

DNA Study



Kentucky Transportation Cabinet District 6 Planning Corrin Gulick, PE

Campbell County

06-1076 – CS 1193 Bridge Over Taylor Creek

Kentucky Transportation
Cabinet Department of
Highways District 6

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41017

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6/14/2011

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I. INTRODUCTION

Kentucky's FY2010-FY2012 Enacted Biennial Highway Plan, as approved by the May 2010 General Assembly, provides a list of projects for the Kentucky Transportation Cabinet from fiscal year 2010 to fiscal year 2012. The plan includes a bridge replacement project on County Route 1193 (Waterworks Road) over Taylor Creek in Campbell County.

A. Study Purpose

The National Environmental Policy Act of 1969 (NEPA) established a policy for federally funded agencies to consider environmental impacts in the decision making process. A fundamental part of the NEPA process is to develop a Purpose and Need Statement in order to prevent future complications with NEPA documentation. This DNA will develop a draft Purpose and Need Statement as well as define the project scope, possible alternatives, planning-level cost estimates for alternates, an identification of potential environmental impacts, and other information pertinent to the Project Development phase of these projects.

B. Location

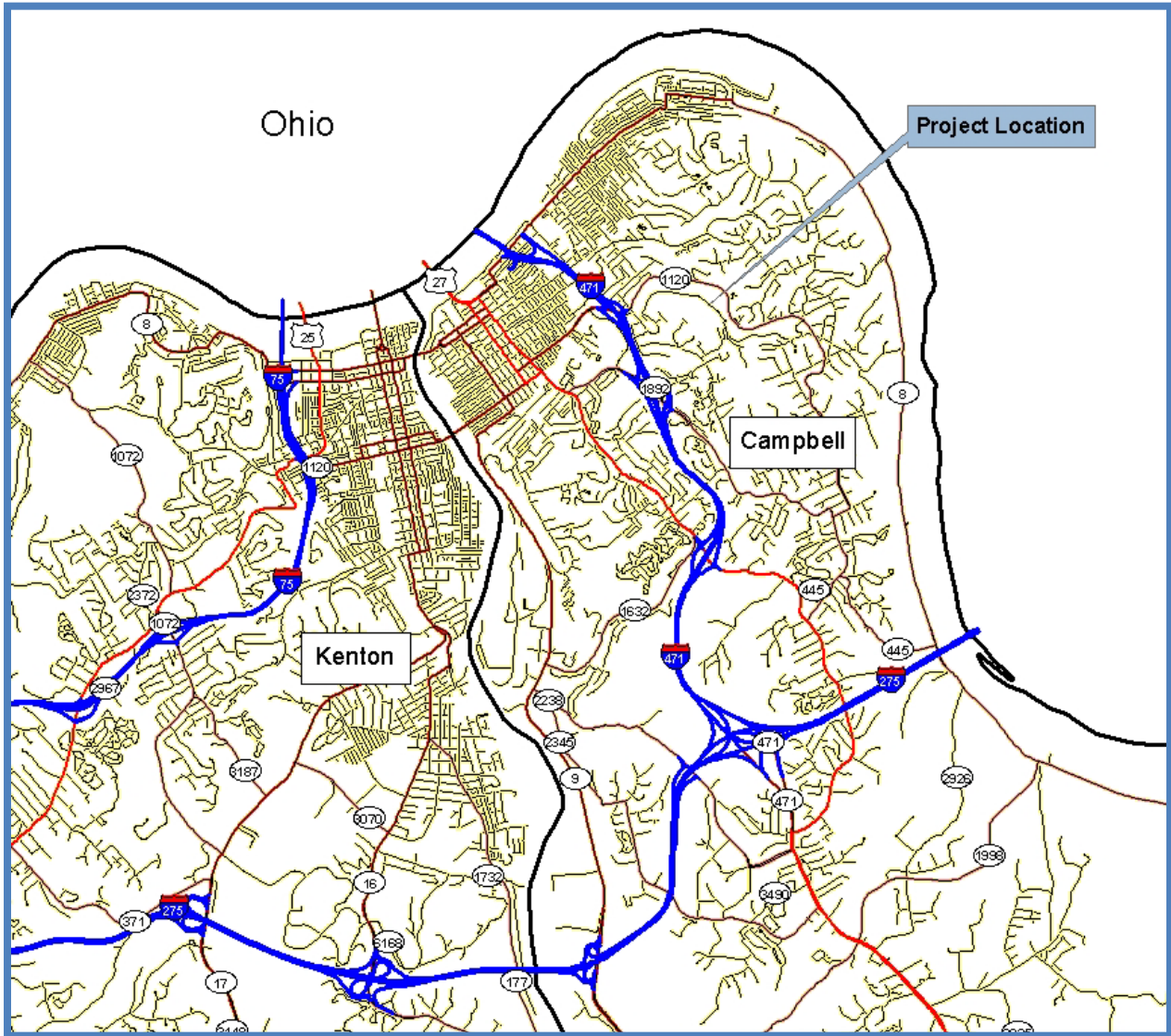


Figure 1 - Location Map

The proposed bridge project on Waterworks Road (County Route 1193) is located in Newport, Kentucky in Campbell County. The Licking River separates Campbell County from Kenton County to the west, and the Ohio River separates it from Ohio to the north and east. Figure 1 shows a location map of the proposed bridge project.

Newport, Kentucky is one of 15 incorporated cities in Campbell County. According to the United States Census, the population of Newport in 2000 was 17,048 people. This dropped significantly by 2010 to 15,273, a reduction 10.4%.



Figure 2 – Aerial of Project Location.

The bridge replacement project studied in this report is located on Waterworks Road, county route to the south of KY 1120. The existing land use along Waterworks Road is zoned as a single family residential by the Newport, Kentucky Planning and Zoning Commission.

II. PROJECT PURPOSE AND NEED

A. Legislation

The bridge replacement project is included in Kentucky’s FY2010-FY2012 Enacted Biennial Highway Plan, as approved by the May 2010 General Assembly. A description of the project as listed in the plan is as follows:

County	Item #	Route	Funding	Phase	Year	Amount
Campbell	06-1076.00	CS 1193	BRZ	D	2012	\$140,000

Table 1 – Project Description

06-1076.00: REPLACE BRIDGE ON CS-1193 (MP 0.793) OVER TAYLOR CREEK; 1.0 MI N. OF JCT KY 1120; (STRUCTURALLY DEFICIENT, SR=31.7) 019C00063N

B. Project Status

Design funds for the Bridge over Taylor Creek have been authorized at this time.

