

TRANSPORTATION PLANNING REPORT

Special Bridge Replacement Program


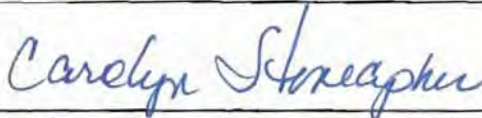
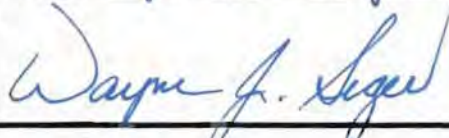
LOCAL ROUTE 00840
BRIDGE OVER LITTLE CREEK AT L.M. 0.41
HARDEMAN COUNTY
PIN: 117283.00



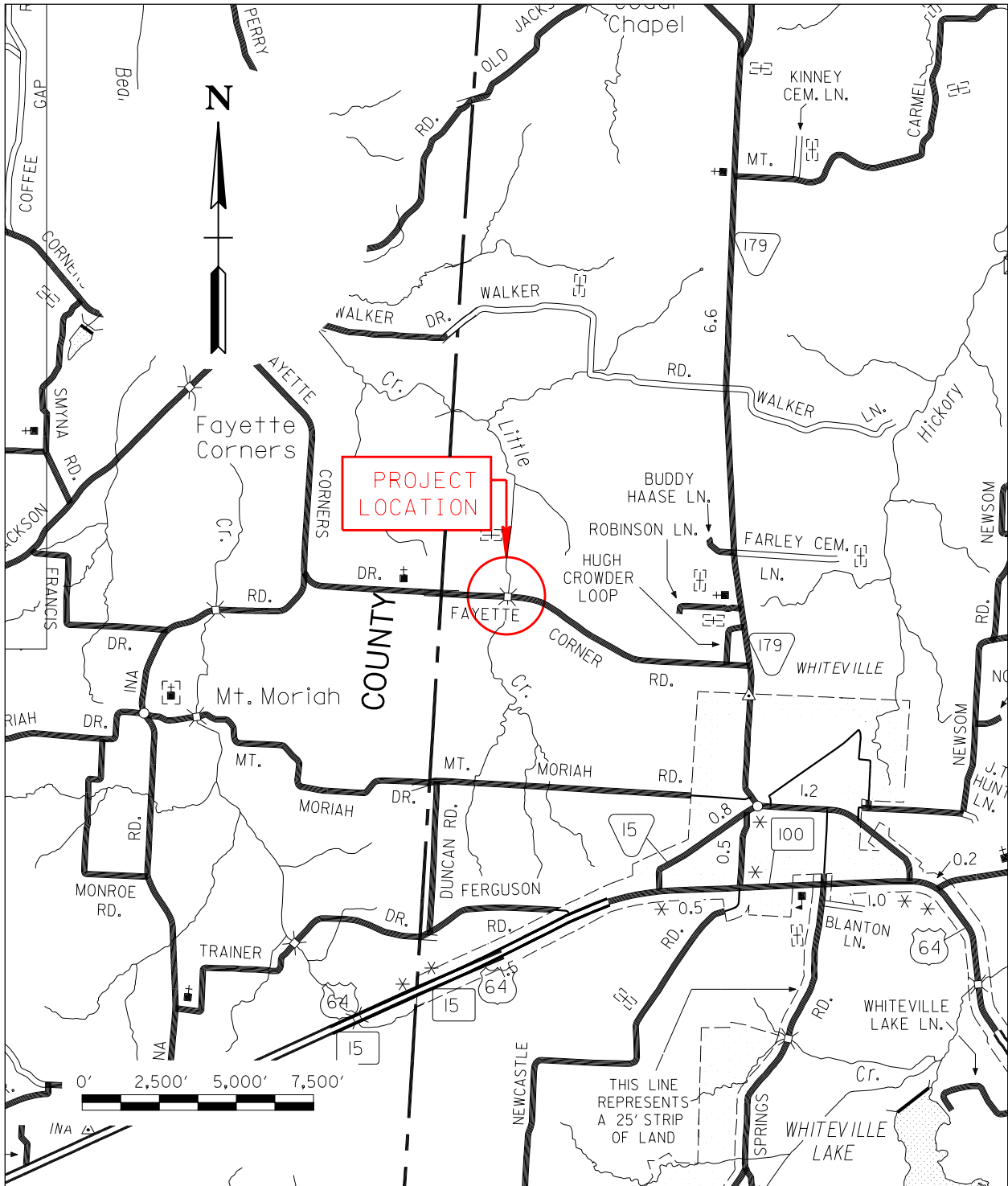
PREPARED BY
TRANSYSTEMS CORPORATION
FOR THE
TENNESSEE DEPARTMENT OF TRANSPORTATION

