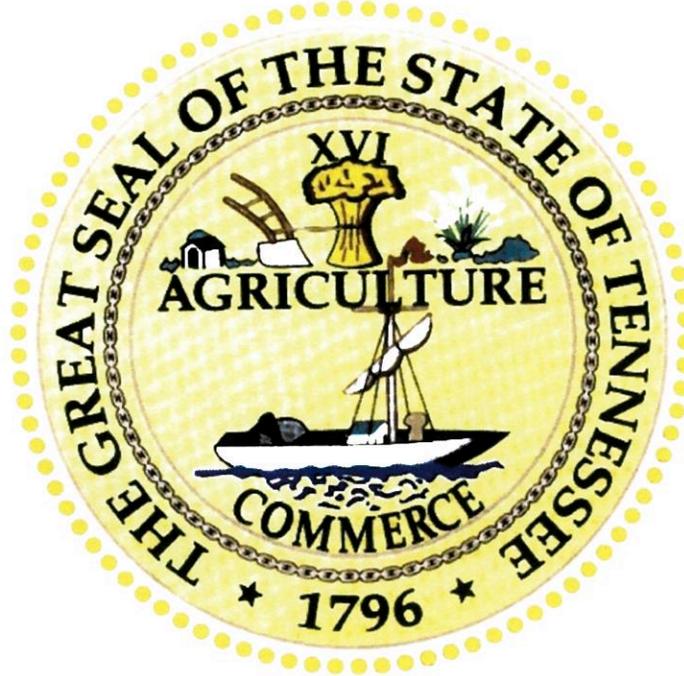


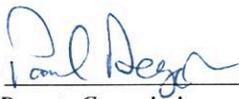
# TRANSPORTATION PLANNING REPORT

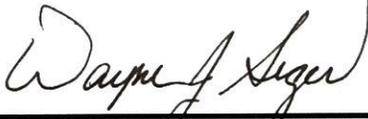
*Special Bridge Replacement Program*  
*LOCAL ROUTE 0A122 – FAIRGROUND LANE*  
*BRIDGE OVER FURNACE CREEK @ L.M. 0.02*  
*JOHNSON COUNTY*  
*PIN: 117017.00*



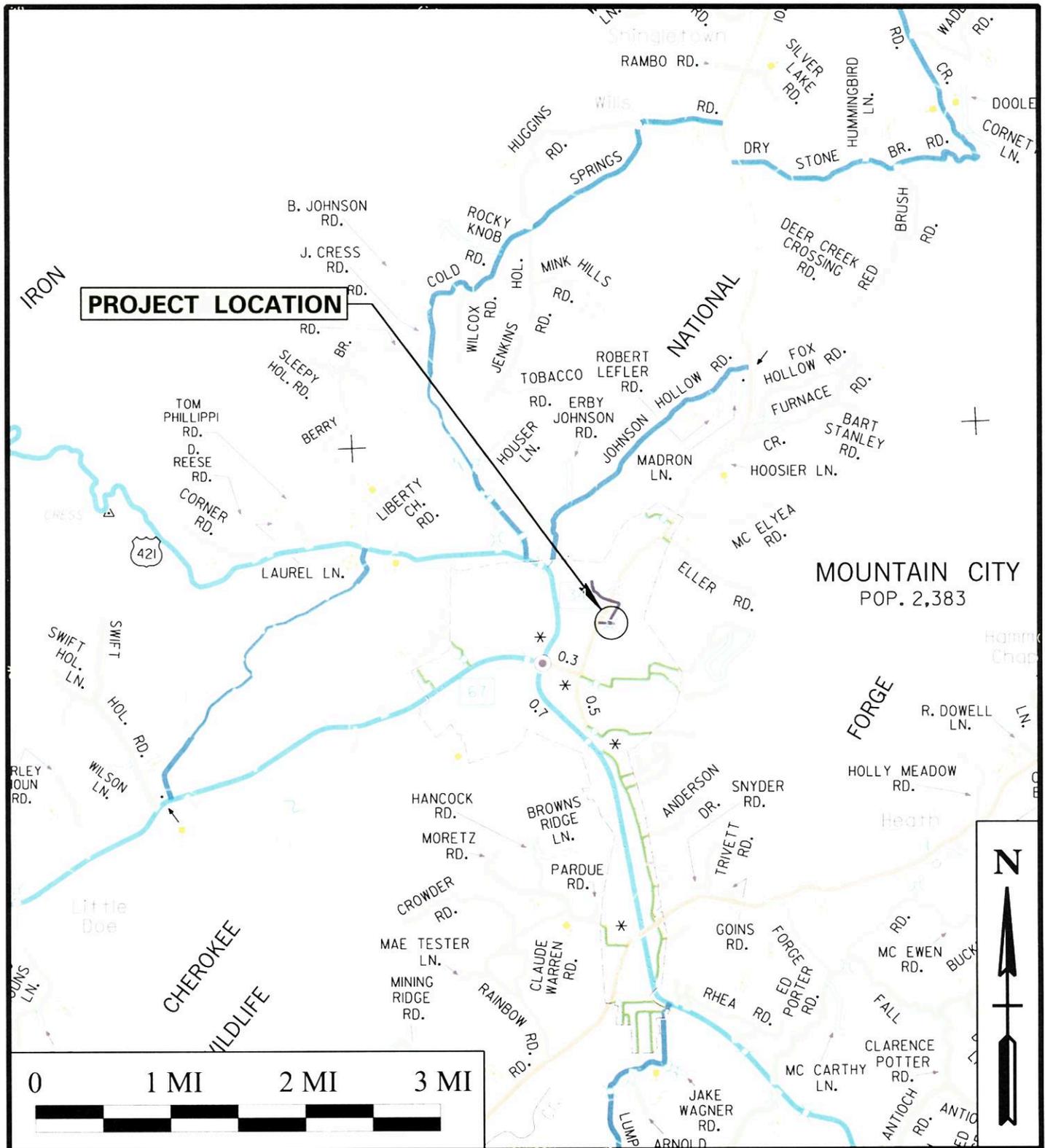
PREPARED BY  
TENNESSEE DEPARTMENT OF TRANSPORTATION  
PROJECT PLANNING DIVISION

