



KYOVA 5th Street West Bridge Study Report

City of Huntington
Cabell County, West Virginia



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1.0 PROJECT SUMMARY

AECOM has been retained by the KYOVA Interstate Planning Commission (the Metropolitan Planning Organization for the tri-state area of West Virginia, Kentucky, and Ohio) to conduct a study and prepare a report for the 5th Street West Bridge, in the City of Huntington. Funding for this study is provided by KYOVA's sub-allocated funds program in coordination with the City of Huntington, the West Virginia Department of Transportation, Division of Highways (WVDOH), and the Federal Highway Administration (FHWA). The existing bridge, located 0.01 miles south of Memorial Boulevard in Cabell County, carries 5th Street West over Fourpole Creek and is 43.6 feet in length. The aerial map on the title sheet shows the project location and Figure 1 below shows an aerial view of the project site.

The purpose of this study is to evaluate rehabilitation and replacement alternatives for improving the existing 5th Street West Bridge. The three alternatives proposed include a No-Build Alternative, Rehabilitation Alternative, and Replacement Alternative, as described in further detail in Section 4.0.

This study was conducted utilizing information provided by KYOVA and information gathered from various other sources, including past bridge inspection reports, survey data, and project site visits.

The bridge is in poor condition and remains open with posted load limits. The width of the existing bridge is narrow with no shoulders, measuring a total bridge width of 24.1 feet. The deck geometry of the proposed replacement bridge will incorporate two 11-foot lanes and two 3- foot shoulders for a total clear width of 28 feet, as well as a 6-foot sidewalk, to better serve both vehicular and pedestrian traffic along 5th Street West.

Based on information available at the time of this report and discussions with stakeholders and public input, it is AECOM's recommendation to construct the Replacement Alternative, which proposes constructing a new 51-foot span bridge along the existing alignment of 5th Street West.



Figure 1: 5th Street West Bridge Aerial View

2.0 EXISTING CONDITIONS

2.1 Existing Bridge Data

The bridge was built in 1921. The sufficiency rating as supplied by the WVDOH is 41.0. The bridge has not undergone any major reconstruction; however, the bridge is posted for a 10-ton weight restriction. The bridge is a single span, simply supported reinforced concrete T-Beam system with a span length measuring 41.7 feet. The floor system of the bridge is in poor condition, consisting of numerous areas of advanced spalling with exposed rebar, cracking, delamination, and scaling. The bridge has a reinforced concrete balustrade type parapet wall along each side that contains scattered cracking, delamination, and spalling. The overall length, measured from end to end of parapet walls, is 43.6 feet. The curb to curb roadway width is 24.1 feet and the out-to-out width of the superstructure is 27.2 feet.

The span is supported by two reinforced concrete abutments at the ends with full height wingwalls. Both abutments are in poor condition, containing advanced spalling, cracking, and delamination. Though there is no undermining or scour present at the abutments, there is stream bank erosion present downstream.

The bridge is a straight structure, not containing any skew. The existing structure contains an 8-inch thick reinforced concrete deck that is in poor condition and a 3-inch thick asphalt wearing surface. Advanced spalling with exposed rebar and chloride leaching are found on the underside of the concrete deck. The asphalt wearing surface is in fair condition with some transverse cracking and potted areas at the ends of the structure.



Figure 3: 5th Street West Bridge General Elevation



Figure 2: 5th Street West Bridge (Looking North)

2.2 Existing Roadway Geometry

5th Street West generally follows perpendicular to the alignment of Fourpole Creek in the project area with the street running in a north-south orientation. The project site is located just south of Memorial Boulevard in Cabell County. The bridge is located on a tangent section of roadway with a relatively flat grade and carries traffic across Fourpole Creek. Intersections exist on the approaches both south and north of the bridge. A four-way intersection containing 5th Street West, West Whitaker Boulevard, Memorial Boulevard, and North Boulevard West is located on the northern approach to the bridge and there is one intersection with West Whitaker Boulevard located south of the bridge.

5th Street West is functionally classified as a Local Rural Road. KYOVA collected traffic count data, beginning in February 2019, over a 21-day period. According to the collected data, an average ADT of 569 VPD was measured over the 5th Street West Bridge; the percentage of trucks was approximately 3 percent. The speed limit on 5th Street West is posted at 25 miles per hour (mph).

