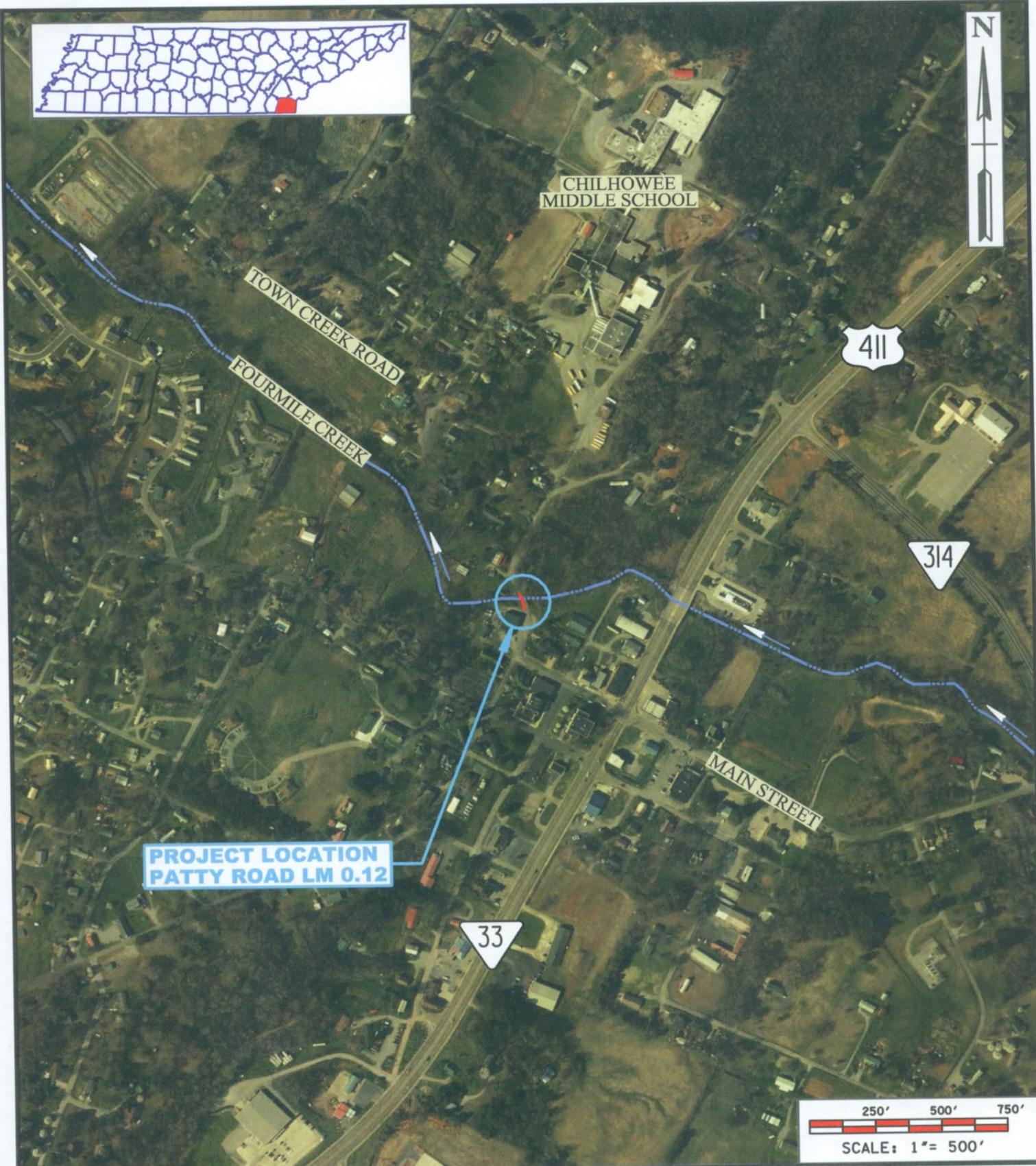


**PROJECT LOCATION
PATTY ROAD LM 0.12**



**VICINITY MAP
LOCAL ROUTE 01223 (PATTY ROAD)
BRIDGE OVER FOURMILE CREEK
L.M. 0.12
BRIDGE NUMBER 70S43130007
POLK COUNTY, TN**

DRAWN BY: BJH	CHECKED BY: HAM
L.R. 01223 (PATTY ROAD) L.M. 0.12	
PIN 117487.00	
DATE: 06-18-2013	



AERIAL MAP
LOCAL ROUTE 01223 (PATTY ROAD)
BRIDGE OVER FOURMILE CREEK
L.M. 0.12
BRIDGE NUMBER 70S43130007
POLK COUNTY, TN

DRAWN BY: BJH	CHECKED BY: HAM
L.R. 01223 (PATTY ROAD) L.M. 0.12	
PIN 117487.00	
	DATE: 06-18-2013

**TRANSPORTATION PLANNING WORKSHEET
BRIDGE REPLACEMENT ANALYSIS, NEEDS, AND COSTS**

County: Polk Route: Local Route 01223 (Patty Road) Log Mile: 0.12
 Feature Crossed: Fourmile Creek System: Local
 Functional Class: Rural Minor Collector Bridge ID: 70S43130007

EXISTING CONDITIONS

2017 AADT: 1,350 App. Cross Section: 20'/26'/40' No. Lanes: 2
 Approach Alignment: 30 Degrees Year Built: 1968 Load Limit: 12 Tons
 Width (out to out): 26'1" Sidewalks: Right -- Left 4' Length: 41' 3"
 No. Spans: Approach: -- Main: 2
 Substructure: Concrete Pier/Abutment Vertical Clearance: 7' Sufficiency Rating: 11.4
 Other: Overhead Utility Lines, City of Benton requested relocating sidewalk on east side. Bridge load limit is incorrectly posted at 3 tons. Gas line adjacent to creek on south side.

