

TRANSPORTATION PLANNING REPORT

SPECIAL BRIDGE REPLACEMENT PROGRAM

Battery Lane
Bridge over West Fork Brown's Creek
Log Mile 4.31
Davidson County
PIN 106007

PREPARED BY
 THE TENNESSEE DEPARTMENT OF TRANSPORTATION
 PROJECT PLANNING DIVISION

Approved by: Ed Cole
 Chief of Env. & Pln.

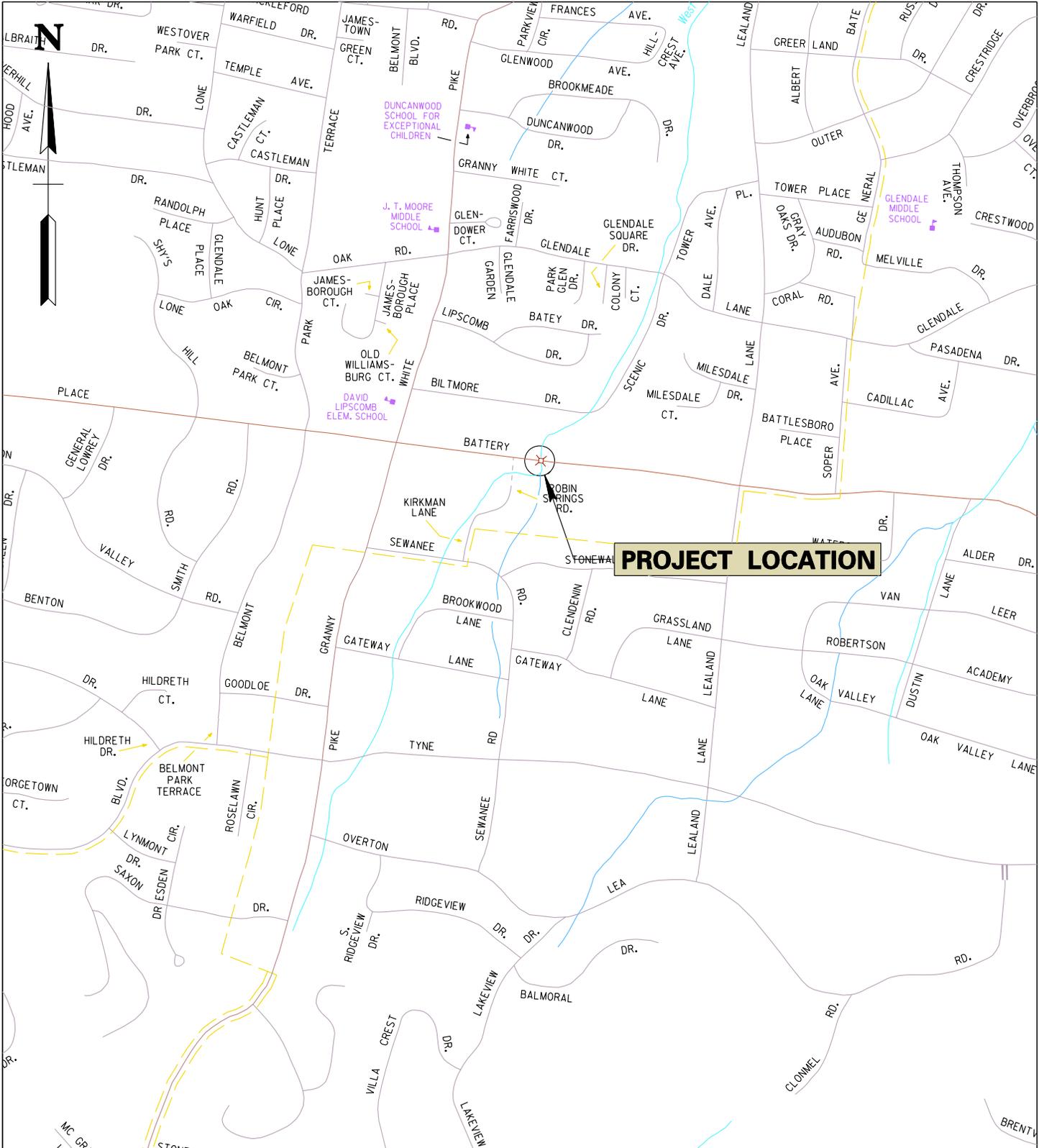
10/24/06
 Date

Paul D. Degez
 Chief Engineer

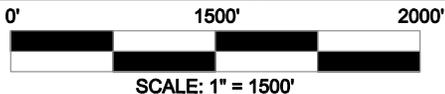
10/22/06
 Date

REVISION

Recommended by:	INITIALS	DATE	Recommended by:	INITIALS	DATE
TRANS. DIRECTOR PROJECT PLANNING DIVISION	SA	6-18-06	TRANS. DIRECTOR PROJECT PLANNING DIVISION		
TRANS. DIRECTOR ENVIRONMENTAL DIVISION	SA	9/21/06	TRANS. DIRECTOR ENVIRONMENTAL DIVISION		
ENG. DIRECTOR DESIGN DIVISION	JH	9/25/06	ENG. DIRECTOR DESIGN DIVISION		
ENG. DIRECTOR STRUCTURES DIVISION	ETD	10/04/06	ENG. DIRECTOR STRUCTURES DIVISION		
TRANS. DIRECTOR PROG. DEV. DIVISION	JUN	10/5/06	TRANS. DIRECTOR PROG. DEV. DIVISION		
ASSISTANT CHIEF ENGINEER	AA	10/13/06	ASSISTANT CHIEF ENGINEER		
ASSISTANT CHIEF OF ENV. & PLN.	EC	10/16/06	ASSISTANT CHIEF OF ENV. & PLN.		