Approved by  Date 2/28/13
Chief of Environment and Planning

Approved by  Date 3/20/13
Deputy Commissioner and Chief Engineer

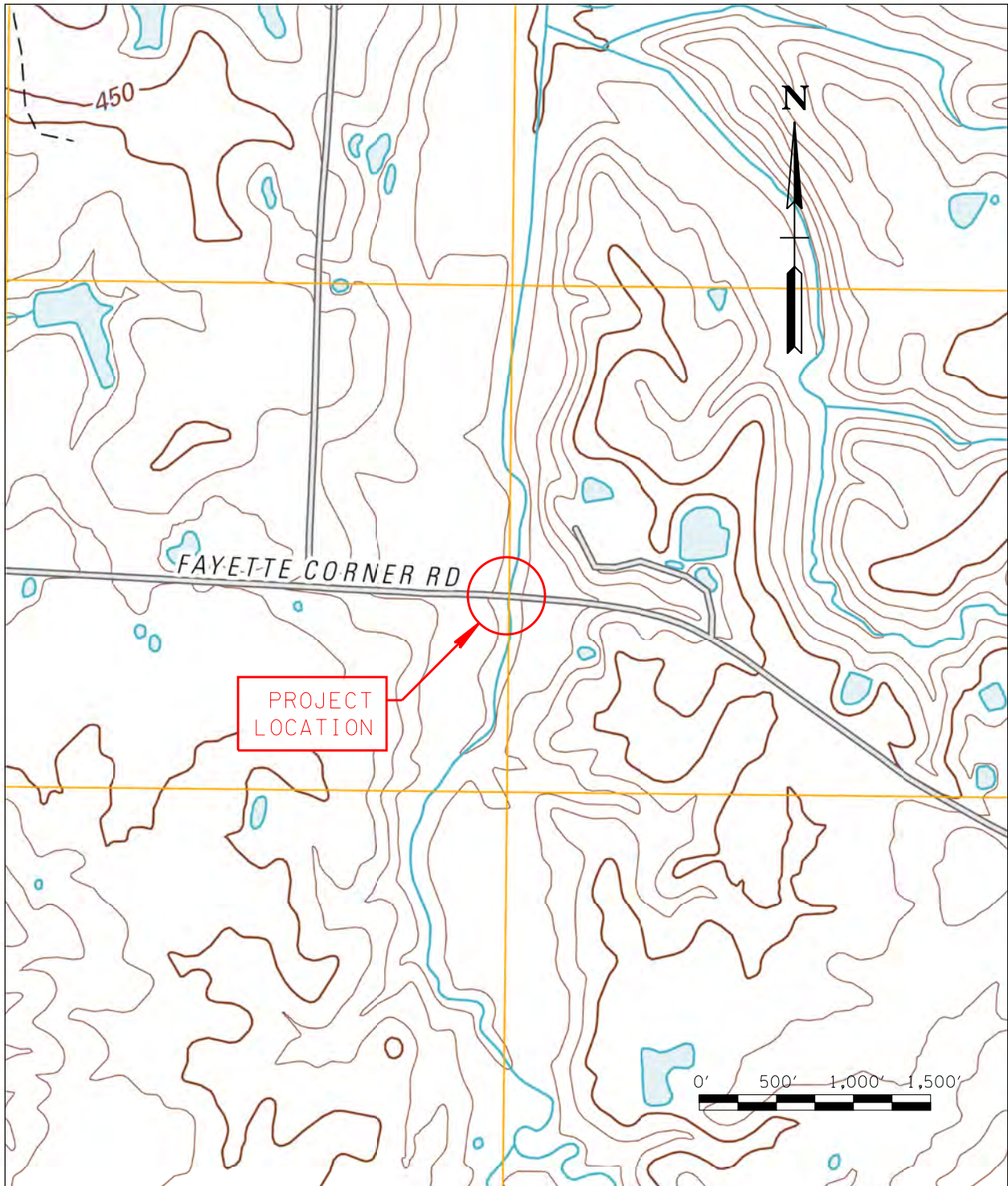
Approved by:	Signature:	Date:
Transportation Director Project Planning Division		1-25-13
Engineering Director Design Division		1-28-13
Engineering Director Structures Division		1-30-13