The approaches to the 5th Street West Bridge are 2-lane local roads with a pavement width of approximately 24 feet. No approach guardrails exist for either approach and there are currently no sidewalks or biking accommodations on the existing structure or along 5th Street West. Typical traffic using the bridge is made up of small delivery trucks and passenger vehicles.

2.3 Existing Right-of-Way, Properties, and Utilities

There was no existing right-of-way information distributed at the time of this report. Property lines were identified based on the Huntington-Kyle Corp Tax Map Sheet 58. Figure 4 shows an overview of the surrounding property parcels relative to the project site, according to the referenced Tax Map.

The project site is within a residential area. There are no commercial developments within the project limits.

Overhead electric and telephone lines, sanitary sewer lines, and water lines are found within the project area. Utility poles located north and south of the bridge support overhead electric and telephone lines servicing houses in the area. Overhead electric and telephone lines run over Fourpole Creek slightly to the west of the bridge.

A sanitary sewer line runs perpendicular under Fourpole Creek from the north (west of the bridge) and crosses the south approach to run parallel to West Whitaker Boulevard. A 2-inch waterline crosses the south approach of the 5th Street West Bridge with a water valve located at the intersection of 5th Street West and West Whitaker Boulevard. There are also two 1-inch water service lines that cross Fourpole Creek at an approximate location east of the bridge and continue to run parallel to West Whitaker Boulevard.

AECOM has started the process of obtaining utility verifications via WV 811; however, not all utility owners were responsive. The next phase of the project should continue the process of utility verification and coordination.