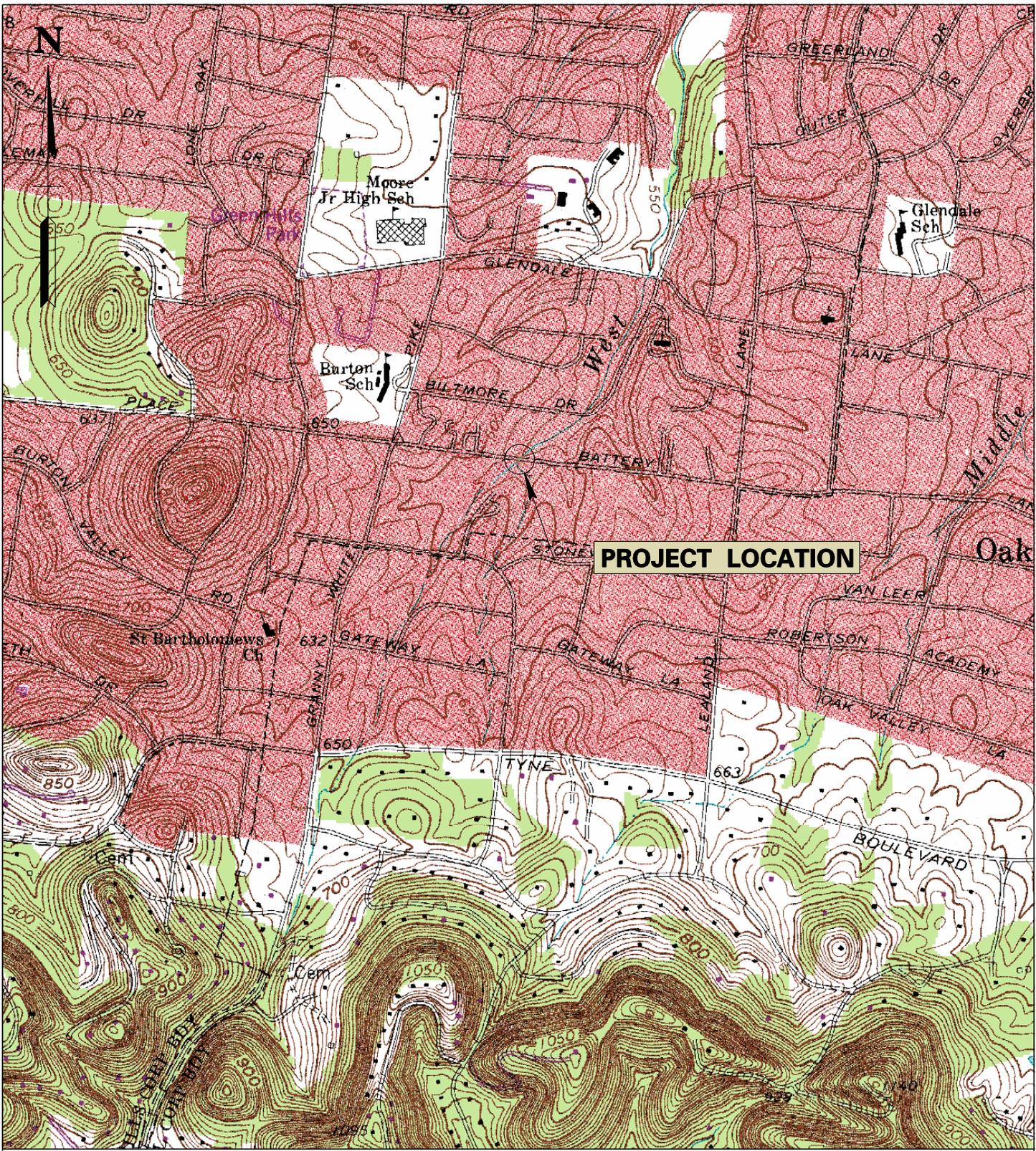


PROJECT LOCATION

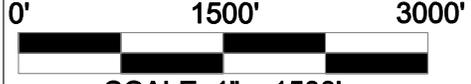


AREA MAP

**BATTERY LANE (1002) DAVIDSON COUNTY
 BRIDGE OVER WEST FORK BROWN'S CREEK @ L.M. 4.31
 BRIDGE ID 19010020007**



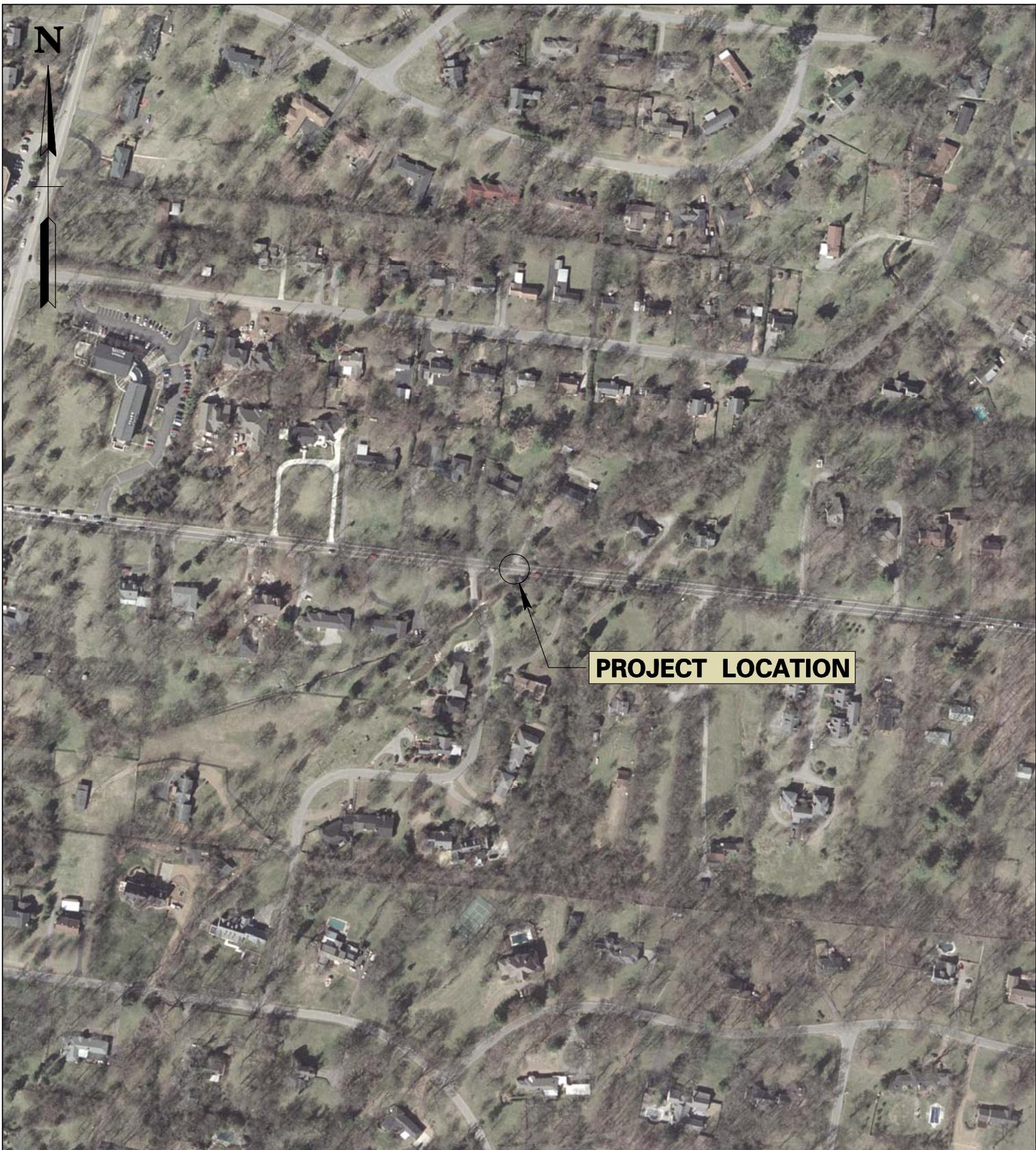
PROJECT LOCATION



SCALE: 1" = 1500'

PROJECT MAP

**BATTERY LANE (1002) DAVIDSON COUNTY
 BRIDGE OVER WEST FORK OF BROWN'S CREEK @ L.M. 4.31
 BRIDGE ID 19010020007 (OAK HILL QUAD)**



PROJECT LOCATION

0' 300' 600'



SCALE: 1" = 300'

AERIAL MAP

**BATTERY LANE (1002) DAVIDSON COUNTY
BRIDGE OVER WEST FORK OF BROWN'S CREEK @ L.M. 4.31
BRIDGE ID 19010020007**

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

County: Davidson Route: Battery Lane Log Mile: 4.31
Feature Crossed: West Fork Brown's Creek System: Local
Functional Class: Minor Collector Bridge ID: 19010020007

EXISTING CONDITIONS

2009 ADT: 15,240 App. Cross Section: 24' / 29' / 50' No. Lanes: 2
Approach Alignment: Tangent Year Built: 1956 Load Limit: H14
Width (curb to curb): 29' Sidewalks: Right -- Left -- Length (ft): 34'
No. Spans: Approach: -- Main: 3
Substructure: Pipe Arch Vertical Clearance: 4.5' Sufficiency Rating: 49
Other: Approximately 3 ft of fill above top of pipe arches

PROPOSED IMPROVEMENTS STANDARDS FROM RD01-TS- 3 Type of Work: Replace
Design Year: 2029 Design ADT: 18,290 Terrain Rolling ADL (F): -- (R): --
Length of Project (ft): 540' Bridge Length (ft): 40'
Design Speed (MPH): existing Posted Speed (MPH): 40
Approach Width: 24' / 40' / As Req'd. Bridge Width (C to C): 40 ft No. Lanes: 2
Right-of-Way Required: 0 Tracts

Maintenance of Traffic

Temporary Detour: X Temporary Runaround: _____ Stage Construct: _____
Alternate Route: Battery Lane to Granny White Pike to Glendale Lane to Lealand Lane to Battery Lane.