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



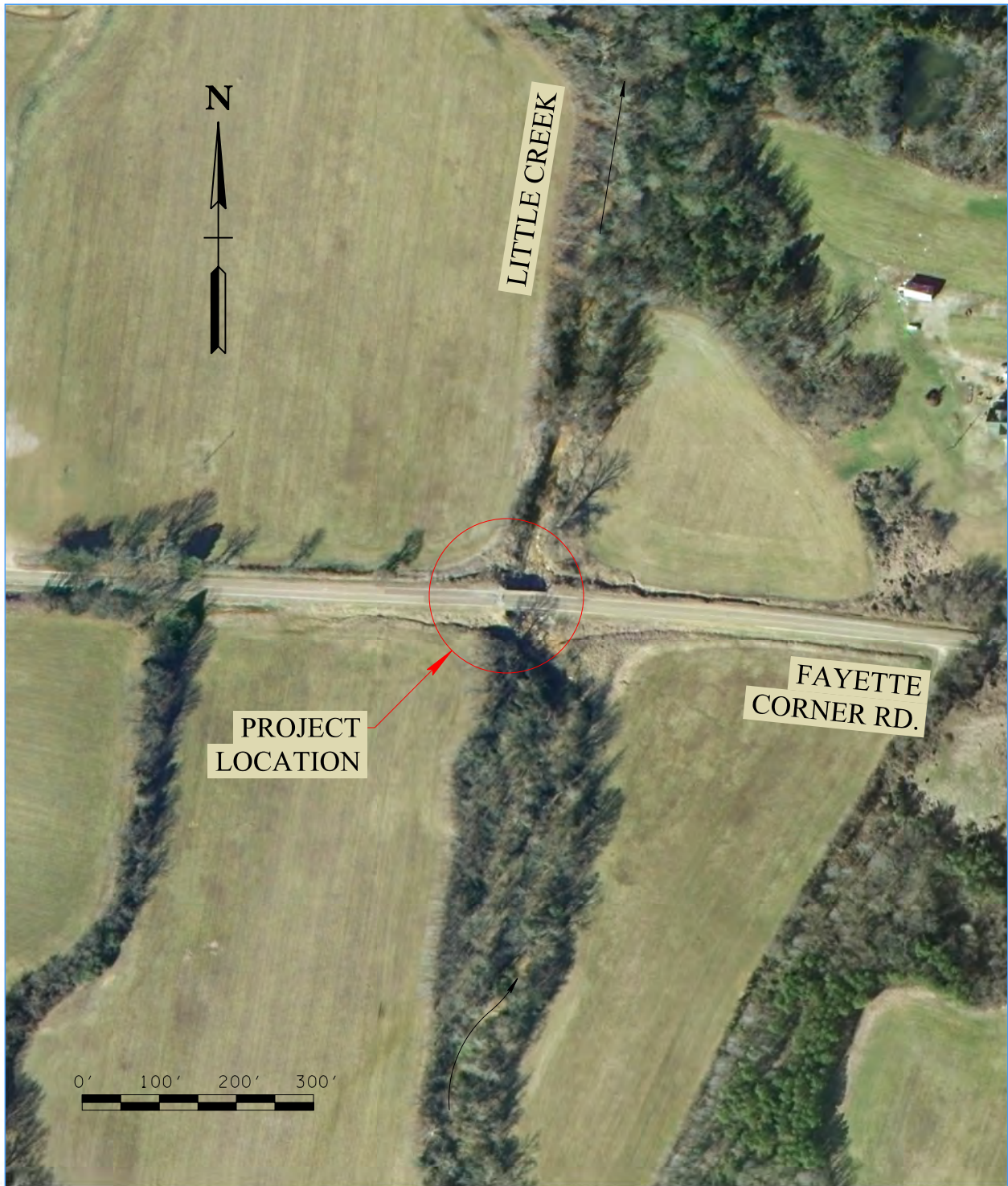
LOCATION MAP

LOCAL ROUTE 00840 (FAYETTE CORNER ROAD)
 BRIDGE #35F00270001 OVER LITTLE CREEK (L.M. 0.41)
 HARDEMAN COUNTY



PROJECT MAP

LOCAL ROUTE 00840 (FAYETTE CORNER ROAD)
BRIDGE #35F00270001 OVER LITTLE CREEK (L.M. 0.41)
HARDEMAN COUNTY



AERIAL MAP

LOCAL ROUTE 00840 (FAYETTE CORNER ROAD)
BRIDGE #35F00270001 OVER LITTLE CREEK (L.M. 0.41)
HARDEMAN COUNTY

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

County: Hardeman Route: Local Route 840 (Fayette Corner Road) Log Mile: 0.41
 Feature Crossed: Little Creek System: Local
 Functional Class: Rural Minor Collector Bridge ID: 35F00270001

EXISTING CONDITIONS

2016 AADT: 870 App. Cross Section: 18' / 24' / 40' No. Lanes: 2
 Approach Alignment: Tangent Year Built: 1960 Load Limit: 10 tons
 Width (out to out): 22 ft. Sidewalks: Right N/A Left N/A Length: 57 ft.
 No. Spans: Approach: 0 Main: 3
 Substructure: Timber Vertical Clearance: 15 ft. Sufficiency Rating: 47.0
 Other: Utility conduit attached to upstream (south) side of bridge.

PROPOSED IMPROVEMENTS

STANDARDS FROM RD01-TS- 2 (Table 1) Type of Work: Replace
 Design Year: 2036 Design AADT: 1,050 Terrain Rolling ADL (F): — (R): —
 Project Length: 468 ft Bridge Length: 72 ft Approach Length: 410 ft
 Design Speed (MPH): 40 Posted Speed (MPH): — Bike/Ped: —
 Min. Clear Bridge Width: 22' / 28' / As Req. Bridge Width (C to C): 32 ft No. Lanes: 2
 Right-of-Way Required: 0 Ac. Tract(s) 0 Structure Type: Conc. I-beam

