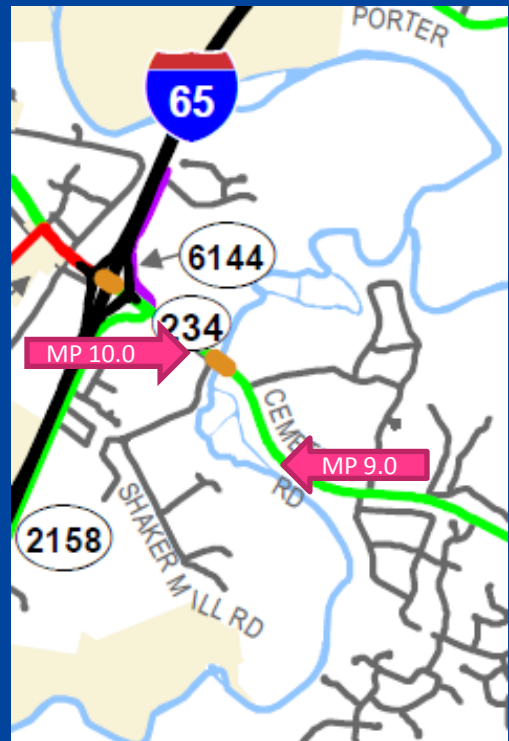


Data

Needs

Analysis

Scoping Study



3-1077 (Warren County)

KY 234 (Cemetery Road);
Bridge Replacement over
Drakes Creek (MP 9.746),
0.097 mile east of Shaker Mill
Rd (CR1131).

Prepared by
KYTC District 3

June 29, 2012



I. PRELIMINARY PROJECT INFORMATION

County: Warren **Item No.:** 3-1077.00
Route Number(s): KY 234 **Road Name:** Cemetery Road
Program No.: **UPN:** (Function) (County #) (Route) (MPs)
Federal Project No.: **Type of Work:** Bridge Replacement
-2012 **Highway Plan Project Description:**

KY 234 (Cemetery Road); Bridge Replacement over Drakes Creek (MP 9.746), 0.097 mile east of Shaker Mill Rd (CR1131)

Beginning MP: 9 **Ending MP:** 10 **Project Length:** 1

Functional Class.: Urban Rural
 Collector State Class.: Primary Secondary
 NHS NN Ext Wt

MPO Area: Bowling Green
Truck Class.: A

In TIP: Yes No

Terrain: Rolling
 % Trucks:
 Access Control: None Permit Fully Controlled Partial **Spacing:**

ADT (current): 2010 6,620

Access Control: None Permit Fully Controlled Partial **Spacing:**

Median Type: Undivided Divided (Type):

Existing Bike Accommodations: None **Ped:** Sidewalk

Posted Speed: 35 mph 45 mph 55 mph Other (Specify):

KYTC Guidelines Preliminarily Based on: 55 MPH Proposed Design Speed

COMMON GEOMETRIC

Roadway Data:	EXISTING	PRACTICES*	
No. of Lanes	2	2	Existing Rdwy. Plans available?
Lane Width	9	12	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shoulder Width	4	8	Year of Plans: 1961/2000
Max. Superelevation**	6.00%	8%	<input type="checkbox"/> Traffic Forecast Requested
Minimum Radius**	955	965	Date Requested: pending
Maximum Grade	4%	7%	<input type="checkbox"/> Mapping/Survey Requested
Minimum Sight Dist.	N/A	495	Date Requested:
Sidewalk Width(urban)	N/A	N/A	Type: pending
Clear-zone***	N/A	26-32	

Project Notes/Design Exceptions?:

*Based on proposed Design Speed, **AASHTO's A Policy on Geometric Design of Highways and Streets, ***AASHTO's Roadside Design Guide

Bridge No.*: 114B00012N (Bridge #2)
Sufficiency Rating: 42.8 **Existing Geotech data available?** Yes No
Total Length: 316
Width, curb to curb: 27
Span Lengths: 100
Year Built: 1963

*If more than two bridges are located on the project, include additions sheets.

Posted Weight Limit:
Structurally Deficient? Yes
Functionally Obsolete? Yes

II. PROJECT PURPOSE AND NEED

A. Legislation

The following funding was listed in the 2012 General Assembly's Enacted Highway Plan.	<i>Funding</i>	<i>Phase</i>	<i>Year</i>	<i>Amount</i>
	BRO	Design	2013	\$510,000
	BRO	R/W	2015	\$500,000
	BRO	Utilities	2015	\$1,200,000
	BRO	Construction	2017	\$3,500,000
			TOTAL	\$5,710,000

B. Project Status

Design funds will be authorized in the FY 2013 and this project will be included in the BG/WC MPO TIP. This project was identified as a new transportation need in the District 3 Transportation Plan process in 2011.