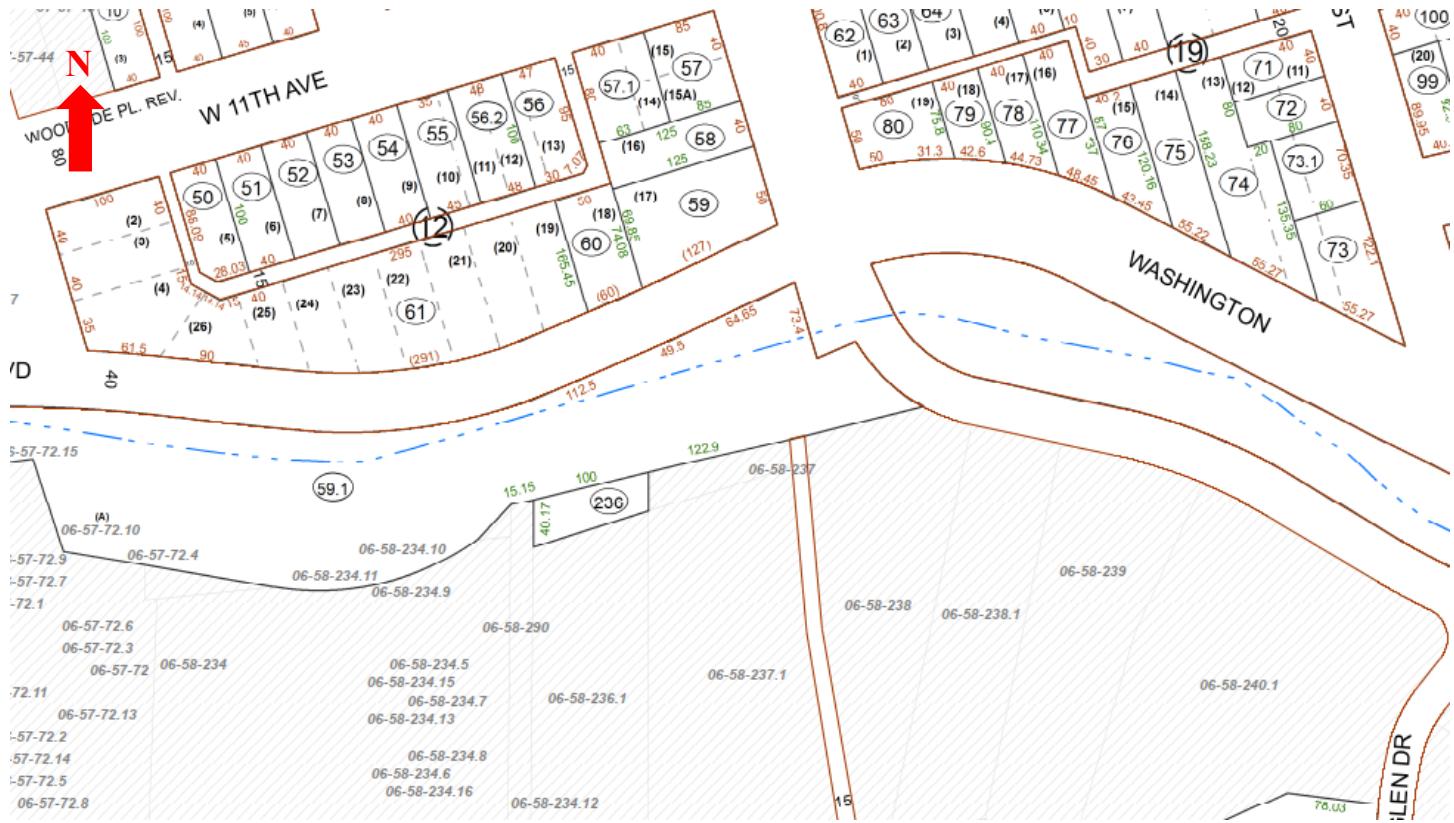


Figure 4: 5th Street West Bridge Project Site Tax Map

3.0 PROPOSED STRUCTURES

Feasible bridge alternates were discussed with the KYOVA Interstate Planning Commission during the Scoping Meeting. It was determined during scoping of the project that three alternatives would be investigated for 5th Street West Bridge. These options include a No-Build Alternative, Rehabilitation Alternative, and Replacement Alternative.

3.1 No-Build Alternative

The existing structure is in poor condition. Due to the deteriorating condition of the existing structure, the No-Build Alternative would eventually result in the permanent closure of the bridge to traffic. With the bridge being on a residential and commercial route, leading into a cul-de-sac and tying into multiple residential side roads, a permanent detour would prove inconvenient to both motorists required to travel the detour and to residents living along the detour route due to increased traffic and noise pollution. Continued deterioration to the existing structure could also cause impacts to Fourpole Creek and its natural resources. Due to these limitations, the No-Build Alternative was found not to be a prudent alternative.

3.2 Rehabilitation Alternative

The existing structure is in poor condition with severe deficiencies to the beams, abutments, balustrade wall, deck, and has erosion along abutments. Due to these deficiencies, the existing bridge is posted for a 10-ton weight restriction. To improve the condition of the existing bridge, rehabilitation would need to include extensive repairs and replacements to the previously mentioned structural items, including the following:

- Repairing and/or rebuilding breast walls and surrounding bearing areas and replacing existing bearings.
- Repairing advanced spalling, cracking, deteriorating and broken reinforcement, delamination, and scaling of all beams. Strengthening of all beams may be required to meet current design criteria in eliminating posted weight restrictions.
- Repairing advanced spalling, cracking, and delamination of both abutments and all wingwalls.
- Repairing advanced spalling and replacing corroded rebar within the deck. Strengthening of existing deck may be required to meet current design criteria in eliminating posted weight restrictions.
- Performing Chloride Testing due to significant Chloride Leaching around the deck and beams and probably mitigation for future corrosion protection.
- Repairing/replacing asphalt wearing surface due to cracking.

- Repairing advanced cracking, delamination, and spalling of balustrades while also replacing broken portions of wall. Strengthening existing railing may be required to meet current design criteria in eliminating posted weight restrictions and crash testing requirements.
- Repairing cracking in the approach roadway asphalt at each end of the structure.

Due to the extensive list of the previously mentioned conditions, a superstructure replacement would be warranted while also performing major repairs to both the abutments and wing walls as well as regrading due to erosion around abutments. While a superstructure replacement and/or strengthening would improve the condition and rating of the existing bridge, current Geometric Design Criteria requirements set by the WVDOH would not be satisfied. Given the state of its advanced deterioration and failure to meet standard design criteria, the Rehabilitation Alternative was found not to be a prudent alternative.

3.3 Replacement Alternative

The Replacement Alternative, as shown in Figure 5 below, will require the construction of a new bridge with a single span length of approximately 51 feet and a clear width of 28 feet, consisting of two 11-foot lanes and 3-foot shoulders on each side of the roadway and uses the existing alignment of 5th Street West. The proposed bridge will also include a 6-foot sidewalk along the western side, which is to be tied into the existing trail crossing along 5th Street West. By also proposing new additional sidewalk along the western side of West Whitaker Boulevard as well as a crosswalk crossing South Boulevard, pedestrians in the surrounding residential area will be able to better access the walking trail north of the bridge along Memorial Boulevard and North Boulevard West.