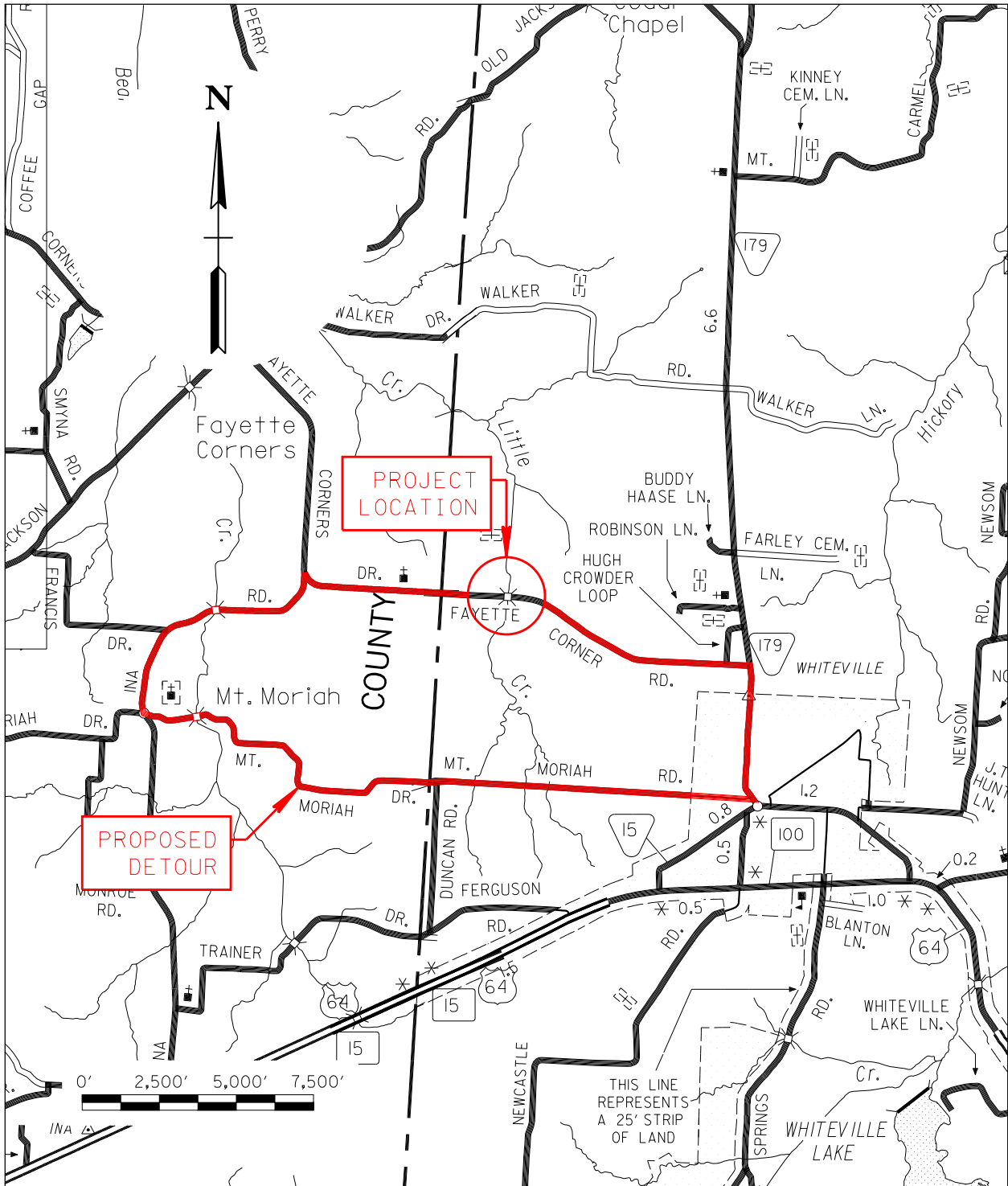
MAINTENANCE OF TRAFFIC

Temporary Detour: Temporary Runaround: Stage Construct:
 Alternate Route: 9.3 miles total. From west of bridge: left on Ina Road, left on Mount Moriah Road, left on State
 Route 179. From east of bridge: right on State Route 179, right on Mount Moriah Road, right on Ina Road.
 Remarks: Close roadway and detour traffic. See Detour Map for detour route. Road closure letter required.

ESTIMATED COST

Right-of-Way: \$10,000 Approaches: \$138,400 Structure: \$386,000
 Preliminary Engineering: \$74,300 Utilities: \$16,000 Misc./Cont.: \$160,100
 Mobilization: \$32,200 Total: \$817,000
 Remarks: Replace existing bridge with single-span, 72-foot structure.

Field investigation by: Glen Blankenship (TDOT Region 4 Survey), Mike Gilbert (TDOT Project Planning), Gena Gilliam (TDOT Project Planning), Jane Jones (TDOT Region 4 Design), Jason Moody (TDOT Region 4 Traffic), Patrick Murray (TranSystems Corporation), Lisa Reaney (TDOT Project Planning), Luke Sullivan (TranSystems Corporation), Fred Vinson (TDOT Region 4 ROW)



DETOUR MAP

LOCAL ROUTE 00840 (FAYETTE CORNER ROAD)
 BRIDGE #35F00270001 OVER LITTLE CREEK (L.M. 0.41)
 HARDEMAN COUNTY

Route:	Local Route 00840 (Fayette Corner Road)
Description:	Bridge #35F00270001 over Little Creek (LM 0.41)
County:	Hardeman
Length:	0.07 Miles
Date:	August 31, 2012

<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	\$ 3,000		\$ 12,000	\$ 15,000
Earthwork	\$ 3,000		\$ 12,000	\$ 15,000
Railroad Crossing or Separation	\$ -		\$ -	\$ -
Drainage	\$ -		\$ -	\$ -
Utilities	\$ 3,200		\$ 12,800	\$ 16,000
Structures	\$ 77,200		\$ 308,800	\$ 386,000
Pavement Removal	\$ 2,640		\$ 10,560	\$ 13,200
Paving	\$ 11,080		\$ 44,320	\$ 55,400
Roadway and Pavement Appurtenances	\$ -		\$ -	\$ -
Retaining Walls	\$ -		\$ -	\$ -
Topsoil	\$ -		\$ -	\$ -
Seeding	\$ 40		\$ 160	\$ 200
Sodding	\$ -		\$ -	\$ -
Rip-Rap or Slope Protection	\$ 4,500		\$ 18,000	\$ 22,500
Fencing	\$ -		\$ -	\$ -
Signing	\$ 200		\$ 800	\$ 1,000
Pavement Markings	\$ 60		\$ 240	\$ 300
Lighting	\$ -		\$ -	\$ -
Signalization	\$ -		\$ -	\$ -
Guardrail	\$ 3,160		\$ 12,640	\$ 15,800
Pay Item Quantity Adjustment (15%) ¹	\$ 16,510		\$ 66,000	\$ 82,600
Maintenance of Traffic	\$ -		\$ 10,000	\$ 10,000
Mobilization (5%)	\$ 6,300		\$ 25,800	\$ 32,200
CONSTRUCTION COST (rounded)	\$ 132,900		\$ 542,100	\$ 675,200
Engineering and Contingency (10%)	\$ 13,300		\$ 54,200	\$ 67,500
TOTAL CONSTRUCTION COST (rounded)	\$ 146,200		\$ 596,300	\$ 742,700
Preliminary Engineering (10%)	\$ 14,600		\$ 59,600	\$ 74,300
PROJECT COST (ROUNDED)²	\$ 160,800		\$ 655,900	\$ 817,000