Approved by  Date \_\_\_\_\_  
Chief of Environment and Planning

Approved by  Date 6/21/13  
Deputy Commissioner and Chief Engineer

Approved by:	Signature	DATE
Transportation Director Project Planning Division		6-5-13
Engineering Director Design Division		6-10-13
Engineering Director Structures Division		6-12-13

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

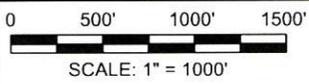
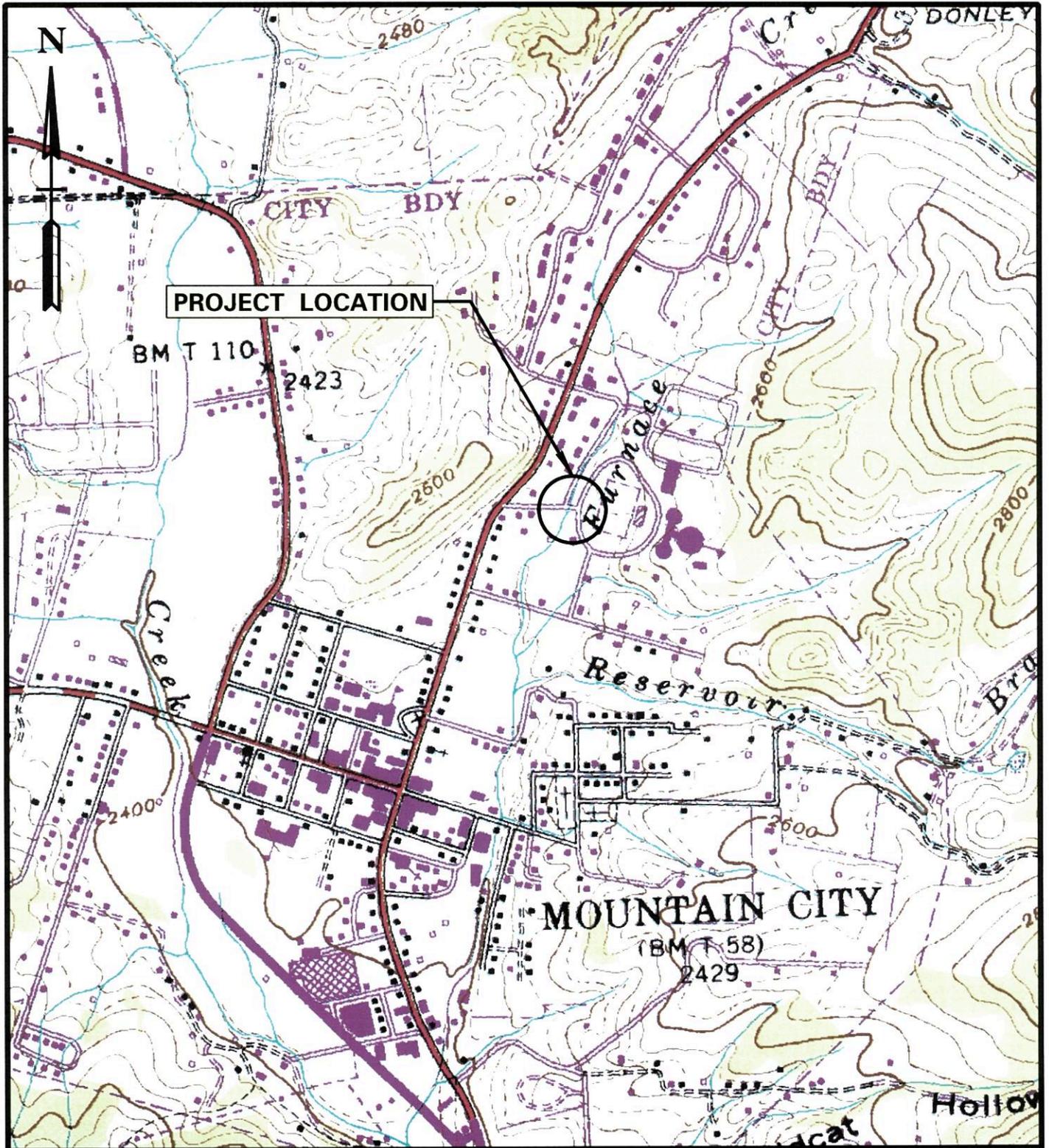


**PROJECT LOCATION**

**MOUNTAIN CITY**  
POP. 2,383



**AREA MAP**  
**ROUTE 0A122 JOHNSON COUNTY**  
**FAIRGROUND ROAD**  
**BRIDGE OVER FURNACE CREEK @ L.M. 0.02**  
**IN MOUNTAIN CITY**  
**BRIDGE ID 460A4350001**



**PROJECT MAP**  
ROUTE 0A122 JOHNSON COUNTY  
FAIRGROUND ROAD  
BRIDGE OVER FURNACE CREEK @ L.M. 0.02  
IN MOUNTAIN CITY  
BRIDGE ID 460A4350001



**PROJECT LOCATION**

0' 100' 200' 300'  
SCALE: 1" = 200'

**AERIAL MAP**  
**ROUTE 0A122 JOHNSON COUNTY**  
**FAIRGROUND ROAD**  
**BRIDGE OVER FURNACE CREEK @ L.M. 0.02**  
**IN MOUNTAIN CITY**  
**BRIDGE ID 460A4350001**

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

County: Johnson Route: 0A122 Log Mile: 0.02  
 Feature Crossed: Furnace Creek System: Local Route  
 Functional Class: Local Road Bridge ID: 460A4350001

**EXISTING CONDITIONS**

2017 AADT: 2,080 App. Cross Section: 24'/26'/52' No. Lanes: 2  
 Approach Alignment: Tangent Year Built: 1970 Load Limit: H(10 tons)  
 Width (out to out): 0.0 Sidewalks: Left -- Right 4' Length: 30  
 No. Spans: Approach: -- Main: 1  
 Substructure: Concrete Abutments Vertical Clearance: 7.6' Sufficiency Rating: 38.5  
 Other: None

**PROPOSED IMPROVEMENTS**

STANDARDS FROM RD01-TS- 1 Type of Work: Replace  
 Design Year: 2037 Design AADT: 2,500 Terrain Mount DHV: 550  
 Project Length: 275' Bridge Length: 39 ft Approach Length: 175'/WB - AsReq/EB  
 Design Speed (MPH): 30 Posted Speed (MPH): None Approach Width: 24' / 40' / As Req  
 Sidewalks: 5' (one side) Bridge Width (O to O): 48 ft No. Lanes: 2  
 Right-of-Way Required: 3 tracts (0.1 Acre) Tract(s) Structure Type: Box Bridge (3 @ 12 x 8)  
 Other: Johnson County High School has applied for the State of TN "Safe Routes to School" program. Pedestrian Sidewalk retrofitted to one side of the structure is one of the improvements they have requested.