C. System Linkage

KY 234 is classified as a Rural Major Collector that links the center of Bowling Green to Scottsville and also to the Barren River Lake recreational area. This classification will not likely change because of this improvement. Currently KY 234 is a mult-laned facility from the center of Bowling Green to the nearby I-65 interchange with a final lane drop at the intersection with Shaker Bend Avenue just to the west of the existing bridge over the Drakes Creek. KY 234 provides access for the residential developments of eastern Warren County to I-65.

D. Modal Interrelationships

There are presently no bike or pedestrian facilities along this section of roadway. The GoBG Transit routes do not travel in this area and freight traffic is not an issue.

E. Social Demands & Economic Development

Nearby to this project, a historic church (Burton Memorial) is located. Several large "estate" subdivisions exist along this corridor which feed commuting traffic into the facility.

F. Transportation Demand

The last actual traffic for this specific section on KY 234 is 6,620 ADT (2010).

II. PROJECT PURPOSE AND NEED (cont.)

G. Capacity

There are no perceived congestion issues associated with this bridge.

H. Safety

This section of roadway has an identified CRF (Critical Rate Factor) that is greater than 1.5. See the Crash Diagram for more information. A large percentage of the crashes are of rear-end incidents which are occurring near the intersection with Roger Porter Road which serves as major entrance to a large subdivision. This clustering of crashes indicates the need for left turn storage to move those turning vehicles out of the flow of traffic. A string of single vehicle crashes are located along the hill to the south of Roger Porter Road and indicates an issue with alignment and speed issues.

I. Roadway Deficiencies

KY 234 is a multi-laned facility up to a short distance prior to the bridge over Drakes Creek. These are 12 foot wide lanes and also a 8 foot wide paved shoulder on both sides of the roadway. The pavement width and shoulder transitions down to 9 foot lanes with a 2 foot stabilized shoulder. This typical section continues after the bridge along the remainder of the KY 234 corridor which does not provide the motorist much room for error. The existing bridge structure description: 80 ft - 100 ft - 80 ft RCDG & 50 ft simple RCD. This narrow bridge has been identified as structurally deficient (rating of 42.8) at a point where the road transitions from a wide urban road to a narrow, winding rural road.

Draft Purpose and Need Statement:

Need: KY 234 is a Rural Major Collector which provides a connection between the center of Bowling Green to eastern Warren County and Scottsville, including access to the Barren River Lake. This narrow bridge has been identified as structurally deficient (rating of 42.8) at a point where the road transitions from a wide urban road to a narrow, winding rural road.

Purpose: The purpose of this improvement is to increase the safety and reliability of the bridge on KY 234 over Drakes Creek and to ease the transition from the urban multi-laned typical section to the more narrow rural road.

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

Project is in: Attainment area Nonattainment or Maintenance Area PM 2.5 County

STIP Pg. #: n/a

TIP Pg. #: n/a

B. Archeology/Historic Resources

Known Archeological or Historic Resources are present

There are potential for Archeological sites along the Drakes Creek floodplain. The Burton Memorial Baptist Church is listed on the National Register of Historic Places and is located nearby to the south of the project.

C. Threatened and Endangered Species

The following T & E Species are listed for Warren County: gray bat, Indiana bat, purple catspaw pealymussel, clubshell, fanshell, Northern Riffleshell, orangefoot pimpleback, pink mucket, ring pink, rough pigtoe, sheepsnose, Eggert's Sunflower, Price's Potato Bean, and Kentucky Cave Shrimp. All the above listed species could be present within this project with the exception of the Kentucky Cave Shrimp. The project is not located in the known habitat area of the Mammoth Cave Drainage Basin for the Kentucky Cave Shrimp.

D. Hazardous Materials

Potentially Contaminated Sites are present Potential Bridge or Structure Demolition

The bridge will require an asbestos inspection before demolition and a Notice of Demolition will need to be submitted to the Division of Air Quality before demolition starts.

E. Permitting

Check all that may apply: Waters of the US MS4 area Floodplain Impacts Navigable Waters of the US Impacts
Are 401/404 Permits likely to be required? Yes No Impacts to: Wetlands Stream/Lake/Pond
 ACE LON ACE NW ACE IP DOW IWQC Special Use Waters

Possible Army Corps permit required for crossing Drakes Creek. Further investigation required after plans have been developed.

F. Noise

Are existing or planned noise sensitive receptors adjacent to the proposed project? Yes No
Is this considered a "Type I Project" according to the [KYTC Noise Analysis and Abatement Policy?](#) Yes No

G. Socioeconomic

Check all that may apply: Low Income/Minority Populations affected Relocations Local Land Use Plan available

There are possible relocations.

H. Section 4(f) or 6(f) Resources

The following are present on the project: Section 4(f) Resources Section 6(f) Resources

The Burton Memorial Church could be 4(f) impact.

Anticipated Environmental Document:

CE Level 1

IV. POSSIBLE ALTERNATIVES

A. Alternative 1: No Build

This alternative should be carried forward, but does not address the needs identified.