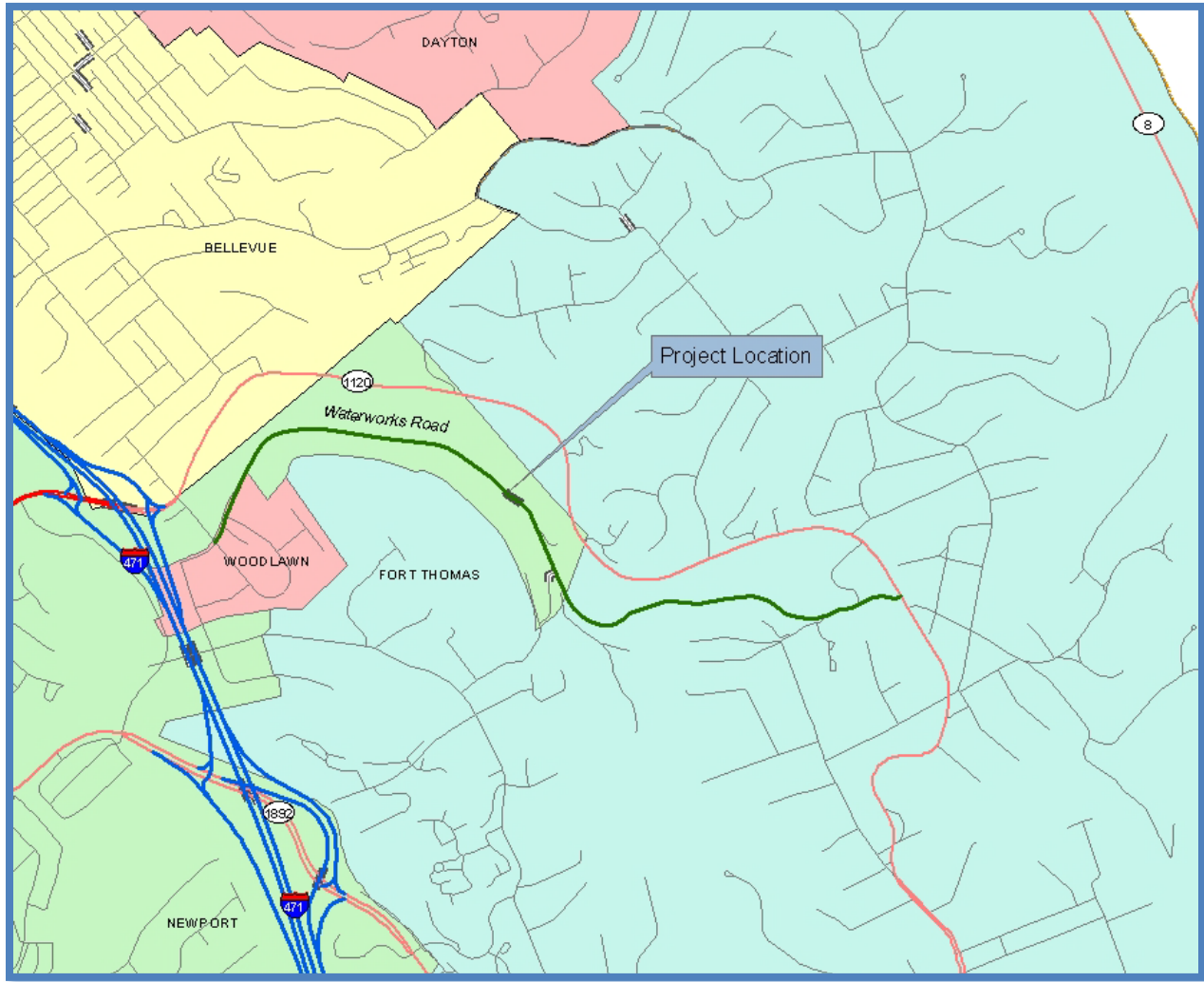
C. System Linkage

Figure 3 – System Linkage Map

From west to east, Waterworks Road starts in Woodlawn, runs through Newport, and terminates in Fort Thomas. Waterworks road is classified as a local roadway. It connects to KY 1120, a rural minor arterial, on the eastern end of the roadway; however, the majority of Waterworks Road runs parallel to the south of KY 1120.

There is also a development to the west of interstate 471 known locally as the Newport Pavilion. This development includes large chain stores such as Target, Kroger Market Place, and several local businesses. Although Waterworks Road does not connect directly to the Newport Pavilion, it does provide connectivity for local residents.

Since Waterworks Road is classified as a local road, there are no existing traffic counts along the roadway.

D. Modal Interrelationships

Waterworks Road is not part of the Transit Authority of Northern Kentucky (TANK) bus route.

The Northern Kentucky Water District is located on the eastern end of Waterworks Road. Although this is a truck traffic generator, the trucks are restricted from travel across the Waterworks Road Bridge over Taylor Creek. The design team should consider accommodating trucks in the bridge design.

A field visit indicated pedestrian are using Waterworks Road. Although there have been no official measurements of the amount of pedestrian use along the roadway, it is suspected that the residents along Waterworks Road are walking to the Newport Pavilion to the east of Interstate 471. The design team should consider the pedestrian use of the roadway in the design.

E. Social Demands and Economic Development

Land use along Waterworks Road is comprised of single family residential housing. Any closures along the roadway would require coordination with the local residents who use the roadway. The project team will need to determine further impacts of a roadway closure.

F. Transportation Demand

There are no existing traffic counts along Waterworks Road.

G. Capacity

The proposed bridge replacement project will not add or reduce the capacity on Waterworks Road. Since there are no future plans at this time to widen Waterworks Road, only two lane bridges are considered in this report.

H. Safety

The needs for the replacement of the Waterworks Road Bridge over Taylor Creek arise from existing structural deficiencies. The structural deficiencies pose a safety and reliability issue to the traveling public.

I. Roadway Deficiencies

The sufficiency rating of a bridge is based on structural value, functionality and detour length, and can be as high as 100. However, once this number drops below 50, a bridge is eligible for federal bridge replacement funding. The Waterworks Road Bridge over Taylor Creek has a sufficiency rating of 31.70 and is classified as structurally deficient. As a result, there is currently a 3 ton weight limit on the bridge, and it qualifies for BRZ funding.

The inspection report from January 27, 2011 noted several issues with the structural members of the bridge. A summary of these issues are listed below:

- The superstructure of the bridge is in poor condition and was given a score of 4 out of 9 (bridges are typically considered for closure once this number drops below a 3).
- The northern half of the structure is comprised of an unpainted steel open girder system. This was the original bridge.
- The steel girders on the bridge are in critical condition from severe rusting and significant section loss. The top and bottom flanges of the northern-most girder have almost 100% section loss, and severe section loss is occurring throughout the steel elements of the bridge.
- Floor beams on the bridge have severe rusting and major section loss.
- The southern half of the structure is comprised of a tee beam design. This newer portion of the bridge was constructed when the bridge was widened.
- The tee beam section of the bridge is experiencing severe spalling and the structural steel is exposed and rusting. Cracking and staining is evident throughout this portion of the structure
- A large amount of delamination is occurring between the original deck and the asphalt overlay. Potholes and cracking are noted in the deck.
- The substructure of the bridge is in serious condition and was given a score of 3 out of 9 (bridges are typically considered for closure once this number drops below a 3).
- The wingwalls are of a stone masonry design.
- There is a large vertical crack in the north-west abutment under the bearing of one of the girders. This crack is approximately six feet tall and one foot wide.

- Both of the south wingwalls have masonry failure. The north-east wingwall is completely missing. The north-west wingwall is completely undermined and several rows of masonry are completely gone.
- Sever scour is evident on the east and west ends of the bridge.

A full replacement of the bridge including the superstructure and substructure is required. The Inspection Report as well as the Structural, Inventory, and Appraisal Sheet are located in Appendix B and Appendix C, respectively.

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

The United States Environmental Protection Agency has designated Campbell County as an area not in attainment, pursuant to the Clean Air Act Amendments of 1990. However, the Waterworks Road Bridge over Taylor Creek does not intend to add or reduce capacity to the existing roadway. As a result, there should be no permanent affect on the air quality from the proposed project.

B. Archaeology

No archaeological impacts are anticipated for this project.

C. Threatened and Endangered Species

The United States Fish and Wildlife Service has identified Campbell County as a potential habitat for several endangered species, listed in Table 2. All of the listed species could potentially be impacted by the proposed project.

 <p style="margin: 0;">U.S. Fish & Wildlife Service <i>Kentucky Ecological Services Field Office</i></p>	<p>U.S. Fish & Wildlife Service 330 West Broadway, Rm 265 Frankfort, KY 40601 Phone: 502-695-0468 Fax: 502-695-1024</p>
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Endangered, Threatened, & Candidate Species in <u>CAMPBELL</u> County, KY					
Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Mammals	<i>Myotis sodalis</i>	Indiana bat	E	P	
Mussels	<i>Pleurobema clava</i>	clubshell	E	K	
	<i>Cyrogenia stegaria</i>	fanshell	E	K	
	<i>Plethobasus cooperianus</i>	orangefoot pimpleback	E	K	
	<i>Lampsilis abrupta</i>	pink mucket	E	K	
	<i>Pleurobema plenum</i>	rough pigtoe	E	K	
	<i>Epioblasma torulosa rangiana</i>	Northern riffleshell	E	P	
	<i>Obovaria retusa</i>	ring pink	E	P	
	<i>Plethobasus cyphus</i>	sheepnose	C	P	
Plants	<i>Trifolium stoloniferum</i>	running buffalo clover	E	P	

NOTES:

* Key to notations: E = Endangered, T = Threatened, C = Candidate, CH = Critical Habitat

**Key to notations: K = Known occurrence record within the county, P = Potential for the species to occur within the county based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics.

Table 2 – Threatened and Endangered Species in Campbell County

D. Hazardous Materials

No hazardous materials impacts are anticipated for this project.

E. Historic Property

No historic impacts are anticipated for this project.

F. Permitting

This project will likely disturb more than one acre of land during construction. Therefore, the Kentucky Pollutant Discharge System (KPDES) KYR10 Permit Notice of Intent (NOI) shall be submitted to the Kentucky Division of Water.