PROPOSED IMPROVEMENTS

STANDARDS FROM RD01-TS- 2 Type of Work: Replace
 Design Year: 2037 DesignAADT: 1,620 Terrain Level ADL (F): -- (R): --
 Project Length: 272' Bridge Length: 52 ft Approach Length: 2 @ 110'
 Design Speed (MPH): 20 Posted Speed (MPH): 15
 Approach Width: 22'/30'/As Req. Bridge Width (O to O): 38 ft No. Lanes: 2
 Right-of-Way Required: 0.15 acres Tract(s) 3 Structure Type: (3) 16'x8' Box Bridge

MAINTENANCE OF TRAFFIC

Temporary Detour: Temporary Runaround: Stage Construct:
 Alternate Route: Car Detour: West on Benton Station Road and then east on Town Creek Road (approx. 2.2 miles)
 Truck Detour: North on SR 33(US 411), west on Etowah Road, west on McClure Road and then south on Patty Road (approx. 6.1 miles)
 Remarks: Single phase construction utilizing above detour routes. A detour map is provided on Figure 2.

ESTIMATED COST

Right-of-Way: \$10,000 Approaches: \$117,500 Structure: \$223,500
 Preliminary Engineering: \$41,000 Utilities: \$0 Misc./Cont.: \$37,000
 Mobilization: \$18,000 Total: \$447,000

Remarks: Lane widths to be increased to eleven (11) feet, four (4) foot shoulders and a single five (5) foot sidewalk over the structure and the approaches in order to meet design standard RD01-TS-2. Also install a single slope concrete barrier wall on both sides of the structure. The current grade as well as the current alignment are to remain the same.
 Field Investigation by: Glenda Tyus (Planning), Lisa Reaney (Planning), Alan Wolfe (Reg. 2 Traffic), Gary Chapman (Reg. 2 Survey), Landon Castleberry (Reg. 2 Traffic), Amber Thornton (Reg. 2 Traffic), Barry McClendon (Reg. 2 Survey)
Roy Thomason (Polk Co. Hwy Official), Harvey McKaig and Karen Anderson (ARCADIS)
Aaron Hardin (Benton Police Department), Mayor Jerry T. Stephens (City of Benton)

Route:	Local Route 01223 (Patty Road)
Description:	Bridge over Fourmile Creek (70S43130007)
	L.M. 0.12
County:	POLK
Length:	272 FT
Date:	June 18, 2013

<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ 2,000	\$ -	\$ 8,000	\$ 10,000
Clearing and Grubbing	\$ 1,000	\$ -	\$ 4,000	\$ 5,000
Earthwork	\$ 600	\$ -	\$ 2,400	\$ 3,000
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ 300	\$ -	\$ 1,400	\$ 1,700
Utilities	\$ -	\$ -	\$ -	\$ -
Structures	\$ 44,700	\$ -	\$ 178,800	\$ 223,500
Pavement Removal	\$ 700	\$ -	\$ 2,800	\$ 3,500
Paving	\$ 3,700	\$ -	\$ 14,600	\$ 18,300
Roadway and Pavement Appurtenances	\$ 2,800	\$ -	\$ 11,000	\$ 13,800
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ 200	\$ -	\$ 900	\$ 1,100
Seeding	\$ 600	\$ -	\$ 2,400	\$ 3,000
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ 900	\$ -	\$ 3,600	\$ 4,500
Fencing	\$ -	\$ -	\$ -	\$ -
Signing	\$ -	\$ -	\$ -	\$ -
Pavement Markings	\$ 100	\$ -	\$ 400	\$ 500
Lighting	\$ -	\$ -	\$ -	\$ -
Signalization	\$ -	\$ -	\$ -	\$ -
Guardrail	\$ 1,700	\$ -	\$ 6,700	\$ 8,400
Other Construction Items (15%)	\$ 8,900	\$ -	\$ 35,600	\$ 44,400
Maintenance of Traffic	\$ 2,000	\$ -	\$ 8,000	\$ 10,000
Mobilization (5%)	\$ 4,000	\$ -	\$ 14,000	\$ 18,000
CONSTRUCTION COST (rounded)	\$ 74,200	\$ -	\$ 294,600	\$ 368,700
Engineering and Contingency (10%)	\$ 7,000	\$ -	\$ 29,000	\$ 37,000
TOTAL CONSTRUCTION COST (rounded)	\$ 82,000	\$ -	\$ 324,000	\$ 406,000
Preliminary Engineering (10%)	\$ 8,000	\$ -	\$ 33,000	\$ 41,000
PROJECT COST ¹(rounded)	\$ 90,000	\$ -	\$ 357,000	\$ 447,000

¹ For estimating future project costs, a compounded inflation rate of 10 % should be applied from the date of this estimate.