**MAINTENANCE OF TRAFFIC**

Temporary Detour:  Temporary Runaround:  Stage Construct:   
 Alternate Route: Recommend building bridge during summer to avoid delays for Johnson County High School.  
Close Fairground Lane at the bridge and use Fairview Ave/Fairhaven St entrance as primary access during construction.  
See Detour for primary and secondary entrances during construction.  
 Remarks: \_\_\_\_\_

**ESTIMATED COST**

Right-of-Way: \$10,000 Approaches: \$168,800 Structure: \$253,300  
 Preliminary Engineering: \$52,800 Utilities: \$26,000 Misc./Cont.: \$47,100  
 Mobilization: \$22,800 Total: \$580,800

Remarks: The existing alignment and grade are to be maintained with a roadway width of 40 feet total, with two 12' lanes and two 8' shoulders in order to meet the design standards according to RD01-TS-1. A small amount of right-of-way will be required from adjacent property owners.

Field Investigation by: Randy Plummer (Reg. 1 Design), Bailee Young (Reg. 1 Intern), Barry Bishop (Mountain City Rdwy. Sup.) Bob Ellen (Mountain City Highway Dept.), Mike Gilbert, David Duncan, and Terrance Hill (TDOT Planning)

Route:	Fairground Lane (0A122)
Description:	Bridge Replacement over Furnace Creek @ L.M. 0.02
County:	Johnson
Length:	275 Feet
Date:	June 5, 2013

<u>DESCRIPTION</u>	<u>STATE</u>	<u>LOCAL</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ -	\$ 2,000	\$ 8,000	\$ 10,000
Clearing and Grubbing	\$ -	\$ 400	\$ 1,600	\$ 2,000
Earthwork	\$ -	\$ 500	\$ 2,000	\$ 2,500
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ -	\$ 320	\$ 1,280	\$ 1,600
Utilities	\$ -	\$ 5,200	\$ 20,800	\$ 26,000
Structures	\$ -	\$ 55,500	\$ 222,100	\$ 277,600
Pavement Removal	\$ -	\$ 1,200	\$ 4,900	\$ 6,100
Paving	\$ -	\$ 11,900	\$ 47,700	\$ 59,600
Roadway and Pavement Appurtenances	\$ -	\$ 2,240	\$ 8,960	\$ 11,200
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ -	\$ -	\$ -	\$ -
Seeding	\$ -	\$ -	\$ -	\$ -
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ -	\$ 300	\$ 1,200	\$ 1,500
Fencing	\$ -	\$ -	\$ -	\$ -
Signing	\$ -	\$ -	\$ -	\$ -
Pavement Markings	\$ -	\$ 100	\$ 300	\$ 400
Lighting	\$ -	\$ -	\$ -	\$ -
Signalization	\$ -	\$ -	\$ -	\$ -
Guardrail	\$ -	\$ 1,800	\$ 7,100	\$ 8,900
Other Construction Items (15%)	\$ -	\$ 12,200	\$ 48,900	\$ 61,100
Maintenance of Traffic	\$ -	\$ 3,000	\$ 12,000	\$ 15,000
Mobilization (5%)	\$ -	\$ 4,800	\$ 19,400	\$ 24,200
CONSTRUCTION COST (rounded)	\$ -	\$ 101,500	\$ 406,200	\$ 507,700
Engineering and Contingency (10%)	\$ -	\$ 10,200	\$ 40,600	\$ 50,800
TOTAL CONSTRUCTION COST (rounded)	\$ -	\$ 111,700	\$ 446,800	\$ 558,500
Preliminary Engineering (10%)	\$ -	\$ 11,200	\$ 44,700	\$ 55,900
<b>PROJECT COST<sup>1</sup> (rounded)</b>	<b>\$ -</b>	<b>\$122,900</b>	<b>\$ 491,500</b>	<b>\$ 614,400</b>

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

Local Route 0A122  
LM 0.02 (Bridge Replacement)