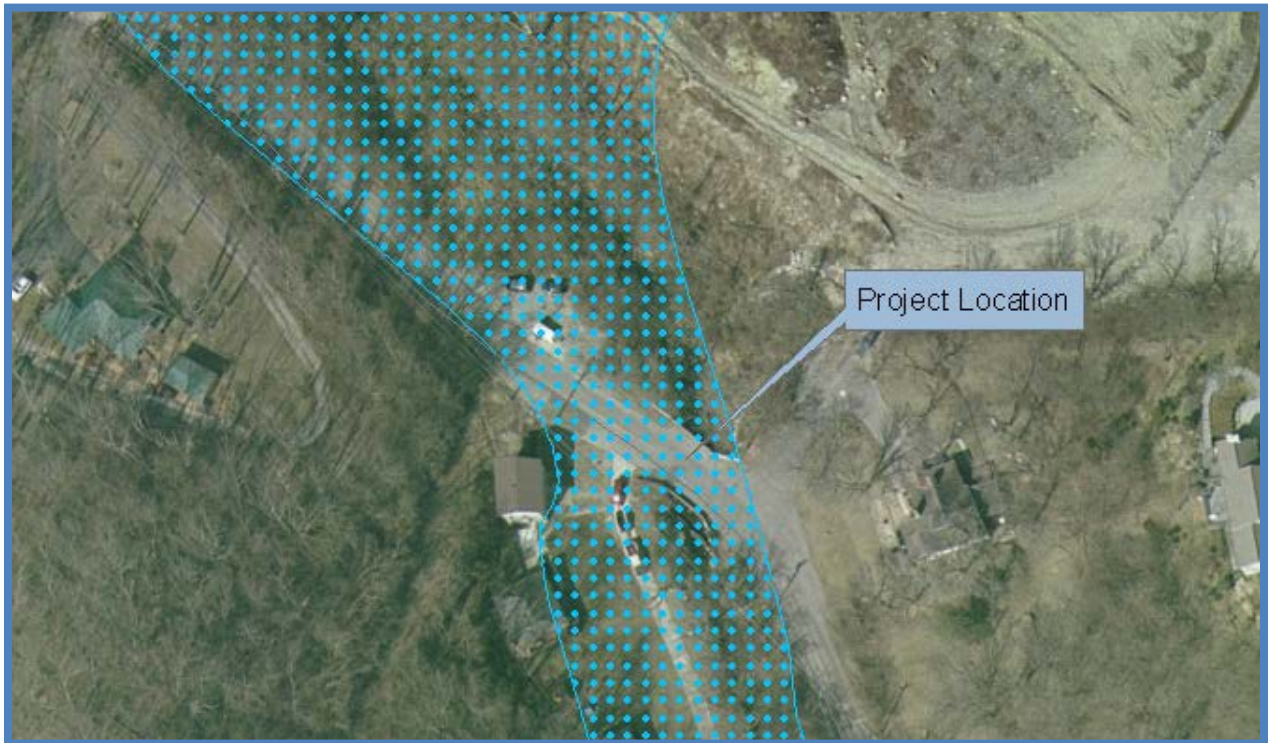


Figure 4 - FEMA FIRM Map

The Flood Insurance Rate Map (FIRM), shown in Figure 4, published by the Federal Emergency Management Agency (FEMA) shows that the project is located in a special flood hazard area. This area is subject to inundation by a 100 year flood event. A 100 year flood event means that there is a 1% chance of flooding in this area annually. The map also shows that a base flood elevation has been determined for the project area.

The amount of work done below the base flood elevation and the linear amount of impacts to Taylor Creek will determine the need for the Army Corps of Engineers 404 permit and the Kentucky Division of Water 401 permit. This will be determined by the project team.

G. Noise

Permanent noise impacts are not anticipated with the project.

H. Socioeconomic

The proposed bridge project is located in Census Tract 523.01 in Campbell County, Kentucky. Within this block tract, there are 3 block groups that could be potentially impacted by the proposed project, 1002, 2008 and 2005. The table below summarizes the specific block group information about the minority population within the specified block groups:

Campbell County Census Tract 523.01					
Block Group	1002	2008	2005	Total	% Total
Population	6	7	88	101	100
White	6	7	81	94	93
African American	0	0	2	2	2
Hispanic	0	0	5	5	5

Table 3 – Census Information

Furthermore, according the Kentucky Data Center, the percent of the Campbell County population with an annual income below the poverty level is 11.1%. This data as well as the data shown in Table 3 shows socioeconomic impacts are not likely for this project.

I. Section 4(F)

No Section 4(F) impacts are anticipated for this project.

J. Section 6(F)

No publicly financed outdoor recreational facilities are identified within the project areas.

IV. PRELIMINARY PROJECT INFORMATION

A. Existing Conditions

Waterworks Road Bridge Over Taylor Creek	
Year Built	1900 (estimated)
Year Widened	1940 (estimated)
Milepoint	0.783
Design	Tee Beam/Two Girder Floorbeam System
Lanes	2
Lane Width	9 feet (varies)
Spans	1
Length of Longest Span	27 feet
Skew	45°
Width Curb to Curb	31.5 feet
Speed Limit	25 MPH
Deck Type	Concrete
Weight Limit	Yes
Utilities on Bridge	Yes
Sufficiency Rating	31.70
Road Width	18 feet (shoulders vary)

Table 4 – Existing Conditions

Pictures of the existing Waterworks Road Bridge over Taylor Creek can be found in Appendix A.

The existing roadway is mostly rural with some urban components. There are portions of Waterworks Road with a centerline stripe and/or curb along one side of the roadway. However, the portion of Waterworks Road on and near the Bridge over Taylor Creek has a more rural feel without curb or a discernable centerline stripe.

B. Utilities

The bridge inspection report indicated three underground utilities are attached to the bridge. There is a 36 inch waterline on the north side of the bridge. A concrete arch was built to help support this line. To the north of the bridge, a 12 inch waterline was noted that runs along the creekbed. It appears that this line was encased in concrete at one point in time. Furthermore, there is a 12 inch waterline that runs through the north wingwall. At this time, it is not clear if any of these lines are still in service. A survey should be conducted to determine if more utilities are present in the area and which utilities are active lines. There will likely be quite a bit of utility relocation involved with this project.

Please find a list of potential utility providers in the area:

- Duke Energy
- Northern Kentucky Water District
- Sanitation District Number 1
- Cincinnati Bell
- Insight Communications

V. **PROJECT PURPOSE AND NEED STATEMENT**

The existing Waterworks Road Bridge over Taylor Creek is classified as structurally deficient, creating an unsafe condition for the traveling public. Therefore, the purpose of the project is to improve public safety by providing a dependable crossing of Taylor Creek.

VI. **POSSIBLE ALTERNATIVES**

Due to the condition of the existing bridge, it is not practical to salvage the existing substructure or superstructure of the bridge.

A. Alternate 1: No Build

The no-build alternate consists of not implementing the proposed project improvements described in the following alternates. A no-build alternate would require the bridge to close and eventually be removed. Consequently, this does not fulfill the purpose and need of the project.

B. Alternate 2: Replace Bridge on Existing Alignment

Alternate 1 proposes constructing a new Bridge over Taylor Creek along the existing alignment. The existing bridge would need to be completely replaced, including the superstructure and the substructure.

There is significant scour under the abutments and wingwalls of the existing bridge. In order to prevent future scour issues, the design team should consider countermeasures. This could include, but is not limited to, revising the skew of the bridge, and increasing the span length of the bridge.

Increasing the span length could impact the access points to the east and/or west of the bridge. Relocation of the access points could impact a structure on adjacent properties. Potentially impacted structures are shown in Figure 5, circled in red. The design team will determine the final layout of the bridge and bordering access points.