B. Alternative 2

“New bridge on north side of existing bridge” – This alternative would realign KY 234 to the north side of existing roadway and bridge which closely follows the roadway alignment prior to 1962 (old plans: pj17213.pdf). This alignment minimizes impacts to right of way and residences. Widening to the north eliminates impacts to Shaker Mill Road, a county road with an S-curve and steep grade approach to KY 234 on the west side of Drakes Creek. The tie-in on the east approach will slightly improve the horizontal geometry (current radius is approximately 1,300 ft. radius, which is adequate for a 55-mph facility). The tie-in on the west approach may create a slight reverse curve situation in order to keep the proposed bridge parallel to the existing bridge. Two typical sections should be studied. One option is to construct only 2-lanes across the bridge, then widen south of Drakes Creek for the EB left turn lane. Design criteria would recommend two 12’ lanes and 8’ shoulders (40’ curb to curb), although narrower shoulders could be considered under a Practical Solutions approach. A second option is to construct 3-lanes across the bridge in order to include an EB left turn lane at Roger Porter/Lake Side Way. Roger Porter/Lakeside Way is the back entrance to a new subdivision, and traffic volumes have increased in recent years. Design criteria would recommend three 12’ lanes and 8’ shoulders (52’ curb to curb), although narrower shoulders could be considered under a Practical Solutions approach. The intersection with Roger Porter/Lakeside Way is approximately 700’ east of Drakes Creek which is adequate distance for a 330’ approach taper (at 55:1 taper rate), 100’ turn lane taper, and 250’+ of left turn storage if the 2-lane bridge typical section is used. Alternatives 2 and 3 require approximately 3,300 ft (0.625 mile) of reconstruction, including 1,500 of five lanes-plus-transition to two- or three-lane typical. Roadway reconstruction will start at Cumberland Trace intersection and every effort should be made to maximize use of existing pavement on the west side of Drakes Creek. **Utilities:** A three-phase power line with telephone runs along the north side of the roadway along the pre-1962 alignment north of the bridge. The line crosses over to the south side of the roadway over the bridge. An additional telephone line runs along the south side throughout the entire corridor. WCWD has a water pump station within the project limits and potentially impacted by Alt. 2. According to Tim Minnick, the building was constructed a few years ago for a cost of \$225,000. A 14” ductile iron water line runs along the north side of the roadway west of Drakes Creek, then crosses the roadway under the bridge, then proceeds across the river with a river crossing that costs approximately \$75,000. **Right of Way:** Alt. 2 is preferable from a right-of-way standpoint. Three large parcels would be impacted by the Alt. 2, two of which fall under the same ownership. . One other six-acre parcel on the southwest quadrant would also be impacted with easements. The two SARKAR parcels could be costly as prime residential development potential with expansion of the Rivergreen subdivision.

Planning Level Cost Estimate:	<u>Phase</u>	<u>Estimate</u>
	Design	\$510,000
	R/W	\$400,000
	Utilities	\$1,680,000
	Const	<u>\$3,500,000</u>
	Total	\$6,090,000

IV. POSSIBLE ALTERNATIVES (cont.)

B. Alternative #3

"New bridge on south side of existing bridge" – This alternative would realign KY 234 to the south side of existing roadway and bridge. This alignment has a greater impact to right of way and residences located on the south side of the roadway both west and east of the river crossing. Widening to the south impacts Shaker Mill Road, a county road with an S-curve and steep grade approach to KY 234 on the west side of the bridge. Several hundred feet of Shaker Mill Road will have to be relocated which will impact residences and front yards. The tie-in on the east approach may slightly diminish the horizontal geometry (current curve radius is approximately 1,300 ft., which is adequate for a 55-mph facility). Two typical sections should be studied. One option is to construct only 2-lanes across the bridge, then widen south of Drakes Creek for the EB left turn lane. Design criteria would recommend two 12' lanes and 8' shoulders (40' curb to curb), although narrower shoulders could be considered under a Practical Solutions approach. A second option is to construct 3-lanes across the bridge in order to include an EB left turn lane at Roger Porter/Lake Side Way. Roger Porter/Lakeside Way is the back entrance to a new subdivision, and traffic volumes have increased in recent years. Design criteria would recommend three 12' lanes and 8' shoulders (52' curb to curb), although narrower shoulders could be considered under a Practical Solutions approach. The intersection with Roger Porter/Lakeside Way is approximately 700' east of Drakes Creek which is adequate distance for a 330' approach taper (at 55:1 taper rate), 100' turn lane taper, and 250'+ of left turn storage if the 2-lane bridge typical section is used. Alternatives 2 and 3 require approximately 3,300 ft (0.625 mile) of reconstruction, including 1,500 of five lanes-plus-transition to two- or three-lane typical. Roadway reconstruction will start at Cumberland Trace intersection and every effort should be made to maximize use of existing pavement on the west side of Drakes Creek. **Utilities:** A three-phase power line with telephone runs along the north side of the roadway along the pre-1962 alignment north of the bridge. The line crosses over to the south side of the roadway over the bridge. An additional telephone line runs along the south side throughout the entire corridor. A 14" ductile iron water line runs along the north side of the roadway west of Drakes Creek, then crosses the roadway under the bridge, then proceeds across the river with a river crossing that costs approximately \$75,000. The river crossing could potentially be impacted by Alt. 3. East of the river, the pipe is 16" ductile iron. **Right of Way:** On Alternative 3, as many as ten small two- to three-acre lots would be impacted, mostly to tie down entrances with temporary easement. One other six-acre parcel on the southwest quadrant would also be impacted.

