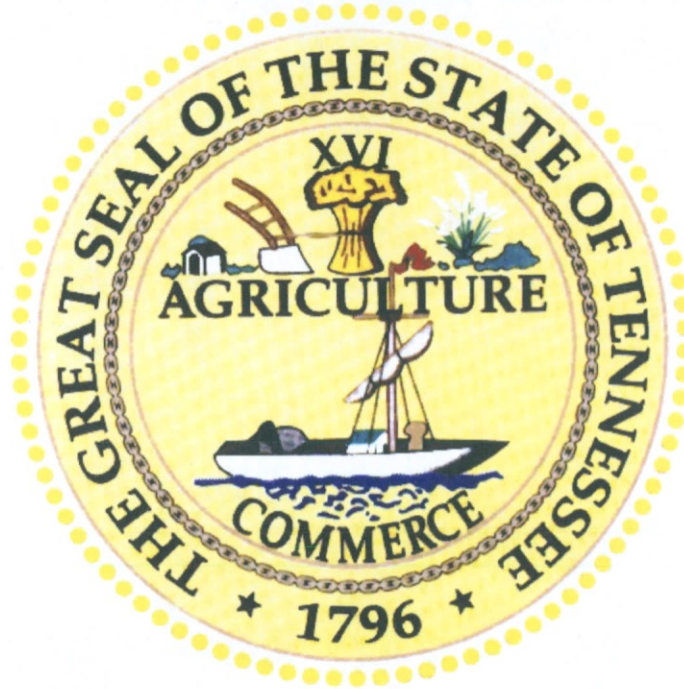


TRANSPORTATION PLANNING REPORT

Special Bridge Replacement Program

LOCAL ROUTE 0A439 – FERN AVENUE
BRIDGE OVER CANE CREEK @ L.M. 1.26
CAMDEN, TN BENTON COUNTY
PIN: 107646.00

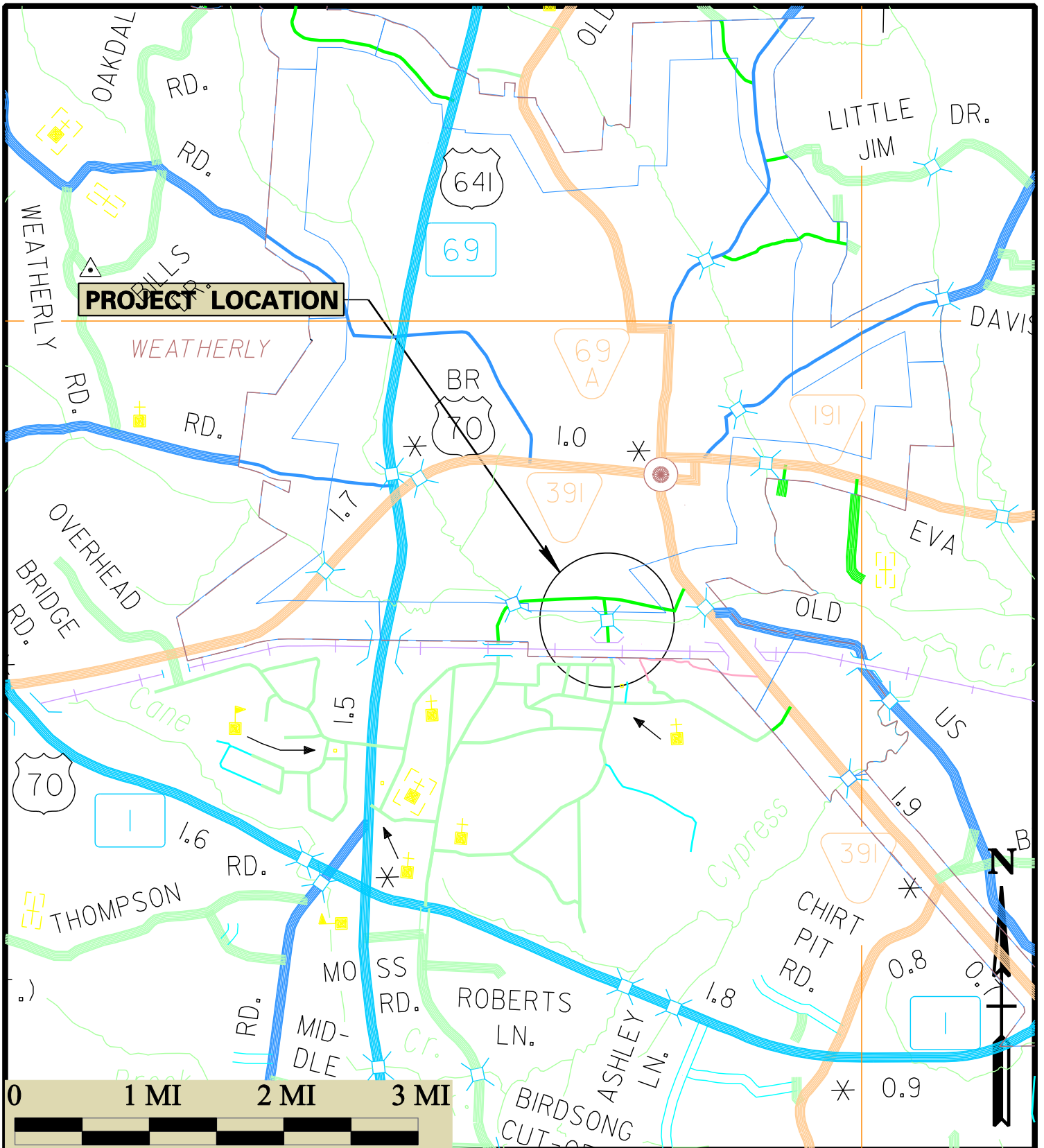


PREPARED BY
TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

Approved by [Signature] Date 3/14/13 Approved by [Signature] Date 3/20/13
Chief of Environment and Planning Deputy Commissioner and Chief Engineer