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
-	Right-of-Way	LS	LS	\$ 10,000.00	\$ 10,000
RIGHT-OF-WAY TOTAL (ROUNDED)					\$ 10,000
201-01	Clearing and Grubbing	LS	LS	\$ 5,000.00	\$ 5,000
CLEAR AND GRUBBING TOTAL (ROUNDED)					\$ 5,000
203-03	Borrow Excavation (Unclassified)	CY	200	\$ 15.00	\$ 3,000
EARTHWORK TOTAL (ROUNDED)					\$ 3,000
202-03.01	Removal of Asphalt Pavement	SY	700	\$ 5.00	\$ 3,500
PAVEMENT REMOVAL TOTAL (ROUNDED)					\$ 3,500
209-08.02	Temporary Silt Fence (w/ backing)	LF	500	\$ 3.25	\$ 1,625
DRAINAGE TOTAL (ROUNDED)					\$ 1,700
	Removal of Existing Bridge	SF	1066	\$ 15.00	\$ 16,000
	Box Bridge	SF	1,976	\$ 105.00	\$ 207,480
STRUCTURES TOTAL (ROUNDED)					\$ 223,500
--	Full Depth Paving	SY	480	\$ 38.00	\$ 18,240
PAVING TOTAL (ROUNDED)					\$ 18,300
711-05.71	Single Slope Concrete Barrier Wall	LF	104	\$ 100.00	\$ 10,400
701-01.01	Concrete Sidewalk (4")	SF	838	\$ 4.10	\$ 3,400
ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)					\$ 13,800
712-01	Traffic Control	LS		\$ 10,000.00	\$ 10,000
MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)					\$ 10,000
203-07	Furnishing & Spreading Topsoil	CY	105	\$ 10.00	\$ 1,050
TOPSOIL TOTAL (ROUNDED)					\$ 1,100
801-01	Seeding (With Mulch)	UNIT	50	\$ 40.00	\$ 2,000
801-03	Water	MG	100	\$ 10.00	\$ 1,000
SEEDING TOTAL (ROUNDED)					\$ 3,000
716-11.01	Spray Thermo Pvmt Mrkng (4" Line)	LM	0.35	\$ 1,500.00	\$ 525
PAVEMENT MARKINGS TOTAL (ROUNDED)					\$ 500
705-02.02	Single Guardrail (Type 2)	LF	100	\$ 15.55	\$ 1,555
705-04.04	Guardrail Terminal (Type 21)	EACH	2	\$ 1,773.47	\$ 3,547
705-01.01	Guardrail at Bridge Ends	LF	50	\$ 56.85	\$ 2,843
706-01	Guardrail Removed	LF	200	\$ 2.00	\$ 400
GUARDRAIL TOTAL (ROUNDED)					\$ 8,400
709-05.06	Machined Rip-Rap (Class A-1)	TON	150	\$ 30.00	\$ 4,500
RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)					\$ 4,500



**STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION**

PROJECT PLANNING 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: Project Planning Office

FROM: Clint Butler, P.E.
ARCADIS

DATE: June 18, 2013

SUBJECT: TPR Field Review (Special Bridge Replacement Program)
Local Route 01223 (Patty Road), Bridge over Fourmile Creek, Log Mile 0.12, Polk County
PIN 117487.00

A field review was held for the above-mentioned project on January 17, 2013.

The existing structure consists of a two (2) span continuous steel beam bridge with a concrete substructure and an out-to-out width of 26 feet 1 inch. Overall bridge length is 41 feet with approximately 7 feet of vertical clearance. Bridge sufficiency rating is 33.7. The 10-year and 100-year discharges and depths of flow for the drainage basin were determined using the appropriate regression equations. The calculated 100-year flow depth is 10.4 feet and the 10-year flow depth is 7.7 feet. There is no evidence overtopping has occurred.

The proposed alignment for this structure will remain on the existing centerline and will be designed to meet the TDOT design standard RD01-TS-2 for a posted 15 mph speed limit. The proposed roadway grade will maintain existing elevation. The proposed structure elevation is below the 100 year flow depth and no evidence of overtopping was noted. Additionally, the proposed structure provides a larger opening. Construction of the proposed structure is to be completed in a single phase.

Based on low traffic volume, it is recommended that through traffic during bridge construction be detoured east on Benton Station Road, then west on Town Creek Road for approximately 2.2 miles. Trucks will be detoured north on State Route 33, then south on Patty Road for approximately 6.1 miles. See Figure 2 for detour map.

The route has a base year (2017) AADT of 1350 and a design year (2037) AADT of 1620. The proposed bridge over Fourmile Creek will consist of an out-to-out width of thirty-eight (38) feet with two (2) eleven (11) foot lanes, four (4) foot shoulders and a five (5) foot sidewalk on the east side. The proposed structure is to be a three (3) span concrete box bridge with a total length of approximately fifty-two (52) feet. No utilities are expected to be impacted during this project, however overhead utility lines are present and a gas line is located along the south side of the creek. Approximately 0.15 acres of right-of-way will be required for roadway and structure improvements. (See Figure 1).

The required approach work, right-of-way, estimated replacement and preliminary engineering costs for this bridge are approximately \$447,000 of which a local match of \$90,000 is required.

CB

cc: file

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	
2. Airport (existing or proposed)	
3. Commercial area, shopping center	
4. Floodplains	
5. Forested land	X
6. Historical, cultural, or natural landmark	
7. Industrial park, factory	
8. Institutional usages	
a. School or other educational institution	X
b. Church or other religious institution (Cemetery)	
c. Hospital or other medical facility	
d. Public building, e.g., fire station	X
e. Defense installation	
9. Recreation usages	
a. Park or recreational area	
b. Game preserve or wildlife area	
10. Residential establishment	X
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	X
NPDES	X
Aquatic Resource Alteration	X
13. Other	
14. Location coordinated with local officials	X
15. Railroad crossings	
16. Hazardous materials site	

**TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION**

PROJECT NO.: _____ ROUTE: Patty Road (01223)
 COUNTY: Polk CITY: Benton
 PROJECT PIN NUMBER: 117487.00
 PROJECT DESCRIPTION: Special Bridge Replacement Program
Bridge over Fourmile Creek (Bridge ID# 70S43130007)
L.M. 0.12

DIVISION REQUESTING:

MAINTENANCE	<input type="checkbox"/>	PAVEMENT DESIGN	<input type="checkbox"/>
PLANNING	<input checked="" type="checkbox"/>	STRUCTURES	<input type="checkbox"/>
PROG. DEVELOPMENT & ADM.	<input type="checkbox"/>	SURVEY & DESIGN	<input type="checkbox"/>
PUBLIC TRANS. & AERO.	<input type="checkbox"/>	TRAFFIC SIGNAL DESIGN	<input type="checkbox"/>
YEAR PROJECT PROGRAMMED FOR CONSTRUCTION:	_____	OTHER _____	<input type="checkbox"/>
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
1,350	2017	1,620	227	14	2037	65-35	1	1		