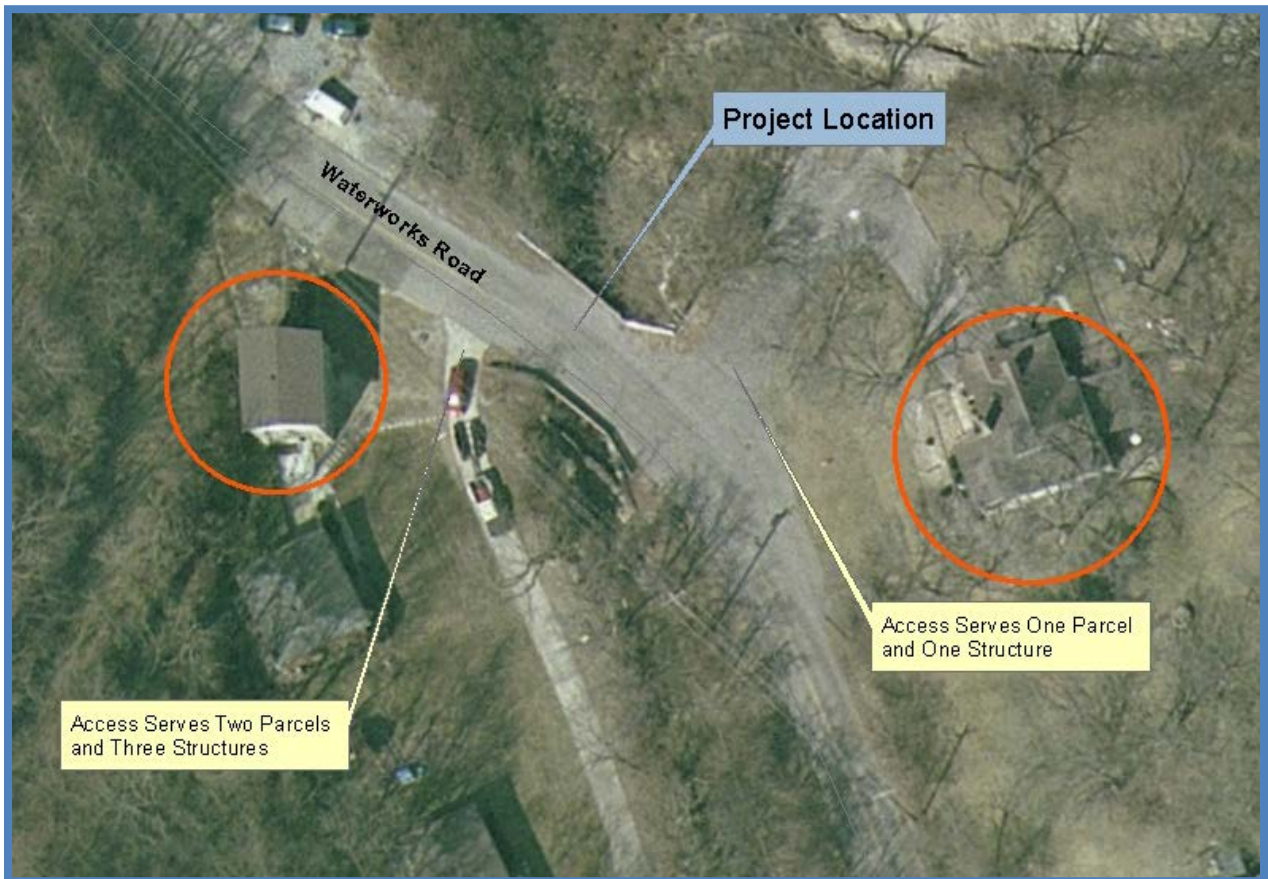


Figure 5 – Impacted Access Points and Structures for Alternate 1

This alternate would require Waterworks Road to be closed temporarily. Figure 5 shows a potential detour route for Waterworks Road during this time in yellow.

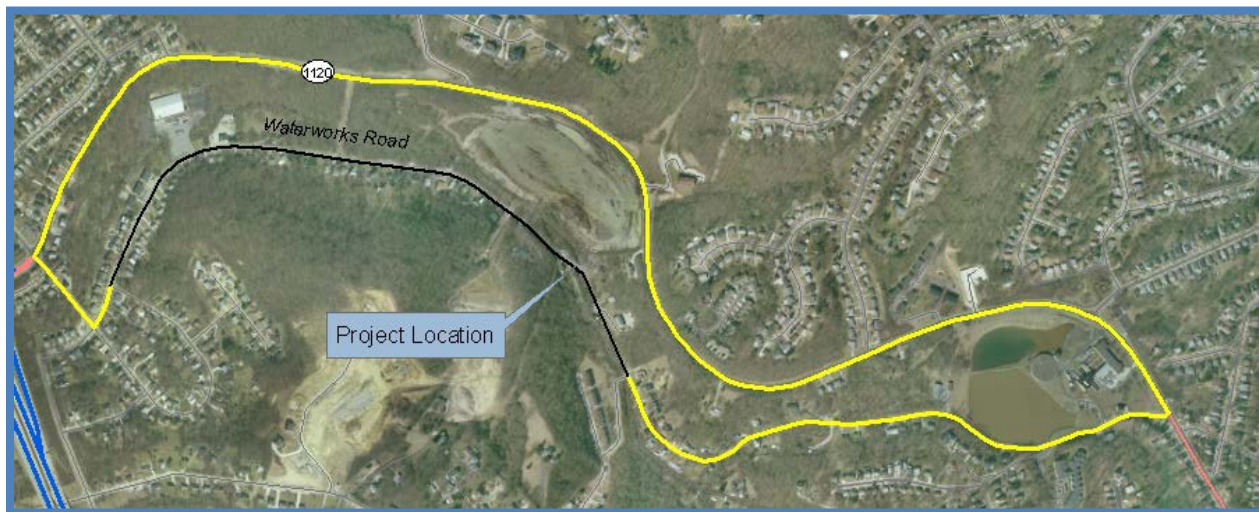


Figure 6 – Proposed Detour Route for Alternate 2

The detour shown in Figure 6 utilizes KY 1120 (Memorial Parkway) and West Crescent Avenue as a detour for Waterworks Road. KY 1120 is three lanes from Wilson Road/West Crescent Avenue to Taylor Avenue. There is a lane drop into a left turn lane at Taylor Avenue, and the roadway is two lanes to the intersection with Waterworks Road.

No traffic counts are available for Waterworks Road or West Crescent Avenue. However, traffic counts are available for KY 1120. Traffic counts in 2009 indicated that KY 1120 had an ADT of 11,519 vehicles per day. If this ADT is used, the level of service (LOS) on KY 1120 is an A in the 3 lane portion, and a C in the two lane portion. KY 1120 has the capacity to handle the additional traffic from Waterworks Road during the temporary closure.

For the purposes of this report, a box beam bridge is assumed; however, the design team will determine the appropriate structure design for the project.

Planning Level Cost Estimate

Design	\$140,000
Utilities	\$110,000
Right-of-Way	\$200,000
Construction	\$550,000
Total	\$1,000,000

C. Alternate 3: Replace Bridge on an Alternate Alignment

Figure 7 – Proposed Preliminary Alignment for Alternate 2

Alternate 2 proposes replacing the Waterworks Road Bridge over Taylor Creek along a new alignment. It is not feasible to place the new bridge to the north of the existing bridge, due to the angle of the stream. As a result, the bridge has been shown to the south.

The proposed alignment is shown in Figure 7. The black line shows the existing Waterworks Road and the red line shows the proposed Waterworks Road. The orange line shows the location of the proposed new bridge, and the blue arrows shows the flow of Taylor Creek. The new alignment would allow the existing bridge to be utilized during construction.

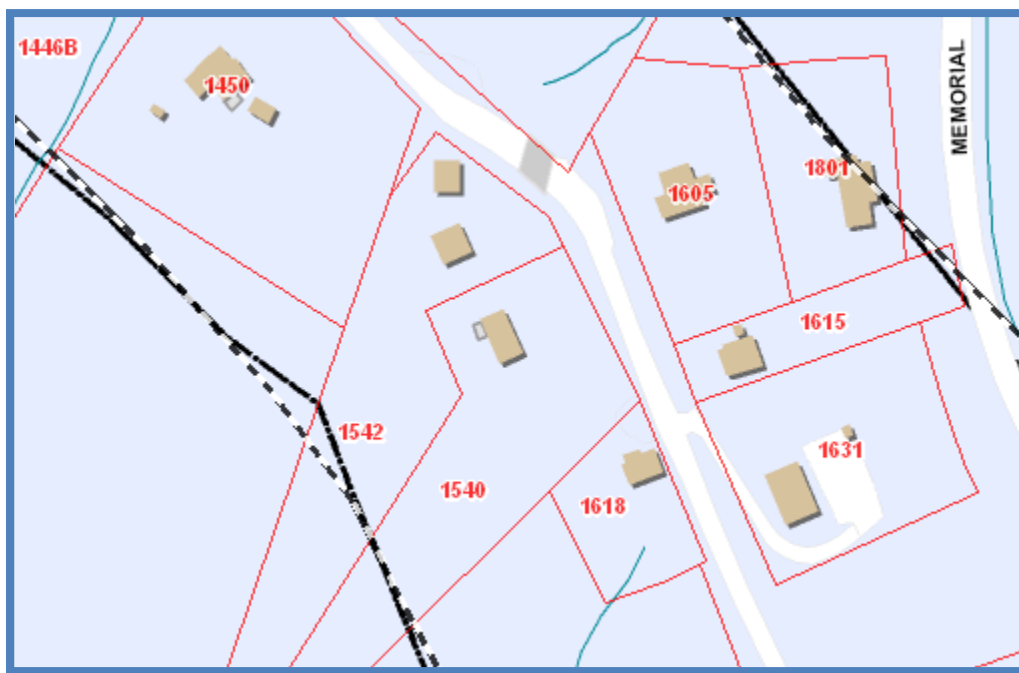


Figure 8 – Property Map for Project Area

Property lines within the project area are shown as a red line in Figure 8. If the alignment shown in Figure 6 is used, the proposed new alignment for Waterworks Road will impact several properties. The table below summarizes the impacts based on preliminary information:

Address	Impact to Structure	Permanent Impact to Property	Temporary Impact to Property
1540	No	Yes	Yes
1542	Yes (2)	Yes	Yes
1605	No	Yes	Yes
1615	No	Yes	Yes
1618	No	Minor	Yes
1631	No	Yes	Yes

Table 5 – Potential Right-of-Way Impacts for Alternate 3

Planning Level Cost Estimate

Design	\$140,000
Utility	\$350,000
Right-of-Way	\$210,000
Construction	\$700,000
Total	\$1,500,000

VII. SUMMARY

Project 06-1076 provides BRZ funding for the design phase of the Waterworks Road Bridge over Taylor Creek Replacement Project in Campbell County. The following key points were discussed in the report:

❖ General Information

- The project is located on Waterworks Road, a local county road in Newport, Kentucky.
- There are no traffic counts for Waterworks Road.
- Pedestrians and Trucks will likely use the roadway.
- The project area will need to be evaluated for endangered species.
- The project will likely need a KPDES NOI, a 401 and possibly a 404 permit from the Division of Water. However, the 404 permit will need further evaluation.
- The bridge is classified as structurally deficient. The superstructure is in poor condition and the substructure is in serious condition. Both the superstructure and substructure should be replaced.
- There are several existing utilities in the area. These include a 36 inch and two 12 inch lines that are currently located on, through, and adjacent to the bridge. It is not known if these lines are currently in service.

❖ Alternates

- Alternate 1 - No Build
 - Does not fulfill the purpose and need of the project.
- Alternate 2 – Replace bridge along the existing alignment
 - Waterworks Road would need to be temporarily closed for construction. This closure will need further evaluation, because there are no traffic counts for Waterworks Road.
 - This alternate would minimize potential utility and right-of-way impacts.
 - The planning level cost estimate for Alternative 2 is approximately \$850,000.
- Alternate 3 – Replace bridge along a new alignment
 - The new alignment is shown to the south due to the existing alignment of the stream.
 - This alternate is likely to impact several properties, including two structures.
 - This alternate will likely require major utility relocations.
 - The planning level cost estimate for Alternate 3 is approximately \$1,500,000.

APPENDIX A:

*Waterworks Road Bridge over Taylor
Creek - Pictures*



Waterworks Road Looking West



Waterworks Road Looking East



North/East End of Bridge



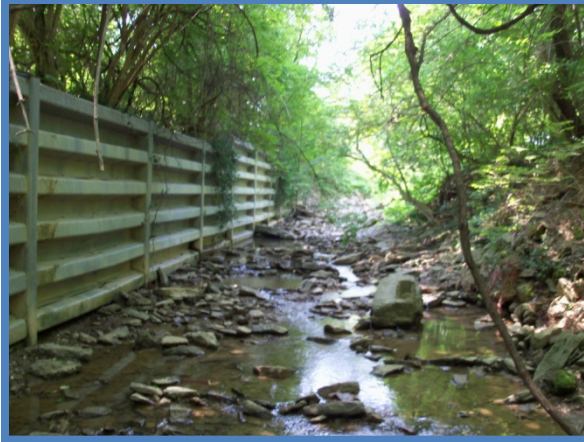
Driveway on South/East Side of the Bridge



Taylor Creek Looking North (Downstream)



Driveway on North/West Side of Bridge



Taylor Creek Looking South (Downstream)



From South (Downstream Side) Looking North to Bridge



From South (Downstream) Side Looking North to Bridge



Close-up of Waterline Going Through the Bridge



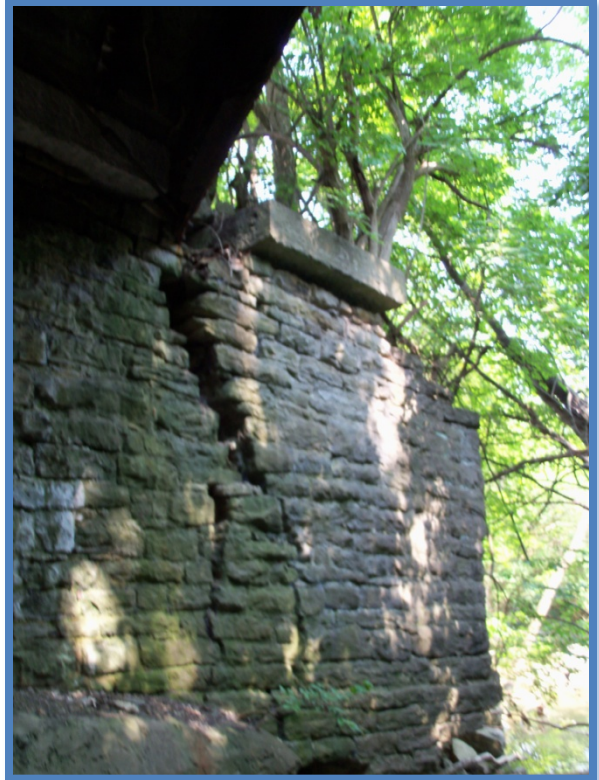
Utility on South Side of Bridge



Close-up of Waterline Going Through the Bridge



South Side of Bridge, Concrete Tee Beam Portion



North/East Wingwall with large Crack



North Side of Bridge, Steel Girder Floorbeam System



Scour Under East Side of Bridge



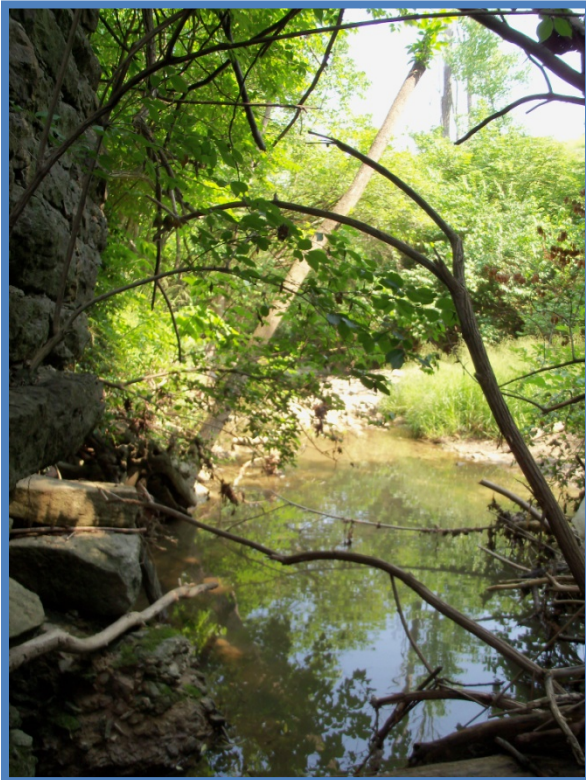
North/West Area with Missing Wingwall



North Side of Bridge Looking South, Utility Line on Arch



North Side of Bridge Showing Utility, Crack and I-Beam Section Loss



Taylor Creek Looking North (Downstream)



South Side of Bridge Looking North Showing Utility Line

APPENDIX B:

*Waterworks Road Bridge Over Taylor
Creek Inspection Report*

019C00063N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 1/27/2011
 Inspector: GCOCHRAN (23)
 Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory: Y
 Element: Y
 Fracture Critical: N
 Underwater: N
 Other Special: N

Inspector Signature: 

District Review Date: 2/1/2011
 District Reviewer: BSEITER (55)