Remarks: Approximate detour length: +/- 2.0 miles

ESTIMATED COST (Rounded up to the nearest \$1000)

Right-of-Way: \$0 Approaches: \$162,000 Structure: \$112,000
Preliminary Engineering: \$55,000 Utilities: \$73,000 Total: \$402,000

Remarks: _____

Field Investigation by: Tyler King, John Wonderly, Katrina Jones, David Marshall, Larry Binion

BRIDGE TPR COST ESTIMATE**Battery Lane @ LM 4.31****Over West Fork Brown's Creek**County: **Davidson** Pg. 1 of 1Bridge No.: **19010020007**Date **8/28/06**

Mineral Aggregate Base						
((length x	width x	depth)	/ 27 cf/cy) x 2.03 tons/cy x	\$ unit price		
540	42	0.67		\$ 15.00		\$ 17,000
Pavement @ 6" depth (3" Black base, 1.75" binder, 1.25" Surface)						
((length x	width x)	/ 9 sf/sy) x	\$ unit price			
540	42		\$ 30.00			\$ 75,600
Borrow Excavation for Mainline						
((length x	width x	depth)	/ 27 cf/cy) x	\$ unit price		
540	42	0.5		\$ 4.00		\$ 1,700
Guardrail at Bridge Ends	104	ft @	\$ 30.00	L.F.		\$ 3,100
Type 2 Guardrail	200	ft @	\$ 13.00	L.F.		\$ 2,600
Guardrail Terminal Anchors	4	@	\$ 1,000.00	each		\$ 4,000
Type III Barricade	40	ft @	\$ 25.00	L.F.		\$ 1,000
Construction Signing	250	sf @	\$ 25.00	per sf		\$ 6,300
Flex. Drums w/ Type 'C' Lights	20	@	\$ 125.00	each		\$ 2,500
Vertical Panels	100	sf @	\$ 25.00	per sf		\$ 2,500
Traffic Control (lump sum)						\$ -
Pavement Removal						
((length x	width x)	/ 9 sf/sy) x	\$ unit price			
540	31		\$ 4.00			\$ 7,400
Erosion Control (lump sum)						\$ 10,000
Mobilization at 5%						\$ 6,700
				Subtotal		\$ 140,400
Miscellaneous and Contingencies at 15%						21,100
Total Approaches (rounded)						\$ 162,000
Proposed bridge:	((length x	width x)	x \$ unit price			
	40.0	42.0	\$ 60.00			\$ 100,800
Removal of Ex. Br.	34.0	31.0	\$ 10.00			\$ 10,500
Total Structures (rounded)						\$ 112,000
Right-of-Way Cost	0	Tracts	@	\$ -	avg. per tract	\$ -
Total R.O.W. (rounded)						\$ -
Utilities	UG Gas:	540	ft @	\$30	per ft	\$ 16,200
	UG Telephone Cable:	540	ft @	\$30	per ft	\$ 16,200
	Cable:	540	ft @	\$15	each	\$ 8,100
	UG Water:	540	ft @	\$30	per ft	\$ 16,200
	Sewer:	540	ft @	\$30	per ft	\$ 16,200
Total Utilities (rounded)						\$ 73,000
Preliminary Engineering at 20% (rounded)						\$ 55,000
Total						\$ 402,000



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

MEMORANDUM

TO: Transportation Planning Office

FROM: Tyler King, Roadway Specialist I
Conceptual Planning Office

DATE: June 28, 2006

SUBJECT: TPR Field Review (Special Bridge Replacement Program)
Battery Lane (1002) over West Fork Brown's Creek
Log Mile 4.31
Davidson County, Tennessee

A field review was held for the above-mentioned project on June 7, 2006.

The existing structure consists of three 4.5 foot high pipe arches with an out to out width of 31 feet. The overall bridge length is 34 feet. The sufficiency rating for this bridge is 49.0. The 10-year and 100 year discharges and depths of flow for the entire drainage basin were determined using the appropriate regression equations. It was determined that the 100-year flow depth is 7.5 ft, resulting in the possible overtopping of the existing roadway.

The proposed alignment is to follow the existing alignment. Traffic cannot be maintained on the existing structure during the construction of the new bridge. The Metropolitan Government of Nashville and Davidson County has agreed to the closing of this section of Battery Lane for the construction of this project. Traffic will be detoured from Battery Lane to Granny White Pike to Glendale Lane to Lealand Lane to Battery Lane. The approximate detour length is 2.0 ± miles.

The route has a base year (2009) ADT of 15,240 and a design year (2029) ADT of 18,290. Battery Lane will be designed to meet Road Design Standard RD01-TS-3. The proposed structure is a concrete span bridge with a total width of 42 feet, containing two 12 foot lanes and eight foot shoulders. The proposed bridge length is approximately 40 feet.

The existing grade is to be maintained, as approved by Structures Division, to minimize additional fill to the area as noted in the memorandum dated May 18, 2006. A study of the area, including the structure over the West Fork Brown's Creek on Biltmore Drive (approx. 0.15 mi. downstream), is to be conducted by TDOT Structures Division to determine the final structure type, size, and elevation. This study will address impacts of the proposed structure on both the upstream and downstream sections of West Fork Brown's Creek including the flood plain. The existing bridge will be removed.

The required approach work, right-of-way acquisition, utility relocations, estimated replacement cost, and preliminary engineering for this bridge are approximately \$402,000.

TK

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	X
5. Forested land	
6. Historical, cultural, or natural landmark	X
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	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	
NPDES	
Aquatic Resource Alteration	
13. Other (10" Sewer Pipe located in downstream channel)	X
14. Location coordinated with local officials	X
15. Railroad crossings	
16. Hazardous materials site	

**TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION**

PROJECT NO.: 99106-1401-94 ROUTE: 1002 (BATTERY LANE)
 COUNTY: DAVIDSON CITY: NASHVILLE
 PROJECT PIN NUMBER: 106007.00
 PROJECT DESCRIPTION: SPECIAL BRIDGE REPLACEMENT PROGRAM
BATTERY LANE BRIDGE OVER WEST FORK BROWN'S CREEK (LM 4.31)

DIVISION REQUESTING:

MAINTENANCE PAVEMENT DESIGN
 PLANNING STRUCTURES
 PROG. DEVELOPMENT & ADM. SURVEY & DESIGN
 PUBLIC TRANS. & AERO. TRAFFIC SIGNAL DESIGN
 OTHER
 YEAR PROJECT PROGRAMMED FOR CONSTRUCTION: 2009
 PROJECTED LETTING DATE: _____

TRAFFIC ASSIGNMENT:

BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
ADT	YEAR	ADT	DHV	%	YEAR	DIR.DIST.	DHV	ADT	FLEX	RIGID
15,240	2009	18,290	1,829	10	2029	65-35	2	3		

REQUESTED BY: NAME TERRY GLADDEN DATE 1/17/06
 DIVISION PLANNING
 ADDRESS 9TH FLOOR
J.K. POLK BLDG.