REQUESTED BY: NAME Mike Gilbert DATE 7/17/12
 DIVISION Planning
 ADDRESS 10th Floor, JK Polk Bldg.
Nashville, TN 37243

REVIEWED BY: TONY ARMSTRONG *Tony Armstrong* DATE 7-20-12
 TRANSPORTATION MANAGER 1
 SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: DUDLEY DANIEL *Dudley Daniel* DATE 7-20-12
 TRANSPORTATION MANAGER 2
 SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

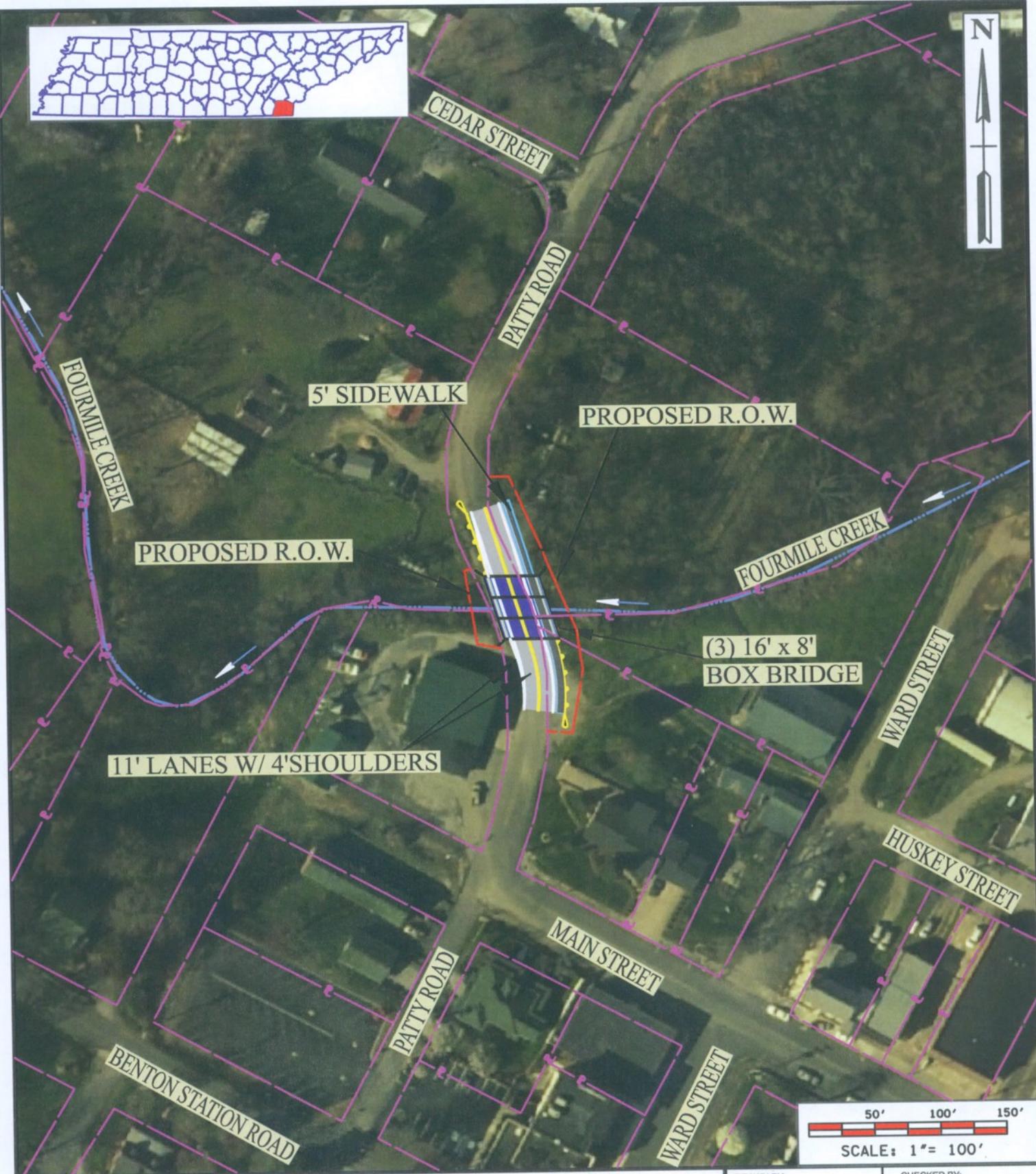
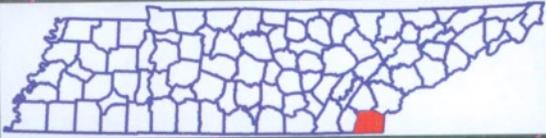
This Traffic is based on 2011 Structure Count from ADAM. The Future Traffic Count is based on the Growth Rate from the ADAM Computer Program.

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.