Planning Level Cost Estimate:

Phase

Estimate

Design	\$510,000
R/W	\$500,000
Utilities	\$850,000
Const	\$3,500,000
Total	\$5,360,000

B. Alternative #4

D. Alternatives 4: "Replace bridge at existing location" – This alternative would reconstruct the bridge at its existing location. This alternative nearly eliminates any construction, right of way, or utility impacts on the west side of Drakes Creek. It is assumed that the Project Team would still consider the EB left turn lane east of Drakes Creek as a necessary part of the project. The existing bridge is a 4-span, continuous cast-in-place Tee Beam (RCDG) structure. Steel reinforcement in the beams extends into the deck which creates a challenge for part-width construction; however, part-width construction is an option as each girder is separate. Existing piers would need to be analyzed as to whether they can be reused. If so, then a wider deck would require an additional column on each existing pier. If not, then a slightly different span arrangement would allow construction of new pier(s) during phased construction. The structure costs for this alternative are similar and may possibly be more than the new alignment bridges due to phased construction of the structure, but the elimination of approach road construction and considerable right of way and utility costs make this alternative worth discussing. Maintaining traffic temporarily on the existing bridge using one lane and signals makes this alternative less desirable.

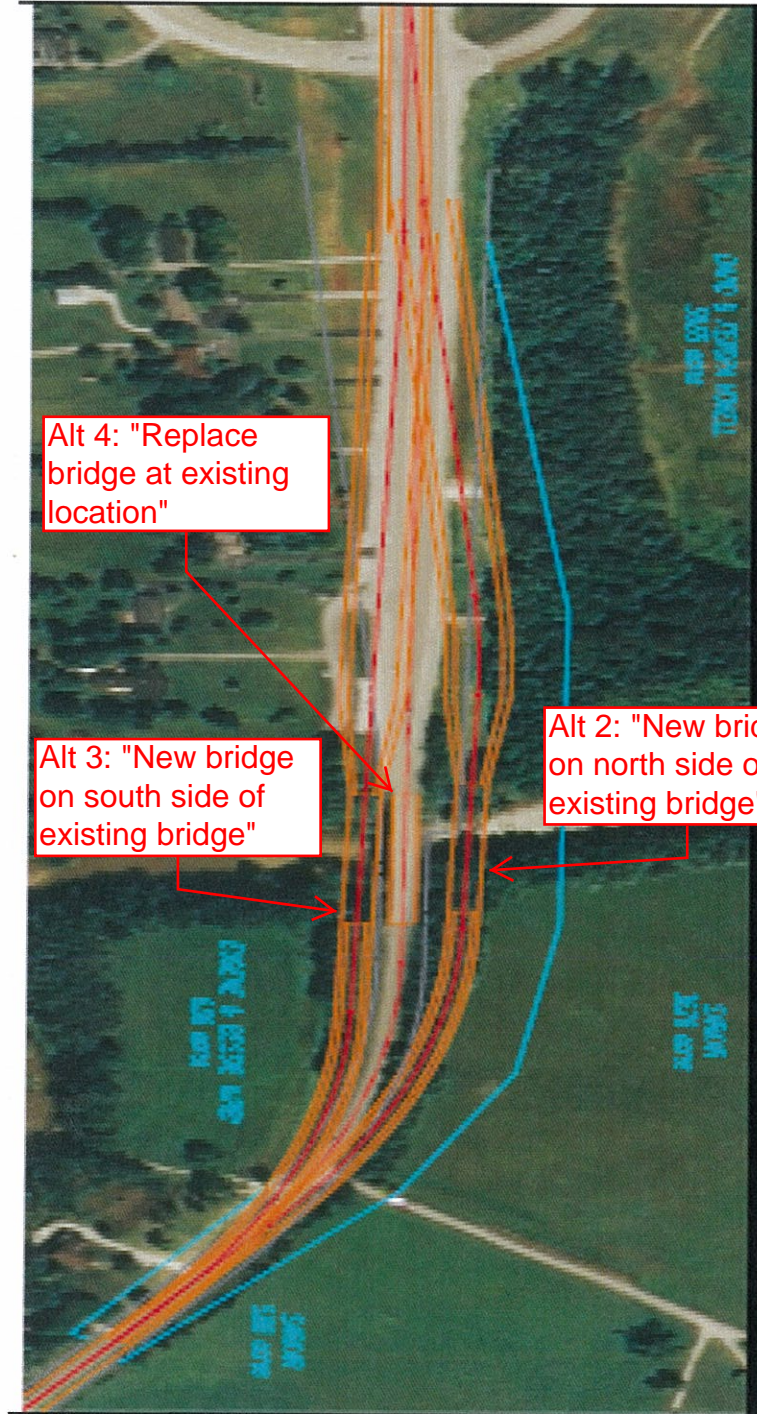
V. Summary

This study is a Data Needs Analysis (DNA) of the proposed bridge replacement over the Drakes Creek on KY 234, Item No. 3-1077. Through analysis of the existing roadway geometrics, crash data, site visits, and discussion among the study team members, the following needs were identified within the project limits:

The bridge is deemed structurally deficient (SR 42.8) and requires complete replacement. Issues exist with the transition from the current four laned KY 234 down to 2 lanes near the approach to the bridge and at the intersection with Shaker Bend Avenue. The crash data indicates the need for a left turn lane into the Roger Porter Road just to the east of the existing bridge. The considered alternates included a no-build recommendation, a new bridge located to the north of the existing (Alternative #2), and a new bridge located to the south of the existing (Alternate #3). Although the more expensive of the two alternates, the team suggested that Alternate #2 would provide the better solution, especially in its impact to the intersection with Shaker Mill Road. The study team considered Alternative 4 but dismissed this alternative because of the issues of the constructing the bridge as part width while attempting to handle the traffic demands along Cemetery Road (KY234). Such an effort is not feasible and would result in traffic delays and possible safety issues.

Alt #	Description	D (\$)(BRO)	R (\$)(BRO)	U (\$)(BRO)	C (\$)(BRO)	Total (\$mil)
1	No Build	-	-	-	-	-
2	New Bridge to the North	510,000	400,000	1,680,000	3,500,000	6,090,000
3	New Bridge to the South	510,000	500,000	850,000	3,500,000	5,360,000
4	New Bridge at Current Location	510,000	<400,000	<850,000	3,500,000	<5,360,000
-	Current Hwy Plan Estimated Cost	510,000	500,000	1,200,000	3,500,000	5,710,000
-	Current Pre-Con Estimated Cost					

NORTH

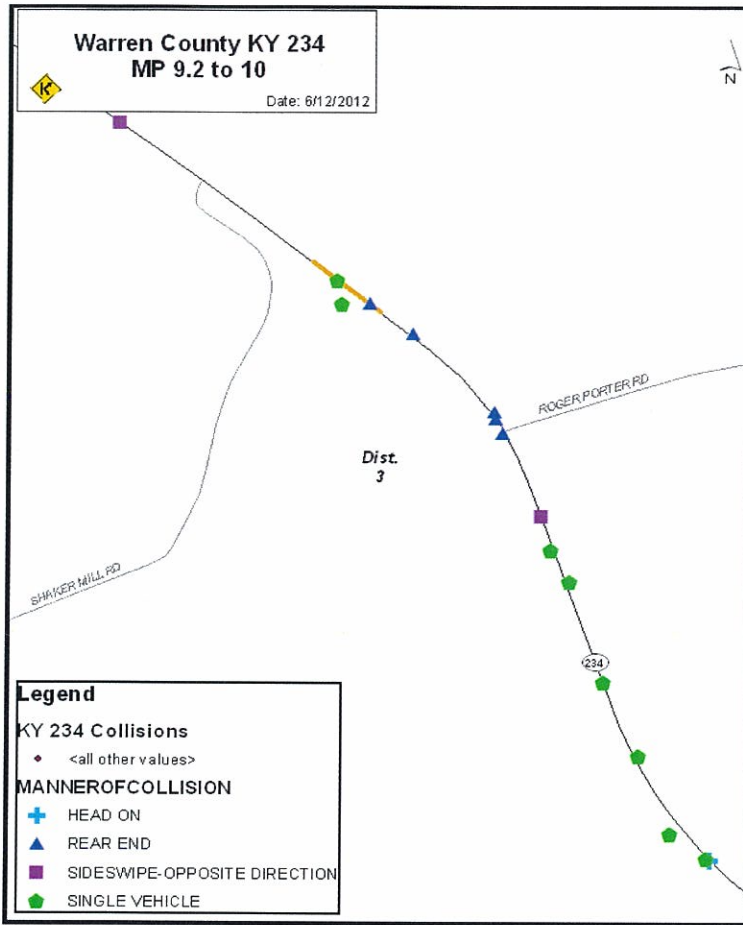


Alt 4: "Replace bridge at existing location"

Alt 3: "New bridge on south side of existing bridge"

Alt 2: "New bridge on north side of existing bridge"