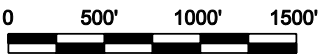
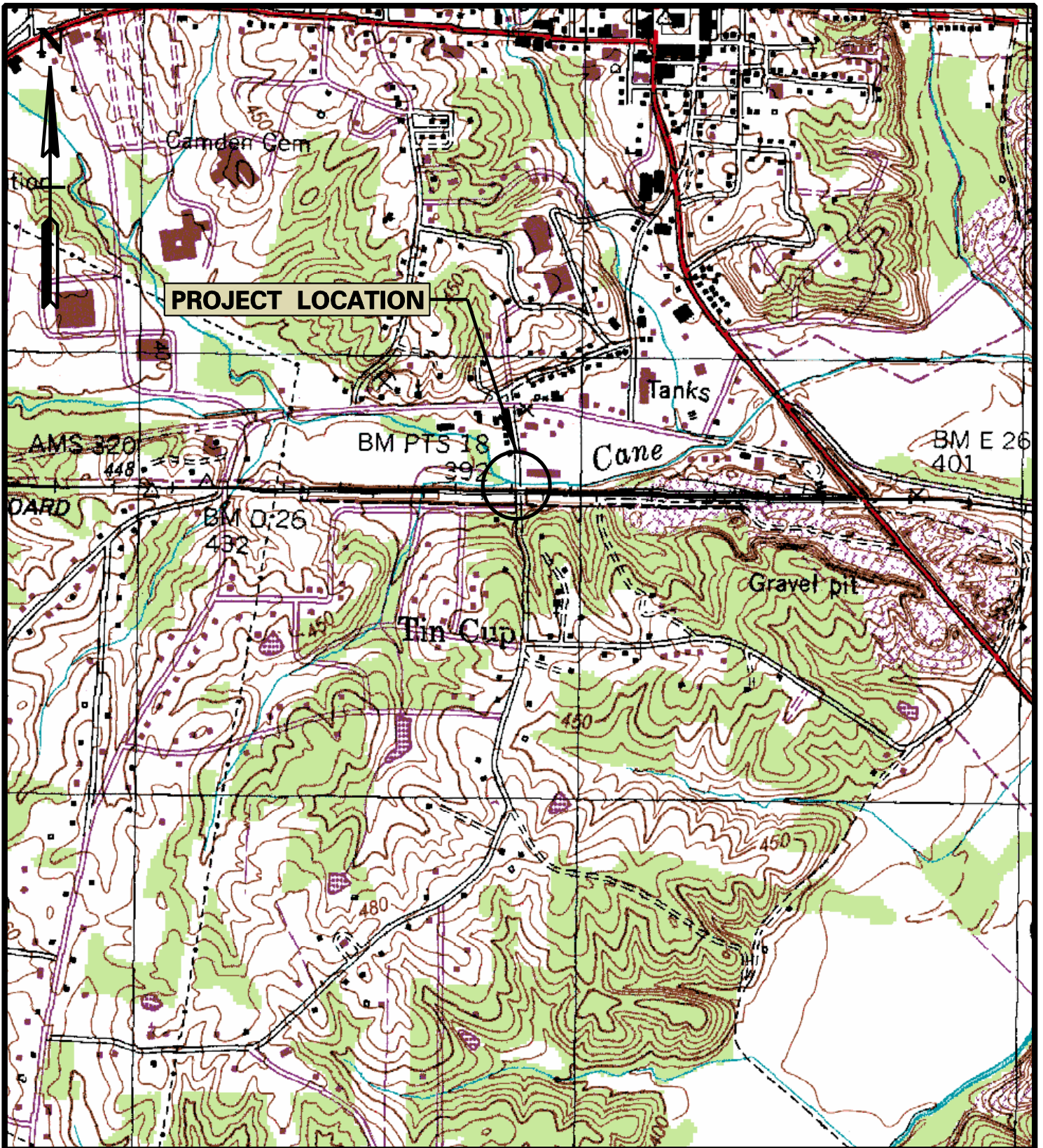
Approved by:	Signature	DATE
Transportation Director Project Planning Division	<u>[Signature]</u>	3-11-13
Engineering Director Design Division	<u>[Signature]</u>	3-11-13
Engineering Director Structures Division	<u>[Signature]</u>	3-12-13

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



AREA MAP

**FERN AVE. (0A439) CAMDEN, TN BENTON COUNTY
 BRIDGE OVER CANE CREEK @ L.M. 1.26
 BRIDGE ID 030A4390003**



SCALE: 1" = 1000'

PROJECT MAP

FERN AVE. (0A439) CAMDEN, TN BENTON COUNTY
BRIDGE OVER CANE CREEK @ L.M. 1.26
BRIDGE ID 030A4390003



0' 100' 200' 300'