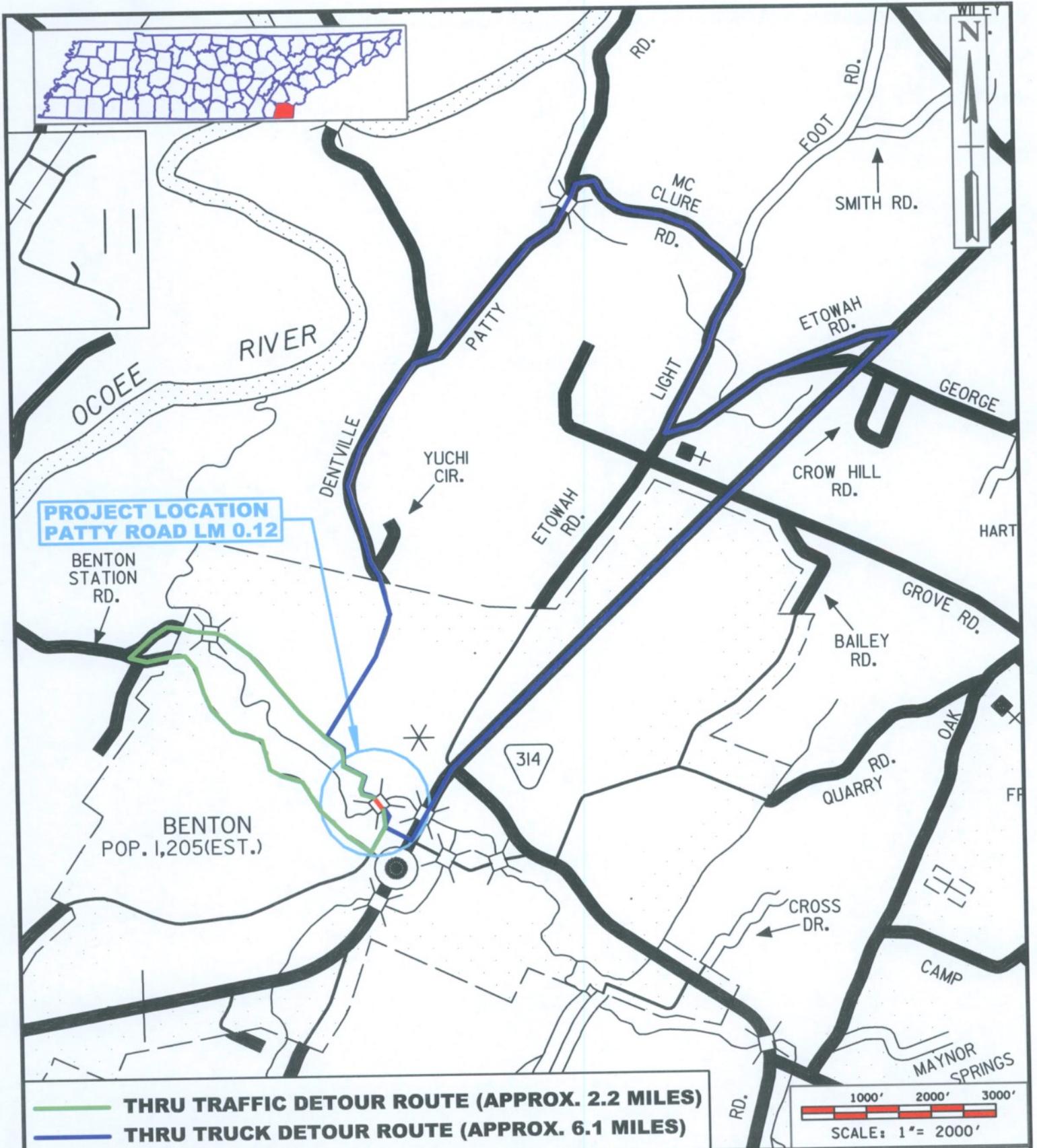
SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS.

(REV. 4/10/12)



**BRIDGE REPLACEMENT
 LOCAL ROUTE 01223 (PATTY ROAD)
 BRIDGE OVER FOURMILE CREEK
 L.M. 0.12
 BRIDGE NUMBER 70S43130007
 POLK COUNTY, TN**

DRAWN BY: BJH	CHECKED BY: HAM
L.R. 01223 (PATTY ROAD) L.M. 0.12	
PIN 117487.00	
FIGURE 1	DATE: 06-18-2013



DETOUR MAP
 LOCAL ROUTE 01223 (PATTY ROAD)
 BRIDGE OVER FOURMILE CREEK
 L.M. 0.12
 BRIDGE NUMBER 70S43130007
 POLK COUNTY, TN

DRAWN BY: BJH	CHECKED BY: HAM
L.R. 01223 (PATTY ROAD) L.M. 0.12	
PIN 117487.00	
FIGURE 2	DATE: 06-18-2013

**Bridge TPR Flow Calculations
For Hydrologic Area 2
Area > 300 Acres**

County: Polk
 Bridge ID: 70S43130007
 Route: Local Route 01223 (Patty Road)
 Feature Crossed: Fourmile Creek
 Log Mile: 0.12

By: CB
 Date: 3/8/13
 PIN: 117487.00

DRAINAGE BASIN

Measurement from quad = 4,083 acres
 Contributing Drainage Area, CDA = acres/640 = 6.38 sq. mi.

USGS REGRESSION EQUATIONS FOR FLOW

$Q_2 = 207(CDA)^{0.725} =$ 793 cfs
 $Q_5 = 344(CDA)^{0.715} =$ 1,294 cfs
 $Q_{10} = 444(CDA)^{0.711} =$ 1,658 cfs
 $Q_{25} = 578(CDA)^{0.708} =$ 2,147 cfs
 $Q_{50} = 682(CDA)^{0.706} =$ 2,523 cfs
 $Q_{100} = 788(CDA)^{0.705} =$ 2,910 cfs