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 1-30-06
 TRANSPORTATION MANAGER 1
 SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: BILL HART Bill Hart DATE 1/30/06
 TRANSPORTATION MANAGER 2
 SUITE 900, JAMES K. POLK BUILDING

COMMENTS:

THIS PROJECT BASED ON A 2006 MACHINE COUNT AND PROJECTED BY THE NASHVILLE COMPUTER ASSIGNMENT.

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 ADT.

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.



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
SUITE 1100, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0339

GERALD F. NICELY
COMMISSIONER

PHIL BREDESEN
GOVERNOR

MEMORANDUM

TO: Dudley Daniel
Conceptual Planning and Safety Office

FROM: Wesley Peden *WPE*
Hydraulic Design Section, Structures Division

DATE: May 18, 2006

SUBJECT: Transportation Planning Report
Battery Lane over West Fork of Brown's Creek @ L.M. 4.31
Davidson County

Per your request dated April 18, I have prepared a cost estimate for a replacement for the subject structure. The proposed structure will be a single span 40' concrete girder bridge with an estimated cost of \$66,000. Bridge aesthetics may be of some concern in that area. If aesthetic treatments are necessary, the estimated cost may increase.

Please note, this fork of Brown's Creek is included in the National Flood Insurance Program and a regulatory floodway is present. Effort should be made to minimize any additional fill required during project development. The current 100 year flood elevation is 583.5.

BILL PURCELL
MAYOR



METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

October 21, 2005

DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING
720 SO. FIFTH STREET
NASHVILLE, TENNESSEE 37206
615-962-8790

Ms. Maria G. Hunter, Administrative Services Assistant
State of Tennessee Department of Transportation
Office of Local Programs
James K. Polk Building, Suite 600
Nashville, TN 37243-0341

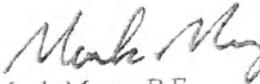
RE: Contract No. 040092 - PIN 106007-00
Federal Project No. BRZE -9312(69)
Bridge on Battery Lane over West Fork Brown's Creek
(LM 4.31)

Dear Ms. Hunter:

Please be advised that The Metropolitan Government of Nashville and Davidson County hereby agrees to the closing of any roads connected with the referenced project, if the Department deems such closing necessary. However, it is a requirement under Metro Code that the Public Works Permit Office review and issue permits for such activities to notify all emergency and public agencies. Public Works would request that these activities be coordinated with our Permit Office at 862-8782.

If you have questions please contact us.

