Bridge Conversion Feasibility Study
Broadway Street (KY 3506) over Kentucky River
Franklin County, KY

January 2021 Update

KENTUCKY TRANSPORTATION CABINET

CITY OF FRANKFORT KENTUCKY

In Partnership With

Palmer ENGINEERING

Memorandum

To: Joshua Rogers, PE
Transportation Engineering Branch Manager
Kentucky Transportation Cabinet
Division of Maintenance, Bridge Maintenance / Preservation Branch
200 Mero Street
Frankfort, Kentucky 40622

From: Palmer Engineering

cc: J. Kellogg, Central Office

Date: January 30, 2021

Subject: Update to 2019 Broadway Bridge Conversion Feasibility Study

Palmer Engineering is pleased to provide an update to our August 2019 Broadway Bridge Conversion Feasibility Study. Since that time, Stantec Consulting Services Inc. has conducted an Underwater Bridge Inspection of the river piers (October, 2020).

This memorandum provides updated cost estimates to account for the underwater inspection findings. Underwater repairs and stabilization costs are provided for conversion options and, because it is potentially unstable during future high-flow flood events, the removal cost of Pier 5 is provided for the full superstructure demolition option.

Additionally, we have now included an option for a new superstructure to be constructed on the existing piers, on the existing alignment. We appreciate the opportunity to update the study with our professional opinion and recommendations. If you need any additional information, please do not hesitate to call or e-mail.

400 Shoppers Drive ■ P.O. Box 747 ■ Winchester, KY 40392-0747
Phone: (859) 744-1218 ■ Fax: (859) 744-1266 ■ E-mail: palmer@palmernet.com ■ Web Site: www.palmernet.com

FEASIBILITY STUDY

BROADWAY BRIDGE OVER KENTUCKY RIVER

FRANKFORT, KY

UPDATED COST ANALYSIS

In 2019, Palmer Engineering conducted a detailed structural condition evaluation of the Broadway Bridge, closed to traffic since 1993. Subsequent structural analyses assessed options to restore the Broadway Bridge and convert it into a pedestrian-only crossing. Significantly, much of the repair work would fall into the "specialty" or "unique" categories, even for experienced bridge contractors.

The 2019 study covered only portions of the bridge visible above the ground and waterline. Since that time, Stantec Consulting Services Inc. has conducted an Underwater Bridge Inspection of the river piers (October 2020). Results of their inspection is the basis for this update to the original cost matrix. For Demolition options, Stantec recommended removal of Pier 5, located near the center of the river, because it is potentially unstable during future high-flow flood events.

Figure 1 shows Broadway Bridge's Pier 5 during lower water level when missing masonry block pieces in the splash zone are visible.

Estimated costs to repair and stabilize the masonry piers are by two methods: 1) Follow the Secretary of the Interior's Standards to maintain historic integrity and 2) Encasing the masonry in a reinforced concrete collar, imprinted to mimic masonry – similar to encasement of the Old Clays Ferry Bridge Pier shown in Figure 2. A summary of costs for each option are in Table 1.

Figure 1: Broadway Bridge Pier 5

Figure 2: Old Clays Ferry Bridge over Kentucky River – Concrete Encased Pier with Rock Imprint