SCALE: 1" = 200'

AERIAL MAP

**FERN AVE (0A439) CAMDEN, TN BENTON COUNTY
BRIDGE OVER CANE CREEK @ L.M. 1.26
BRIDGE ID 030A4390003**

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

County: Benton Route: Local Route 0A439 Log Mile: 1.26
 Feature Crossed: Cane Creek System: Local
 Functional Class: Rural / Local Bridge ID: 030A4390003

EXISTING CONDITIONS

2017 AADT: 520 App. Cross Section: 16' / 20' / 36' No. Lanes: 2
 Approach Alignment: Tangent Year Built: 1970 Load Limit: H10
 Width (out to out): 21.6 Sidewalks: Right -- Left -- Length: 29
 No. Spans: Approach: -- Main: 1
 Substructure: Timber Abutments Vertical Clearance: 6.1' Sufficiency Rating: 36.2
 Other: _____

PROPOSED IMPROVEMENTS

STANDARDS FROM RD01-TS- 1 Type of Work: Replace
 Design Year: 2037 Design AADT: 620 Terrain Rolling ADL (F): -- (R): --
 Project Length: 132' Bridge Length: 32 ft Approach Length: 2 @ 50'
 Design Speed (MPH): 40 Posted Speed (MPH): 30
 Approach Width: 20' /30'/ As Req'd Bridge Width (O to O): 35.5 ft No. Lanes: 2
 Right-of-Way Required: 0.2 acres Tract(s) 4 Structure Type: Box Culvert
 Remarks: Lane width's to be increased to 10 ft and shoulders to be increased to 5 ft with the centerline to remain the same.

MAINTENANCE OF TRAFFIC

Temporary Detour: Temporary Runaround: Stage Construct:
 Alternate Route: DETOUR (2 Miles, 6 Minutes): Fern Ave. to Natchez Trace Rd. to SR 1 (Hwy 70) to Timothy Drive to Rockport Rd. back to Fern Avenue.
 Remarks: Construction of the Box Culvert should not occur during the Benton County Fair (August) due to the amounts of traffic traversing the structure during the fair. (The Fairgrounds are located just northeast of the structure.)

ESTIMATED COST

Right-of-Way: \$10,000 Approaches: \$89,900 Structure: \$128,700
 Preliminary Engineering: \$34,700 Utilities: \$36,000 Misc./Cont.: \$67,400
 Mobilization: \$15,000 Total: \$381,700

Remarks: Lane width's to be increased to 10 ft and shoulders to be increased to 5 ft with the centerline to remain the same. The current elevation of the roadway is to be remain the same due to the RR tunnel just south of the structure.

Field Investigation by: Jane Jones (Reg. 4 Design), Glen Blankenship (Reg. 4 Design), Jason Moody (Reg. 4 Traffic), David Duncan (Conceptual Planning), Mike Gilbert (Conceptual Planning), & The Camden Hwy Dept.

Route:	Fern Avenue (0A439)
Description:	Bridge over Cane Creek (030A4390003)
	L.M. 1.26
County:	BENTON
Length:	132 FT
Date:	February 15, 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	\$ 4,000	\$ -	\$ 16,000	\$ 20,000
Earthwork	\$ 2,250	\$ -	\$ 9,000	\$ 11,250
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ 300	\$ -	\$ 1,200	\$ 1,500
Utilities	\$ 1,000	\$ -	\$ 4,000	\$ 5,000
Structures	\$ 25,700	\$ -	\$ 103,000	\$ 128,700
Pavement Removal	\$ 500	\$ -	\$ 2,200	\$ 2,700
Paving	\$ 8,500	\$ -	\$ 33,900	\$ 42,400
Roadway and Pavement Appurtenances	\$ -	\$ -	\$ -	\$ -
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ -	\$ -	\$ -	\$ -
Seeding	\$ 20	\$ -	\$ 80	\$ 100
Sodding	\$ 200	\$ -	\$ 800	\$ 1,000
Rip-Rap or Slope Protection	\$ 1,500	\$ -	\$ 6,000	\$ 7,500
Fencing	\$ -	\$ -	\$ -	\$ -
Signing	\$ -	\$ -	\$ -	\$ -
Pavement Markings	\$ 120	\$ -	\$ 500	\$ 600
Lighting	\$ -	\$ -	\$ -	\$ -
Signalization	\$ -	\$ -	\$ -	\$ -
Guardrail	\$ 1,700	\$ -	\$ 7,000	\$ 8,700
Other Construction Items (15%)	\$ 7,200	\$ -	\$ 28,800	\$ 36,000
Maintenance of Traffic	\$ 5,000	\$ -	\$ 20,000	\$ 25,000
Mobilization (5%)	\$ 3,000	\$ -	\$ 12,000	\$ 15,000
CONSTRUCTION COST (rounded)	\$ 63,000	\$ -	\$ 252,400	\$ 315,500
Engineering and Contingency (10%)	\$ 6,400	\$ -	\$ 25,200	\$ 31,600
TOTAL CONSTRUCTION COST (rounded)	\$ 69,400	\$ -	\$ 277,600	\$ 347,000
Preliminary Engineering (10%)	\$ 6,900	\$ -	\$ 27,800	\$ 34,700
PROJECT COST ¹(rounded)	\$ 76,300	\$ -	\$ 305,400	\$ 381,700