¹ For estimating purposes pay items are adjusted for fluctuation of cost based on quantity.

² 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	1	\$ 10,000.00	\$ 10,000
RIGHT-OF-WAY TOTAL (ROUNDED)					\$ 10,000
201-01	Clearing and Grubbing	LS	1	\$ 15,000.00	\$ 15,000
CLEAR AND GRUBBING TOTAL (ROUNDED)					\$ 15,000
203-03	Borrow Excavation (Unclassified)	CY	1,000	\$ 15.00	\$ 15,000
EARTHWORK TOTAL (ROUNDED)					\$ 15,000
202-03 01	Removal of Asphalt Pavement	SY	880	\$ 15.00	\$ 13,200
PAVEMENT REMOVAL TOTAL (ROUNDED)					\$ 13,200
DRAINAGE TOTAL (ROUNDED)					\$ -
—	Relocation of Underground Utilities	LF	400	\$ 40.00	\$ 16,000
UTILITIES TOTAL (ROUNDED)					\$ 16,000
—	Removal of Existing Structure	SF	1,250	\$ 15.00	\$ 18,750
—	Structure	SF	2,448	\$ 150.00	\$ 367,200
STRUCTURES TOTAL (ROUNDED)					\$ 386,000
RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)					\$ -
303-01	Mineral Aggregate, Type A Base, Grading D	TON	600	\$ 20.00	\$ 12,000
307-01 01	ACS Mix (PG64-22) (BPMB-HM) Grading A	TON	27	\$ 100.00	\$ 2,700
307-01 08	ACS Mix (PG64-22) (BPMB-HM) Grading B-M2	TON	15	\$ 90.00	\$ 1,350
402-01	Bituminous Material for Prime Coat (PC)	TON	1.3	\$ 610.00	\$ 793
402-02	Aggregate for Cover Material (PC)	TON	5.3	\$ 25.00	\$ 133
403-01	Bituminous Material with Tack Coat (TC)	TON	0.2	\$ 635.00	\$ 127
411-01.10	ACS Mix (PG64-22) Grading D Roadway	TON	59	\$ 120.00	\$ 7,080
604-03 04	Pavement at Bridge Ends	SY	160	\$ 195.00	\$ 31,200
PAVING TOTAL (ROUNDED)					\$ 55,400
ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)					\$ -
RETAINING WALLS TOTAL (ROUNDED)					\$ -
712-01	Traffic Control	LS	1	\$ 10,000.00	\$ 10,000
MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)					\$ 10,000
203-07	Furnishing and Spreading Topsoil	CY	100	\$ 15.00	\$ 1,500
TOPSOIL TOTAL (ROUNDED)					\$ -
801-01	Seeding (With Mulch)	UNIT	5	\$ 28.00	\$ 140
801-03	Water (Seeding and Sodding)	MG	1	\$ 5.00	\$ 5
SEEDING TOTAL (ROUNDED)					\$ 200
SODDING TOTAL (ROUNDED)					\$ -
—	Signs	LS	1	\$ 1,000	\$ 1,000
SIGNING TOTAL (ROUNDED)					\$ 1,000
716-05 01	Painted Pavement Marking (4" Line)	LM	0 303	\$ 850.00	\$ 258
PAVEMENT MARKINGS TOTAL (ROUNDED)					\$ 300
LIGHTING TOTAL (ROUNDED)					\$ -
SIGNALIZATION TOTAL (ROUNDED)					\$ -
FENCE TOTAL (ROUNDED)					\$ -
705-01 01	Guardrail at Bridge Ends	LF	110	\$ 65.00	\$ 7,150
705-02 02	Single Guardrail (Type 2)	LF	50	\$ 20.00	\$ 1,000
705-04 04	Guardrail Terminal (Type 21)	EA	4	\$ 1,900.00	\$ 7,600
GUARDRAIL TOTAL (ROUNDED)					\$ 15,800
709-05 06	Machined Rip-Rap (Class A-1)	TON	750	\$ 30.00	\$ 22,500
RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)					\$ 22,500
PAY ITEM TOTAL (ROUNDED)					\$ 560,400



TranSystems

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MEMORANDUM

To: TDOT Project Planning Office
From: TranSystems Corporation
Date: August 31, 2012
Subject: **Project No. 99109-1453-04, PIN 117283.00**
Transportation Planning Report (TPR) Bridge Replacement
Local Route 00840 (Fayette Corner Road)
Bridge #35F00270001 over Little Creek (L.M. 0.41)
Hardeman County