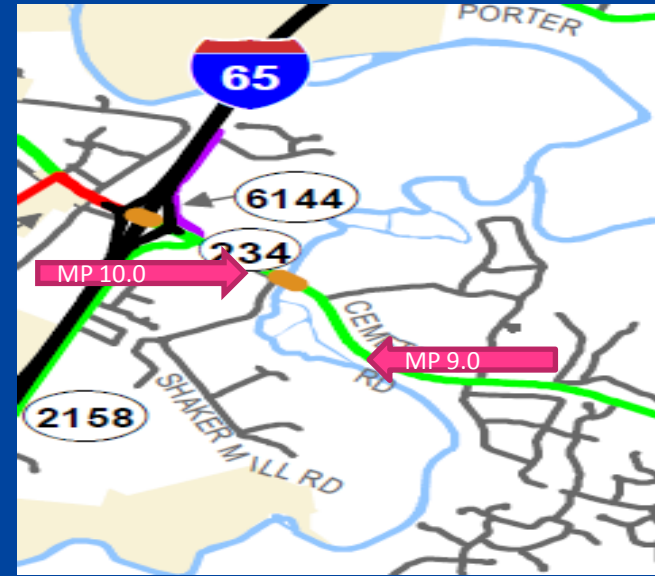
VI. Tables & Exhibits



**KY 234 Cemetery Rd.
 Crashes by Type**

SINGLE VEHICLE	9
REAR END	5
SIDESWIPE OPPOSITE DIRECTION	2
HEAD ON	1
TOTAL	17

* Crash Data from 6/1/09 to 6/01/12

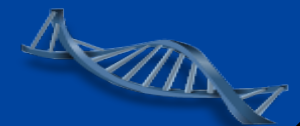


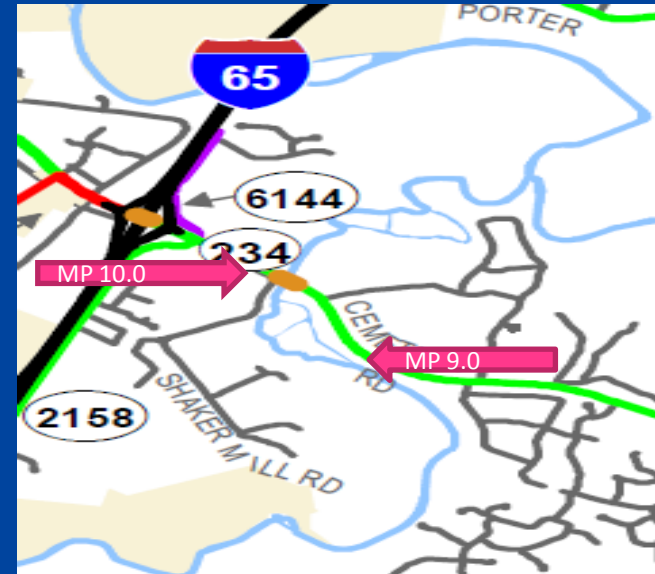
3-1077 (Warren County)

KY 234 (Cemetery Road); Bridge Replacement over Drakes Creek (MP 9.746), 0.097 mile east of Shaker Mill Rd (CR1131).

Photo 1: KY 234 south bound

Photo 2: KY 234 south bound



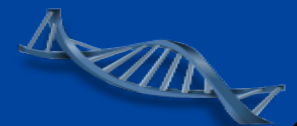


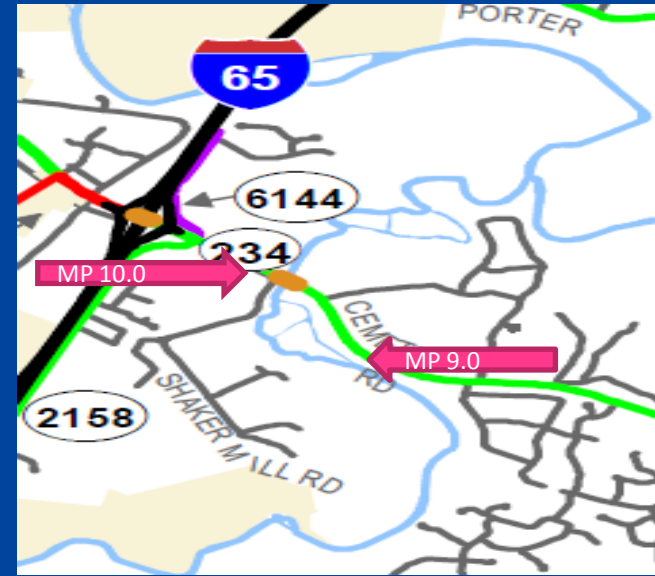
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Photo 1: KY 234 looking south.

Photo 2: KY 234 looking south.