Sincerely,
The Department of Public Works

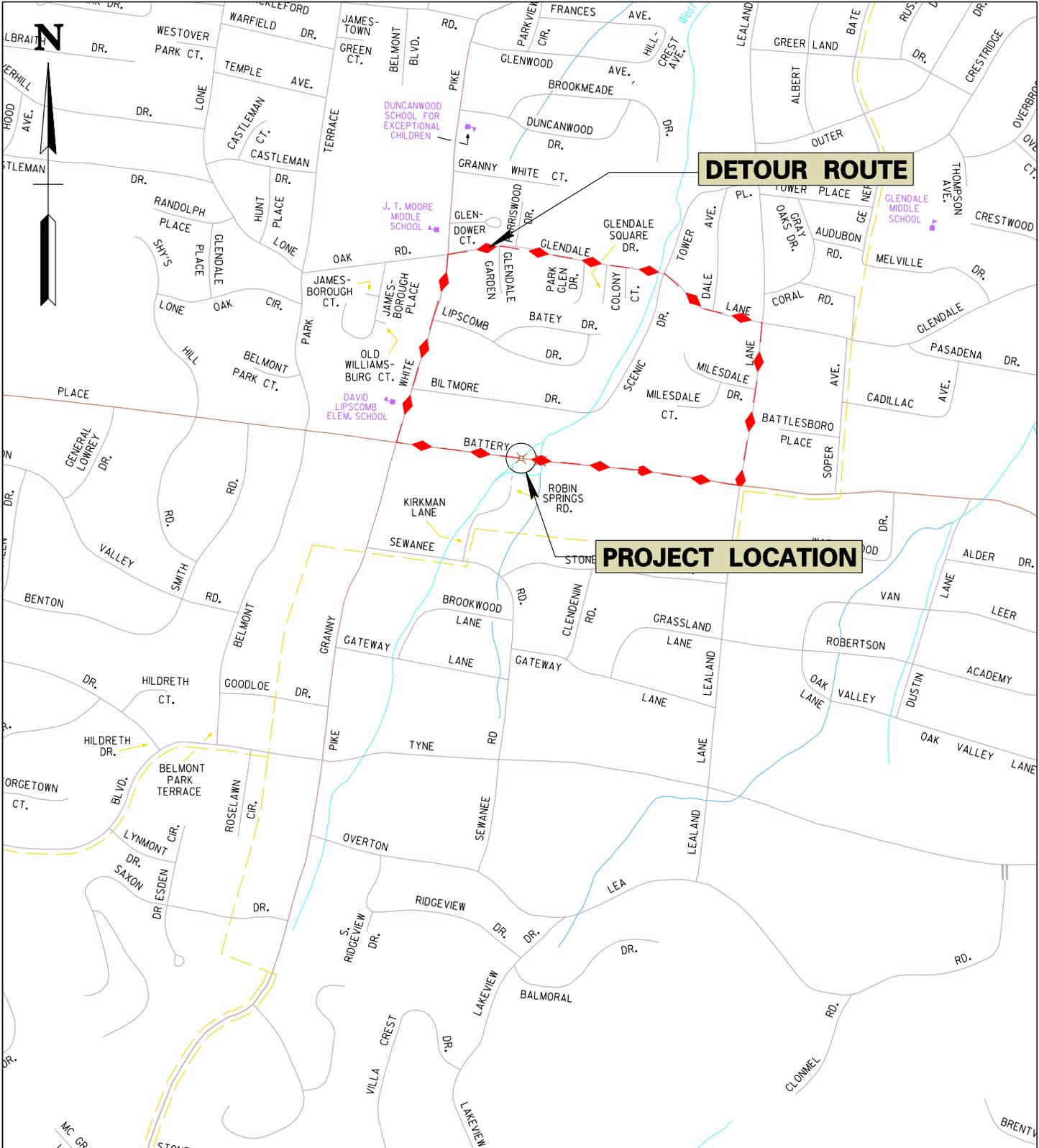

Mark Macy, P.E.
Assistant Director

MM/WLD/BG

Enclosure

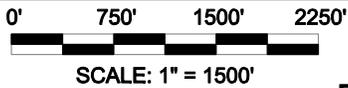
Copy: Billy Davis
Permit Office

marcia hunter 2



DETOUR ROUTE

PROJECT LOCATION



DETOUR MAP

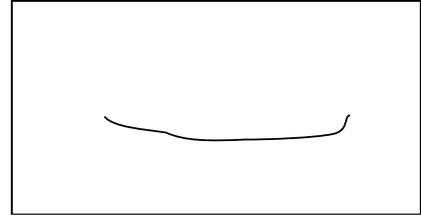
BATTERY LANE (1002) DAVIDSON COUNTY
BRIDGE OVER WEST FORK OF BROWN'S CREEK @ L.M. 4.31
BRIDGE ID 19010020007
DETOUR LENGTH: +/- 2.0 MILES

TPR ON SITE INSPECTION REPORT FOR STREAM CROSSINGS

INSPECTION MADE BY: TK, SH BRIDGE ID: 19010020007 COUNTY: Davidson
 Date: 8/28/06 Route Name: Battery Lane Stream Name: West Fork Brown's Creek @ L.M. 4.31

CHANNEL

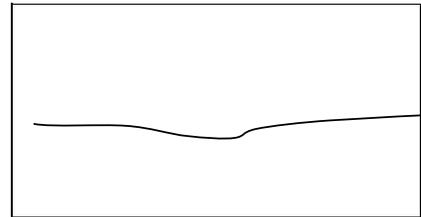
Approx depth and width of channel: Hor.: 18 ft Vert: 3 ft
 Depth of normal flow: 0.6 ft In Reservoir: Yes No
 Depth of Ordinary H.W.: 3 ft
 Type of material in stream bed: Upstream: Stone / Downstream: Concrete
 Type of vegetation on banks: grass and trees
 "N" factor of the channel: 0.03
 Are channel banks stable: yes
 If the streambed is gravel: D₃₀ = -- D₈₅ = --
 Skew of the channel with the roadway: 45 °



Channel Shape Sketch

FLOODPLAIN

Is the skew same as the channel? Yes
 Is it symmetrical about the channel? Yes
 Type of vegetation in the floodplain and "N" factors
 Left U.S.: Grass 0.04 Right U.S.: Grass 0.04
 Left D.S.: Grass 0.04 Right D.S.: Grass 0.04
 Are roadway approaches lower than the structure? No
 Are there any buildings in the floodplain? Yes
 Approx. floor elevations: 587 ft
 Flood information from local residents:
 (elevations & dates) None



Floodplain Sketch

EXISTING STRUCTURE

Length(ft): 34' No. of spans: 3 Structure type: Pipe Arch (3) No. of lanes: 2 Skew: 45 °
 Width (out to out): 31' Width (curb to curb): 29' Approach: paved graveled
 Sidewalks (left,right): N/A Bridgerail type: W-Beam Rub Rail Bridgerail height = 1' 4"
 Superstructure depth: 3' Finished Grade to low girder = N/A Girder depth = N/A
 Are any substructures in the channel? Yes (Sewer pipe) Area of opening = 156 ft²
 Indications of overtopping: None visible
 High water marks: 3' up pipe arch (rust line visible)
 Local scour: None Visible
 Any signs of stream aggradation or degradation? None Visible
 Any drift or drift potential? Minimal
 Any obstructions (pipes,stock fences,etc.)? None

PROPOSED STRUCTURE

Replacement Rehabilitate Widening New Location

Bridge length: 40 ft Bridge type: concrete span Span arrangement: 1 Skew: 45 °
 Bridge width: 42 ft Sidewalks: none Design Speed (MPH): Existing ADT (2029) = 18,290
 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: \$60 per ft² X 40 / 42 length (ft) / width (ft) Cost = \$100,800
 Cost of bridge removal: \$10 per ft² X 34 / 31 length (ft) / width (ft) Cost = \$10,500
 Detour structure: Type and size = N/A Cost = \$0

I Structure Cost (rounded) = \$112,000

**For Hydrologic Area 2
Area > 300 Acres**

County: Davidson
Bridge ID: 19010020007
Route: Battery Lane
Feature Crossed: West Fork Brown's Creek
Log Mile: 4.31

By: Tyler King
Date: 8/28/06
PIN: 106007

DRAINAGE BASIN

Measurement from quad = 660 acres
Contributing Drainage Area, CDA = acres/640 = 1.03 sq. mi.