DEPTH OF FLOW EQUATIONS

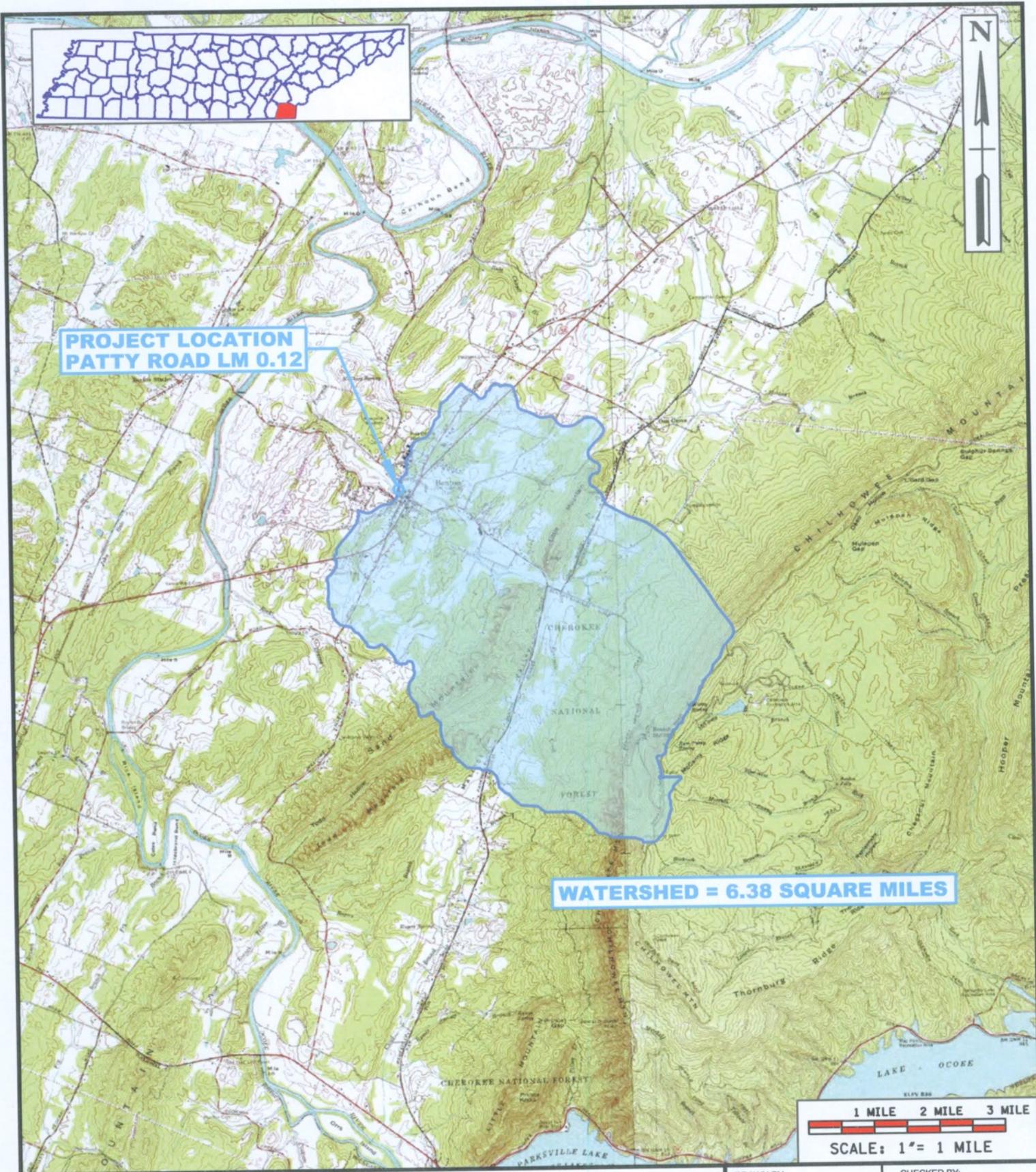
10-Year Flood Depth = $5.33(CDA)^{0.197} =$ 7.7 ft
 100-Year Flood Depth = $7.43(CDA)^{0.181} =$ 10.4 ft

AREAS

Existing Area Below Low Chord = 242 ft²
 Proposed Area Below Low Chord = 384 ft²
 Proposed 10-Year Flood Area, $A_{10} =$ 369 ft²
 Proposed 100-Year Flood Area, $A_{100} =$ 384 ft²

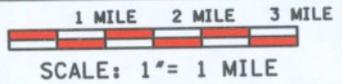
VELOCITIES

Proposed 10-Year Flood Velocity, $V_{10} = Q_{10}/A_{10} =$ 4.5 fps
 Proposed 100-Year Flood Velocity, $V_{100} = Q_{100}/A_{100} =$ 7.6 fps



**PROJECT LOCATION
PATTY ROAD LM 0.12**

WATERSHED = 6.38 SQUARE MILES



**WATERSHED MAP
LOCAL ROUTE 01223 (PATTY ROAD)
BRIDGE OVER STRAIGHT FOURMILE CREEK
L.M. 0.12
BRIDGE NUMBER 70S43130007
POLK COUNTY, TN**

DRAWN BY:

BJH

CHECKED BY:

HAM

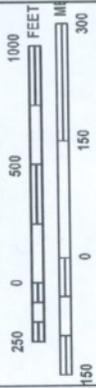
L.R. 01223 (PATTY ROAD) L.M. 0.12

PIN 117487.00

DATE:

06-18-2013

MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0092F

FIRM
FLOOD INSURANCE RATE MAP

POLK COUNTY,
TENNESSEE
AND INCORPORATED AREAS

PANEL 92 OF 425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS	NUMBER	PANEL	SUFFIX
COMMUNITY	4700	000	F
BENTON CITY OF	4700	000	F
POLK COUNTY	4700	000	F