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
-	Right-of-Way	LS	LS		\$ 10,000
<b>RIGHT-OF-WAY TOTAL (ROUNDED)</b>					<b>\$ 10,000</b>
201-01	Clearing and Grubbing	LS	LS	\$ 2,000.00	\$ 2,000
<b>CLEAR AND GRUBBING TOTAL (ROUNDED)</b>					<b>\$ 2,000</b>
203-03	Borrow Excavation (Unclassified)	LS	LS	\$ 2,500.00	\$ 2,500
<b>EARTHWORK TOTAL (ROUNDED)</b>					<b>\$ 2,500</b>
202-03.01	Removal of Asphalt Pavement	SY	1,115	\$ 5.20	\$ 5,798
415-01.02	Cold Planing Bituminous Pavement	SY	140	\$ 1.84	\$ 258
<b>PAVEMENT REMOVAL TOTAL (ROUNDED)</b>					<b>\$ 6,100</b>
209-08.02	Temporary Silt Fence (w/ backing)	LF	400	\$ 4.00	\$ 1,600
<b>DRAINAGE TOTAL (ROUNDED)</b>					<b>\$ 1,600</b>
770-18.10	Above Ground Utilities	LF	2100	\$ 10.00	\$ 21,000
	35FT Wood Pole	EA	1	\$ 5,000.00	\$ 5,000
<b>UTILITIES TOTAL (ROUNDED)</b>					<b>\$ 26,000</b>
	Removal of Existing Bridge	SF	963	\$ 20.00	\$ 19,260
	Box Bridge	SF	2,067	\$ 125.00	\$ 258,375
<b>STRUCTURES TOTAL (ROUNDED)</b>					<b>\$ 277,600</b>
--	Full Depth Paving	SY	1324	\$ 32.00	\$ 42,368
411-03.10	ACS Mix (PG76-22) Grading D	TON	27.2	\$ 96.00	\$ 2,611
403-01	Bituminous Material for Tack Coat (TC)	TON	0.4	\$ 511.00	\$ 204
303-01	Mineral Aggregate, TY A Base, Grading D	TON	685.7	\$ 21.00	\$ 14,400
<b>PAVING TOTAL (ROUNDED)</b>					<b>\$ 59,600</b>
701-01.02	Concrete Sidewalk (6")	SF	2212	\$ 3.10	\$ 6,857
701-02.03	Concrete Handicap Ramp	SF	240	\$ 18.00	\$ 4,320
<b>ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)</b>					<b>\$ 11,200</b>
712-01	Traffic Control	LS	\$ 5,000	\$ 15,000.00	\$ 15,000
<b>MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)</b>					<b>\$ 15,000</b>
716-11.01	Spray Thermo Pvmt Mrkng (4" Line)	LM	0.20	\$ 1,834.00	\$ 367
<b>PAVEMENT MARKINGS TOTAL (ROUNDED)</b>					<b>\$ 400</b>
705-04.07	Type 38 Guardrail End Treatment	EACH	2	\$ 2,075.00	\$ 4,150
705-04.09	Earth Pad for Type 38	EACH	2	\$ 820.00	\$ 1,640
705-01.01	Guardrail at Bridge Ends	LF	50	\$ 62.00	\$ 3,100
<b>GUARDRAIL TOTAL (ROUNDED)</b>					<b>\$ 8,900</b>
709-05.06	Machined Rip-Rap (Class A-1)	TON	50	\$ 30.00	\$ 1,500
<b>RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)</b>					<b>\$ 1,500</b>



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

**MEMORANDUM**

**TO:** Project Planning Office

**FROM:** David Duncan, Transportation Project Specialist 2  
Conceptual and NEPA Planning Office

**DATE:** February 8, 2013

**SUBJECT:** TPR Field Review (Special Bridge Replacement Program)  
Local Route 0A122 (Fairground Lane)  
Bridge over Furnace Creek Log Mile 0.02  
Johnson County

A field review was held for the above-mentioned project on June 6, 2012.

The existing structure is a single span bridge with steel I-beams. The concrete deck has been poured to interlock with the steel I-beams leaving only the bottom flange of the beams exposed. The overall bridge length is 30 feet with approximately 7.6 feet for the vertical clearance. The bridge has an out-to-out width of 32'1" and a curb-to-curb width of 26'2". The sufficiency rating for the structure is 38.5. 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 10.6 feet and the 10-year flow depth is 7.8 feet.

The route has a base year (2017) AADT of 2080 and a design year (2037) AADT of 2500. These are relatively high traffic volumes for a local route given that Fairground Lane serves as the primary access to Johnson County High School and Middle School. The proposed bridge over Forge Creek will consist of an out-to-out width of 48 feet with two (2), twelve (12) feet lanes and two (2), eight (8) feet shoulders in order to meet design standard RD01-TS-1 (AADT 2000 =>, Mountainous, 30 MPH). The length of the entire project will be approximately 275 feet. It is recommended that the proposed structure be a concrete box or slab bridge with a total length of thirty-nine (39) feet. The proposed vertical clearance will be approximately eight (8) feet. There are some signs of overtopping, but it is recommended to maintain the existing grade since this will have adverse impacts to the adjacent football field. If further investigation proves that impacts could be avoided or mitigated then raising the grade would be preferable.

The proposed structure will be wider than the existing which will increase the approach widths. A small amount of ROW will be required to adjust the fill slopes since the approaches will be need to be widened. Additionally, there is a utility pole adjacent to the structure that will need to be relocated.

Johnson County has submitted an application to TDOT for the "Safe Routes to School" program. This application requested either sidewalks be retrofitted to the existing structure or a pedestrian bridge be constructed adjacent to the existing structure. The addition of five (5) feet sidewalks with ADA handicap ramps on the structure is recommended in order to fulfill the needs of Johnson County High School and Middle School. With the addition of sidewalks, the proposed bridge width will be fifty-three (53) feet.

TDOT was informed by Johnson County after the field review that the existing structure has been closed. A detour map has been included in the report, but detour routes have been established by county officials due to the current closure.

The required approach work, utility relocations, estimated replacement, and preliminary engineering costs for this bridge are approximately \$614,400.

DD

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	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	X
b. Church or other religious institution (Cemetery)	
c. Hospital or other medical facility	
d. Public building, e.g., fire station	
e. Defense installation	
9. Recreation usages	
a. Park or recreational area	
b. Game preserve or wildlife area	
10. Residential establishment	
11. Urban area, town, city, or community	X
12. Waterway, lake, pond, river, stream, spring	X
Permit required: Coast Guard	
Section 404	X
TVA Section 26a review	X
NPDES	X
Aquatic Resource Alteration	X
13. Other	
14. Location coordinated with local officials	
15. Railroad crossings	
16. Hazardous materials site	

**TENNESSEE DEPARTMENT OF TRANSPORTATION  
PROJECT PLANNING DIVISION**

PROJECT No. \_\_\_\_\_ ROUTE Fairground Rd (05A122)  
 COUNTY Johnson CITY Mountain City  
 PROJECT PIN NUMBER 04040000  
 PROJECT DESCRIPTION Special Bridge Replacement Program  
Bridge over Furnace Creek  
1.M.002

**DIVISION REQUESTING:**

MAINTENANCE  PAVEMENT DESIGN   
 PLANNING  STRUCTURES   
 PROJECT DEVELOPMENT & ADM.  SURVEY & DESIGN   
 PUBLIC TRANS & AERO  TRAFFIC SIGNAL DESIGN   
 YEAR PROJECT PROGRAMMED FOR CONSTRUCTION \_\_\_\_\_ OTHER \_\_\_\_\_  
 PROJECT DEDICATING DATE \_\_\_\_\_

**TRAFFIC ASSIGNMENT:**

BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
AADT	YEAR	AADT	DIV	%	YEAR	DIR/DIST	DIV	AADT	FLEX	RIGID
2,080	2017	2,500	550	22	2037	65-35	1	2		