USGS REGRESSION EQUATIONS FOR FLOW

$Q_2 = 207(CDA)^{0.725} = 211$ cfs
 $Q_5 = 344(CDA)^{0.715} = 351$ cfs
 $Q_{10} = 444(CDA)^{0.711} = 453$ cfs
 $Q_{25} = 578(CDA)^{0.708} = 590$ cfs
 $Q_{50} = 682(CDA)^{0.706} = 696$ cfs
 $Q_{100} = 788(CDA)^{0.705} = 805$ cfs

DEPTH OF FLOW EQUATIONS

10-Year Flood Depth = $5.33(CDA)^{0.197} = 5.4$ ft
100-Year Flood Depth = $7.43(CDA)^{0.181} = 7.5$ ft

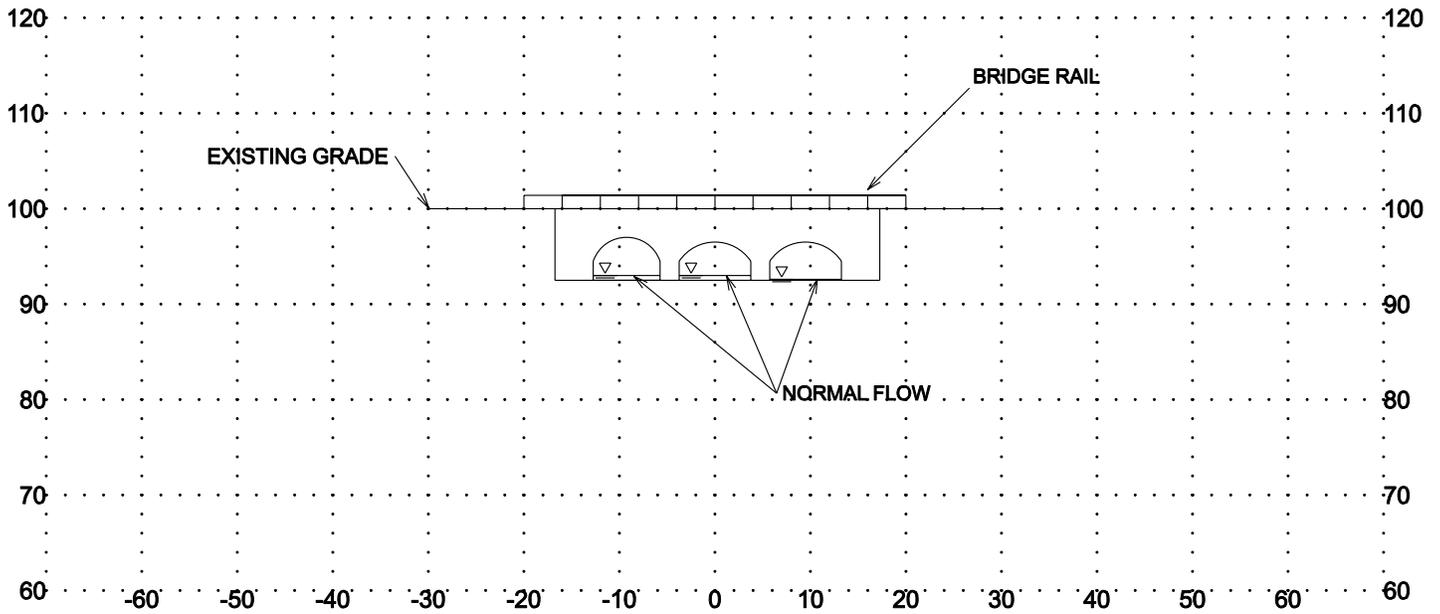
AREAS

Existing Area Below Low Chord = 156 ft²
Proposed Area Below Low Chord = 162 ft²
Proposed 10-Year Flood Area, $A_{10} = 162$ ft²
Proposed 100-Year Flood Area, $A_{100} = 162$ ft²