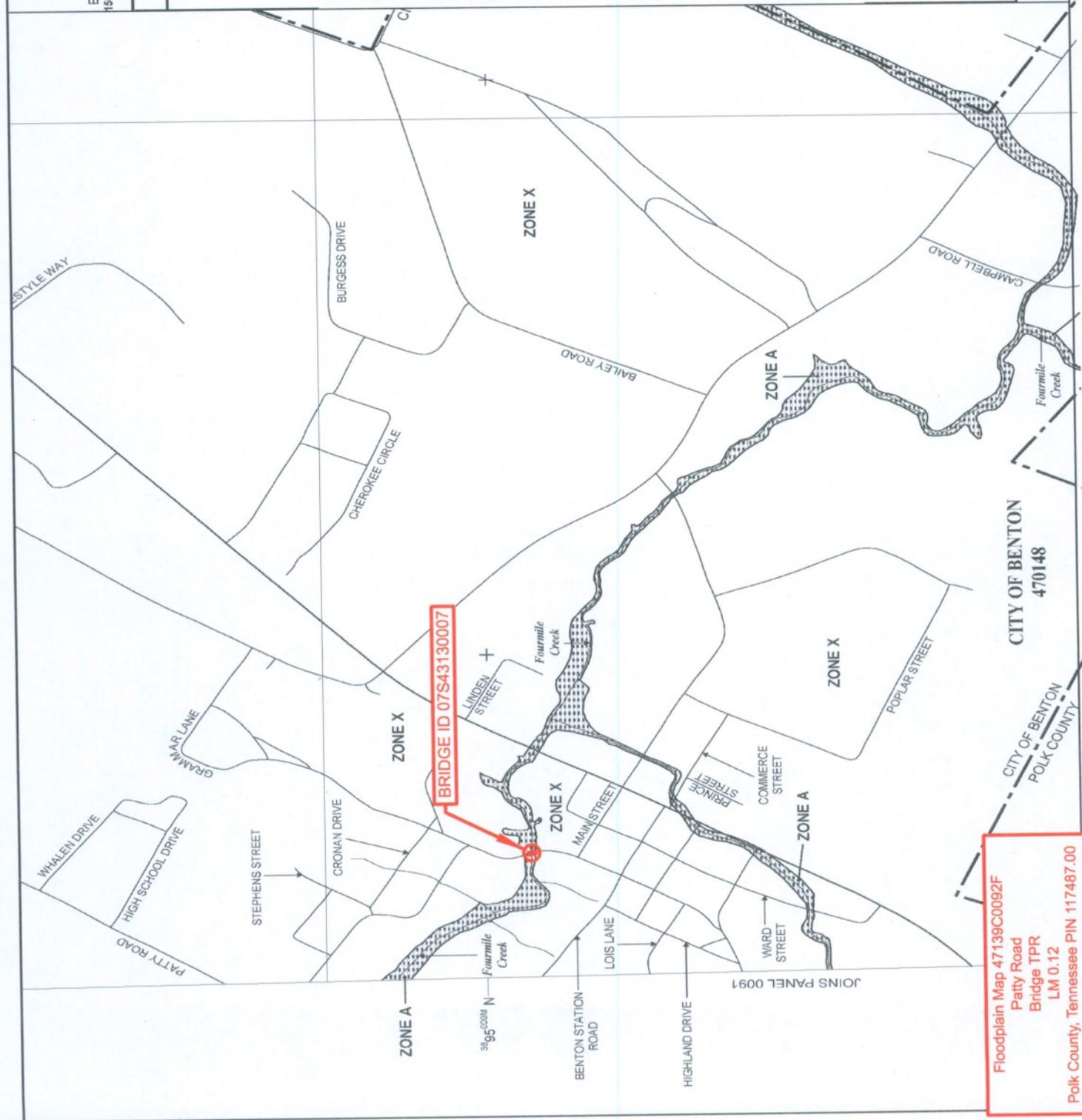
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
47139C0092F
EFFECTIVE DATE
MAY 18, 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 maps, please visit the FEMA Flood Map Store at www.fema.gov.

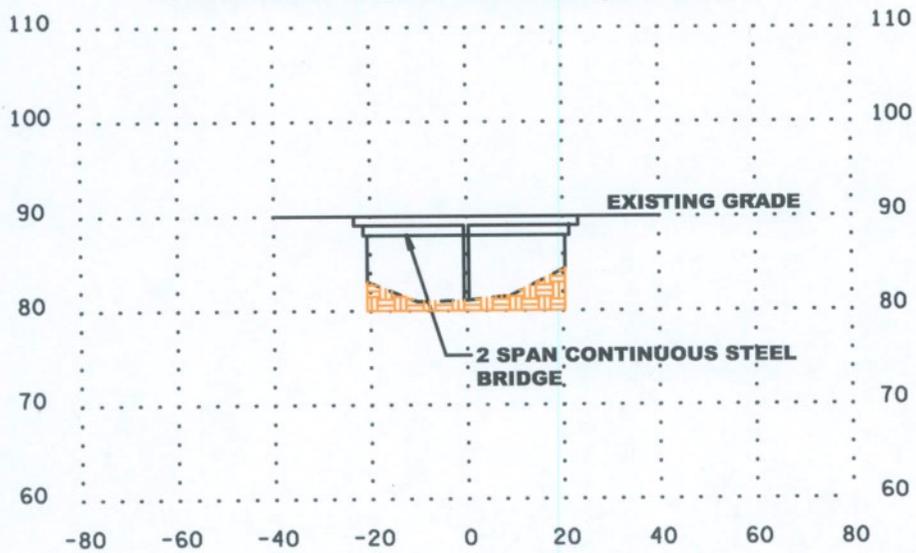


CITY OF BENTON
470148

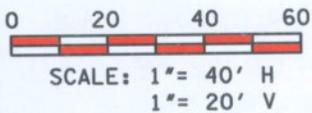
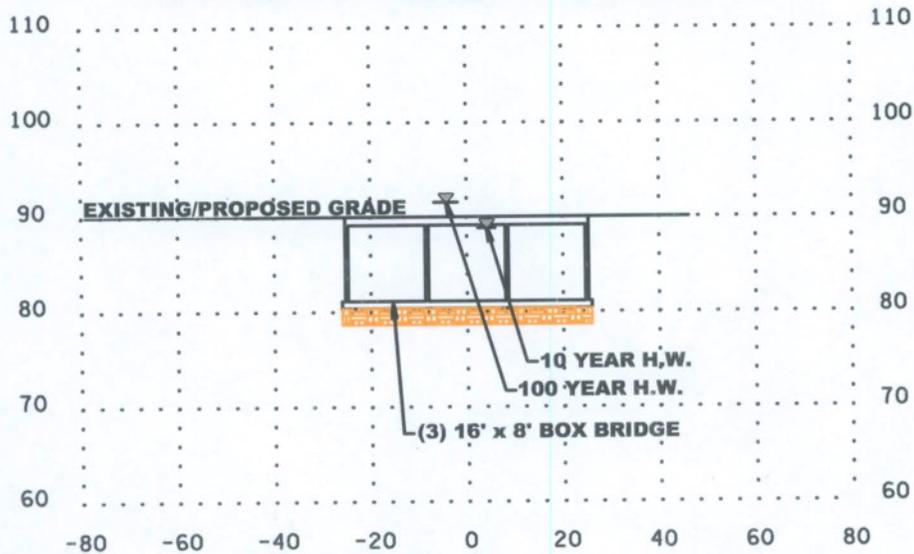
CITY OF BENTON
POLK COUNTY