Because of the proposed sidewalk and shoulders, the out-to-out width of the bridge will be widened by approximately 10 feet. Based off aerial mapping, doing so will require lengthening the bridge span from approximately 43.5 feet to 51 feet to avoid placing the western end of the proposed north abutment in the stream channel. Monumental balustrades will be provided along the sides of the bridges to restore the historical integrity of the existing bridge and surrounding area and will also match similar railing used on the proposed replacement of the 8th Street Bridge further downstream. The vertical alignment of the proposed superstructure will be similar to the existing bridge's vertical alignment by incorporating beams with a similar depth to the existing beams. To meet current design standards, an 8.5-inch deck is proposed and will be designed to accommodate a future wearing surface. The Replacement Alternative was found to be a prudent alternative.

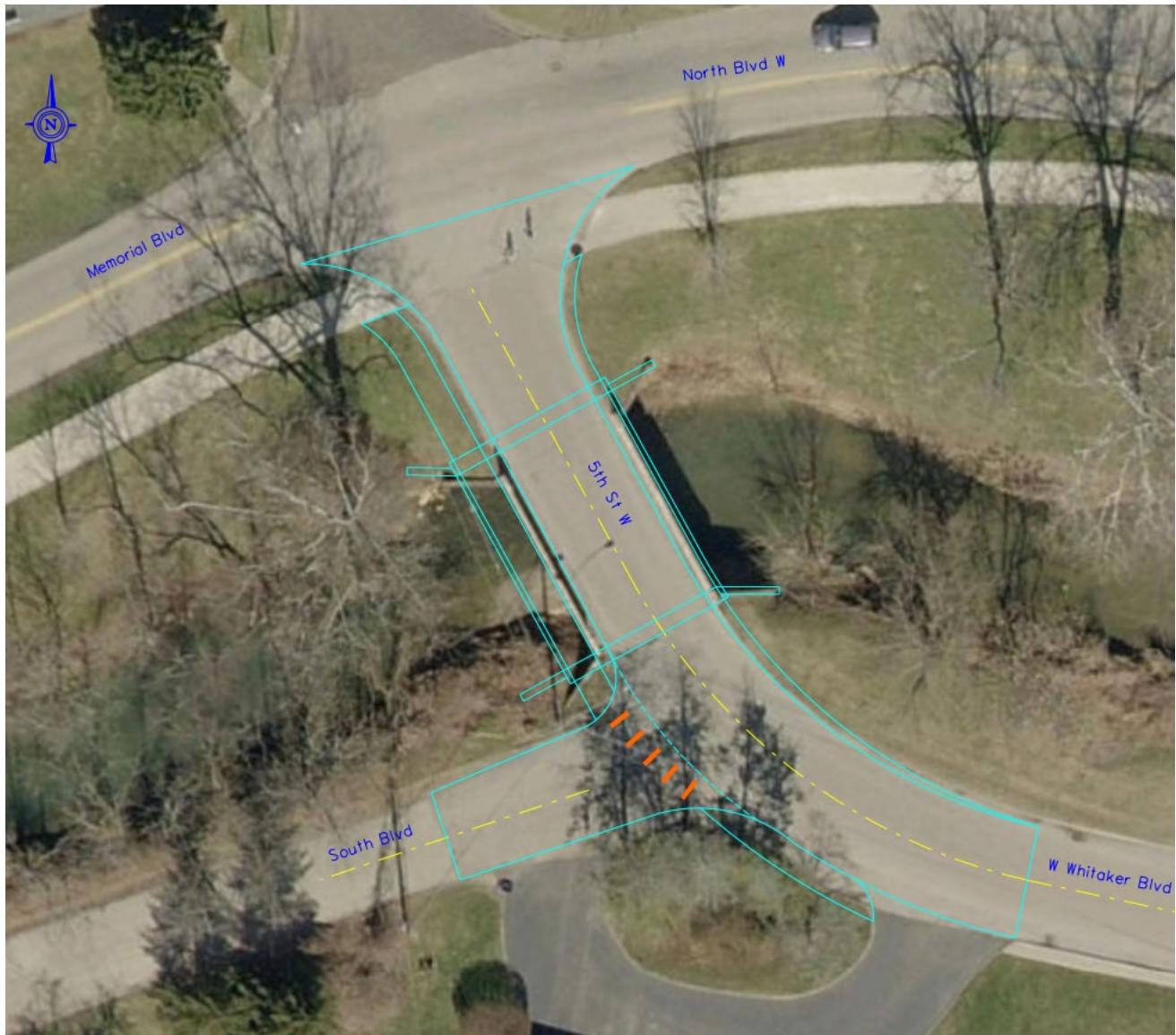


Figure 5: 5th Street West Bridge Replacement Alternative

4.0 MAINTENANCE OF TRAFFIC

Due to the narrow width of the existing bridge, both the Rehabilitation and the Replacement Alternatives would require a detour to reroute traffic during construction. The most feasible detour route to avoid significant inconveniences to traffic flow is to use of the 5th Street Bridge to cross Fourpole Creek to access both North Boulevard West and West Whitaker Boulevard. Figure 6 below shows the proposed detour route for the construction of 5th Street West Bridge.