IDENTIFICATION			
Bridge ID (8):	019C00063N	MAP BRIDGE	District Number: 6
Route Carried (7):	WATERWORKS RD		County (3): 19 Campbell
Mile Point:	0.783		Feature Intersected (6): TAYLOR CREEK
Location (9):	1.0 MI-N. JCT KY 1120		Road Name: WATERWORKS RD
Structure Description:	32.15 Foot - Single Span Steel Stringer/Multi-beam or Girder		

NBI CONDITION		SCHEDULE TAB				
Deck (58):	4	Schedule:	Required (Y/N)	Last Date	Frequency	Next Date
Superstructure (59):	3	NBI (90):		1/27/2011	(91): 6 mos	7/27/2011
Substructure (60):	3	Fracture Critical (92A):	N	(93A): 1/1/1901	(92A): mos	1/1/1901
Culverts (62):	N	Underwater (92B):	N	(93B): 1/1/1901	(92B): mos	1/1/1901
Channel/Protection (61):	3	Other Special (92C):	N	(93C): 1/1/1901	(92C): mos	1/1/1901
		Elemental:	NA		6 mos	7/27/2011

Load Rating and Posting						WATERWAY	
Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross	Scour Critical (113):	4
Recomm. Posting:	3	3	3	3	3	Observed 113 Rating:	3
Field Posting:	6	6	6	6	6	Waterway Adeq. (71):	4
Posting Status (41):	P Posted for load						
Signs Posted:	Cardinal:	Y	Non-Cardinal:	Y			

DECK/WEARING SURFACE							
Deck Type (107):	1 Concrete-Cast-In-Place						
Wearing Surface/Protective System (108):	Type:	6	Membrane:	0	Protection:	0	
Traffic Safety Features (36):	Bridge Rail:	0	Transition:	0	Appr. Rail:	0	Rail Ends: 0
Overlay:	Y						
Overlay Type:	Asphalt						
Overlay Thickness:	5.00						

Vertical Clearances	
Minimum Vertical Overclearance (53):	99.99
Minimum Vertical Underclearance (54):	0.00
Maximum Vertical Clearance (10):	99.99
Minimum Vertical Clearance:	

Sufficiency Ratings		
SR:	31.70	SD/FO: 1 Structurally Deficient

Element Condition State Data								
Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
106/1	Unpnt Stl Opn Girder	LF	306.00	0.00	0.00	238.00	68.00	0.00
110/1	R/Conc Open Girder	LF	136.00	0.00	102.00	14.00	20.00	0.00
13/1	Unp Conc Deck/AC Ovl	SF	1,139.00	0.00	1,139.00	0.00	0.00	0.00

KYTC Bridge Inspection Report

Summary:

Inspection Date: 1/27/2011
 Inspector: GCOCHRAN (23)
 Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory: Y
 Element: Y
 Fracture Critical: N
 Underwater: N
 Other Special: N

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
151/1	Unpnt Stl Floor Beam	LF	30.00	0.00	0.00	30.00	0.00	0.00
217/1	Other Mil Abutment	LF	225.00	0.00	18.00	203.00	4.00	0.00
331/1	Conc Bridge Railing	LF	68.00	0.00	68.00	0.00	0.00	0.00
357/1	Pack Rust Smart Flag	EA	1.00	0.00	0.00	0.00	1.00	0.00
359/1	Soffit Smart Flag	EA	1.00	0.00	0.00	0.00	1.00	0.00
361/1	Scour Smart Flag	EA	1.00	0.00	0.00	1.00	0.00	0.00
363/1	Section Loss SmFlag	EA	1.00	0.00	0.00	1.00	0.00	0.00
607/1	Utilities	EA	1.00	0.00	1.00	0.00	0.00	0.00
611/1	Embankment Erosion	EA	1.00	0.00	0.00	1.00	0.00	0.00
612/1	Chan Algn	EA	1.00	0.00	1.00	0.00	0.00	0.00

Element Condition State Data

Str	Unit	Elm/Env	Description	Description
1	106/1	Unpnt Stl Opn Girder	Steel Girders- Right most half of structure, which appears to be the older original section is constructed of two large steel multi plate riveted girder elements with eight small beam elements in between plate girders. Top flange of eight small beams are encased in deck bottom (soffit) and can not be viewed for inspection at this time. At mid-span area structure has one horizontal floorbeam element at connection between plate girders. Originally the riveted plate girders would have been the exterior most elements of superstructure. All steel beam elements throughout were found to be 100% completely covered in severe rusting conditions. Riveted girders and small beams were found to be in Critical Condition with section loss of up to 80% in stringers on bottom flanges, with exterior plate girders having total section loss of up to 100% in bottom flanges, approximately 75% section loss in top flanges and random areas of 100% section throughout webs. Downstream riveted girder is showing complete section loss throughout bottom flange as well as top, along with severe twisting of web section from the rear bearing to mid-span area and holes rusted through very thin web at or near the rear bearing area. Twisting conditions continue to worsen as stone masonry bearing area at the forward abutment continues to be lost. Several of the vertical stiffeners on both plate girders have missing rivets and have completely lost connection to webs. Heavy section loss noted typical throughout both vertical and diagonal stiffener elements. Eight smaller steel beams have partly encased webs, total encasement of top flanges and end location of beams on abutment seats are encased as well. All of these beam elements have heavy surface scaling and varying degrees of severe section loss. Rusting conditions throughout these beams is severe, the degree of section loss is unknown. If beams were ever sandblasted removing section loss; I'm sure it would be a great amount. (See Photos)	
1	110/1	R/Conc Open Girder	Concrete Beams- Left most side of structure (extension) is of Tee Beam design. Tee beam elements have moderate to heavy cracking (diagonal, transverse and longitudinal) throughout fascias with spalling, efflorescence and exposure of primary reinforcing steel material, which has a great amount of section loss as well. Left most exterior beam has large areas of spalling in random locations throughout exterior fascia with exposed and rusting reinforcing steel. Exterior face along the lower section at rear location has a 3.0' long area of horizontal cracking with seepage. Top edge near mid span and forward half has small areas of deterioration and spalling with seepage. Bottom flange has longitudinal cracking with stalactites at the rear abutment, longitudinal cracking and delamination at mid span, random cracking and spalling at the forward abutment location. Interior face has a few vertical cracks with seepage. Second beam from the left has varying degrees of longitudinal cracking in lower section with leakage, stalactites, delamination and one spalled area with exposed rusting reinforcing steel. Beam has dark damp areas from leakage, with horizontal, vertical and random cracking throughout. Third beam from left, you can not see the right most fascia, which is against beam #4. The left most face has a lot of longitudinal and random cracking with dark damp stained areas. The entire length along the bottom of this beam has longitudinal cracking and is damp from leakage. Bottom section at the rear end of beam has a 10' long area of spalling with six exposed rusting steel reinforcing bars and another 10.0' is delaminated and cracked. Fourth beam from left at the forward abutment location has a 10.0' area where the entire bottom is spalled off (2" deep) and has both vertical and longitudinal reinforcing steel exposed. Bottom section throughout this beam has longitudinal cracking, delamination, deterioration and a heavy amount of stalactites. (See Photos)	

019C00063N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 1/27/2011
 Inspector: GCOCHRAN (23)
 Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory: Y
 Element: Y
 Fracture Critical: N
 Underwater: N
 Other Special: N