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

REVIEWED BY TONY ARMSTRONG *Tony Armstrong* DATE 8-16-12  
 TRANSPORTATION MANAGER 1  
 SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY DUDLEY DANIEL *Dudley Daniel* DATE 8-16-12  
 TRANSPORTATION MANAGER 2  
 SUITE 1000, JAMES K. POLK BUILDING

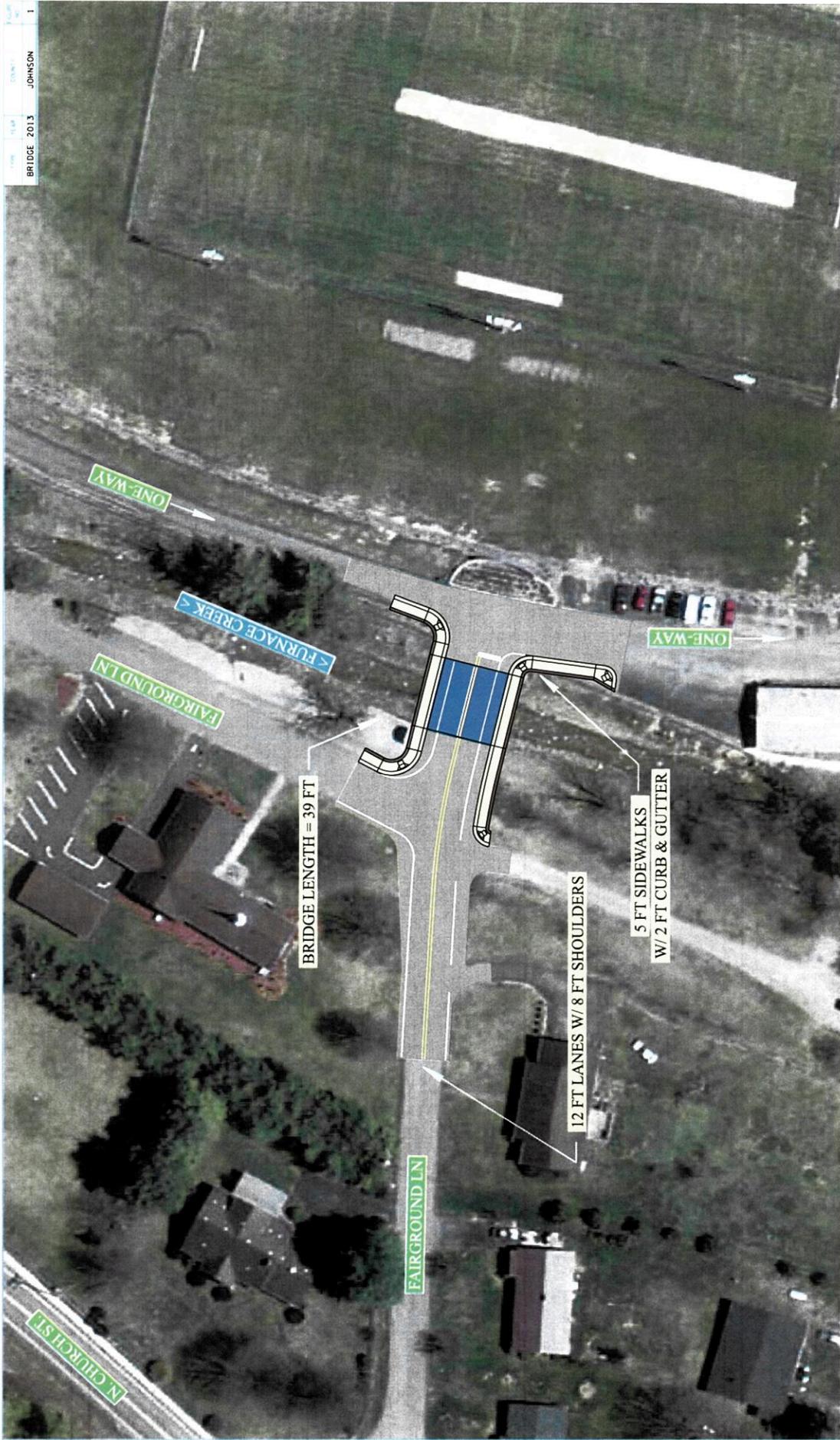
**COMMENTS:**

This Traffic Based on [24 hour] Machine Count, (August 2012). The Future Traffic is based on Growth Rate from the ADAM Computer Program

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

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, DIVS ARE NOT REQUIRED FOR AADT'S OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.

SEE ATTACHMENTS FOR DURING MOVEMENTS AND/OR OTHER DETAILS.



STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 PROJECT PLANNING DIVISION

**BRIDGE REPLACEMENT**

FAIRGROUND REAL TRAFFIC I.M. JOB  
 BRIDGE AND ROADWAY  
 PROJECT NO. 2013-001

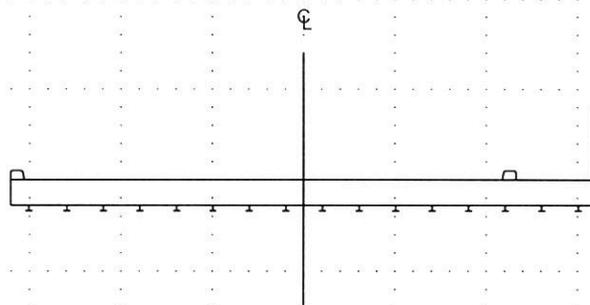


STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION  
 PROJECT NUMBER: 0-11510M

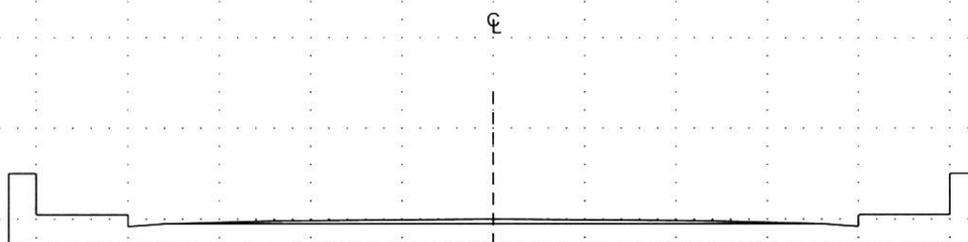
ROUTE 542Z, JOHNSON COUNTY  
 FAIRGROUND ROAD  
 BRIDGE OVER FURNACE CREEK @ L.M. 0.02  
 IN MOUNTAIN CITY  
 BRIDGE ID: 4634435001