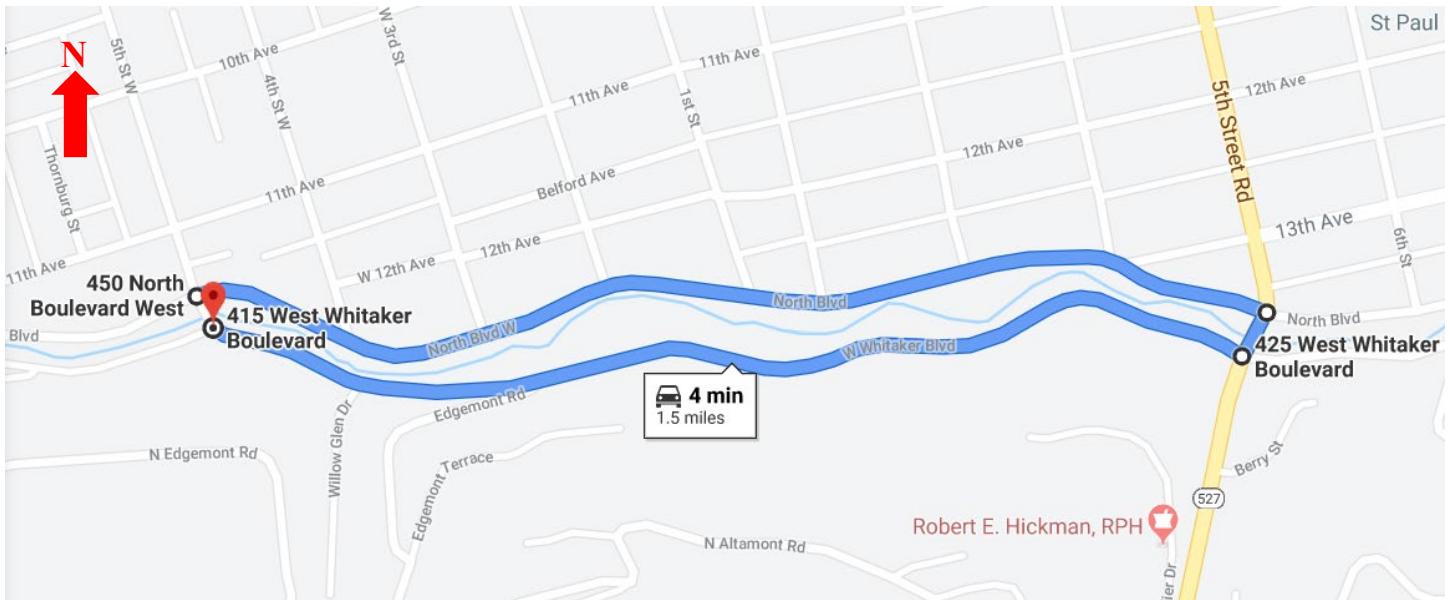


Figure 6: 5th Street West Bridge Detour Route

5.0 ALTERNATIVE MATRIX

The project alternatives were developed and analyzed to minimize impacts to the cultural, natural, and socioeconomic features within the study area while also providing improved conditions to both vehicular and pedestrian traffic. To aid in the evaluation of the three alternatives, AECOM developed an alternative matrix (see Table 1 below) comparing the following factors between all alternatives:

- Geometric Features
- Pedestrian Accommodations
- Post-Construction Bridge Conditions
- Potential Utility Impacts
- Right-of-Way / Potential Property Impacts
- Maintenance of Traffic Requirements
- Preliminary Cost Estimate
- Environmental Permitting and Approval Requirements