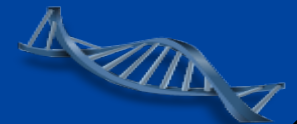


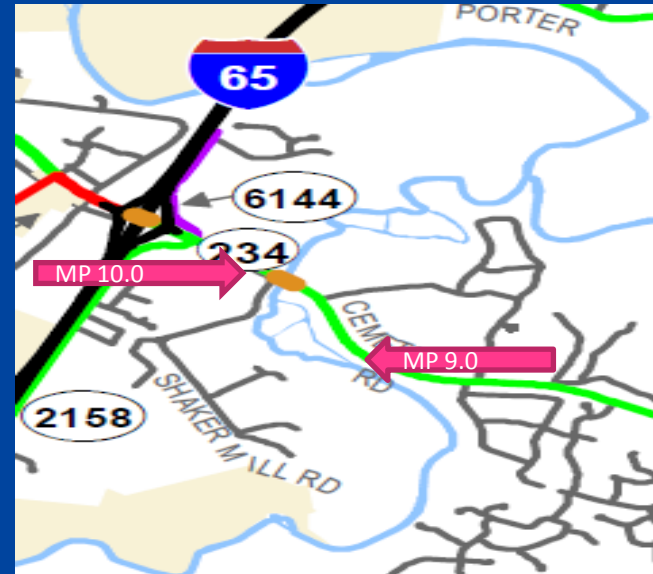
3-1077 (Warren County)

KY 234 (Cemetery Road); Bridge Replacement over Drakes Creek (MP 9.746), 0.097 mile east of Shaker Mill Rd (CR1131).

Photo 1: KY 234 looking south towards bridge.

Photo 2: KY 234 looking south at bridge



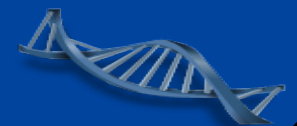


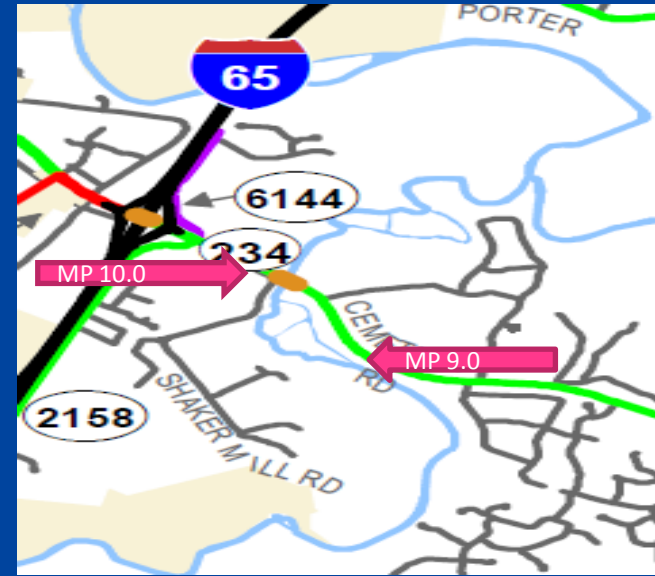
3-1077 (Warren County)

KY 234 (Cemetery Road); Bridge Replacement over Drakes Creek (MP 9.746), 0.097 mile east of Shaker Mill Rd (CR1131).

Photo 1: Roger Porter Rd and KY 234 looking north.

Photo 2: Roger Porter Rd and KY 234 looking south.



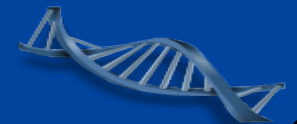


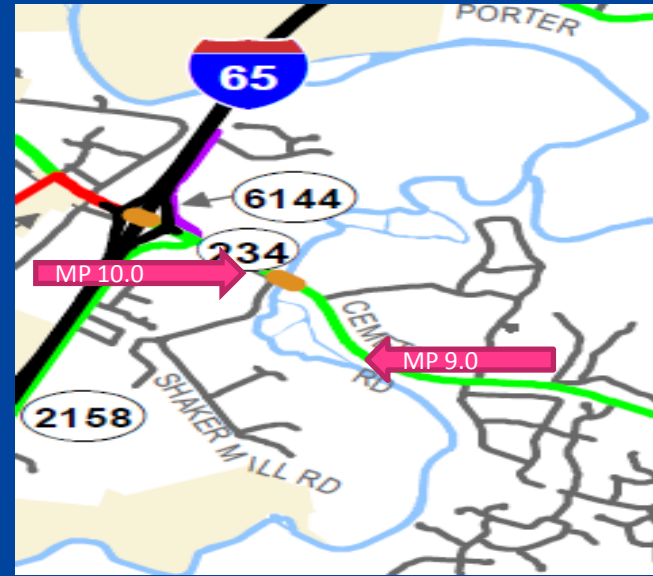
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Photo 1: Roger Porter Rd and KY 234 looking south.

Photo 2: Roger Porter Rd and KY 234 looking south.