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 (0.2 Acres)	LS	LS	\$ 10,000.00	\$ 10,000
RIGHT-OF-WAY TOTAL (ROUNDED)					\$ 10,000
201-01	Clearing and Grubbing	LS	LS	\$ 20,000.00	\$ 20,000
CLEAR AND GRUBBING TOTAL (ROUNDED)					\$ 20,000
203-03	Borrow Excavation (Unclassified)	CY	750	\$ 15.00	\$ 11,250
EARTHWORK TOTAL (ROUNDED)					\$ 11,250
202-03.01	Removal of Asphalt Pavement	SY	350	\$ 5.00	\$ 1,750
415-01.02	Cold Planning Bituminous Pavement	SY	250	\$ 3.50	\$ 875
PAVEMENT REMOVAL TOTAL (ROUNDED)					\$ 2,700
209-08.02	Temporary Silt Fence (w/ backing)		450	\$ 3.25	\$ 1,463
DRAINAGE TOTAL (ROUNDED)					\$ 1,500
	Above Ground Utilities	LF	500	\$ 10.00	\$ 5,000
UTILITIES TOTAL (ROUNDED)					\$ 5,000
	Removal of Existing Bridge	SF	626.4	\$ 15.00	\$ 9,396
	32' Box Culvert	SF	1,136	\$ 105.00	\$ 119,280
STRUCTURES TOTAL (ROUNDED)					\$ 128,700
Asphalt					
--	Full Depth Paving	SY	750	\$ 40.00	\$ 30,000
411-03.10	ACS Mix (PG76-22) Grading D	TON	15.0	\$ 85.00	\$ 1,275
403-01	Bituminous Material for Tack Coat (TC)	TON	1.0	\$ 480.00	\$ 480
303-01	Mineral Aggregate, TY A Base, Grading D	TON	712.7	\$ 14.93	\$ 10,640
PAVING TOTAL (ROUNDED)					\$ 42,400
RETAINING WALLS TOTAL (ROUNDED)					\$ -
712-01	Traffic Control	LS		\$ 25,000.00	\$ 25,000
MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)					\$ 25,000
716-11.01	Spray Thermo Pvmt Mrkng (4" Line)	LM	0.50	\$ 1,100.00	\$ 550
PAVEMENT MARKINGS TOTAL (ROUNDED)					\$ 600
SIGNALIZATION TOTAL (ROUNDED)					\$ -
FENCE TOTAL (ROUNDED)					\$ -
705-02.02	Single Guardrail (Type 2)	LF	100	\$ 15.55	\$ 1,555
705-04.04	Guardrail Terminal (Type 21)	EACH	4	\$ 1,773.47	\$ 7,094
705-01.04	Metal Beam Guard Fence (Guardrail)	LF	32	\$ 60.80	\$ 1,946
GUARDRAIL TOTAL (ROUNDED)					\$ 8,700
709-05.06	Machined Rip-Rap (Class A-1)	TON	250	\$ 30.00	\$ 7,500
RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)					\$ 7,500



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
NASHVILLE, TENNESSEE 37243-0350

MEMORANDUM

TO: Project Planning Office

FROM: Mike Gilbert, Roadway Specialist Supervisor 1
Conceptual Planning Office

DATE: February 18, 2013

SUBJECT: TPR Field Review (Special Bridge Replacement Program)
Fern Avenue (0A439) over Cane Creek
Log Mile 1.26
Camden, TN; Benton County
Pin: 107646.00

A field review was held for the above-mentioned project on June 28, 2012.

The existing bridge consists of a single span, concrete channel structure with an out-to-out width of 21.6 feet. The overall bridge length is 29 feet and the sufficiency rating for this bridge is 36.2. The 10-year and 100-year discharges and depths of flow for the drainage basin were determined using the appropriate regression equations. It was determined that the 100-year flow depth is 9.8 feet and the 10-year flow depth is 7.2 feet.

The proposed alignment and grade for this structure are to remain at the existing location. Due to the proposed structure being a culvert, the superstructure depth will be less than the existing structure, allowing for the clearance to be improved from 6.1 feet to 7.3 feet. According to local officials, the structure does have overtopping issues; however, due to the tunnel going under the CSX Railroad just south of the structure, it is recommended that the grade not be raised in order to prevent a loss of clearance through the tunnel. During the construction of the proposed structure, traffic will be detoured from Fern Avenue to Natchez Trace Road to State Route 1 (U.S. 70) to Timothy Drive to Rockport Road back to Fern Avenue. The approximate detour length from one side of the structure to the other is two (2) miles or six (6) minutes. All other options for maintaining traffic during construction were eliminated due to the accessibility of an acceptable detour with the consent of the Camden Highway Department who attended the field review at the structure. A small amount of right-of-way (0.2 acre) will be required for this project due to the wing walls of the proposed structure and the increased lane widths of the approaches.