Element Condition State Data

Str	Unit	Elm/Env	Description	Description
1	13/1	Unp Conc Deck/AC Ovl		<p>(This structure appears to be an old existing two Multi Plate Riveted Steel Girder designed structure that has been modified without removal of existing girder elements. Structure now looks like concrete slab with partially encased steel beams and an Tee Beam widening along right most side.)</p> <p>Deck- Note that topside surface of deck area could not be viewed for inspection, due to asphalt overlay cover. Concrete deck appears to be approximately 9.0" (inches) thick with unknown placement of reinforcing steel material. Asphalt overlay wearing surface has transverse cracking the total width of bridge, along with both the rear and forward ends of deck.</p> <p>Right most lane throughout deck surface has random rough areas with one location being patched with asphalt cold mix material. Right lane has a large amount of longitudinal cracking in the left wheel track a few feet from centerline and one transverse crack in left lane and several in the right lane. Overlay material is now starting to break down, crack and form random potholes throughout area.</p> <p>Before each resurfacing of asphalt overlay, it does not appear any milling of asphalt pavement material was done/performed prior to new surfacing; therefore depth of asphalt overlay material is unknown at this time.</p> <p>Note that when deck area was sounded, a large amount of delamination was detected. Deck surface has and continues to allow a heavy amount of seepage to structural elements below.</p> <p>Gutter lines throughout deck area were found to be snow covered during time of inspection. (See Photos)</p>
1	151/1	Unpnt Stl Floor Beam		<p>Floor Beam- Floor beam element is under the right most section of this structure in between steel multi plate girders. Floor beam was found to be completely covered with severe rust and a major amount of section loss. Floor beam is of riveted buildup plate design, which has a severe amount of pack rust in between plate members, causing separation and deformation of elements.</p> <p>Floor beam element has anchor bolts which extend down through the deck, through timber runners and are connected to the top flange of this floor beam. All anchor attachment bolts are in very poor condition, but are all in place at this time. A timber runner is placed between the top flange of floor beam and bottom of beams. This runner is very rotten and decayed (very poor condition). Floor beam element continues to show swag and is swayed downward towards channel, which is approaching utility/waterline. Floor beam element was found to be in very poor condition at this time. (See Photos)</p>
1	217/1	Other Mtl Abutment		<p>Stone Abutments- Substructure elements both rear and forward are of random stone masonry design. Abutment elements have been refaced all along the bottom areas the entire width with concrete. This refacing is of different heights (varying from 3.0' to 5.0' high in places). Rear abutment element has one area approximately 10' wide that has been faced with concrete all the way up to the beam seat area. This section of concrete has moderate cracking throughout.</p> <p>All the refacement material is of old construction. Facing all along the bottom of both abutments has areas of cracking and deterioration.</p> <p>Note that large opened vertical crack in the forward abutment at union with the right forward wingwall element continues to open more and more (approximately 1.0/+ foot at top) each inspection; as the right rear wingwall element continues to show complete failure. As noted in past inspections; this large opened crack/separation of stone is directly under the right exterior girder (bearing area for girder). If wingwall continues to fail, failure will cause complete bearing loss under girder (beam seat will be completely gone).</p> <p>Right rear wingwall element has already failed in the past and fallen off, being washed away by stream flow. The other three wingwall elements are of random stone masonry design. The right forward wingwall is and has been 100% completely undermined and has several rows of stone material displaced and gone (completely failed). Stone material along bottom section of this wall continues to fall off; as a large amount hang in air. Unless repairs are made very soon this wingwall element will fall completely off of structure and release embankment.</p> <p>Left rear wingwall has a lot of the mortar/grout falling out of joints in between stones and wall is a little wavy. Bottom of this wingwall over a large utility pipe has a 4' x 2' area where the stone is missing. (See Photos and Element Description Scour for scour details at substructure elements.)</p>
1	331/1	Conc Bridge Railing		<p>Bridge Railing- Both left and right side bridge railing systems on this structure were found to have a minor to moderate amount of concrete deterioration throughout.</p> <p>Railing protection system on top of three out of four wingwall's have failed or are failing and have had metal rails with timber post supports placed in front of walls, which is acting as safety protection devices.</p> <p>Both right side wingwall railing systems are failing with the right forward wingwall railing having 100% separation and has moved out approximately 1.5 feet and is no longer connected to bridge railing. Right Side Wingwall Rails Are No Longer Functioning-As-Designed. Right rear wingwall railing has approximately 2/3 loss to upper portion, which has failed and fallen over towards channel. Both the right rear and right forward wingwall elements were found to have a large amount of stone masonry failure throughout. (See Photos)</p>
1	357/1	Pack Rust Smart Flag		<p>Pack Rust- Multiplate Riveted Girders were found to have severe pack rust in random locations throughout.</p> <p>Buildup floor beam element in between plate girders has heavy pack rust conditions in between plates along the bottom flange, which is separating plates approximately 1.0". A lot of pack rust between the plates and vertical stiffeners in both directions.</p>

019C00063N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 1/27/2011
 Inspector: GCOCHRAN (23)
 Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory: Y
 Element: Y
 Fracture Critical: N
 Underwater: N
 Other Special: N

Element Condition State Data

Str	Unit	Elm/Env	Description	Description
1	359/1	Soffit Smart Flag	Soffit-	The largest majority of the deck soffit is damp and discolored with a lot of diagonal, longitudinal, transverse and random cracking. Large amounts of cracked areas have seepage and areas of stalactites up to approximately 12.0 inches in length. Concrete material throughout soffit area looks old an rotten and in random areas turning back to gravel aggregates (original material mix). Deck in left half over the steel beam members looks somewhat the worst. Here and there are several small areas of spalling and deterioration, along with rusting reinforcing steel material exposed. (See Photos)
1	361/1	Scour Smart Flag	Scour-	Note that a large amount of scouring conditions continue at site of this structure. Forward abutment has an area of scour 4.0' in length, 1.0' deep going back approximately 2.0' (undermined) under existing underpinning construction. Rear abutment left side was found to have an area of scour 15.0' in length, which has undermined abutment back up under reface area (approximately 3.0 feet deep). This area of scour goes back approximately 3.0' and is 2.0' to 3.0' deep in places. Scour appears to go back to the original stone abutment construction. Repairs of scour must be made a priority!! Scouring conditions throughout this structure continue to increase and Must Be Repaired To Prevent Failure Of Substructure Elements. The entire right forward wingwall is undermined completely (100%) and scouring conditions are severe. Because of this the wingwall is pulling away from abutment element; if this is not repaired in the very near future the wingwall will fall completely over causing complete failure of element and structural damage to abutment. Concrete material has been poured throughout channel bed under the structure. A fairly deep hole has developed at the outlet end of this concrete, which causing a large head cut in channel bed to approach up under span of structure. The concrete floor in stream is cracked, settled, uneven and failed in large areas throughout. At normal stream flow, channel was found piping completely under concrete paved channel bed. (See Photos)
1	363/1	Section Loss SmFlag	Section Loss-	(See random notes throughout Element Description Steel Girders and Floor Beam.) A severe amount of section loss was found typical in random locations throughout this structure. (See Photos)
1	607/1	Utilities	Utilities-	Under the left half of span is a very large water line, approximately 3.0 feet in diameter. Because of the massive size of this line a concrete arch has been built under the bridge for this line to rest on. The concrete arch has some minor to moderate cracking and deterioration throughout. Under right half is an approximately 1.0 foot pipe; my guess is a gas line, which is slightly bent near the forward abutment location. This line has some random areas of rust where holes should be coming through shortly. This line has been repaired next to rear abutment in the past. Upstream from bridge approximately 5.0 feet going under the wingwall's in channel is another very large water line. Utility owners should be contacted for review of these lines/conduits, due to poor conditions noted. (See Photos)
1	611/1	Embankment Erosion	Erosion-	Major embankment slippage downstream has reduced/restricted stream flow and caused misalignment of channel. Erosion control protection repairs are needed as soon as possible. (See Photos)
1	612/1	Chan Algn	Channel Alignment-	Poor channel alignment was noted typical throughout site of this structure. Note that large head cut in channel bed continues to approach up under span of structure and will continue to undermine substructure elements more and more as time passes. Repairs are needed as soon as possible for corrections. (See Photos)

BRIDGE.Notes

019C00063N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 1/27/2011
Inspector: GCOCHRAN (23)
Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory: Y
Element: Y
Fracture Critical: N
Underwater: N
Other Special: N

(COMPETE CLOSURE OF THIS STRUCTURE 019-C00063N SHOULD BE CONSIDERED SOON) 02/26/2009, 02/02/2010, 02/23/2010, 07/26/2010 and 01/27/2011.

*Note that this structure is in need of and has been in need of many structural repairs for several years now, which threatens the integrity of this bridge. Many noted repairs throughout several years of inspections have been reported, but note that repairs are not and have not been performed/completed. If Serious Conditions Throughout This Structure Continue To Accelerate; Additional Load Restrictions And Or Closure Of Structure May Be Warranted. (02/26/2009, 02/02/2010, 02/23/2010, 07/26/2010 and 01/27/2011)

Statement from past inspection report (03/17/2008) are as followed:

The right rear wingwall is missing, the right forward wingwall is quickly falling off, and both abutments and right forward wingwall have scour. A large gap has developed between the right forward wingwall and forward abutment breastwall because the wingwall is pulling away. This gap is directly under the end of the right outside girder. If the wingwall pulls away much further the girder loses its bearing seat. THIS BRIDGE NEEDS TO BE REPLACED. FROM NOW ON AS LONG AS IT IS IN SERVICE IT SHOULD BE MONITORED OFTEN.