Floodplain Map 47139C0092F
Patty Road
Bridge TPR
LM 0.12
Polk County, Tennessee PIN 117487.00

EXISTING STRUCTURE (INLET)



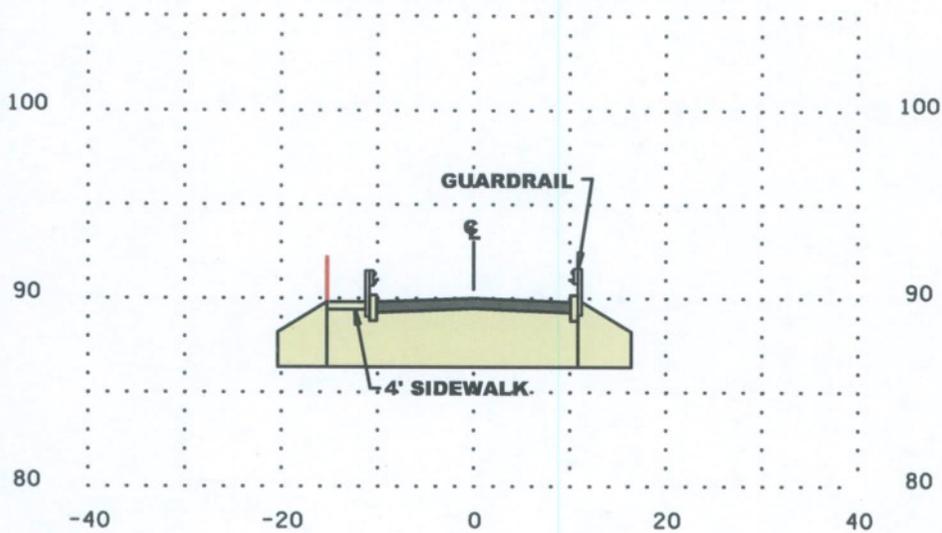
PROPOSED STRUCTURE (INLET)



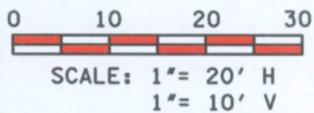
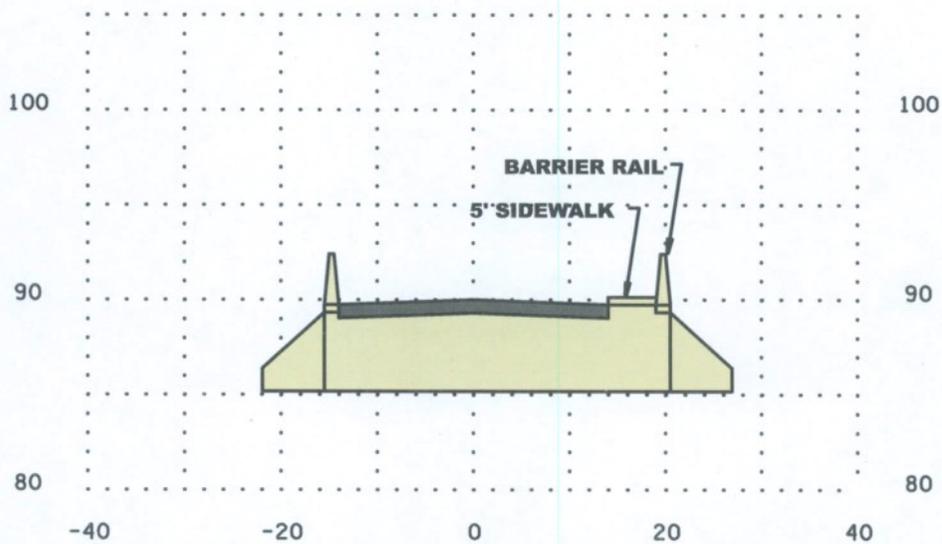
BRIDGE SECTIONS

**LOCAL ROUTE 01223 (PATTY ROAD)
BRIDGE OVER FOURMILE CREEK
L.M. 0.12
BRIDGE NUMBER 70S43130007
POLK COUNTY, TN**

CROSS SECTION - EXISTING



CROSS SECTION - PROPOSED



CROSS-SECTIONS
LOCAL ROUTE 01223 (PATTY ROAD)
BRIDGE OVER FOURMILE CREEK
L.M. 0.12
BRIDGE NUMBER 70S43130007
POLK COUNTY, TN

Bridge ID: 700A2070001
Polk County



View of Structure (Outlet)



View of Structure (Inlet)

Bridge ID: 700A2070001
Polk County



Westbound Bridge Approach on Patty Road



Eastbound Bridge Approach on Patty Road

Bridge ID: 700A2070001
Polk County



Westbound from Bridge on Patty Road



Eastbound from Bridge on Patty Road

Bridge ID: 700A2070001
Polk County



Upstream



Downstream



Upstream Left



Upstream Right

Bridge ID: 700A2070001
Polk County



Downstream Left



Downstream Right

Bridge ID: 700A2070001
Polk County



View Structure Downstream Left



View Structure Downstream Right