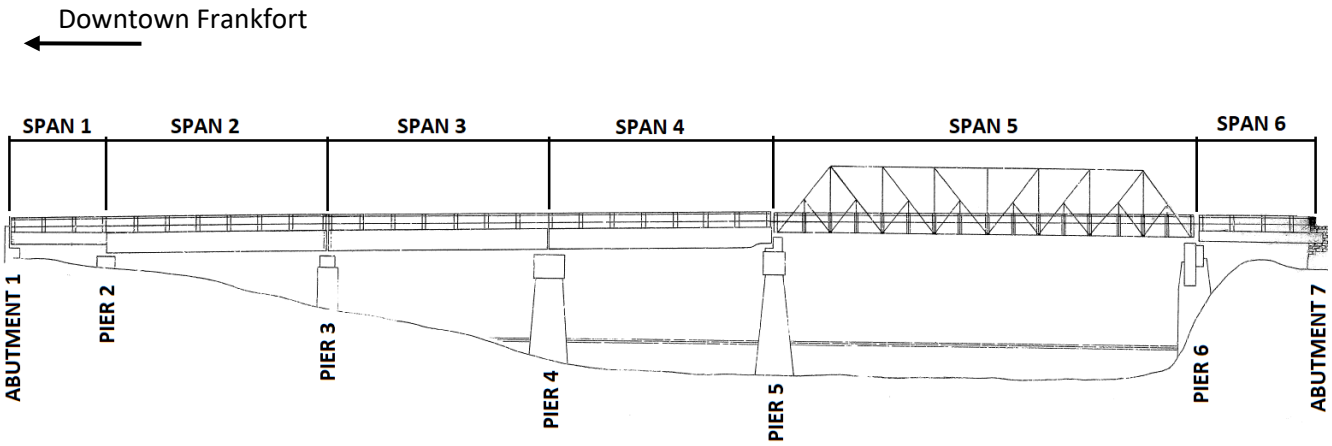

Figure 3: Broadway Bridge Substructure Numbering

Substructure Repair Options:

1. Historic – using Secretary of the Interior's Standards to maintain historic integrity:

    - Abutment 1: Minor repairs
    - Pier 2: No repairs needed
    - Pier 3: Significant repairs above ground line
    - Pier 4: Minor repairs needed for shared pier with Railroad Bridge
    - Pier 5: Major repairs both above water and underwater
    - Pier 6: Significant repairs above water / ground line
    - Abutment 7: Moderate repairs above ground line

2. Repairs without maintaining historic integrity:

    - Abutment 1: Minor repairs
    - Pier 2: No repairs needed
    - Pier 3: Concrete Encasement above ground line with Rock Imprints
    - Pier 4: Minor repairs needed for shared pier with Railroad Bridge
    - Pier 5: Concrete Encasement with Rock Imprints – includes installation of sheet piling, excavation and encasement to top of existing footing
    - Pier 6: Concrete Encasement above ground line with Rock Imprints
    - Abutment 7: Minor repairs

Table 1*: Cost Estimates

	Rehab & 12' Concrete Path** & Historic Pier Repair	Rehab & 12' Concrete Path** & Concrete Pier Encasement	New Pedestrian Superstructure on Existing Substructures	New Pedestrian Bridge – On New Alignment***	Demo - Deck Removal Only	Demo - Super-structure Removal
Deck Removal	$375,000	$375,000		$375,000	$375,000	
Superstructure Removal			$600,000			$600,000
Truss Rehab	$220,000	$220,000				
Approach Spans Rehab	$200,000	$200,000				
Blast Clean & Paint	$487,000	$487,000				
12' Concrete Path	$256,000	$256,000				
Historic Repairs – Abutments 1 & 7, Piers 3, 4, 5, 6	$2,366,000		$2,366,000			
Historic Repairs Underwater - Pier 5 down to Mudline	$350,000		$350,000			
Concrete Encasement of Piers 3, 5, 6; Repairs to Abutments 1 & 7, Pier 4		$2,343,000				
Pier 5 Removal						$180,000
New Pedestrian Bridge				$1,650,000		
New Superstructure			$970,000			
TOTAL	$4,254,000	$3,881,000	$4,286,000	$2,025,000	$375,000	$780,000

*Estimates do not include engineering, construction inspection, and administrative costs
**A basic 10' wide wooden pedestrian path without maintenance vehicle capacity would be $125,000 less
***Complete Superstructure and Pier 5 removal may be desirable with this option

Brad Robson

Brad Robson, PhD, PE, SE

Vice President

STATE OF KENTUCKY
BRADLEY N. ROBSON
17627
LICENSED PROFESSIONAL ENGINEER

Brad Robson

Digitally signed by Brad Robson
DN: cn=Brad Robson, o=Palmer Engineering Company, ou, email=brobson@palmernet.com, c=US
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