The route has a base year (2017) AADT of 520 and a design year (2037) AADT of 620. The bridge over Cane Creek will be designed to meet Road Design Standard RD01-TS-1. The structure is to consist of a reinforced concrete box bridge with two (2) barrels at sixteen (16) feet. The total length of the box bridge will be thirty-two (32) feet. The structure is also to contain two (2) ten (10) foot lanes with two (2) five (5) foot shoulders. This cross-section will taper back down to the existing cross section of sixteen (16) feet of travel way due to the tunnel and the lack of existing right-of-way on Fern Avenue. Each approach is to be approximately fifty (50) due to the surrounding restrictions. This should not be an issue due to the grade remaining the same.

The required approach work, utility relocations, estimated replacement cost, and preliminary engineering for this bridge are approximately \$381,700 (Local match: \$76,300).

MG

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	
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 (Fairgrounds)	X
	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	X
	NPDES	X
	Aquatic Resource Alteration	X
13.	Other	
14.	Location coordinated with local officials	X
15.	Railroad crossings: Tunnel south of structure (Under CSX RR)	X
16.	Hazardous materials site	

**TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION**

PROJECT NO.: _____ ROUTE: Fern Ave. (0A439)
 COUNTY: Benton CITY: Camden
 PROJECT PIN NUMBER: 107646.00
 PROJECT DESCRIPTION: Special Bridge Replacement Program
 Bridge over Cain Creek
 L.M. 1.26

DIVISION REQUESTING:

MAINTENANCE
 PLANNING
 PROG. DEVELOPMENT & ADM.
 PUBLIC TRANS. & AERO.

PAVEMENT DESIGN
 STRUCTURES
 SURVEY & DESIGN
 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	DHV	%	DHV	AADT	FLEX	RIGID
520	87	14	2037	2	3		

REQUESTED BY: NAME Michael Gilbert DATE 4/12/12
 DIVISION Planning
 ADDRESS 10th Floor
 J.K. Polk Bldg

REVIEWED BY: TONY ARMSTRONG DATE 4-20-12
 TRANSPORTATION MANAGER 1
 SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: DUDLEY DANIEL DATE 20 Apr 12
 TRANSPORTATION MANAGER 2
 SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

This Traffic Based on 2006 Cycle Count. The Future 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. 4/10/12)

TYPE	YEAR	COUNTY	FIGURE NO.
BRIDGE	2012	BENTON	1

10 FT LANES W/ 5 FT SHLDR
32 FT BOX CULVERT (2 BARRELS @ 16')

DIRECTION OF FLOW >>>>

FERN AVE.

CANE CREEK

CSX RAILROAD

OAKWOOD ST.



BRIDGE REPLACEMENT

FERN AVENUE (OA439)
BRIDGE I.D. 030A4390003 (L.M. 1.26)
BENTON COUNTY

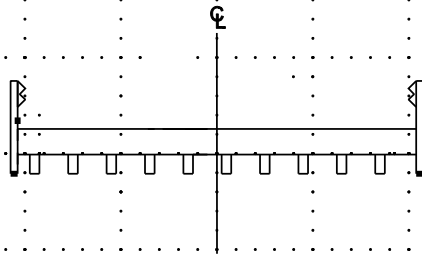
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 1 OF 1
FERN AVE.
(OA439)
L.M. 1.26

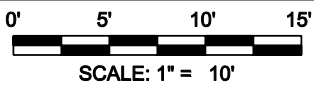
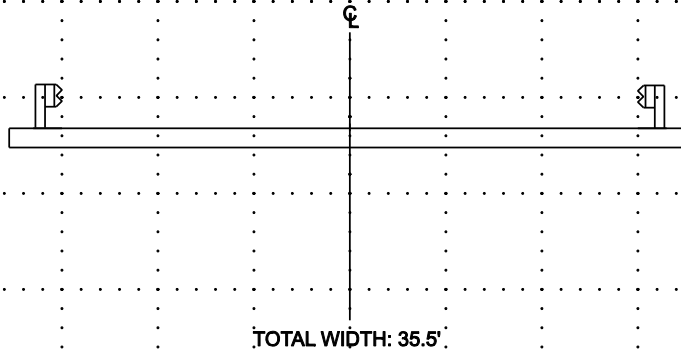
TENNESSEE D.O.T.
PROJECT PLANNING DIVISION
FILE NO.