A field review for the Fayette Corner Road bridge replacement TPR was held on July 12, 2012. The following table lists attendees present:

Name	Organization	Phone	E-mail
Glen Blankenship	TDOT Region 4 Survey	(731) 935-0137	glen.blankenship@tn.gov
Mike Gilbert	TDOT Project Planning	(615) 741-0772	michael.gilbert@tn.gov
Gena Gilliam	TDOT Project Planning	(615) 253-7692	gena.gilliam@tn.gov
Jane Jones	TDOT Region 4 Design	(731) 935-0140	jane.jones@tn.gov
Jason Moody	TDOT Region 4 Traffic	(731) 935-0183	jason.d.moody@tn.gov
Patrick Murray	TranSystems Corporation	(615) 829-7737	rpmurray@transystems.com
Lisa Reaney	TDOT Project Planning	(615) 741-0967	lisa.reaney@tn.gov
Luke Sullivan	TranSystems Corporation	(615) 829-7734	lrsullivan@transystems.com
Fred Vinson	TDOT Region 4 ROW	(731) 935-0115	fred.vinson@tn.gov

The existing bridge, built in 1960, is a three-span, precast concrete slab (PCCS) structure with a length of approximately 58 feet and an out-to-out deck width of approximately 21.5 feet. The bridge features timber piles and abutments. The most recent sufficiency rating for this bridge, determined during a November 2, 2010 inspection, is 47.0. Based on regression equations supplied by TDOT and the United States Geological Survey (USGS), the estimated 10-year depth of flow for the Little Creek drainage basin is approximately 8.4 feet and the 100-year depth of flow is approximately 10.8 feet.

Based on the conditions of the existing bridge, it is recommended that the structure be replaced. The design year for the new structure is 2036; the projected average annual daily traffic (AADT) for Fayette Corner Road at the design year is approximately 1,050 vehicles per day. The roadway is classified as a rural minor collector road and will feature two 11-foot travel lanes with 4-foot shoulders at a design speed of 40 miles per hour, per TDOT standard drawing RD01-TS-2.



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The proposed structure is a single-span, prestressed concrete I-beam bridge approximately 72 feet in length and with a deck width of approximately 34 feet. The proposed bridge will be constructed in the same location and have the same vertical and horizontal alignment as the existing structure. No permanent ROW acquisition is necessary. The existing utility conduit on the south side of the existing structure should be relocated to or replaced on the new structure. The low chord of the proposed bridge provides approximately 3.6 feet of clearance above the 100-year high water elevation. Fayette Corner Road is recommended to be closed at the construction limits during construction of the proposed bridge; a road closure agreement letter is necessary.

The estimated replacement cost for this bridge is approximately \$870,400, including costs for right-of-way, approaches, structure, preliminary engineering, utilities, mobilization, and miscellaneous items.

CHECKLIST 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 or shopping center | |
| 4. | Floodplains | X |
| 5. | Forested land | X |
| 6. | Historical, cultural, or natural landmark | |
| 7. | Industrial park or factory | |
| 8. | Institutional usages | |
| | a. School or educational institution | |
| | b. Church, cemetery, or religious institution | |
| | c. Hospital or medical facility | |
| | d. Public building (e.g., fire station) | |
| | e. Defense installation | |
| 9. | Recreational usages | |
| | a. Park or recreational area | |
| | b. Game preserve or wildlife area | |
| 10. | Residential establishment | X |
| 11. | Urban area, town, city, or community | |
| 12. | Waterway, lake, pond, river, stream, or spring | X |
| | Permits Required: Coast Guard | |
| | Section 404 | |
| | TVA Section 26a Review | |
| | 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.: 99109-1453-04 ROUTE: Fayette Corner Road
 COUNTY: Hardeman CITY: Whiteville
 PROJECT PIN NUMBER: _____
 PROJECT DESCRIPTION: Bridge over Little Creek on Fayette Corner Road
L.M. 0.41

DIVISION REQUESTING:

MAINTENANCE PAVEMENT DESIGN
 PLANNING STRUCTURES
 PROG. DEVELOPMENT & ADM. SURVEY & 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
870	2016	1,050	126	12	2036	65-35	3	4		

REQUESTED BY: NAME Glenda Tyus DATE 5/10/12
 DIVISION Project Planning
 ADDRESS 10th Floor, JKP Bldg
Nashville, TN 37243

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 5-14-12
 TRANSPORTATION MANAGER 1
 SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: DUDLEY DANIEL Dudley Daniel DATE 15 May 12
 TRANSPORTATION MANAGER 2
 SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

This Traffic is based on 2011 Cycle 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, ADTs 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)



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TRANSPORTATION PLANNING REPORT
 LOCAL ROUTE 00840 (FAYETTE CORNER ROAD)
 BRIDGE #35F00270001 OVER LITTLE CREEK (L.M. 0.41)
 HARDEMAN COUNTY

STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

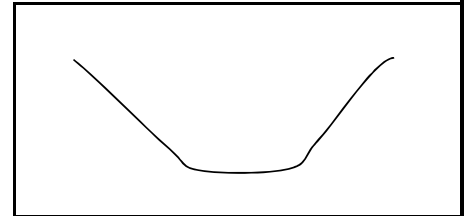
FIGURE 1
 LOCAL 00840
 L.M. 0.41

SITE INSPECTION

INSPECTION MADE BY: TranSystems Corporation BRIDGE ID: 35F00270001 COUNTY: Hardeman
 Date: 7/12/12 Route Name: Local Route 00840 (Fayette Corner Road) Stream Name: Little Creek