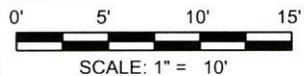
EXISTING STRUCTURE



COMPLETED PROPOSED STRUCTURE



TOTAL WIDTH = 53.0'



**STAGE CONSTRUCTION DETAIL**  
**LOCAL ROUTE 0A122 JOHNSON COUNTY**  
**BRIDGE OVER FORGE CREEK @ L.M. 0.02**  
**BRIDGE ID: 460A4350001**



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

County: Johnson  
 Bridge ID: 460A4350001  
 Route: 0A122  
 Feature Crossed: Furnace Creek  
 Log Mile: 0.02

By: DD  
 Date: 6/5/13  
 PIN: 117017.00

**DRAINAGE BASIN**

Measurement from quad = 4,448 acres  
 Contributing Drainage Area, CDA = acres/640 = 6.95 sq. mi.

**USGS REGRESSION EQUATIONS FOR FLOW**

$Q_2 = 207(CDA)^{0.725} =$  844 cfs  
 $Q_5 = 344(CDA)^{0.715} =$  1,376 cfs  
 $Q_{10} = 444(CDA)^{0.711} =$  1,762 cfs  
 $Q_{25} = 578(CDA)^{0.708} =$  2,281 cfs  
 $Q_{50} = 682(CDA)^{0.706} =$  2,681 cfs  
 $Q_{100} = 788(CDA)^{0.705} =$  3,091 cfs

**DEPTH OF FLOW EQUATIONS**

10-Year Flood Depth =  $5.33(CDA)^{0.197} =$  7.8 ft  
 100-Year Flood Depth =  $7.43(CDA)^{0.181} =$  10.6 ft

**AREAS**

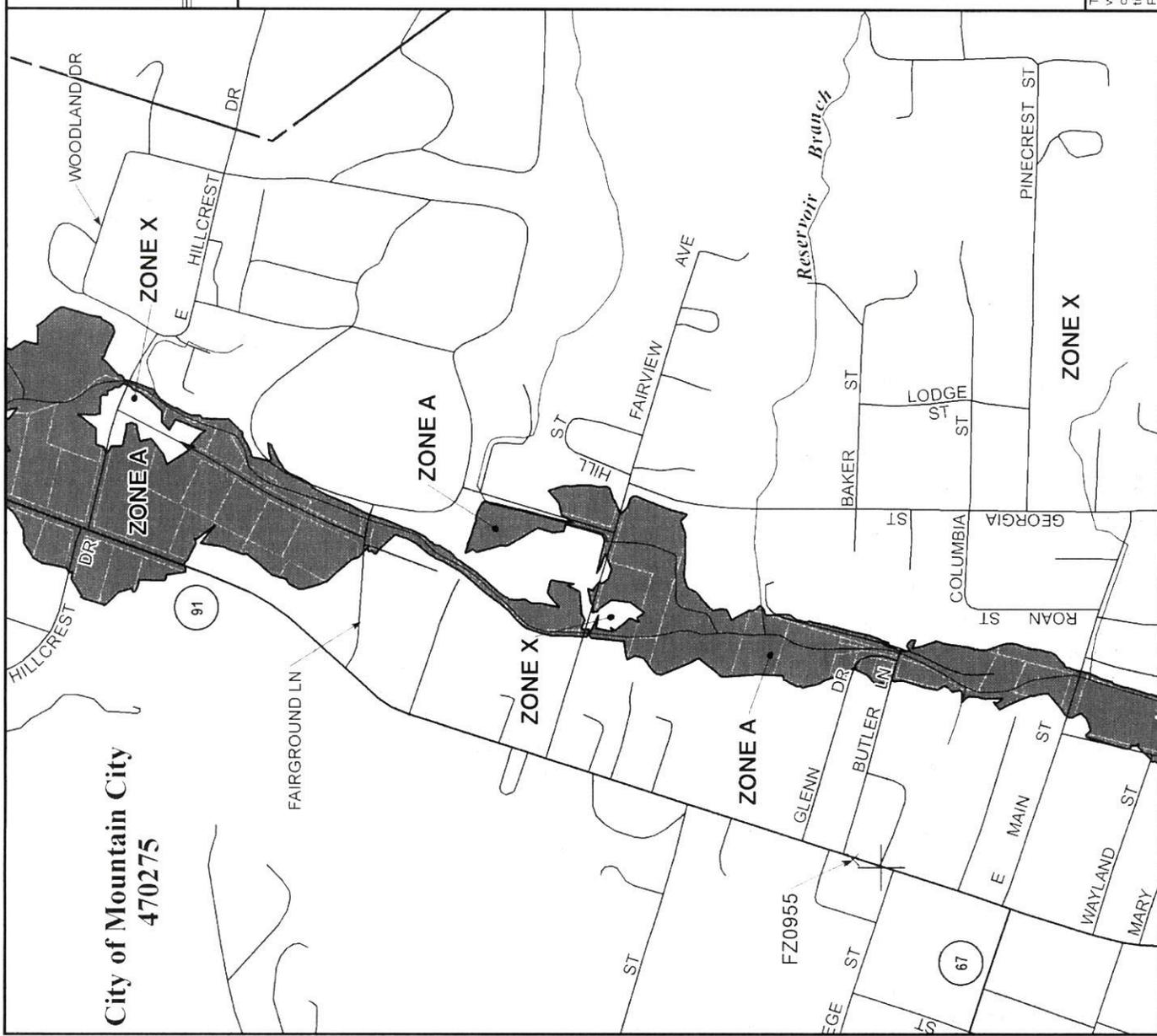
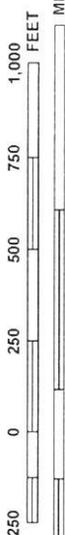
Existing Area Below Low Chord = 566 ft<sup>2</sup>  
 Proposed Area Below Low Chord = 570 ft<sup>2</sup>  
 Proposed 10-Year Flood Area,  $A_{10} =$  183 ft<sup>2</sup>  
 Proposed 100-Year Flood Area,  $A_{100} =$  303 ft<sup>2</sup>