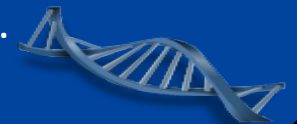


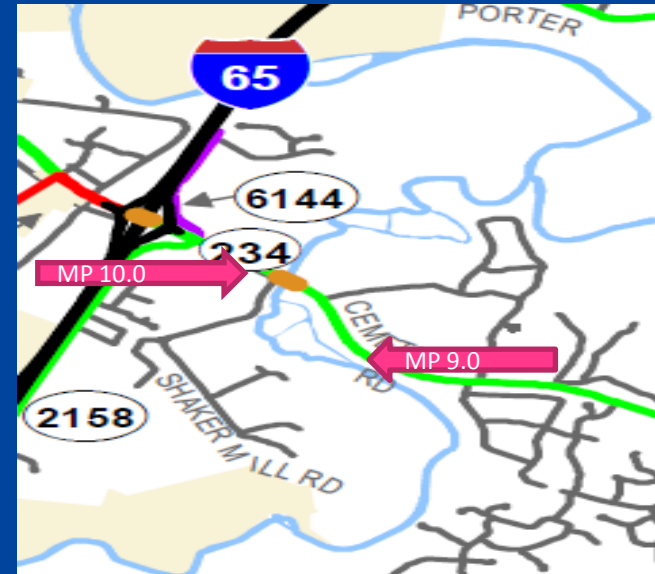
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KY 234 (Cemetery Road); Bridge Replacement over Drakes Creek (MP 9.746), 0.097 mile east of Shaker Mill Rd (CR1131).

Photo 1: Burton Memorial Church looking north on KY 234.

Photo 2: Burton Memorial Church looking north on KY 234.



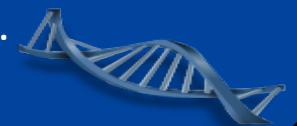


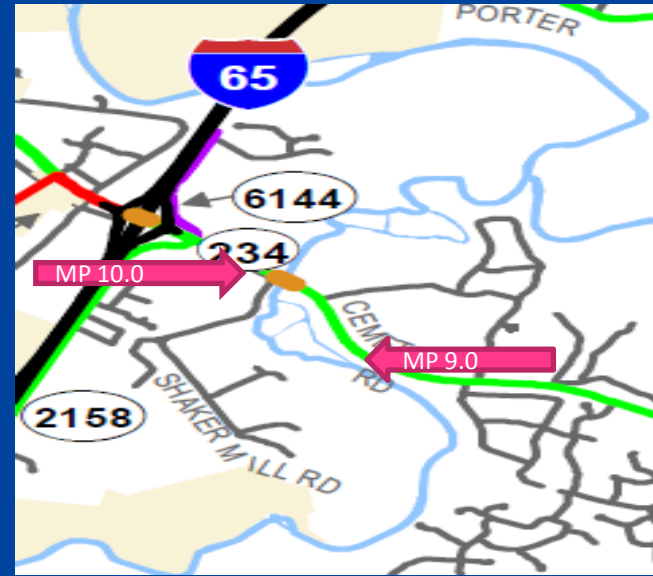
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Photo 1: Burton Memorial Church looking north on KY 234.

Photo 2: Burton Memorial Church looking north on KY 234.



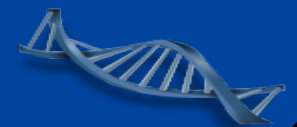


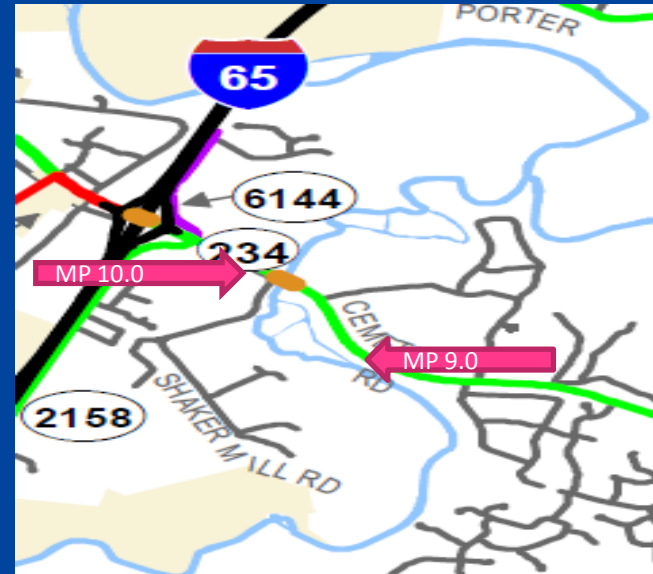
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Photo 1: Bridge over Drakes Creek looking south.

Photo 2: Bridge over Drakes Creek looking south.





3-1077 (Warren County)

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Photo 1: Bridge over Drakes Creek looking south.