*Loaded garbage truck was found using structure during time of inspection. (01/27/2011)

*Note that loaded Tri-axle dump trucks as well as over sized loads were seen using this structure for travel date of inspection. 6 ton posting is not stopping trucks from using this bridge. (02/26/2009) Last inspection on 03/17/2008 stated heavy loads were also using structure at that time as well.

Work Candidates

Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended
019-C00063N-1	Approved	High	Unassigned	11	0	1/27/2011
019-C00063N-2	Approved	High	Unassigned	33	217	1/27/2011
019-C00063N-3	Approved	High	Unassigned	24	361	1/27/2011
019-C00063N-4	Approved	High	Unassigned	33	607	1/27/2011
019-C00063N-4	Approved	High	Unassigned	60	0	2/26/2010

APPENDIX C

*Waterworks Road Bridge Over Taylor
Creek Structural Inventory and Appraisal
Sheets*

"STRUCTURAL, INVENTORY, AND APPRAISAL SHEET"

Co. 2197

ROBERT A. HANS 2197

8. PROJECT NUMBER CR-019-5333-00063		1. STATE CODE 214 (KY)		2. HIGHWAY DISTRICT 06		3. COUNTY 037-CAMPBELL		4. PLACE CODE CITY/TOWN 01445-NEWPORT	
5. INVENTORY ROUTE ON UNDER 1-5-1-05333-0		6. FEATURES INTERSECTED TAYLOR CREEK		7. FACILITY NAME CR-5333 - WATERWORKS ROAD		11. MILEPOINT ON UNDER			
9. LOCATION 1 MILE NORTH OF Jct KY 1120 IN Ft. THOMAS		10. INVENTORY ROUTE - MIN. VERTICAL CLEARANCE ON UNDER 99 FT. 99 IN.		11. MILEPOINT ON UNDER					
16. LATITUDE 39 05 5		17. LONGITUDE 084 27 5		19. BYPASS, DETOUR LENGTH 02		20. TOLL 3-FREE		21. MAINTENANCE RESPONSIBILITY 04-CITY	
22. OWNER 04-NEWPORT		26. FUNCTIONAL CLASSIFICATION ON UNDER 19		27. YEAR BUILT EST 1900		28. LANES ON STRUCTURE 02		29. APPROACH ROADWAY W/SHOULDER 020	
29. AVERAGE DAILY TRAFFIC ON EST UNDER 1000		30. A.D.T. YEAR ON UNDER 96		31. DESIGN LOAD UNKNOWN 0-13 TON MAX		32. APPROACH ROADWAY WIDTH W/SHOULDER 020		APPROACH ROADWAY PAVEMENT 020	
33. BRIDGE MEDIAN 0-NONE		34. SKEW 30 DEG.		35. STRUCTURE FLARED 0		36. TRAFFIC SAFETY FEATURES 0000		37. HISTORICAL SIGNIFICANCE 5	
40. NAVIGATION HORIZONTAL CLEARANCE 0000		41. STRUCTURE OPEN, POSTED, CLOSED B		42. TYPE SERVICE ON - 1-HIGHWAY OVER - 5-WATERWAY		43. STRUCTURE TYPE MAIN - 302		38. NAVIGATION CONTROL 0	
NO. OF SPANS 45. MAIN - 001 46. APPROACH -		47. TOTAL HORIZONTAL CLEARANCE		48. LENGTH OF MAX. SPAN 315 FT.		49. STRUCTURE LENGTH 000032		39. NAVIGATION VERTICAL CLEARANCE 000	
50. CURB-SIDEWALK WIDTHS L.T. 000 FT. RT. 000 FT.		51. BRIDGE WIDTH, CURB TO CURB 315 FT.		52. DECK WIDTH OUT-TO-OUT 330 FT.		53. MIN. VERTICAL CLEARANCE OVER DECK 99 FT.			
54. MIN. VERTICAL UNDERCLEARANCE REFERENCE N 00 FT. 00 IN.		55. MIN. LATERAL RIGHT UNDERCLEARANCE REFERENCE N 99 FT.		56. MIN. LATERAL LEFT UNDERCLEARANCE 99 FT.					
100. DEFENSE HIGHWAY ON UNDER 0		101. PARALLEL STRUCTURE DIRECTION N		102. TEMPORARY STRUCTURE 2		103. HIGHWAY SYSTEM ON - 0		104. YEAR RECONSTRUCTED OVER 1940 EST	
BRIDGE DESCRIPTION SINGLE SPAN 31.5' CONCRETE SLAB w/ PARTIALLY ENCASED STEEL BEAM ON TWO GIRDER w/ FLOORBEAM SYSTEM * R.C.D.G WIDENING UPSTREAM SIDE									
107. DECK TYPE 1 CONCRETE		108. WEARING SURFACE / PROTECTIVE SYSTEM SURFACE 6 ASPHALT		MEMBRANE 0 NONE		PROTECTION 0 NONE			
ASPHALT THICKNESS C-CITY		APPROACH SIGHT DISTANCE AND SPEED LENGTH 1. 500 2. 500		SPEED 1. 25 2. 25		ROAD NAME WATERWORKS ROAD			

BRIDGE CONDITION RATINGS

CR-019-5333 - Coas263

MATERIAL
CONCRETE

CONDITION
FAIR

RATING
6

58. DECK					
59. SUPERSTRUCTURE	CONCRETE & STEEL	POOR			4
60. SUBSTRUCTURE	CONCRETE	POOR			5
61. CHANNEL AND CHANNEL PROTECTION	CONCRETE & NATURAL	POOR			5
62. CULVERTS - WINGWALLS			N/A		

		BRIDGE APPRAISAL RATINGS		DEFICIENCIES		RATING	
64. OPERATING RATING	913	66. INVENTORY RATING	913	67. STRUCTURAL EVALUATION		COMPUTER GENERATED	
90. INSPECTION DATE	0197	91. DESIGNATED INSPECTION FREQUENCY	12 MONTH	68. DECK GEOMETRY		COMPUTER GENERATED	

SIGNATURE
Robert A. Nemo

TITLE
District Bridge Engineer

92. CRITICAL FEATURE		93. CRITICAL FEATURE	
A. <u>Y</u> <u>1</u> <u>2</u>			8
B. <u>Y</u> <u>1</u> <u>2</u>			5
C. <u>N</u> <u>-</u> <u>-</u>			

94. BRIDGE IMPROVEMENT COSTS	95. ROADWAY IMPROVEMENT COSTS	96. TOTAL PROJECT COSTS	97. YEAR OF ESTIMATE	MEMORIAL BRIDGE NAME
98. BORDER BRIDGE	A. <u>-</u> <u>-</u> <u>-</u>	99. BORDER BRIDGE NUMBER	109. AVERAGE DAILY TRUCK TRAFFIC %	110. NATIONAL NETWORK ON <u>0</u> UNDER
	B. <u>-</u> <u>-</u> <u>-</u>		114. FUTURE A.D.T. YR.	115. A.D.T. YR.
	C. <u>-</u> <u>-</u> <u>-</u>			

112. NBIS BRIDGE LENGTH	113. SCOUR CRITICAL BRIDGES	116. VERTICAL LIFT BRIDGE CLEARANCE
	4 REPAIR REPAIR	
DRAWING NUMBER	KY. ROAD SYSTEM	INDEPTH INSPECTION - DATE
	09	

REMARKS

APPENDIX D

Weight Limit MEMO



TRANSPORTATION CABINET

Steven L. Beshear
Governor

Frankfort, Kentucky 40622
www.transportation.ky.gov/

Michael W. Hancock, P.E.
Secretary

Memo To: Rob Hans, P.E.
Chief District Engineer
District Six

From: Anne Lynch Irish, P.E. *ALI*
Chief Load Rating Engineer
Division of Maintenance

Date: August 5, 2010

Subject: Bridge Posting
Campbell County
Waterworks Road over Taylor Creek

After review of the condition and analysis or changes in the weight carrying capacity of the subject structure by the bridge preservation analysis staff, this office concurs that the posting level for the following bridge should be as follows:

019C00063N Post the structure at 3 tons for all traffic due to the serious condition of both the substructure and superstructure.

Please notify the proper officials of this posting change. Should you have any questions, please advise.

ALI

cc: File
Rick Davis
Brandon Seiter
Gary Cochran
Craig Bresch