**VELOCITIES**

Proposed 10-Year Flood Velocity,  $V_{10} = Q_{10}/A_{10} =$  9.6 fps  
 Proposed 100-Year Flood Velocity,  $V_{100} = Q_{100}/A_{100} =$  10.2 fps



MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0131C

**FIRM**  
FLOOD INSURANCE RATE MAP  
JOHNSON COUNTY,  
TENNESSEE  
AND INCORPORATED AREAS

PANEL 131 OF 275  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	
COMMUNITY	NUMBER PANEL SUFFIX
JOHNSON COUNTY	470230 0131 C
MOUNTAIN CITY, CITY OF	470275 0131 C

Note 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.

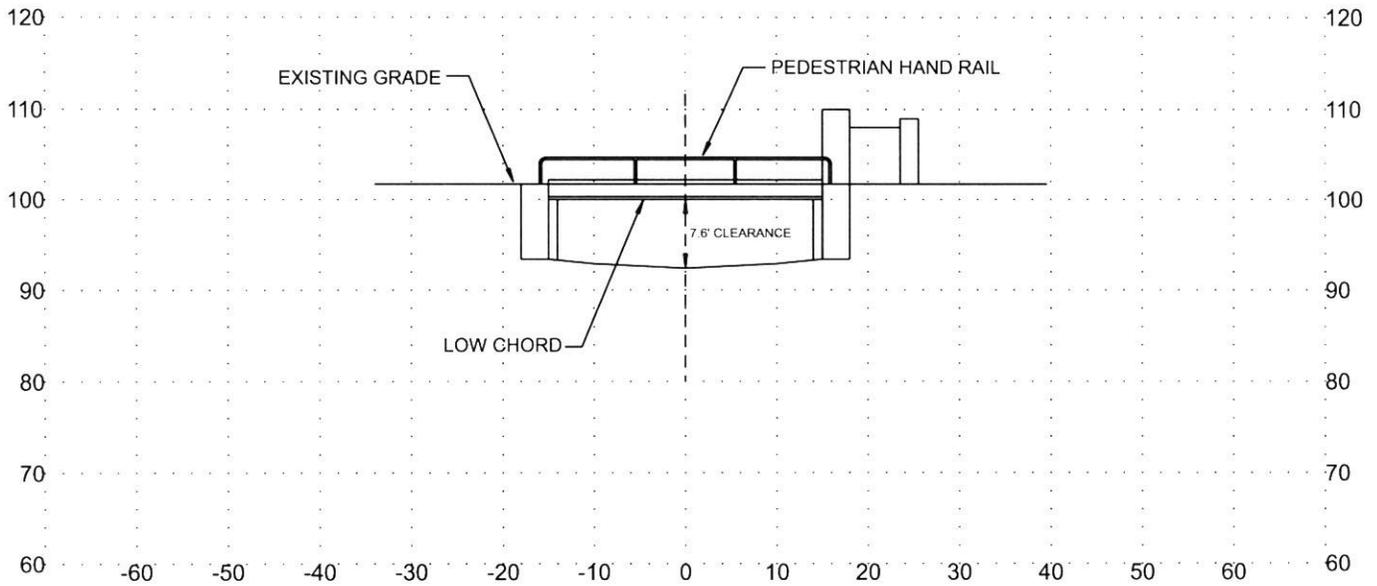


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47091C0131C  
EFFECTIVE DATE  
JUNE 16, 2009

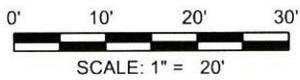
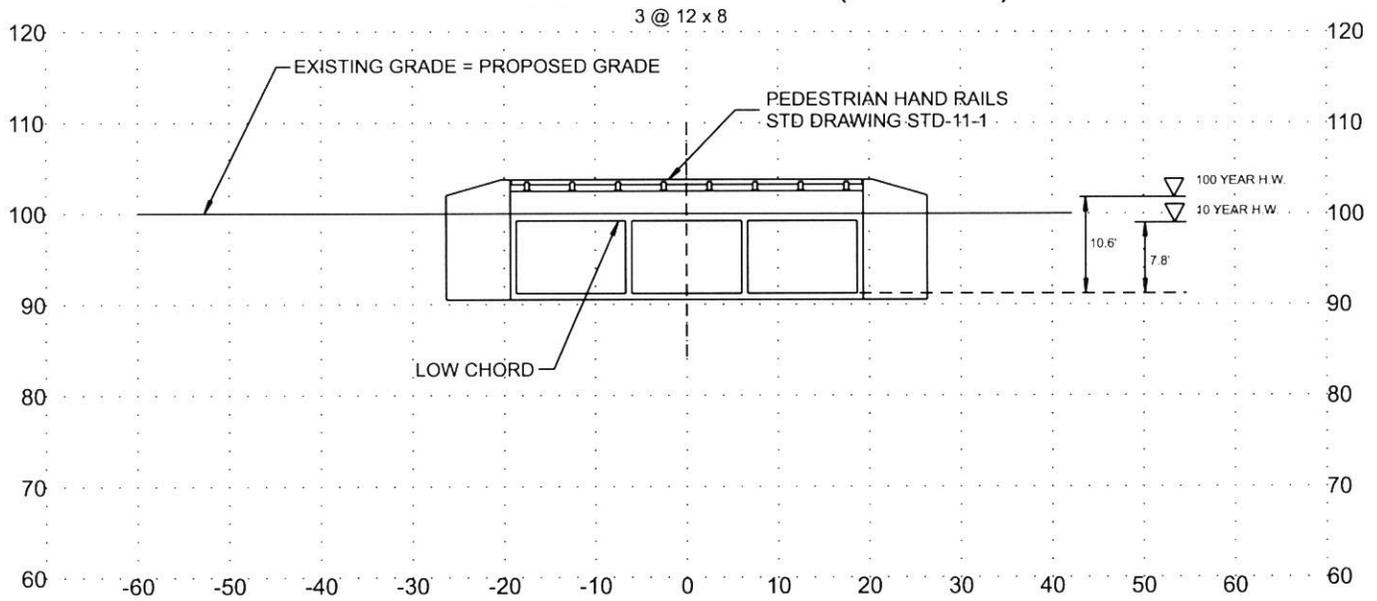
Federal Emergency Management Agency