Table 1: 5th Street West Bridge Alternative Matrix

5th Street West Bridge Study - Alternatives Matrix			
Alternative	Alternative 1 - No Build	Alternative 2 - Rehabilitation of the Existing Bridge	Alternative 3 - Replacement of the Bridge on Existing Alignment
Engineering Requirements			
Roadway Width (feet)	24.1	24.0	22.0
Shoulder Width (feet)	0	0	3.0 (each side)
Bike/Ped Accomodations - Sidewalk/Bikepath/Shared	N/A	N/A	6'-0" Sidewalk
Bridge Condition	Poor	Fair	New
Traffic (ADT)	1400	1400	1400
Utility Impacts	N/A	N/A	TO BE CONFIRMED
Right of Way Impacts	None	None	None
Maintenance of Traffic Requirements	None	Detour (5th Street Bridge)	Detour (5th Street Bridge)
Cost (Eng & CO) (\$000)	\$0	\$750,000	\$1,000,000
Environmental Permits/Approvals			
Air Quality/WV DEP	No	Yes	Yes
National Historic Preservation Act/SHPO	No	TBD ¹	TBD ¹
Endangered Species Act / USFWS	No	Yes ²	Yes ²
Migratory Bird Treaty Act/ USFWS	No	Yes	Yes
Bald and Golden Eagle Protection Act/USFWS	No	Yes ³	Yes ³
Floodplains/Local Jurisdiction	No	Yes	Yes
WV NPDES, Stormwater, E&S/ WV DNR	No	Yes	Yes
Section 10/404 Authorization/USACE	No	yes	Yes
Stream Activit Permit/WV DNR	No	Yes	Yes
Water Quality Certification/DWWM	No	Yes	Yes

¹ AECOM Cultural/Archeological team recommends preliminary SHPO consultation due to the need for federal permits

² USFWS identified 4 federally listed mussel/ clam species in the Ohio River watershed. Additional consultation with the USFWS will be required to comply with the Endangered Species Act.

³ USFWS lists the Bald Eagle as a migratory species potentially present in the area.

6.0 STAKEHOLDER & PUBLIC INVOLVEMENT

Stakeholder and Public Meetings were held in conjunction with AECOM and KYOVA on May 16, 2019, to discuss both the Rehabilitation and Replacement Alternatives and to obtain feedback from those most impacted by the proposed project. Below is a summary of the feedback received from both the stakeholders and the general public:

Rehabilitation Option	
Benefits	Concerns
Lower up-front cost	Need to add lighting
Increases weight limit	No sidewalk
	Keep trail open during construction
	Look at options to provide trail access during construction
	Shorter lifespan
	Continued maintenance needs
	Does not provide the best long-term solution
	Long term condition of the substructure, which is not being replaced

Replacement Option	
Benefits	Concerns
High benefit for cost	High cost
Longer lasting for the money	Need to add lighting
11-foot lanes keep larger truck traffic off the bridge	Potentially additional environmental clearance requirements
Adds sidewalk for pedestrians and bicycles	Keep trail open during construction
Wing wall moved out of the stream will provide better water flow at peak	Look at options to provide trail access during construction

Additionally, there was a discussion about a temporary detour during construction. Typically, there are three options commonly used in West Virginia for bridge replacements:

1. Detour Route
2. Phased “lane at a time” construction with alternating one-way traffic, controlled by temporary signals.
3. Temporary bridge adjacent to the bridge replacement site.

There was a consensus with the Stakeholder group that Whitaker Boulevard provides an obvious detour to the improved 5th Street East Bridge, that will be replaced with an improved, wider structure, prior to the 5th Street West Bridge construction. Stakeholders did not think that the added cost for phased construction or a temporary bridge was warranted.

7.0 CONCLUSION / RECOMMENDATIONS

Based on the information collected and evaluated at this time, it is AECOM's recommendation to proceed with further project development of the Replacement Alternative, which proposes replacing the 5th Street West Bridge on the existing alignment with an improved single-span structure incorporating a longer span, larger bridge width, sidewalk, and shoulders, while using a temporary detour to maintain traffic during construction.

Additional steps will need to be taken to advance the 5th Street West Bridge replacement into the design phase and ultimately the construction phase. These steps include, but are not limited to, further environmental investigations, including National Environmental Policy Act (NEPA) environmental documentation required by the Federal Highway Administration, most likely a Categorical Exclusion (CE), as well as the permitting requirements outlined in the Alternative Matrix Table in Section 5.0; preliminary engineering including obtaining existing survey and mapping; completing the utility verification and coordination process; right-of-way investigations; geotechnical investigations; and final design including the development of contract documents and right-of-way plans.