CHANNEL

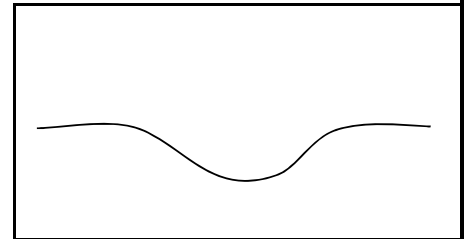
Approx depth and width of channel: Horizontal: _____ Vertical: _____
 Depth of normal flow: None In Reservoir: Yes No
 Depth of Ordinary High Water: N/A
 Type of material in stream bed: Sand, small boulders
 Type of vegetation on banks: Med. To dense brush and trees
 "N" factor of the channel: 0.05
 Are channel banks stable: Yes No
 If the streambed is gravel: $D_{30} =$ N/A $D_{85} =$ N/A
 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.: Cultivated (0.040) Right U.S.: Cultivated (0.040)
 Left D.S.: Cultivated (0.040) Right D.S.: Cultivated (0.040)
 Are roadway approaches lower than the structure? Yes No
 Are there any buildings in the floodplain? Yes No
 Approx. floor elevations: N/A
 Flood information from local residents:
 (elevations & dates) N/A



Floodplain Sketch

EXISTING STRUCTURE

Length: 58 ft. No. of spans: 3 Structure type: PCCS No. of lanes: 2 Skew: 90 °
 Width (out to out): 21.7 ft. Width (curb to curb): 20.3 ft. Approach: paved graveled
 Sidewalks on Structure: Yes No Bridgerail type: None Bridgerail height = N/A
 Superstructure depth: 2 ft. Finished Grade to low girder = 30 in. Girder depth = 36 in.
 Are any substructures in the channel? Yes No Vertical Clearance = 16.0 ft
 Indications of overtopping: None
 High water marks: None
 Local scour: Yes, _____ No
 Any signs of stream aggradation or degradation? None
 Any drift or drift potential? Yes, Drift can accumulate. No
 Any obstructions (pipes, stock fences, etc.)? None

PROPOSED STRUCTURE

Replacement Rehabilitate Widening New Location
 Bridge length: 72 ft Bridge type: Conc. I-beam Span arrangement: 1 Main Skew: 90 °
 Bridge width: 34.0 ft Sidewalks: N/A Design Speed (MPH): 40 ADT (2036) = 1,050
 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: \$150 per ft² X 72 / 34 length (ft) / width (ft) Cost = \$367,200
 Cost of bridge removal: \$15 per ft² X 57 / 22.0 length (ft) / width (ft) Cost = \$18,800
 Detour structure: Type and size = N/A Cost = \$0

Total Structure Cost = \$386,000

**Bridge TPR Flow Calculations
for Hydrologic Area 4
Area > 486 Acres**

County:	<u>Hardeman</u>	By:	<u>TranSystems Corp.</u>
Bridge ID:	<u>35F00270001</u>	Date:	<u>August 31, 2012</u>
Route:	<u>Local Route 00840 (Fayette Corner Road)</u>	PIN:	<u>117283.00</u>
Feature Crossed:	<u>Little Creek</u>		
Log Mile:	<u>0.41</u>		

DRAINAGE BASIN

Measurement from USGS quad =	<u>2,445</u>	ac.
Contributing drainage area (CDA) =	<u>3.82</u>	mi. ²

USGS REGRESSION EQUATIONS FOR FLOW

2-Year Flood Flow Rate = $Q_2 = 436 \times (CDA)^{0.527} =$	<u>884</u>	ft. ³ /sec.
5-Year Flood Flow Rate = $Q_5 = 618 \times (CDA)^{0.545} =$	<u>1,283</u>	ft. ³ /sec.
10-Year Flood Flow Rate = $Q_{10} = 735 \times (CDA)^{0.554} =$	<u>1,544</u>	ft. ³ /sec.
25-Year Flood Flow Rate = $Q_{25} = 878 \times (CDA)^{0.564} =$	<u>1,870</u>	ft. ³ /sec.
50-Year Flood Flow Rate = $Q_{50} = 981 \times (CDA)^{0.570} =$	<u>2,106</u>	ft. ³ /sec.
100-Year Flood Flow Rate = $Q_{100} = 1080 \times (CDA)^{0.575} =$	<u>2,334</u>	ft. ³ /sec.

FLOOD DEPTH OF FLOW EQUATIONS

10-Year Flood Depth of Flow (D_{10}) = $6.98 \times (CDA)^{0.142} =$	<u>8.4</u>	ft.
100-Year Flood Depth of Flow (D_{100}) = $9.24 \times (CDA)^{0.116} =$	<u>10.8</u>	ft.