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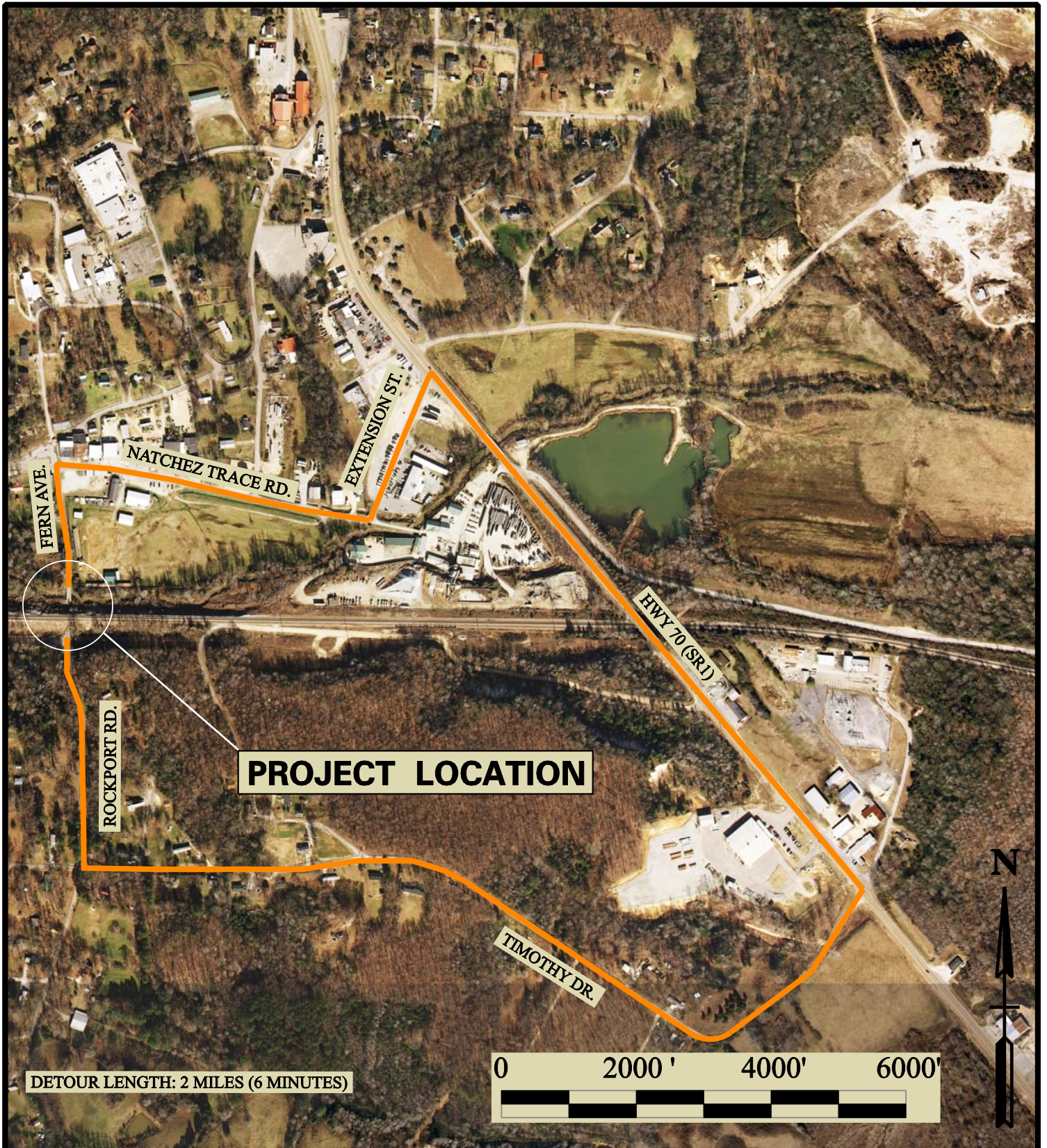
EXISTING STRUCTURE



COMPLETED PROPOSED STRUCTURE



STAGE CONSTRUCTION DETAIL
FERN AVE. (0A439) CAMDEN, TN BENTON COUNTY
BRIDGE OVER CANE CREEK L.M. 1.26
BRIDGE ID 030A4390003



DETOUR MAP

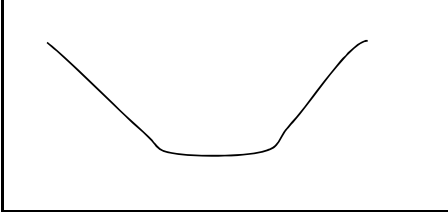
**FERN AVE. (0A439) CAMDEN, TN BENTON COUNTY
BRIDGE OVER CANE CREEK @ L.M. 1.26
BRIDGE ID 030A4390003**

SITE INSPECTION

INSPECTION MADE BY: Mike Gilbert BRIDGE ID: 030A4390003 COUNTY: Benton
Date: 8/8/12 Route Name: Local Route 0A439 Stream Name: Cane Creek @ L.M. 1.26

CHANNEL

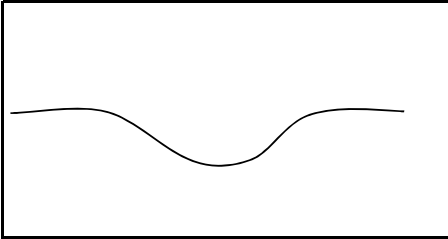
Approx depth and width of channel: Horizontal: 12' Vertical: 2'
Depth of normal flow: 2' In Reservoir: Yes No
Depth of Ordinary High Water: Low Chord
Type of material in stream bed: Clean
Type of vegetation on banks: Heavy Brush / Trees
"N" factor of the channel: 0.022
Are channel banks stable: Yes No
If the streambed is gravel: $D_{30} = \underline{\quad -- \quad}$ $D_{85} = \underline{\quad -- \quad}$
Skew of the channel with the roadway: 90°



Channel Shape Sketch

FLOODPLAIN

Is the skew same as the channel? Yes No
Is it symmetrical about the channel? Yes No
Type of vegetation in the floodplain and "N" factors
Left U.S.: Heavy Brush (0.075) Right U.S.: Trees (0.15)
Left D.S.: Trees (0.15) Right D.S.: Heavy Brush (0.075)
Are roadway approaches lower than the structure? Yes No
Are there any buildings in the floodplain? Yes No
Approx. floor elevations: ---
Flood information from local residents:
(elevations & dates) ---