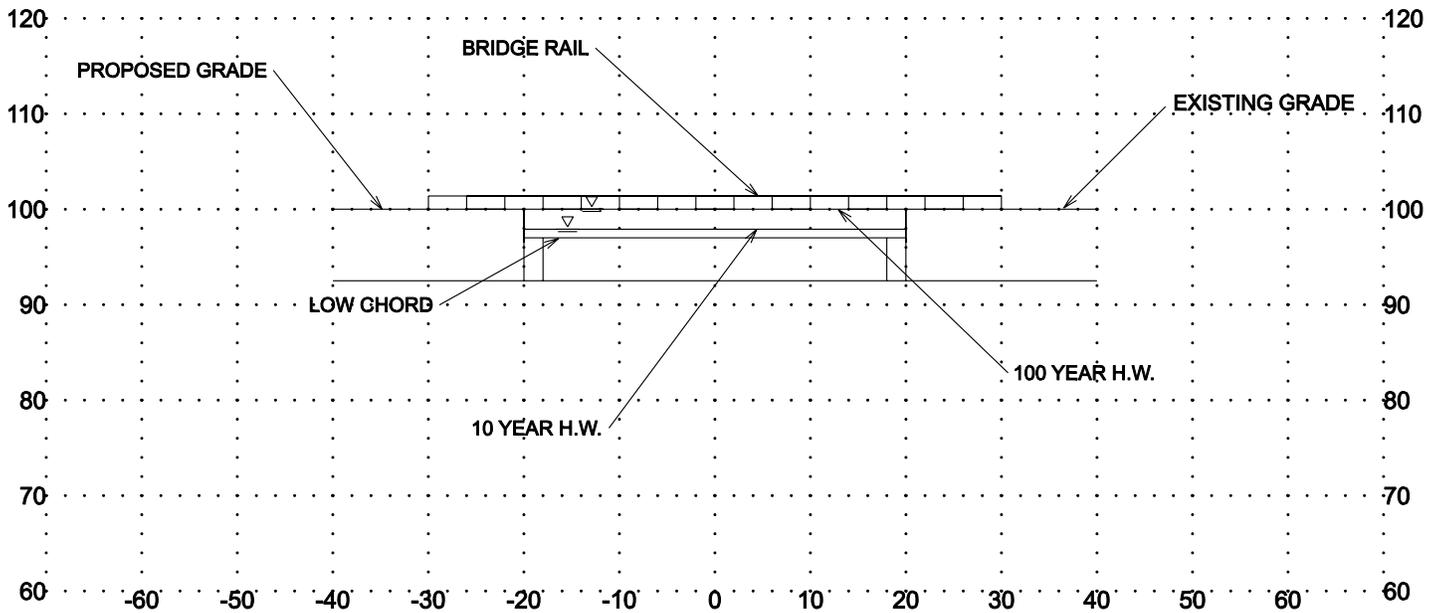
VELOCITIES

Proposed 10-Year Flood Velocity, $V_{10} = Q_{10}/A_{10} = 2.8$ fps
Proposed 100-Year Flood Velocity, $V_{100} = Q_{100}/A_{100} = 5.0$ fps

EXISTING STRUCTURE (INLET)



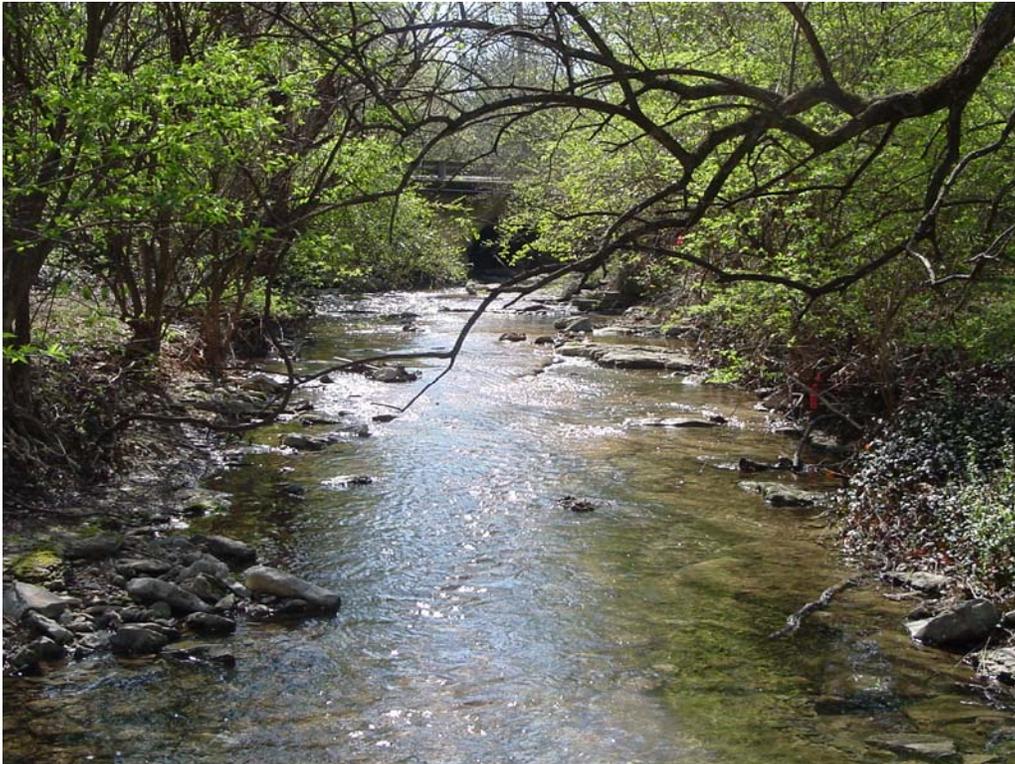
PROPOSED STRUCTURE (INLET)



BRIDGE SECTIONS
BATTERY LANE DAVIDSON COUNTY
BRIDGE OVER W. FORK BROWN'S CREEK @ L.M. 4.31
BRIDGE ID 99106140194



Inlet



Outlet



Upstream



Upstream Left



Upstream Right



Downstream



Downstream Left



Downstream Right



Eastern Approach



Western Approach



Bridge Looking East



Bridge Looking West



Substructure



Bridge Number



Rock Wall Parallel to Battery Lane



Weathering of Structure



Concrete Section Located Along the Downstream Side (center) of Fork with Manhole



Close-up of Cap and Surrounding Area (Concrete)



Gas Pipeline Warning Sign



Gas Pipeline attached to Westbound Side of Bridge



Underground Telephone Cable Warning (Eastbound Side)



Sanitary Sewer



Overhead Utilities



Fire Hydrant on Westbound Shoulder



Edge of Pavement and Curb on Eastbound Lane (Bottle designates where curb ends and pavement begins)



Edge of Pavement and Curb on Westbound Lane