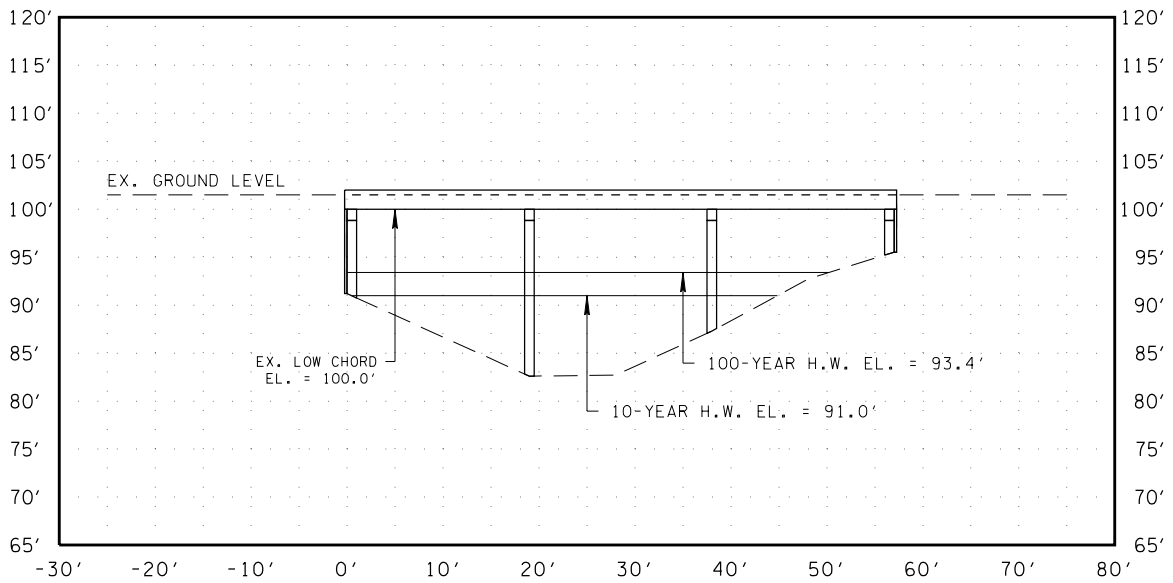
FLOOD AREAS

Existing Area Below Low Chord =	<u>665</u>	ft. ²
Proposed Area Below Low Chord =	<u>575</u>	ft. ²
Proposed 10-Year Flood Area (A_{10}) =	<u>227</u>	ft. ²
Proposed 100-Year Flood Area (A_{100}) =	<u>346</u>	ft. ²

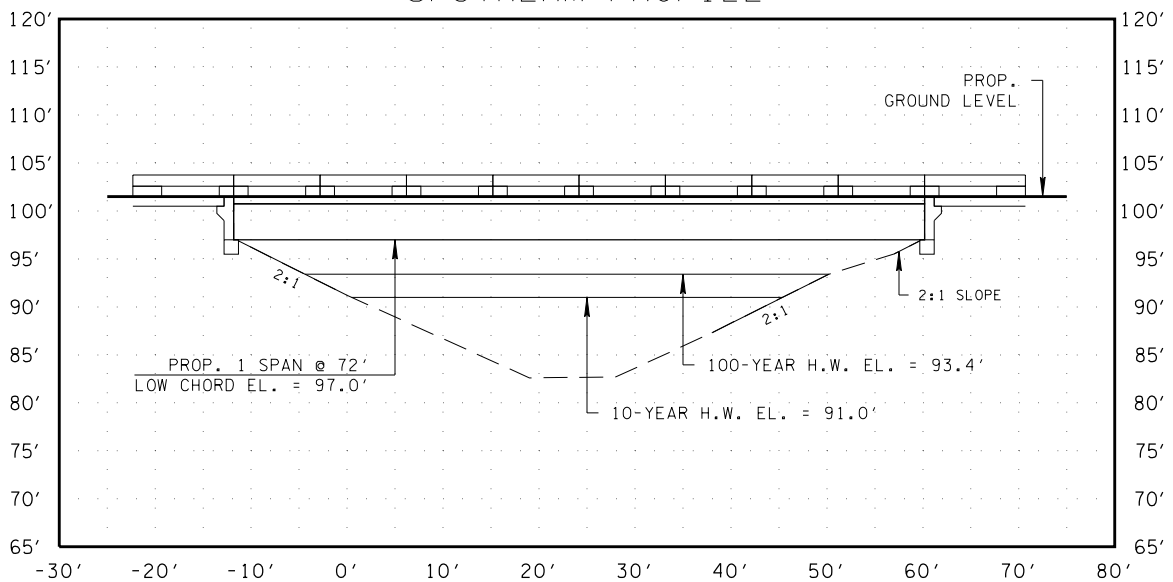
FLOOD VELOCITIES

Proposed 10-Year Flood Velocity (V_{10}) = $Q_{10} / A_{10} =$	<u>6.8</u>	ft./sec.
Proposed 100-Year Flood Velocity (V_{100}) = $Q_{100} / A_{100} =$	<u>6.7</u>	ft./sec.

EXISTING BRIDGE UPSTREAM PROFILE



PROPOSED BRIDGE UPSTREAM PROFILE



BRIDGE PROFILE

LOCAL ROUTE 00840 (FAYETTE CORNER ROAD)
BRIDGE #35F00270001 OVER LITTLE CREEK (L.M. 0.41)
HARDEMAN COUNTY



View upstream from bridge.



Right view of upstream floodplain.



Left view of upstream floodplain.



View downstream from bridge.



Right view of downstream floodplain.



Left view of downstream floodplain.



View forwards on route from bridge.



View backwards on route from bridge.



View of bridge inlet.



View of bridge outlet.