Floodplain Sketch

EXISTING STRUCTURE

Length: 29 No. of spans: 1 Structure type: Conc. Channels No. of lanes: 2 Skew: 90°
Width (out to out): 21.6' Width (curb to curb): 20.5' Approach: paved graveled
Sidewalks on Structure: Yes No Bridgerail type: Guardrail Bridgerail height = 2.4'
Superstructure depth: 4.5' Finished Grade to low girder = 2.1' Girder depth = 2.1'
Are any substructures in the channel? Yes No Vertical Clearance = 6.1 ft
Indications of overtopping: Signs surrounding structure are installed higher than normal due to flooding according to locals.
High water marks: Low Chord
Local scour: Yes, --- No
Any signs of stream aggradation or degradation? None
Any drift or drift potential? Yes, None No
Any obstructions (pipes, stock fences, etc.)? None

PROPOSED STRUCTURE

Replacement Rehabilitate Widening New Location
Bridge length: 32 ft Bridge type: Box Culvert Span arrangement: 2 @ 16 ft Skew: 90°
Bridge width: 35.5 ft Sidewalks: No Design Speed (MPH): 40 ADT (2037) = 620
Proposed grade: Maintain Existing Proposed alignment: Maintain Existing
Method of maintaining traffic: Stage construction On site detour Close road Shift Centerline
Cost of proposed Structure: \$105 per ft² X 32 / 36 length (ft) / width (ft) Cost = \$119,300
Cost of bridge removal: \$15 per ft² X 29 / 21.6 length (ft) / width (ft) Cost = \$9,400
Detour structure: Type and size = N/A Cost = \$0

Total Structure Cost = \$128,700

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

County: Benton
 Bridge ID: 030A4390003
 Route: Local Route 0A439
 Feature Crossed: Cane Creek
 Log Mile: 1.26

By: MG
 Date: 4/16/12
 PIN: 107646.00

DRAINAGE BASIN

Measurement from quad = 2,976 acres
 Contributing Drainage Area, CDA = acres/640 = 4.65 sq. mi.

USGS REGRESSION EQUATIONS FOR FLOW

$Q_2 = 207(CDA)^{0.725} =$ 631 cfs
 $Q_5 = 344(CDA)^{0.715} =$ 1,032 cfs
 $Q_{10} = 444(CDA)^{0.711} =$ 1,324 cfs
 $Q_{25} = 578(CDA)^{0.708} =$ 1,716 cfs
 $Q_{50} = 682(CDA)^{0.706} =$ 2,018 cfs
 $Q_{100} = 788(CDA)^{0.705} =$ 2,329 cfs

DEPTH OF FLOW EQUATIONS

10-Year Flood Depth = $5.33(CDA)^{0.197} =$ 7.2 ft
 100-Year Flood Depth = $7.43(CDA)^{0.181} =$ 9.8 ft

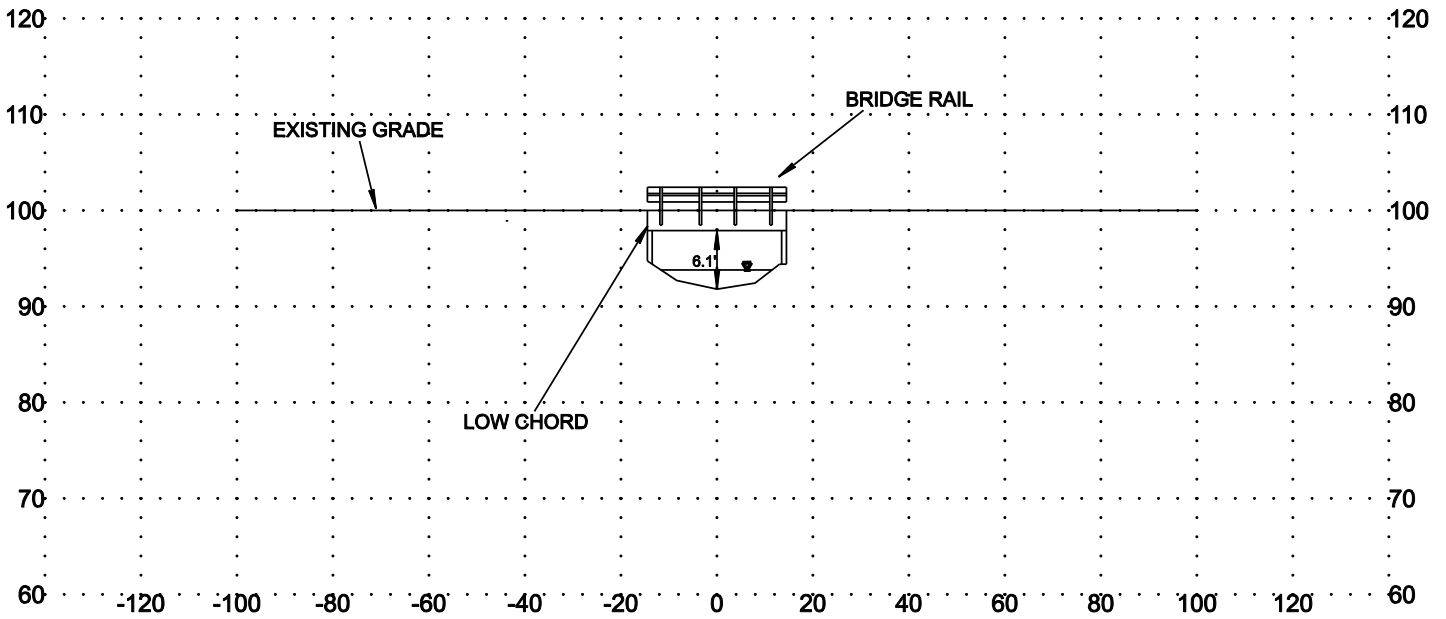
AREAS

Existing Area Below Low Chord = 566 ft²
 Proposed Area Below Low Chord = 570 ft²
 Proposed 10-Year Flood Area, $A_{10} =$ 183 ft²
 Proposed 100-Year Flood Area, $A_{100} =$ 303 ft²