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 flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

## EXISTING STRUCTURE (OUTLET)



## PROPOSED STRUCTURE (OUTLET)



**BRIDGE SECTIONS**  
 LOCAL ROUTE 0A122    JOHNSON COUNTY  
 BRIDGE OVER FURNACE CREEK @ L.M. 0.02  
 BRIDGE ID 460A4350001

Johnson County  
Bridge ID: 460A4350001

**PICTURES**



**EASTBOUND APPROACH (LOOKING WEST)**



**WESTBOUND APPROACH (LOOKING EAST)**

Johnson County  
Bridge ID: 460A4350001

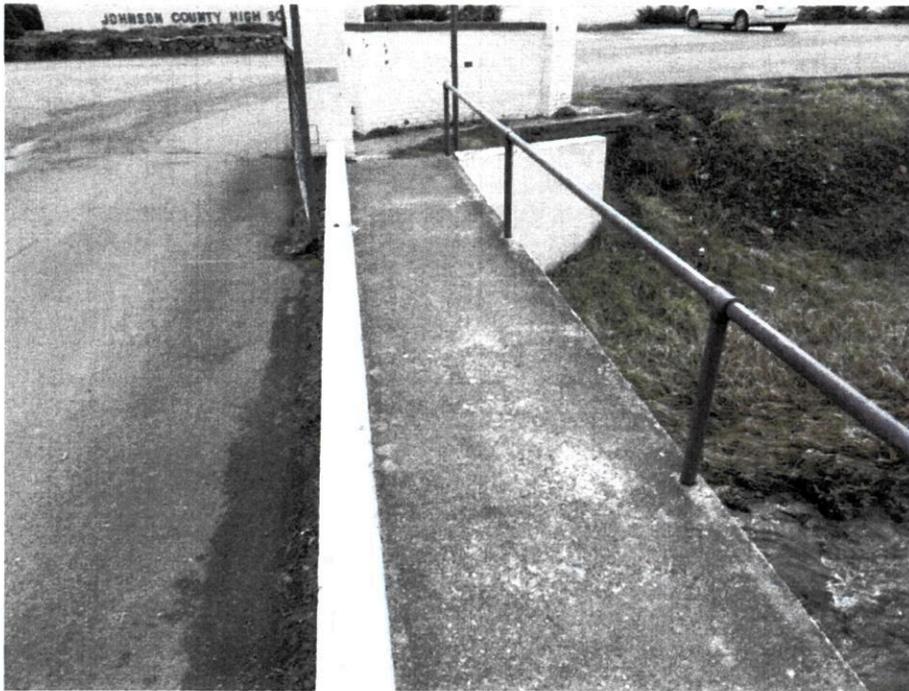


**WESTBOUND APPROACH (LOOKING WEST)**



**EASTBOUND APPROACH (LOOKING EAST)**

Johnson County  
Bridge ID: 460A4350001



**FOUR (4) FOOT SIDEWALK ON THE RIGHT SIDE**



**RAISED CURB ON THE LEFT SIDE**

Johnson County  
Bridge ID: 460A4350001



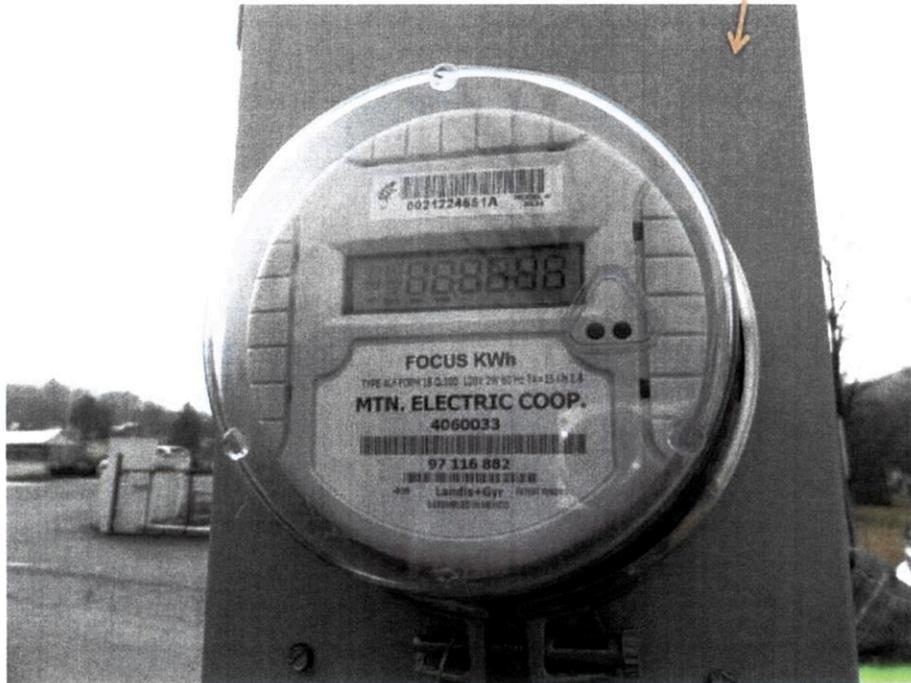
OUTLET



INLET



UTILITIES ADJACENT TO STRUCTURE



Johnson County  
Bridge ID: 460A4350001



**UPSTREAM**



**UPSTREAM LEFT**

Johnson County  
Bridge ID: 460A4350001



**UPSTREAM RIGHT**



**DOWNSTREAM**

Johnson County  
Bridge ID: 460A4350001



**DOWNSTREAM LEFT**

Johnson County  
Bridge ID: 460A4350001



**DOWNSTREAM RIGHT**



**CORRUGATED METAL PIPE**

Johnson County  
Bridge ID: 460A4350001



STRUCTURAL VIEW



VIEW UNDER THE DECK

Johnson County  
Bridge ID: 460A4350001



**STEEL BEAMS WITH ONLY BOTTOM FLANGE EXPOSED**