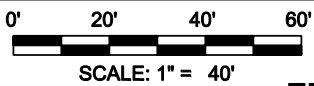
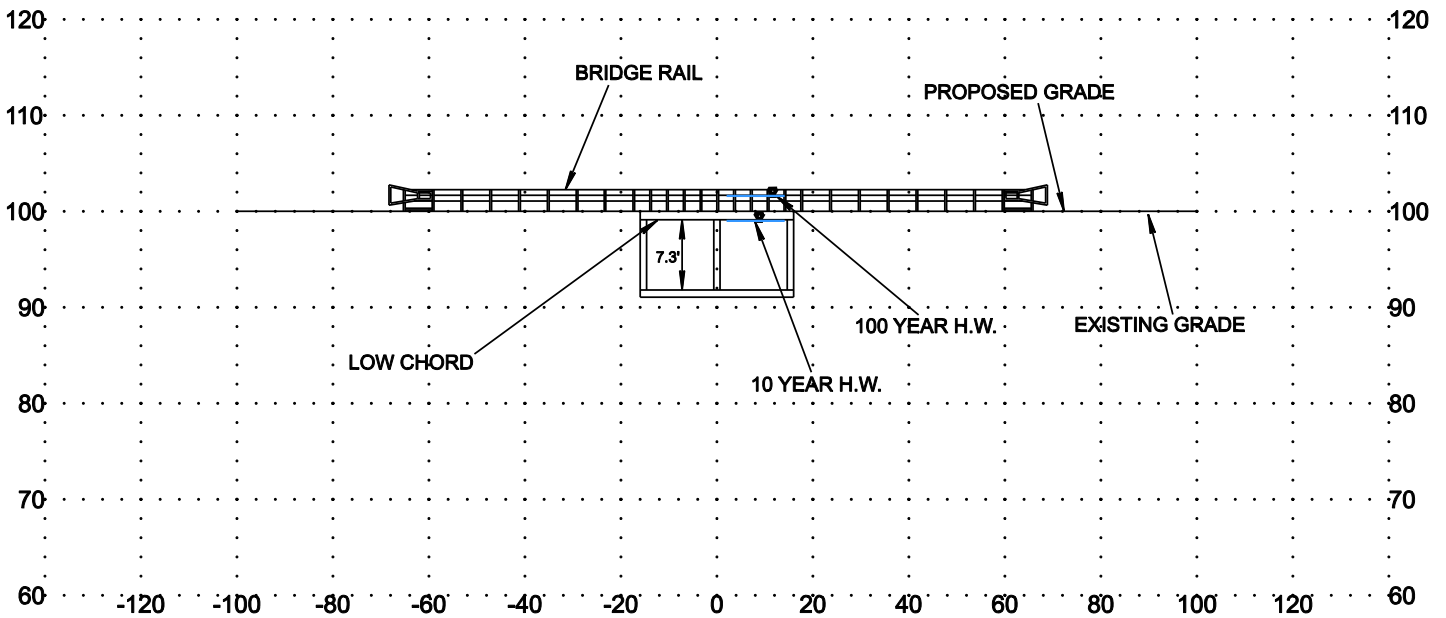
VELOCITIES

Proposed 10-Year Flood Velocity, $V_{10} = Q_{10}/A_{10} =$ 7.2 fps
 Proposed 100-Year Flood Velocity, $V_{100} = Q_{100}/A_{100} =$ 7.7 fps

EXISTING STRUCTURE (INLET)



PROPOSED STRUCTURE (INLET)



BRIDGE SECTIONS
FERN AVE. (0A439) CAMDEN, TN BENTON COUNTY
BRIDGE OVER CANE CREEK
BRIDGE ID 030A4390003

Bridge ID: 140A0530001
Benton County



View of Structure



Bridge Number

Bridge ID: 140A0530001
Benton County



Northbound Bridge Approach on Fern Avenue



Southbound Bridge Approach on Fern Avenue

Bridge ID: 140A0530001
Benton County



Bridge Looking North on Fern Avenue



Bridge Looking South on Fern Avenue

Bridge ID: 140A0530001

Benton County



Bridge Rail



Structure

Bridge ID: 140A0530001
Benton County



Substructure



Overhead Utilities



Underground Utilities



Inlet

Bridge ID: 140A0530001
Benton County



Outlet



Upstream

Bridge ID: 140A0530001

Benton County



Upstream Right



Upstream Left

Bridge ID: 140A0530001

Benton County



Downstream



Downstream Right

Bridge ID: 140A0530001

Benton County



Downstream Left